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GOLD ONE INTERNATIONAL LIMITED
RAND URANIUM PTY LTD - RANDFONTEIN SURFACE OPERATIONS

AMENDMENT OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME IN TERMS OF SECTION 102 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, NO. 28 OF 2002, FOR THE PROPOSED RECLAMATION OF THE LINDUM TAILINGS STORAGE FACILITY, RANDFONTEIN, GAUTENG

INTEGRATED ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME

May 2013

Prepared for: Rand Uranium (Pty) Ltd a wholly owned subsidiary of ;

GOLD ONE
INTERNATIONAL LIMITED

DMR Ref. No. GP/30/5/1/2/5(08) MR

REVISION TABLE

REVISION	DATE	AUTHORS	INTERNAL REVIEW	EXTERNAL REVIEW
1	4/4/2013	Bruce d'Hotman Elize Botha Amanda Mooney Romy Antrobus	Jonathan van de Wouw / Peter Theron	Issued for client review
2	23/05/2013	Bruce d'Hotman Elize Botha Amanda Mooney Romy Antrobus	Jonathan van de Wouw / Peter Theron	Submitted

EXECUTIVE SUMMARY

This executive summary provides an overview of the proposed project, including the location and a brief project description, followed by a summary of the public consultation conducted. An overview of the Environmental Impact Assessment (EIA) process is provided together with the key findings and impacts identified during the EIA. The mitigation, management and monitoring measures recommended to reduce the negative or enhance the positive of the overall impacts of the project included in the Environmental Management Programme are also presented.

INTRODUCTION

Gold One International Limited (Gold One) through its wholly owned subsidiary Rand Uranium (Pty) Ltd (RU) "the Applicant" aims to reclaim gold tailings material from the Lindum Tailings Storage Facility (TSF) in the Gauteng Province next to the town of Randfontein. Gold One is required to undertake an EIA and submit an EMP to the Department of Mineral Resources (DMR) in support of the existing MRA as per Section 39 of MPRDA.

LOCATION

The Lindum TSF is situated in the Gauteng Province directly east of the town of Randfontein and 40km west of Johannesburg, south and spanning the R41 road. The Lindum TSF falls under the jurisdiction of the Randfontein Municipality.

MOTIVATION FOR THE PROJECT

Gold One aims to reclaim gold from tailings material that makes up the dormant Lindum TSF. By reclaiming the tailings material from the TSF, the mine will effectively be rehabilitating the area by removing the TSF and returning the site to a sustainable land use.

PROJECT DESCRIPTION

Hydraulic mining will be used to pulp the Lindum TSF tailings in sections at a time, washing the material downwards to a central channel draining to a sump constructed in the south eastern corner of the TSF. The material is then passed through a screen to ensure that no large or tramp objects are included in the slurry. Once the required density of tailings material is obtained within the sump, the slurry is then to be pumped via an existing pipeline route to the Cooke plant for processing.

The slurry will be transported along the existing pipeline route to Cooke Plant through a 200mm pipeline for processing. Approximately 60 000 tons per month (tpm) will be processed from Lindum TSF at the Cooke Plant facility. The plant, beyond the milling section, will ultimately be operating at a capacity of 400 000 tpm as part of the overall Cooke Optimisation Project (COP) of which the Lindum product will form a part. The resultant Lindum tailings forming part of the main stream 400 000tpm(currently 300 000tpm), will initially be deposited on the existing Cooke TSF until the COP is functional (fourth quarter 2013) thereafter deposition of the tailings material into disused open cast pits in and around Randfontein, which deposition forms part of the existing COP will occur. The deposition of processed material in to the pits is the subject of the current COP Environmental process being considered by the DMR.

PUBLIC CONSULTATION

During the scoping phase the public participation process was designed to provide the authorities, stakeholders, surrounding community and any other Interested and Affected Parties (IAPs) with information about the proposed project and allow them the opportunity to comment, raise any interests, concerns or comments, to be registered on IAPs' database for the proposed project, or request additional information.

A media notice was published in the Randfontein Herald on the 25th of January 2013 and site notices (in English and Afrikaans) were posted up for display next to the Lindum TSF, at the Randfontein Hospital, the Randfontein Library and the Uitvalfontein Landfill site. Background Information Documents (BIDs) were placed at the Randfontein Hospital as well as the Randfontein Library. Scoping Reports (SR) were placed at the Randfontein Library and the Gold One Cooke Operations Offices and made available for public review.

During the assessment phase the registered IAPs were informed of the EIA process that had been conducted and the draft report was made available for comment. All comments received were viewed and relevant sections included in this final report.

ENVIRONMENTAL IMPACT ASSESSMENT

The scope of this Section 102 amendment is limited to the reclamation of the Lindum Tailings Storage Facility (TSF) and the infrastructure associated with the hydraulic reclamation. The transport of the slurried material via an existing pipe route, water supply and processing of the tailings material and the subsequent deposition is not covered within the scope of this report but is covered under existing Environmental Authorisations forming part of the greater COP.

The potential impacts of the proposed reclamation project on the receiving biophysical and socio-economic environment during construction, operation, decommissioning and post-closure were assessed during the EIA. The following specialist studies were undertaken:

- Groundwater– Louis Botha of Groundwater Square;
- Surface Water - Garfield Krige of African Environmental Development (AED)
- Heritage - Dr J van Schalkwyk

Additionally Dr. Japie van Blerk, Director at AquiSim Consulting (Pty) Ltd, was appointed to undertake the Radiation assessment as part of the National Nuclear Regulator (NNR) requirements.

	RECEPTOR	ASPECT	ENVIRONMENTAL IMPACT (POST MITIGATION)	PRIMARY MANAGEMENT MEASURES PROPOSED TO REDUCE IMPACT
Low Significance	Air Quality at reclamation site	▪ Transportation, construction and decommissioning of surface infrastructure. ▪ Clearing of vegetation. ▪ Construction vehicles emissions. ▪ Leveling of berms. ▪ Hydraulic mining of tailings.	▪ Increased dust fallout and particulate matter causing a reduction in air quality. ▪ Dust generation from dismantling and transport of surface infrastructure.	▪ Pre and maintaining -wetting of the TSF and access roads will aid in reducing the generation of dust due to construction, hydraulic mining and decommissioning activities.
	Land Capability and Soil Qualityat reclamation site	▪ Hydrocarbon or chemical spillages. ▪ Vehicle movement over soils transporting surface infrastructure. ▪ Reclaiming of mobilised tailings material. ▪ Remaining acidic tailings material. ▪ Contaminated run-off from TSF.	▪ Loss of soil resource through erosion as well as compaction. ▪ Contamination of soil due to hydrocarbon spills. ▪ Contamination by remaining mobilised acidic tailings material in the TSF footprint.	▪ Vehicles and equipment must be maintained to ensure hydrocarbon spills do not occur. ▪ Keep a spill kit on-site if hydrocarbon spills should occur. ▪ Ensure transportation of infrastructure by vehicles is kept to the access roads only to reduce compaction of surrounding soils. ▪ Liming of soils to prevent the migration of contaminants.
	Traffic	▪ Construction vehicles transporting men, equipment and materials to and from site.	▪ Increase in nuisance traffic. ▪ Degradation of dirt roads. ▪ Increased road safety hazards.	▪ Ensure vehicles keep to allocated speed limit at all times. ▪ Ensure that drivers drive with the vehicles lights on at all times. ▪ Transport of materials may only occur during daylight hours.
	Ambient Noise at the reclamation site	▪ Construction and decommissioning of the sump and leveling of the berms. ▪ Transportation of the pumps, toilets and water tank to and from the site.	▪ Increase in ambient noise levels.	▪ Ensure that construction and decommissioning only occur during the daylight hours.

	RECEPTOR	ASPECT	ENVIRONMENTAL IMPACT (POST MITIGATION)	PRIMARY MANAGEMENT MEASURES PROPOSED TO REDUCE IMPACT
	Socio-Economic	▪ Construction of the sump and berms. ▪ Transportation of the pumps, toilets and water tank to site. ▪ Construction vehicles and personnel on site.	▪ Increase in nuisance impacts (noise, air quality, traffic).	▪ Any grievances brought forward by IAPs will be taken into account by a Gold One site-representative who will be in a position to provide feedback and solutions to issues being raised.
	Surface Water Quality at the reclamation site	▪ Contaminated surface run-off coming into contact with surrounding streams. ▪ Mobilised tailings material escaping and polluting surface water. ▪ Hydrocarbon spills form vehicles. ▪ Vegetation clearance leading to erosion and siltation.	▪ Reduction in surface water quality in the adjacent streams.	▪ Ensuring that the sump and drainage trenches have sufficient capacity to handle a 50 year flood event will ensure that dirty water is contained on site and does not enter the adjacent stream system. ▪ Create diversion berms (where these are not already in place) to divert clean surface run-off around the sites under construction and contain dirty water.
	Groundwater Quality	▪ Increased ingress of contaminated water due to vegetation and slimes removal prior to rehab of footprint clearing.	▪ AMD pollution of groundwater resources	▪ Limit the construction phase to the dry months if possible and limit water retention in the reclamation footprint.
	Socio-Economic	▪ Transportation of the pumps, toilets and water tank to and from the site. ▪ Decommissioning vehicles and personnel on site. ▪ Dismantling of the sump and leveling of the berms.	▪ Increase in nuisance impacts (noise and air quality.	▪ Any grievances brought forward by IAPs will be taken into account by a Gold One site-representative who will be in a position to provide feedback and solutions to issues being raised.
	Heritage	▪ Construction, operational and decommissioning activities. ▪ Hydraulic mining activities.	▪ Loss or damage to identified cultural / heritage resources.	▪ Heritage sites are fenced off with a buffer zone of 15m from their outer edges. ▪ If it is deemed necessary to remove the structures during construction or operation they should be documented in full. An application for their destruction must be made.

	RECEPTOR	ASPECT	ENVIRONMENTAL IMPACT (POST MITIGATION)	PRIMARY MANAGEMENT MEASURES PROPOSED TO REDUCE IMPACT
Medium Significance	Air Quality	▪ The rehabilitation of the TSF footprint. (Positive)	▪ Increase in the ambient air quality due to the removal of the TSF (source of air pollution)	▪ No mitigation required as it is a positive impact. ▪ Rehabilitate footprint as soon as practical
	Ground Water Quality	▪ Contaminated surface run-off seeping into the groundwater due to hydraulic mining ▪ Seepage of water off remaining tailings.	▪ Reduction in groundwater quality and potential contamination. ▪ AMD pollution of groundwater resources.	▪ To keep any storm water away from the working areas. ▪ To prevent rainwater and the process water (used for hydraulic mining) that has fallen on the site from leaving in an uncontrolled fashion. ▪ The complete removal of all tailings material from the TSF footprint.
	Ground Water Quality (Positive)	▪ Decreased water ingress potential due to TSF reclamation.	▪ Reduction in groundwater contamination.	▪ No mitigation required as it is a positive impact.
	Surface Water Quality	▪ Polluted run-off during floods mixes with surface water bodies. ▪ Seepage from TSF footprint	▪ Reduction in water quality during operations. ▪ Contamination of aquatic environments.	▪ Construct berms to intercept polluted water. ▪ Construct adequate clean and dirty water stormwater systems. ▪ Revegetate environment to reduce seepage of water.
	Surface Water Quality (Positive)	▪ Removal of contaminants associated with the TSF due to reclamation of the tailings material.	▪ Reduction surface water contamination from the removal of the TSF (source of contaminants).	▪ No mitigation required as it is a positive impact.
	Socio-Economic (Positive)	▪ Reclamation of TSF	▪ Increase in the visual quality of the area due to the rehabilitation of the TSF.	▪ No mitigation is needed as this is a positive impact on the environment after rehabilitation.
	Ambient Noise	▪ Hydraulic mining of tailings material.	▪ Increase in ambient noise levels.	▪ Fit silencers on equipment. ▪ Restrict unnecessary activities to daylight hours only.

In order to monitor the potential impacts described above, the following monitoring programmes will be incorporated into the proposed Lindum TSF Reclamation Project:

- Groundwater quality monitoring programmes will include monitoring of the groundwater around the TSF during operation and decommissioning as well as post closure to ensure trace elements/metals of concern do not reduce the groundwater quality in compliance to mine standards and WUL requirements;

- Surface water quality monitoring will be completed to determine if any trace remnants of the tailings material enters the nearby streams in compliance to mine standards and WUL requirements;

Any contracted staff employed to work on the Lindum TSF Reclamation Project will be trained to ensure that the environmental awareness plan is followed with respect to this project. Any new contracted staff will also be made aware of the emergency response plan to ensure the safety of all personnel and that environmental damage is prevented or minimised.

The closure cost, following reclamation, for the Lindum TSF Reclamation Project is estimated at **R 5 550 653**, this is made up of breakdown and removal costs for all surface infrastructure as well as full rehabilitation of the project area post operational phase and post closure costs.

Prime Resources (Pty) Ltd, the Environmental Assessment Practitioner, is of the opinion that the proposed development should go ahead, provided the following conditions are met:

- Implementation of all management and mitigation measures as indicated in the Environmental Management Programme, in order to ensure that the post-significance impact ratings are maintained; and
- Implementation of the monitoring programmes detailed in the Environmental Management Programme.

GOLD ONE INTERNATIONAL LIMITED

ENVIRONMENTAL IMPACT ASSESSMENT/ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED LINDUM TAILINGS STORAGE FACILITY RECLAMATION PROJECT

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LIST OF ACRONYMS

BID	Background Information Document
COP	Cooke Optimisation Project
DMR	Department of Mineral Resources
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
GDARD	Gauteng Department of Agriculture and Rural Development

IAP	Interested and Affected Parties
MPRDA	Mineral and Petroleum Resources Development Act No. 28 of 2002
MAMSL	Metres Above Mean Sea Level
NEMA	National Environmental Management Act No. 102 of 1998
NEMAQA	National Environmental Management: Air Quality Act No. 39 of 2004
NEMBA	National Environmental Management: Biodiversity Act No. 10 of 2004
NEMWA	National Environmental Management: Waste Act No. 59 of 2008
NFEPA	National Freshwater Ecosystem Priority Areas
NNR	National Nuclear Regulator
NWA	National Water Act No. 36 of 1998
PRECIS	Pretoria Computerised Information Service
RLM	Randfontein Local Municipality
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute's
SR	Scoping Report
TDS	Total Dissolved Solids
TPM	Tonnes Per Month
TSF	Tailings Storage Facility
WRDM	West Rand District Municipality
WMA	Water Management Area

APPLICANT'S UNDERTAKING

I, ……, duly and properly authorised by Gold One International Limited, (Gold One) hereby declare that the information provided in this Integrated Environmental Impact Assessment and Environmental Management Programme, prepared for the Amendment of the EMP (Ref: GP/30/5/1/2/5(08) MR), in accordance with the Minerals and Petroleum Resources Development Act (MPRDA) (Act 28 of 2002) Regulations 49, 50 and 51, is true, complete, and correct. I understand that this undertaking is legally binding and that failure to give effect hereto will render the applicant liable for prosecution in terms of Section 98 (b) and 99 (1)(g) of the MPRDA.

Signed on this …… day of ……20… at …… (Place)

……
Pierre Kruger-- Legal Counsel
Gold One International (Pty) Ltd

1 INTRODUCTION AND BACKGROUND

1.1 Details of Applicant

Name of Applicant:	Rand Uranium Pty Ltd (Randfontein Surface Operations)
Contact person:	Rex Zorab
Physical Address:	Block A Randfontein Surface Operations Offices, Off R559, Randfontein
Postal Address:	Suite X17, Weltevreden Park, 1715
Telephone Number:	011 278 1725
Fax Number:	011 278 1737

1.2 Details of Environmental Assessment Practitioner

Name of Company	Prime Resources (Pty) Ltd
Contact Persons	Bruce d'Hotman
Physical Address:	The Workshop 70 - 7th Avenue, Parktown North, Johannesburg
Postal Address:	PO Box 2316, Parklands, 2121
Telephone Number:	011 447 4888
Fax Number:	011 447 0355
Email:	prime@resources.co.za

Gold One, through its wholly owned subsidiary Rand Uranium (Pty) Ltd (RU) has appointed Prime Resources (Pty) Ltd to amend its existing- and Department of Mineral Resources (DMR) approved Environmental Management Programme (EMP) in terms of Section 102 of the Minerals and Petroleum Resources Development Act (2002) (MPRDA) to incorporate the proposed Lindum Tailings Storage Facility (TSF) Reclamation Project.

1.3 Project Overview and Location

Gold One's Rand Uranium (Pty) Ltd is situated outside of Randfontein (See Figure 1) approximately 40 km west of Johannesburg in the Gauteng Province (See Figure 2). Associated with the Rand Uranium's Randfontein Surface Operations is the historic Lindum Tailing Storage Facility (TSF) which is no longer utilised as part of the ongoing operations.

Gold One intends to reclaim the Lindum TSF at a rate of approximately 60 000 (tonnes per month) tpm, utilising hydraulic mining methods. This slurried material will be pumped to the Cooke Plant where residual gold will be extracted utilising existing processes and the resultant tailings deposited initially onto the Cooke dump and latterly in several existing disused open cast pits in

and around Randfontein. Such treatment, pipe routes and deposition forms part of the existing Cooke Optimisation Project (COP).

The scope of this particular Section 102 amendment is limited to the reclamation of the Lindum TSF and the infrastructure associated with the hydraulic reclamation thereof, with the pumps utilised to pump the slurried material forming the battery limits hereof. The transport via an existing pipe route, water supply and processing of the tailings material and subsequent deposition as part of the current and future production mix from the Cooke gold plant is not covered within the scope of this report but is covered under existing Environmental Authorisations forming part of the greater COP.

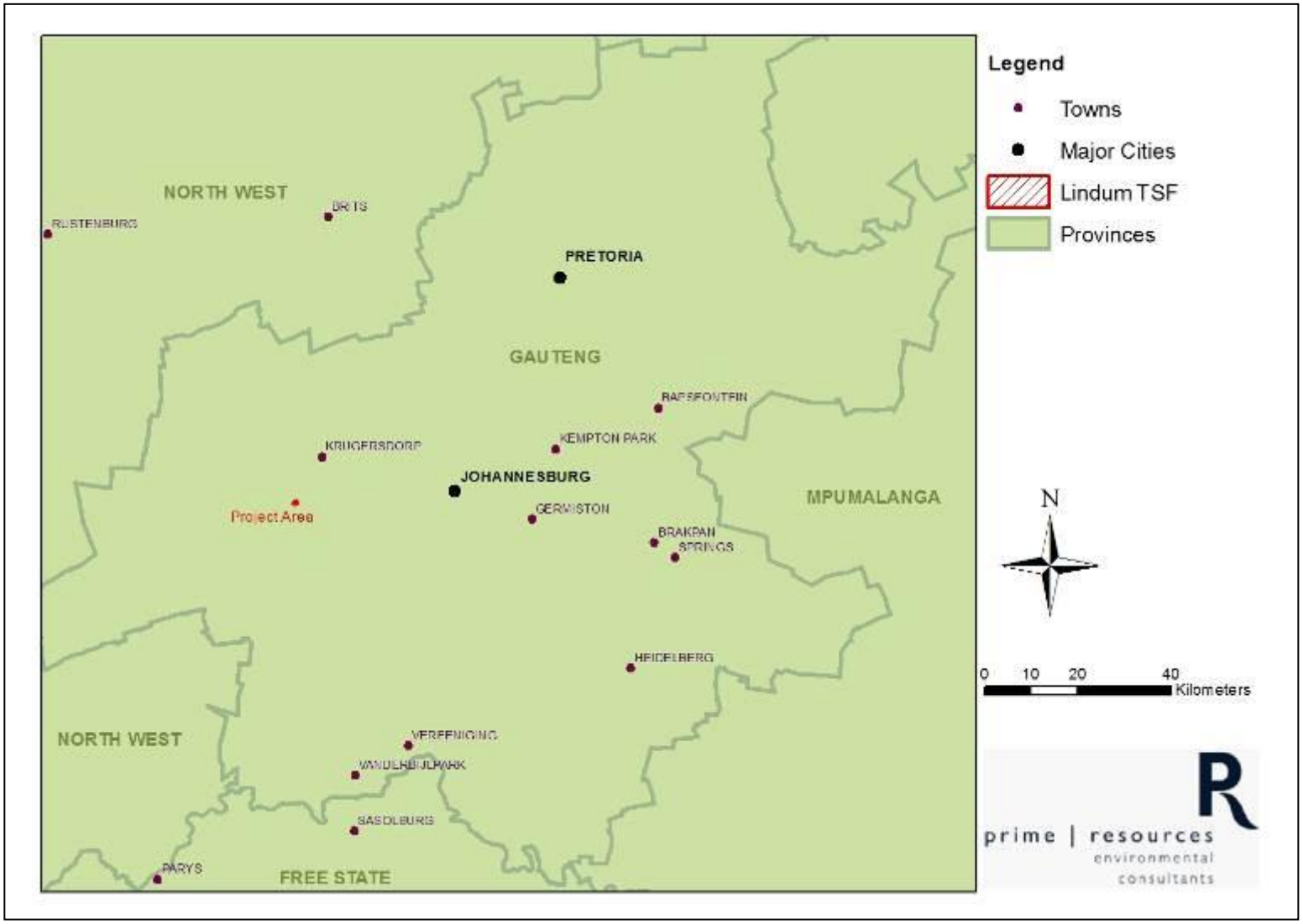

Figure 1: Location of the Lindum TSF in Gauteng Province

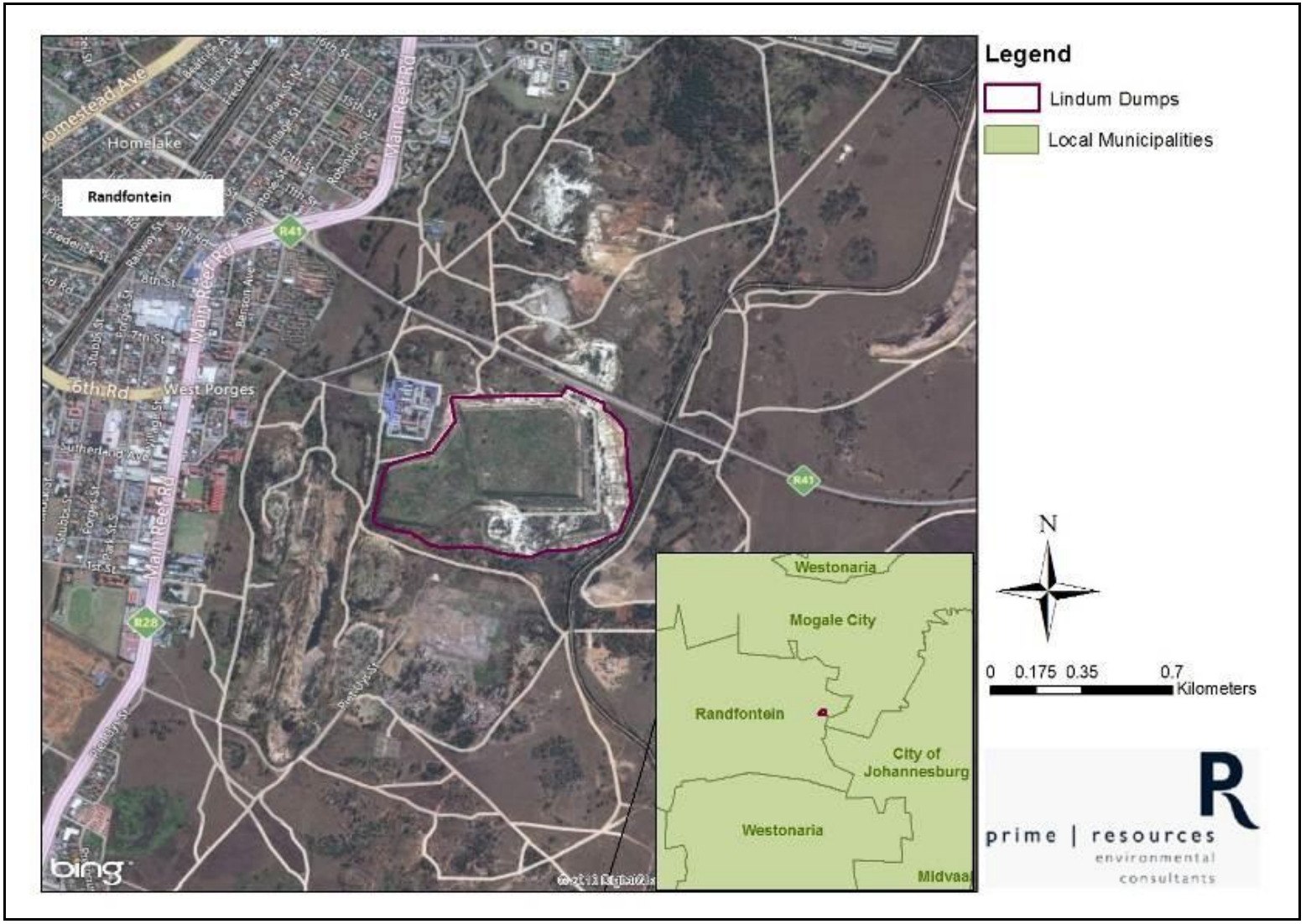

Figure 2: Location of the Lindum TSF in relation to the town of Randfontein

1.4 Legal Requirements

In order to protect the environment and ensure that the proposed development is undertaken in an environmentally responsible manner, the following pertinent laws apply and guide the EIA/EMP process. They are as follows:

1.4.1 The Constitution of South Africa (Act No. 108 of 1996)

Everyone has the right:

- To an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:
    - Prevent pollution and ecological degradation;
    - Promote conservation; and
    - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

1.4.2 The Mineral and Petroleum Resources Development Act (No. 28 of 2002)

The MPRDA is the key legislation governing mining activities within South Africa. It details the requirements and processes which need to be followed and adhered to by mining companies. The Department of Mineral Resources (DMR) is the competent authority that deals with all mining related applications.

The MPRDA by definition:-

- Recognises that minerals and petroleum are non-renewable natural resources;
- Acknowledges that South Africa's mineral and petroleum resources belong to the nation and that the State is the custodian thereof;
- Affirms the State's obligation to protect the environment for the benefit of present and future generations, to ensure ecologically sustainable development of mineral and petroleum resources and to promote economic and social development;
- Recognises the need to promote local and rural development and the social upliftment of communities affected by mining;
- Reaffirms the State's commitment to reform to bring about equitable access to South Africa's mineral and petroleum resources.

Section 102 of the MPRDA indicates that a prospecting right, mining right, mining work programme or EMP may not be amended or varied (including by extension of the area covered by it or by the addition of minerals or seams, mineralised bodies, or strata, which are not at the time the subject thereof) without the written consent of the Minister.

It is the intention of the Applicant to amend the existing and DMR-approved EMP (DMR Reference Number GP/30/5/1/2/5(08) MR) to incorporate the proposed hydraulic reclamation of the Lindum TSF.

Section 39 of the MPRDA, when read together with Regulations 50 and 51 of GNR527 of 2004, promulgated in terms of the MPRDA, describes the process for the preparation of an EIA/EMP. This process requires that the following are produced / undertaken:

- EIA report as per Regulation 50; and
- EMP as per regulation 51.

The EIA component of this document has thus been prepared to meet the requirements of Regulation 50 of the MPRDA Regulations of GN527, April 2004:

MPRDA REGULATION 50	CONTENT	CHAPTER
(a)	An assessment of the environment likely to be affected by the proposed mining operation, including cumulative environmental impacts	7
(b)	An assessment of the environment likely to be affected by the identified alternative land use or developments, including cumulative environmental impacts	7
(c)	An assessment of the nature, extent, duration, probability and significance of the identified potential environmental, social and cultural impacts of the proposed mining operation, including cumulative environmental impacts	7
(d)	A comparative assessment of the identified land use and development alternatives and their potential environmental, social and cultural impacts	4
(e)	Determine the appropriate mitigatory measures for each significant impact of the proposed mining operation	7
(f)	Details of the engagement process of IAP followed during the course of the assessment and an indication of how the issues raised by IAPs have been assessed	6
(g)	Identify knowledge gaps and report on the adequacy of predictive methods, underlying assumptions and uncertainties encountered in compiling the required information	8
(h)	Description of the arrangements for monitoring and management of environmental impacts	11
(i)	Inclusion of technical and supporting information as appendices	Appendices

The EMP component of this document has been prepared to meet the requirements of Regulation 51 of the MPRDA Regulations of GN527, April 2004:

MPRDA REGULATION 51		CONTENT	CHAPTER
(a)	Description of the	(i) mine closure	11.5

MPRDA REGULATION 51		CONTENT	CHAPTER
	environmental objectives and specific goals for -	(ii) the management of identified environmental impacts emanating from the proposed mining operation	11.2
		(iii) the socio-economic conditions as identified in the social and labour plan	11.3
		(iv) historical and cultural impacts (if applicable)	11.4
(b)	An outline of the implementation programme must include -	(i) a description of the appropriate technical and management options chosen for each environmental impact, socio-economic condition and historical and cultural aspect for each phase of the mining operation	10
		(ii) action plans to achieve the objectives and specific goals contemplated in paragraph (a) which must include a time schedule of actions to be undertaken to implement mitigatory measures for the prevention, management and remediation of each environmental impact , socio-economic condition and historical and cultural aspect for each phase of the mining operation	10
		(iii) procedures for environmental related emergencies and remediation	12
		(iv) planned monitoring and environmental management programme performance assessment	10
		(v) financial provision in relation to the execution of the environmental management programme which must include (aa) the determination of the quantum of the financial provision contemplated in regulation 54 (bb) details of the method providing for financial provision contemplated in regulation 53	14
		(vi) an environmental awareness plan contemplated in section 39(3)(c) of the Act	13
		(vii) all supporting information and specialist reports that must be attached as appendices to the environmental management programme	Appendices
		(viii) an undertaking by the applicant to comply with the provisions of the Act and regulations thereto	Page 10

1.4.3 The National Environmental Management Act (No. 107 of 1998) and the Environmental Impact Assessment Regulations (GNR 543 of 2010)

This Act is enabling legislation intended to provide a framework for integrating environmental management into all developmental activities to promote co-operative environmental governance with regard to decision making by state organs on matters affecting the environment.

Section 28 of NEMA stipulates 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. This section has been amended by the National Environmental Laws Amendment Act, No. 14 of 2009, which stipulates (in item 12), that the aforementioned duty of care to remediate applies to any significant pollution of degradation which:

- Occurred before the commencement of the Act;
- Arises or is likely to arise at a different time from the actual activity that caused the contamination; or
- Arises through an act or activity of a person that results in a change to pre-existing contamination.

The EIA Regulations GN543, June 2010 (as revised in December 2010), serve to regulate the procedure and criteria for submitting, processing and considering decisions for applications for environmental authorisation in order to avoid the commencement of activities which may have a detrimental impact on the environment. These Regulations provide details on the process to be followed for the consultation of stakeholders and IAPs, the identification of the Competent Authority and the various timeframes and application requirements for environmental authorisation. A further three Regulations, GNR544, 545, 546, provide lists of activities for which environmental authorisation, either in the form of a Basic Assessment or Scoping and EIA / EMP, is required before the activity can commence.

Considering that the intention of the project is to reclaim tailings material at an existing facility utilising hydraulic mining techniques and to transport the material via the existing pipeline route in place between Lindum TSF and Cooke Plant (which allows for both tailings pipelines and a process water pipeline), which has already been approved and further amended in the previous EMPs compiled prior to the NEMA 2010 Regulations, it is foreseen that no specific Environmental Authorisation in terms of NEMA is required. Furthermore, any NEMA / WULA processes required for the overall COP are being addressed in separate EIA / EMP processes currently under consideration by the relevant Competent Authorities including the DMR, DWA and NNR.

1.4.4 The National Water Act (No. 36 of 1998)

The National Water Act (NWA) regulates all matters relating to inland water resources. It thus operates as a management instrument with the lead authority being the Department of Water Affairs (DWA). This Act provides mechanisms for the prevention of the pollution of water resources to support the management of water as a renewable resource. Section 21 of the Act lists water uses for which authorisation is required from the DWA, while Section 39 identifies several water uses where the need for a license is dispensed with. The use of water for which a license is not required is also described.

Regulation 704 of 1999 provides regulations for the use of water for mining and related activities and is aimed to further protect water resources. This regulation describes how mining activities should be managed to protect water resources. The Act and Regulation thus play a crucial role in the mining process as many mining-related activities use water as listed in Section 21, thereby requiring approval from the DWA.

Previously a Section 21 application was submitted by Rand Uranium in 2010 as part of an amendment to its 2008 WUL (under final consideration by the DWA) which included the current Lindum TSF footprint. The hydraulic reclamation of the Lindum TSF itself does not trigger any activities defined in terms of Section 21 of the NWA. The requirement in terms of the NWA regarding the placement of final tailings from the Cooke Plant into the various opencast pit voids around Randfontein are the subject of separate environmental processes for the COP currently under consideration by the DMR and the DWA. The current (COP submission) water balance will be amended to cater for the Lindum TSF Reclamation project.

1.4.5 The National Heritage Resources Act (No. 25 of 1999)

The National Heritage Resources Act serves to protect and manage the South African heritage and cultural resources. These resources includes places, buildings, structures and equipment of cultural significance, historical settlements and townscapes, archaeological and paleontological sites, graves and burial grounds. The Act protects any heritage resources from damage by developments by stipulating in Section 38 that any person intending on undertaking any form of development which involves the activities listed below must, at the earliest stage of initiation, notify the South African Heritage Resources Association (SAHRA):

A. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
B. the construction of a bridge or similar structure exceeding 50 m in length;
C. any development or other activity which will change the character of a site—
    i. exceeding 5 000 m^2 in extent; or
    ii. involving three or more existing erven or subdivisions thereof; or
    iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
    iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

D. the re-zoning of a site exceeding 10 000m^2 in extent; or

E. any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

Table 1: Listed activity invoked by the proposed Lindum TSF Reclamation Project in terms of SAHRA

SECTION	ACTIVITY NUMBER	LISTED ACTIVITY	DESCRIPTION
38	(c)(i)	Any development or other activity which will change the character of a site —exceeding 5 000 m^2 in extent.	The reclamation of tailings material from the Lindum TSF takes place over an extent of 30 Ha, the nature of which will be altered to the rehabilitated state following completion of the project.

The listed heritage considerations will be taken into account as part of the environmental process. The public consultation procedure for the project included a provincial representative from SAHRA as an IAP. A heritage impact assessment was undertaken in February 2013, refer to section 7.1.

1.4.6 The National Environmental Management: Waste Act (No. 59 of 2008)

The National Environmental Management: Waste Act (NEMWA) serves to reform the laws regulating waste management in order to protect public and environmental health by providing measures for the prevention of pollution and ecological degradation and to provide defining requirements for the licensing and control of waste management activities.

This Act supersedes Section 20 of the Environment Conservation Act, No. 73 of 1989 and provides measures for waste management covering the various aspects of activities which generate waste. The schedules attached to the Act also provide definitions for activities which require a waste management license, while also identifying the relevant environmental authorisations (either in the form of a Basic Assessment {Schedule A activities} or Scoping, EIA / EMP {for Schedule B activities} and prepared in terms of NEMA) which are further required for said activities.

While the NEMWA makes provision for the rehabilitation of contaminated land as an activity requiring a Waste Management License, the Lindum TSF is not considered contaminated land, but rather a mineral resource. None of the activities in terms of the above schedule will thus be triggered by the proposed Lindum TSF Reclamation Project.

2 METHODOLOGY

The environmental process to be followed has been based on the requirements as stipulated in the MPRDA Regulations (GN527 of 2004). This report details the outcomes of the assessment phase as detailed in Section 50 and 51 of the MPRDA Regulations as it pertains to the target site ie the Lindum TSF area.

Existing specialist studies, desktop research and historic information were utilised to inform the environmental baseline information presented in this EIA. A site-visit was undertaken during the scoping phase to survey the current *in situ* environmental conditions and to contextualise the proposed project. A public involvement process has also been conducted to introduce the Lindum TSF Reclamation Project to IAPs as described in Section 6, to ascertain any concerns or issues.

The above were all incorporated into a Scoping Report which served to integrate the above and identify any gaps in the existing information as well as the potential impacts associated with the proposed Lindum TSF Reclamation Project.

The potential gaps in the existing information were then addressed by appointing the following specialist service providers:

- African Environmental Development (AED) to determine the potential impact of the proposed reclamation project on the surrounding surface water resources.
- Groundwater Square to determine the potential impacts of the proposed reclamation project will be on the receiving groundwater regime.
- Dr J. van Schalkwyk to determine the cultural / heritage significance of the project area and to determine any potential impacts thereto from the proposed project.

The resultant information was utilised to inform an assessment of the potential impacts associated with the proposed Lindum TSF Reclamation Project. Management measures are recommended in order to reduce the significance of potential impacts and monitoring protocols devised to act as an early warning of any potential impacts.

Additionally Dr. Japie van Blerk, Director at AquiSim Consulting (Pty) Ltd, was appointed to undertake the Radiation assessment as part of the National Nuclear Regulator (NNR) requirements.

3 DESCRIPTION OF THE PRE-OPERATION ENVIRONMENT

3.1 Introduction

This section serves to provide a description of the baseline conditions of the receiving environment related to the proposed Lindum TSF Reclamation Project as gathered from the sources described in Section 2 above with respect to the affected site of the TSF. This section will also highlight any sensitive environments identified.

3.2 Climate

3.2.1 Rainfall

The Randfontein district generally receives approximately 571 mm of rain per year, with most rainfall occurring during the mid-summer months. Figure 3 shows the average rainfall values for Randfontein per month. It receives the lowest rainfall (0 mm) in July and the highest (107 mm) in December (SA Explorer, 2012).

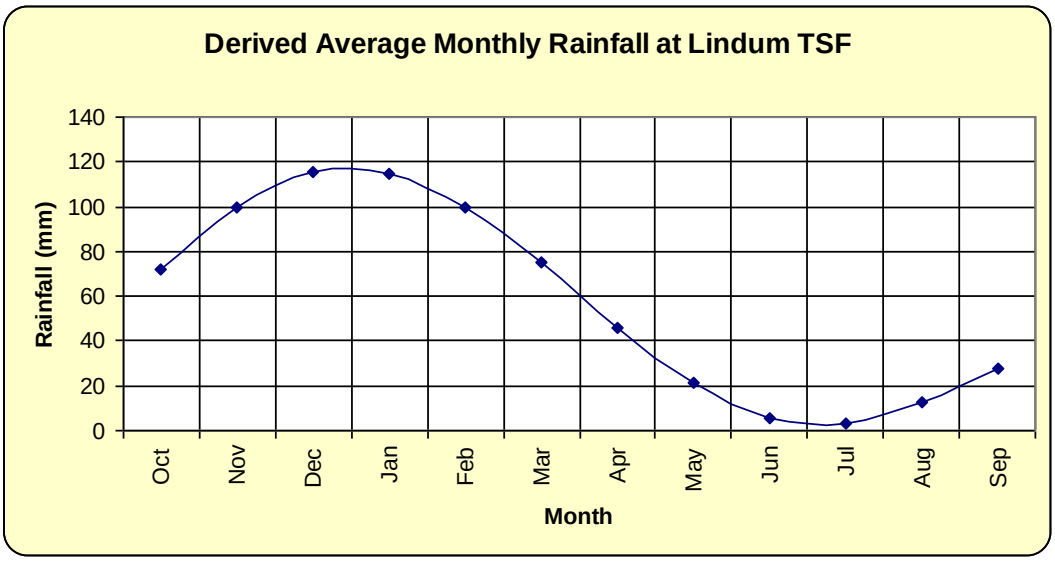

Figure 3: Derived average rainfall for Lindum TSF (AED 2013)

The climate is typical of Highveld conditions, with relatively warm to hot summers, fairly high rainfall and moderate to cool winters (with little or no rain). Cycles of prolonged drought lasting for several years, are a natural phenomenon (Le Roux, 2011).

Rainfall for the relevant quaternary catchment (further discussed in Section 3.8) shows that the Mean Annual Precipitation is approximately 664mm while the Mean Annual Runoff is approximately 17mm[3]. The Mean Annual Evaporation for the quaternary catchment is between 1,600 and 1,700 mm around the study area (DWAF, SAGDT Cover data).

3.2.2 Temperature

The area has a relatively cool climate. The mean daily maximum temperature for the summer months is generally lower than 30°C. Figure 4 shows that the average midday temperatures for Randfontein range from 16°C in June to 26°C in January. The region is the coldest during June when the temperature drops to 0°C on average at night (SA Explorer, 2012).

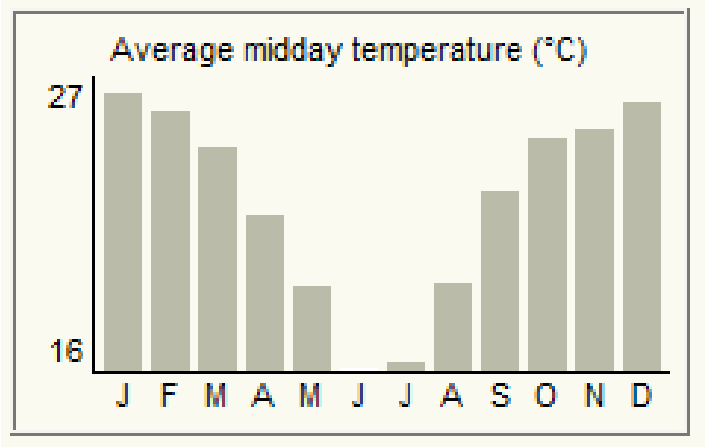

Figure 4: Average temperature in Randfontein

3.2.3 Evaporation

Figure 5 indicates the monthly evaporation as recorded at the Zuurbekom Meteorological station (26.30083S; 27.81381E), approximately 16.5 km away from the Lindum TSF, from 1958 to 2012.

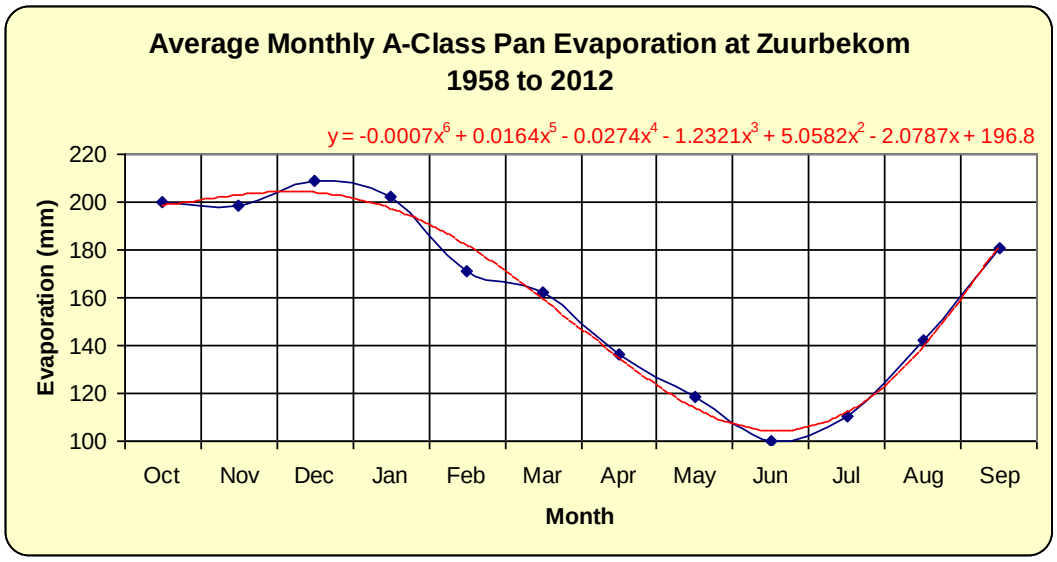

Figure 5: The average monthly A-Class Pan evaporation at Zuurbekom

3.2.4 Wind

A consistent pattern of wind from the sector North West to North prevails during summer and South South West during autumn and winter. Figure 6 shows data for 2007 to 2009 regarding the wind speeds experienced in the West Rand District Municipality.

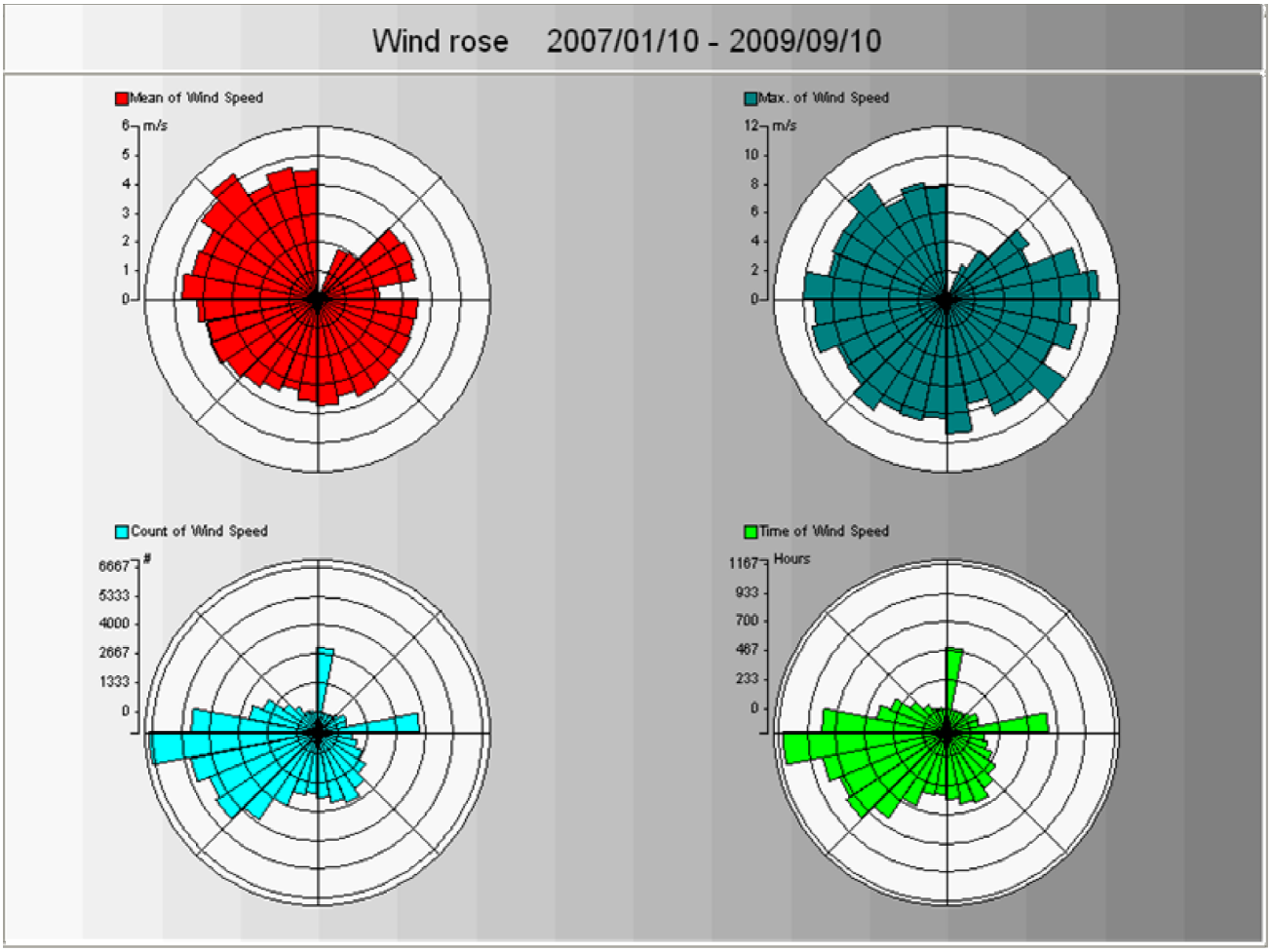

Figure 6: The direction and speed of wind in the West Rand District Municipality between 2007 and 2009

3.3 Topography

The greater Krugersdorp/Randfontein area lies approximately 1350-1600 metres above mean sea level (mamsl), and is comprised of mid-slopes indicating a frequently undulating landscape punctuated by crests of a small magnitude. The Lindum TSF project area lies at an elevation of between 1650 mamsl to 1670 mamsl on gently undulating grassland.

3.4 Geology

The regional geology of the study area is largely underlain by rocks of the Johannesburg Subgroup of the Witwatersrand Supergroup, with the Black Reef Formation of the Transvaal Supergroup outcropping as a thin surface layer over the underlying Witwatersrand rocks. The study area contains six identified main reef groupings: the Black Reef; the Ventersdorp Contact Reef; the

Elsburg Formations; the Kimberleys; the Livingstone Reefs; and the South Reef. Within these, several economic reef horizons have been mined. The reefs comprise fine to coarse grained pyritic mineralisation within well-developed thick quartz pebble conglomerates or narrow single pebble lags, which in certain instances are replaced by narrow carbon seams.

The Lindum TSF project area is overlain in the central and the east by Ventersdorp Lava and Black Reef quartzites. The vertical dipping Witwatersrand quartzite is outcropping on the West. The dips flatten to the East the Eastern boundary being the Witpoortjie fault. Figure 7 indicates the layout of the geological formations in the study area.

The Randfontein area is characterised by numerous east-west trending faults and joints. An example was noted at Porges Pit located approximately 260m to the south-west of the Lindum TSF. The faults are believed to act as groundwater conduits and have the potential to transmit significant volumes of water (Golder, August 2010).

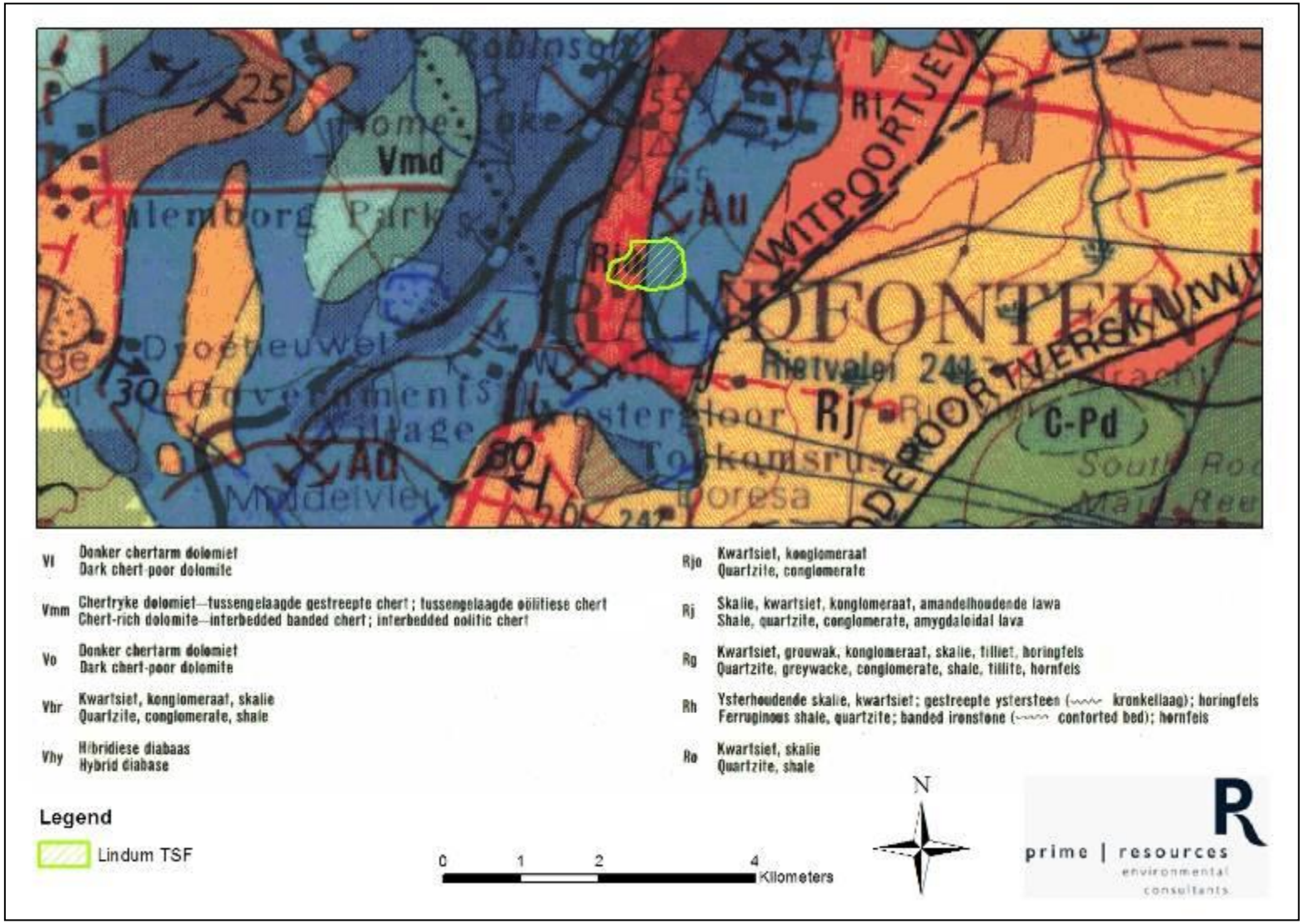

Figure 7: Regional geology associated with the Lindum Tailings Storage Facility

3.5 Soils

The soil type associated with the Lindum TSF and the greater project area is made up of the Hutton Form soils (Hu24/hu26). The Hutton Form soils generally comprise predominantly fine grained sandy, to silty loams or fine to medium grained sandy clay loams, varying from those with a single grained structure, to those with an apedal structure. These soils generally showed pale red brown to yellow red colours in the topsoils, and fine to medium grained sandy, and silty clay loams, with dark orange reds and dark red colours in the sub soil horizons. The high iron content of the parent rocks from which these soils are derived is responsible for the red colours. Clay contents generally vary from as low as 6% to 12% in the sandy topsoils, where the soils are derived from the sandstone parent materials, to between 15% and 28% for the topsoil associated with the more basic host rocks derived from the dolerite and diabase parent materials. In the topographically lower lying areas, the high clay contents are associated with the colluvial derived soils, generally associated with the wetland areas, and flood plain environments. The subsoil clay percentages range from 25% to 50% depending on the parent material from which the soils are derived.

In almost all cases in this area the soils classify as having a mesotrophic leaching status (moderately leached), and are generally luvic in character. This implies that the soils are only moderately leached (as evidenced by their red colours), and have formed in-situ. These soil forms, generally occupy the upper and upper midslopes and are most often found associated with the Griffin and Clovelly Form soils. There are erosion and/or stability risks associated with soils associated with the general area. Excessive runoff during thunderstorms and associated downpours at the start of the rains results in extensive erosion. There is a high risk of sinkhole formation due to the inherent instability of the subsurface and water pollutants dissolving the dolomites.

At the Lindum TSF itself, the underlying soils would have been compacted due to the dumping of tailings materials. The stripping of underlying soils could also potentially have occurred during the construction of the TSF. Any seepage arising from the TSF may have affected the quality of the underlying and surrounding soil through possible contamination.

3.6 Terrestrial Biodiversity

3.6.1 Flora

The Lindum TSF area does not fall within any formal protected areas. The greater Randfontein Surface Operations are situated within the Grassland Biome vegetation type according to the South African National Biodiversity Institute's vegetation database (Mucina and Rutherford, 2006).

While the regional vegetation type is classified as the sensitive Soweto Highveld Grassland Vegetation Type (Figure 8) , which is listed as Threatened in NEMBA (Government Gazette No. 34809), the project area has already been disturbed to the extent of being completely transformed due to previous mining practices and residue deposition and is therefore no longer in its natural

state. According to the South African National Biodiversity Institute's (SANBI) National Biodiversity Assessment, the region falls within the Bushveld-Bakenveld terrestrial biodiversity priority area.

The regional vegetation type is dominated by *Themeda triandra (Rooigras)* grassland. Other grass species include *Elionurus muticus, Eragrostis racemosa, Heteropogon contortus and Tristachya leucothrix*. The Grassland is classified as Endangered by Mucina and Rutherford (2006).

While the project area is not associated with any indigenous or exotic grasses due to the nature of the pre-existing disturbance, the regional grass cover is fairly uniform, comprising mostly grasses belonging to the genus Eragrostis. Other common grasses are *Tristachya rehmannii, Elionurus argenteus (koperdraadgras), Pogonarthria squarrosa, Aristida congesta, and A. junciformis* while *Cynodon dactylon* (common "kweek" grass) is the dominant pioneer grass on fallow lands.

Alien invasive plant species associated with the Lindum TSF Reclamation Project area include: *Hyparhenia Hirta, Eregrostis Curvula, Pennisetum Clandestinum, Bidens Pilosa, Tagetes minuta, and Rhynchelytrum Repens.*

Indigenous trees to the area are: *Acalia Karoo, Protea Caffra, Celtis Africana and sometimes Protea Welwitschili and Cussonia Paniculata*. Exotic trees such as *Schinus Molle* (pepper tree) *Eucalyptus* (Blue Gum) *Pinus* (Pine) and Australian Acacia Trees occur.

Red Data plants found in the region include the following: *Andromischus umbraticola subsp. Umbraticol,a Boophane disticha, Bowiea volubilis subsp. Volubilis Callilepis leptophylla, Delosperma leendertzia,e Drimia sanquine, Habenaria mossii, Holothrix randii, Ilex mitis var. mitis, Khadia beswickii, Lithops lesliei subsp. Lesliei var. rubrobrunnea,* and *Melolobium subspicatum,* however, due to the disturbed nature of the habitat associated with the Lindum TSF, it is unlikely that any Red Data species will occur on the TSF.

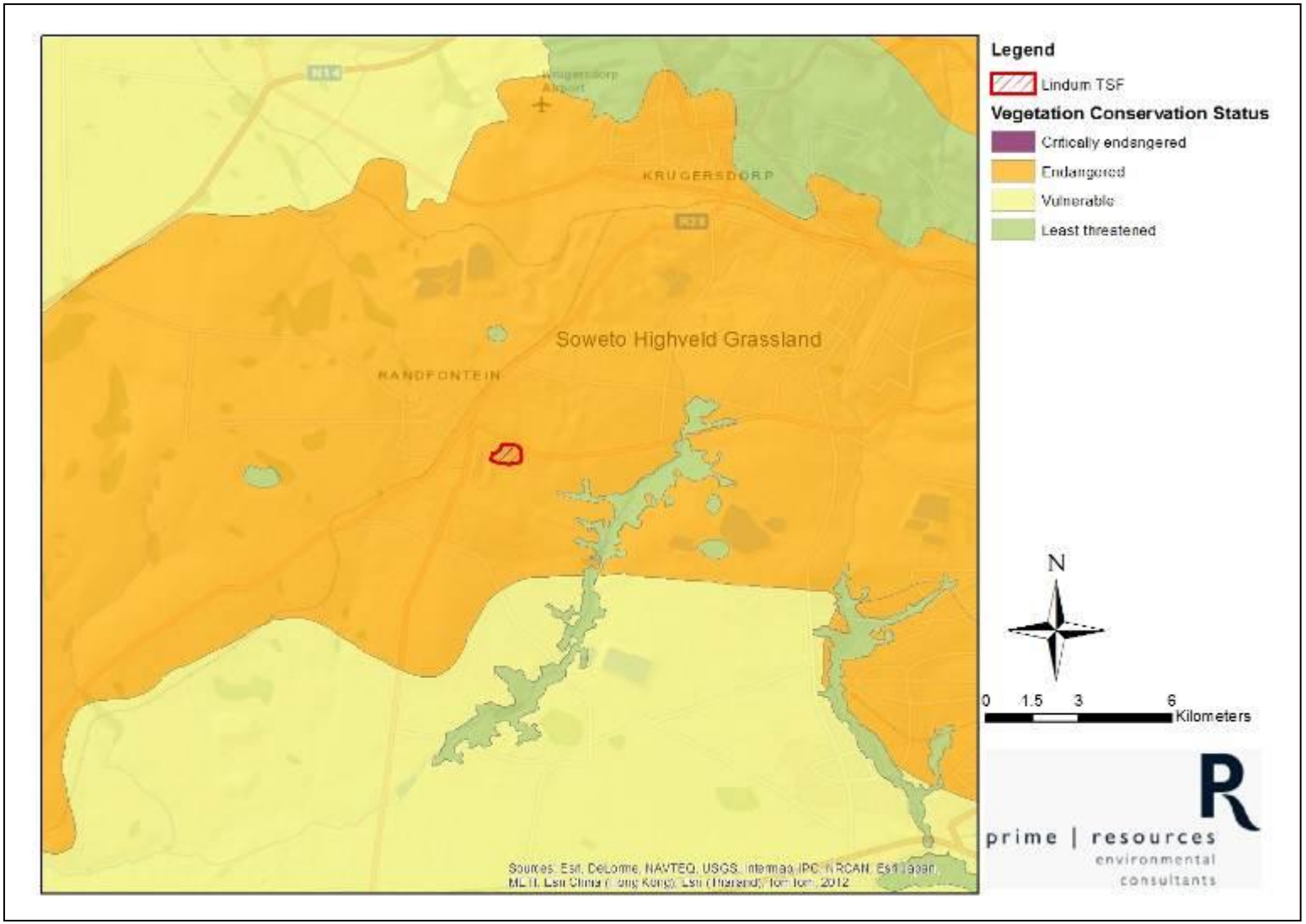

Figure 8: The Vegetation Type and conservation status relative to the Lindum TSF

3.6.2 Fauna

While the following Red Data species are potentially associated with the greater Randfontein region, due to the transformed nature of the project area associated with the Lindum TSF, it is unlikely that any of Red Data species occur on-site:

Table 2: Red Data Listed Species potentially found in the Randfontein area

RED DATA INVERTEBRATES	RED DATA MAMMALS	RED DATA BIRDS	RED DATA HERPETOFAUNA
Aloeides dentatis denatis (Roodepoort copper butterfly)	*Atelerix frontalis* (Southern African hedgehog)	*Gyps coportheres* (Cape Vulture)	*Pyxicephalus adspersus* (Giant bullfrog)
Metisella meninx (Marsh sylph butterfly)	*Miniopterus schreibersii* (Schreiber's long-fingered bat)	*Tyto capensis* (African Grass Owl)	
Lepidochrysops praeterita (Highveld blue butterfly)	*Myotis tricolor* (Temmick's hairy bat)	*Eupodotis senegalensis* (White-bellied korhaan)	
Hadogenes gunningi (Flatrock scorpion)	*Mystromys albicaudatus* (White-tailed rat)	*Phoenicopterus ruber* (Greater famingo)	
Harpactira hamiltoni (Golden starburst baboon spider)	*Rhinolophus blasii* (Peak saddle [Blasius's] horseshoe bat)	*Phoeniconaias minor* (Lesser flamingo)	
Ichnestoma stobbiai (Fruit chafer beatle)	*Rhinolophus clivosus* (Geoffrey's horseshoe bat)	*Circus ranivorus* (African Marsh Harrier)	
Opistophalmus pugnax (Burrowing scorpion)			

3.7 Land Cover and Land Use

Land Cover in the regional area consists of Grassland Biome Vegetation as discussed in Section 3.6.1. Figure 9 is a visual representation of the land cover and land use surrounding the Lindum TSF area.

The land uses surrounding the Lindum TSF consists of mining activities, urban settlements, degraded vegetation as well as some agricultural activities. Land use associated with the Lindum TSF itself includes previous mining activities which have resulted in the creation of the TSF as well as the resultant degradation of vegetation. The study site lies between the towns of Randfontein, Azaadville and Toekomsrus, and contains disturbed veld due to the mining activities and the settlements in the area. Figure 9 shows the layout of the Lindum TSF in relation to the towns.

The regional land uses associated with the Randfontein Section, as well as the Cooke Section (which includes the Lindum TSF) are as follows: Existing total urban coverage is 17% (3,521ha), existing mining activities is 19% (3,930 ha) and the majority of the Mining Right Area 47.32% (9,965 ha) is covered with grasslands.

The main Lindum TSF project area is bounded on the north by the R41 and by a mine rail system and embankment to the east. A small portion of remnant residue deposition to the north of the R41 is evident. To the north-west there is an old mine hostel now used as a hospital and to the south-west the Randfontein waste disposal facility is situated. The area to the south comprises open veld.

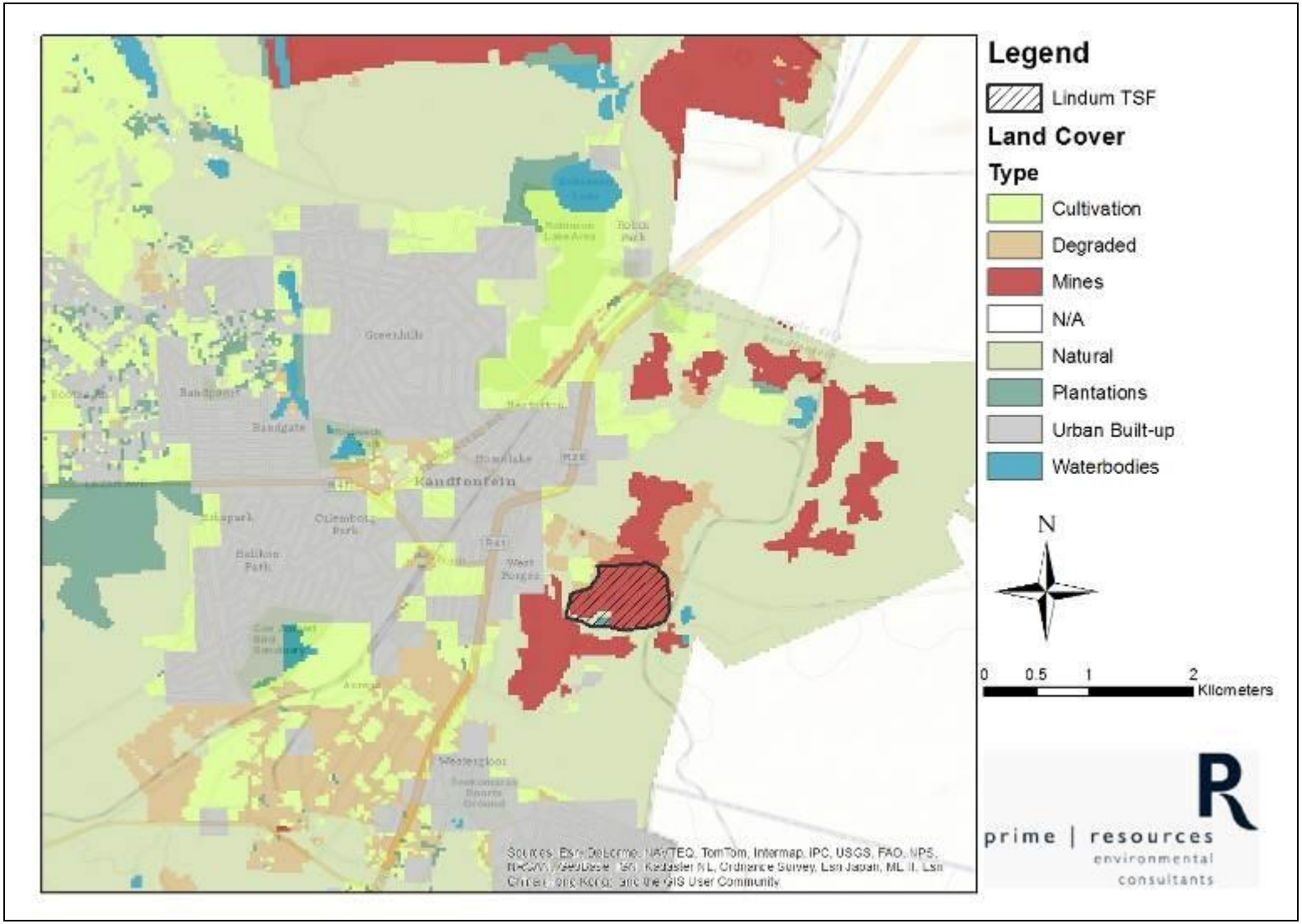

Figure 9: Land Cover surrounding the Lindum TSF

3.8 Surface Water

The information presented in this section of the report has been sourced from the specialist assessment conducted by African Environmental Development (AED) in February 2013, (a copy of this study is contained as Appendix 2).

3.8.1 Description of the Catchments

The Randfontein area is located on the watershed between the Crocodile (West) Marico Water Management Area (WMA) and the Upper Vaal WMA. It falls partially in the following quaternary catchment areas: A21D, A21F, C23D, and C23E. The rivers that drain the specific catchments are listed in Table 3 and the position of the Lindum TSF area in relation to the catchments is shown in Figure 10.

Table 3: Rivers in their respective catchments

CATCHMENT	RIVER/STREAM
A21D	Bloubankspruit
A21F	Magalies River
C23C	Wonderfonteinspruit which runs into the Vaal River
C23D	

The river catchments of the regional mining area (including the Randfontein and Cooke Section) are the Mooi River to the South and the Crocodile River to the North. The total catchment area amounts to approximately 26 500 Ha. The Lindum TSF area falls within the quaternary catchment C23D, drained by the Wonderfonteinspruit. Quaternary catchment C23D has a mean annual rainfall of 663.50 mm and a mean annual run-off of 29.5 mm. This means that, of the annual 663.5 mm rainfall, approximately 29.5 mm reaches the surface streams as surface water run-off.

The three streams draining the region surrounding the Lindum TSF area are the Bloubankspruit, the Wonderfonteinspruit and the Middelvleispruit (Figure 11). The streams are considered to be endangered according to SANBI. The ecosystems around the streams have lost significant amounts of their original natural habitat and their functioning is therefore compromised. The three streams are considered to be important upstream stretches of National Freshwater Ecosystem Priority Areas (NFEPA). The Bloubankspruit is situated approximately 2.5 km to the west of the Lindum TSF, the Middelvleispruit is situated 5 km south west of the Lindum TSF area and the Wonderfonteinspruit is situated 3.5 km east of the Lindum TSF.

With regards to the Lindum TSF site footprint, the most important river system is the Wonderfonteinspruit. The Wonderfonteinspruit flows past the Lindum TSF in a south-westerly direction into the Donaldson Dam (weir) that forms part of the Dolomite Water Control Board. Joining into the Wonderfonteinspruit are several streams that rise to the north flowing into the property. Some tributaries rise on the Randfontein section and flow in a south-eastern direction joining the Wonderfonteinspruit, confluencing with the Mooi River.

Wonderfonteinspruit

The Wonderfonteinspruit rises at the Continental Watershed in Krugersdorp at the Tudor Dam and travels in a westerly direction for approximately 2 Km, before turning towards the south at the Lancaster Dam at Luipaardsvlei. Downstream from this dam, the Wonderfonteinspruit flows in a generally south westerly to southerly direction for approximately 11.5 Km into the next dam, the Luipaardsvlei Attenuation Dam. Along its course between the Lancaster Dam and the Luipaardsvlei Attenuation Dam, it flows through areas that have been subjected to extensive gold mining for periods of over 130 years. The quality of the water in the stream is subsequently very poor shortly before entering the Luipaardsvlei Attenuation Dam, the effluent from the local sewage Plant of Mogale City joins this stream. The result is a significant improvement of the water quality. Additionally the character of the stream is changed from purely mining influence to a mixture of mining and urban impacts. Approximately 10km downstream from the Luipaardsvlei Attenuation Dam, the Wonderfonteinspruit reaches the Donaldson Dam. This dam is considered to be the demarcated end of the Upper Wonderfonteinspruit.

The Luipaardsvlei Attenuation Dam

This dam was constructed to attenuate the flow in the Wonderfonteinspruit. The dam is situated in its current position due to the dolomite underlying the Wonderfonteinspruit further downstream from the Luipaardsvlei Attenuation Dam.

Wonderfonteinspruit tributary located adjacent to the Lindum TSF

This very small, non-perennial, stream rises in the form of two erosion trenches draining the Lindum TSF. The two channels come together towards the south east of the TSF and the single stream leaves the area, flowing under the mine rail embankment towards the east-southeast. The confluence of this stream with the Wonderfonteinspruit occurs within the LuipaardsvleiAttenuation Dam. In its upper reaches, there is water flowing in the channel, however once it passes over the Witpoortjie Fault, the stream is dry. This suggests that the water is recharging into the groundwater environment where it passes over this fault. During heavy rains and thunderstorms, water will pass over the fault and continue on to the Wonderfonteinspruit, but during average to low flow conditions, it appears that all water is lost to groundwater.

3.8.2 Surface water flow patterns

Although the Wonderfonteinspruit is the larger watercourse passing in close proximity to the study area, the stream most likely to be affected by the Lindum reclamation project is the tributary (located adjacent to the site see Figure 12), flowing from the TSF to the Luipaardsvlei Attenuation Dam. Figure 13 below shows the surface topography illustrating the actual drainage patterns of water flowing across the study area. As can be seen the drainage patterns across the study area follow the suggested pathways, and surface run-off from the tailings dam will be routed towards this tributary.

Average surface flow off the Lindum Tailings Dam

The Lindum TSF area will occupy a total maximum surface area of approximately 30 Ha. During operation, vegetation covering the TSF will be removed and bare tailings material will be exposed. All water falling on this tailings dam (not contained) will become part of the hydraulic mining water circuit and no surface run-off will occur to areas outside the confines of the facility.

Although the surface run-off under natural grassland conditions in quaternary catchment C23D would only be 8 850 m³/annum, the run-off collected from the tailings dam, in the process of being reworked, will increase to 154 480 m³/annum should all the vegetation be removed.

Peak flow conditions

A 50-year, 24-hour storm falling over the Lindum TSF will produce a surface run-off of 25.5 l/m², i.e. 25.5 litres will run off every square metre of surface of the tailings dam as it is at present (i.e. well vegetated). This volume will increase to 191.25 l/m² in areas where the vegetation has been removed and the tailings material is in the process of being processed. Under normal circumstances it is expected that an area no larger than 5% of the tailings dam surface would be under these conditions at any given time during course of it being reworked.

Assuming a maximum TSF footprint of 30 Ha of which 5 % is in the process of being reclaimed, a 50-year storm will produce a total surface run-off of 7 267.5 m³ off the unaltered TSF surface and 2 869 m³ off the 5% area in the process of being reclaimed. Subsequently, a total volume of 10 136.5 m³ of contaminated water will be produced off the entire project area during a storm with a 50-year return period.

3.8.3 Water Quality

Surface water bodies associated with the proposed project are illustrated in Figure 11. Surface water sampling conducted by Digby Wells (Ground Water report for Cooke Optimisation Project November 2012) indicated that the upper Wonderfonteinspruit exhibited high levels of nitrate, chloride, sodium, manganese, ammonia, fluoride and electrical conductivity. Significant streams in the relevant catchments are particularly vulnerable to AMD seepage and salt loading as a result of tailings seepage in the shallow groundwater zone and decant of mine water through old shafts.

Similarly water quality studies were conducted during surface water assessment conducted by AED in February 2013. These results showed that the natural stream leaving the study area and flowing towards the Wonderfonteinspruit was of particularly bad quality. The water results returned a low pH coupled with high sulphate levels and high electrical conductivity. A low pH and high sulphate concentration will invariably also cause many of the heavy metals to go into solution as was found to be the case. Although some of the determinants found in this stream were found to be tailings-related, it is understood that there could be at least one additional contributor, such as the adjacent landfill site, contaminating the water.

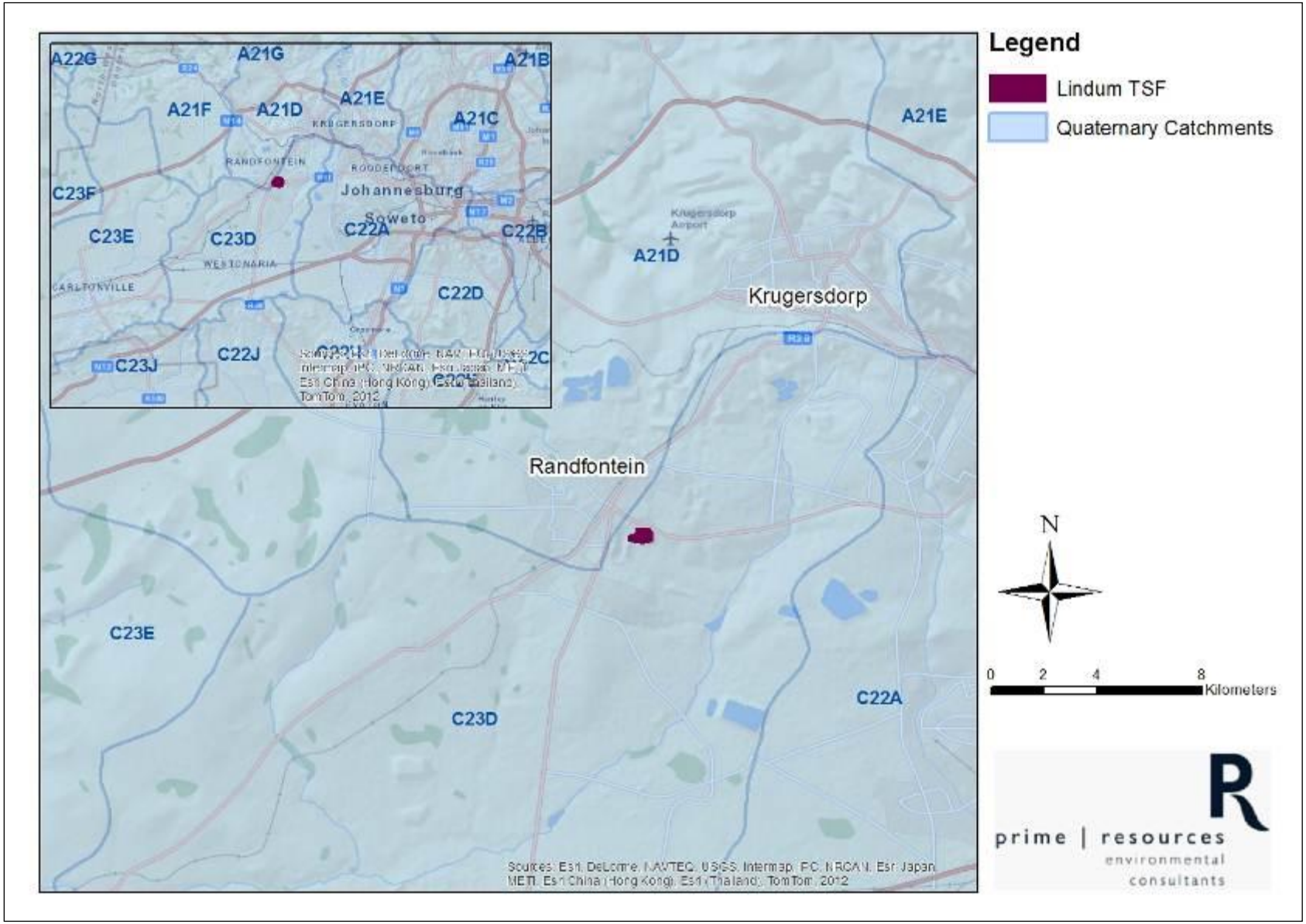

Figure 10: Position of the Lindum TSF relative to the quaternary river catchments

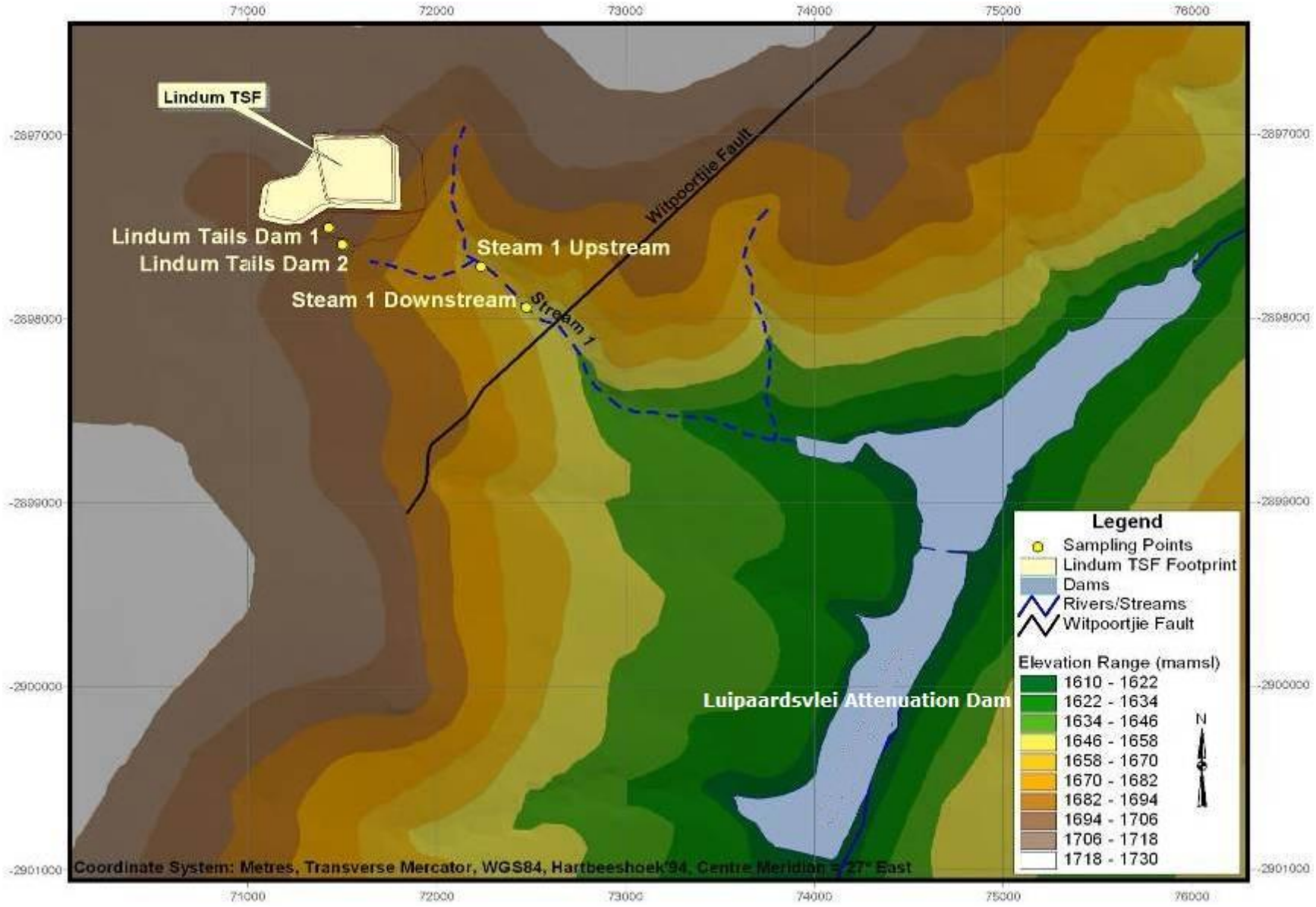

Figure 11: Surface water resources in relation to the Lindum TSF

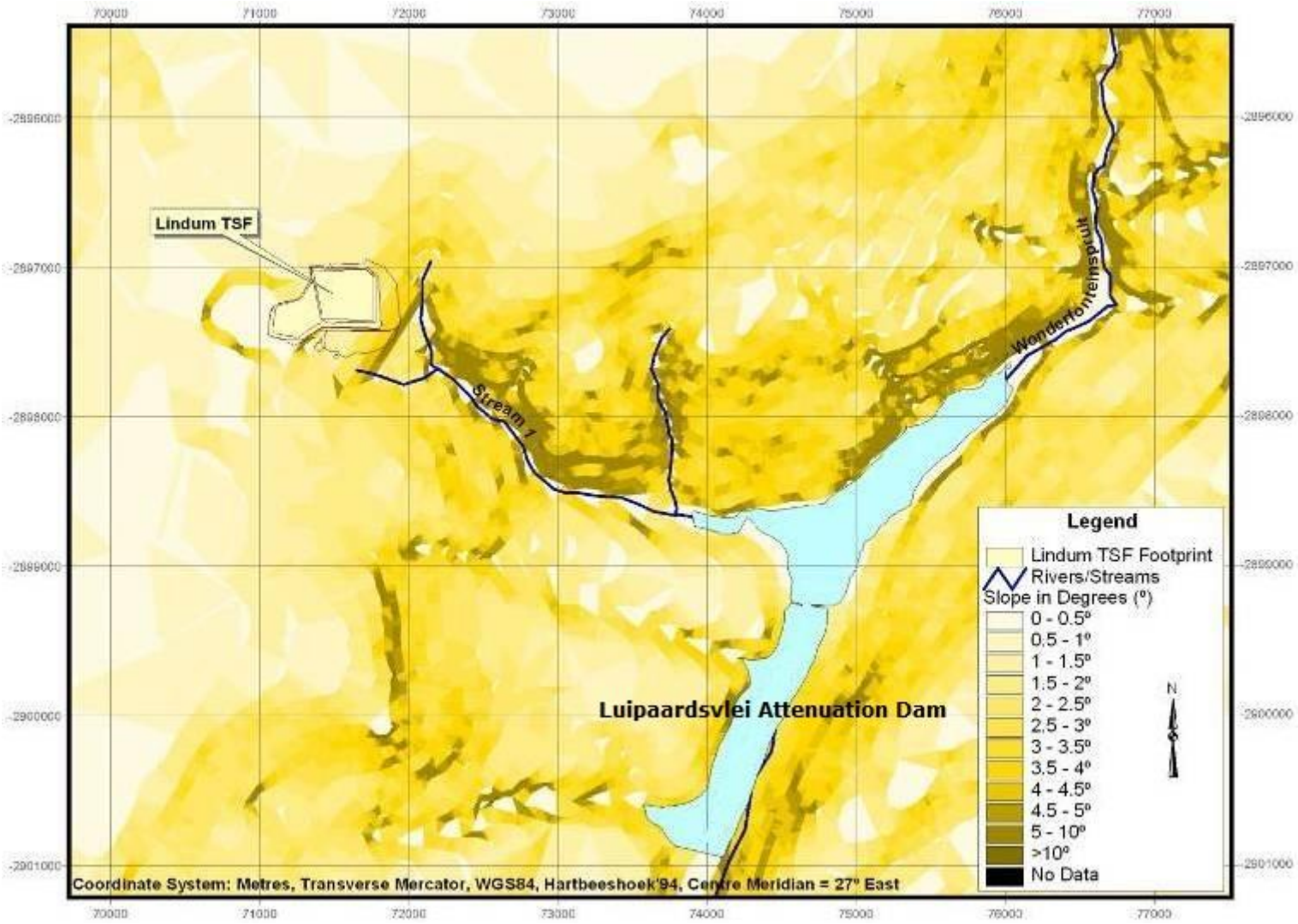

Figure 12: Tributary stream adjacent to the site (labelled as Stream 1) as well as the slope of the land across and around the study area.

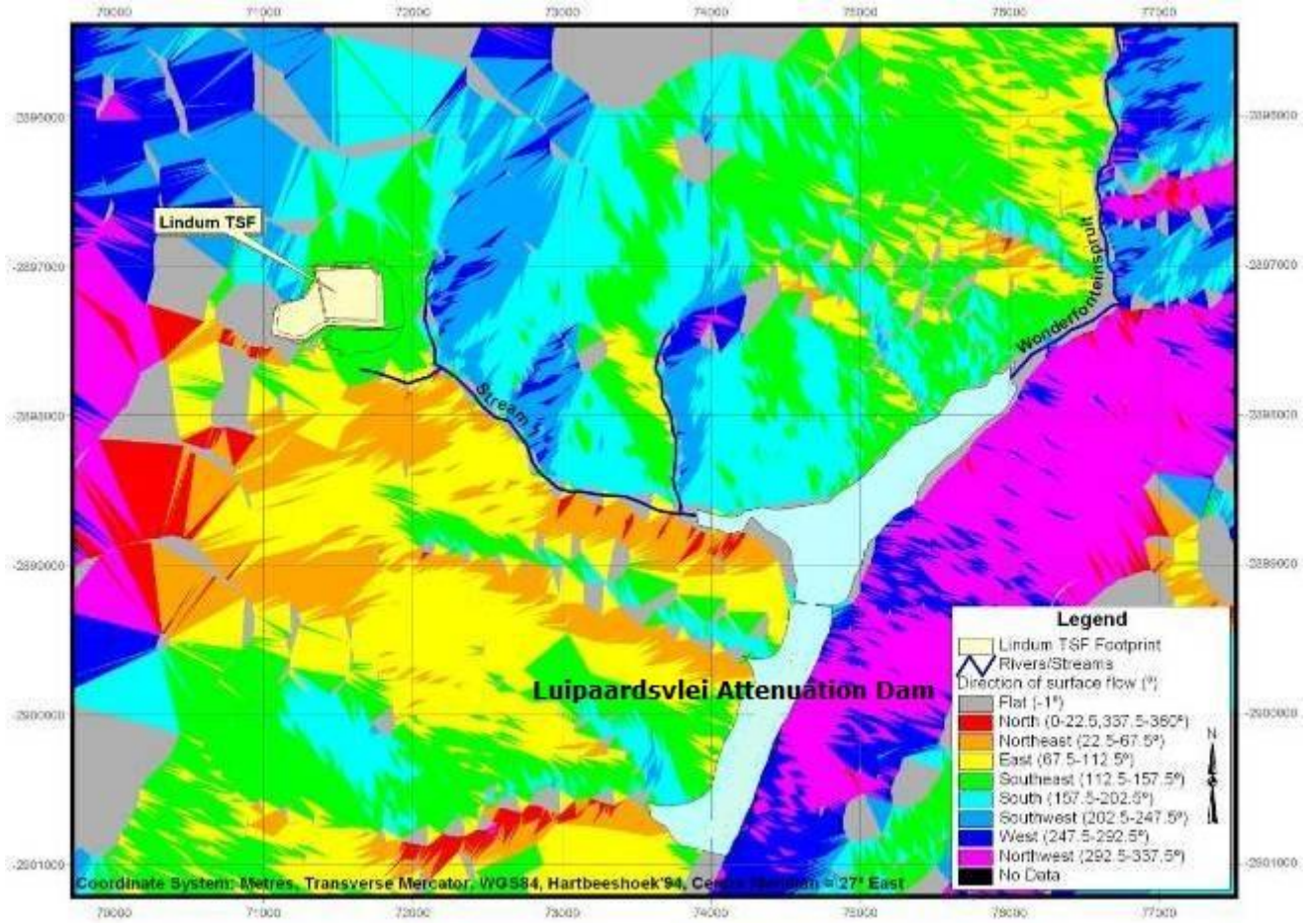

Figure 13: A colour map showing the direction of surface water flow across and downstream from the Study Area

3.9 Wetlands

There are no natural wetlands situated within the footprint of the Lindum TSF or within the scope of this reclamation project. An area to the south east of the site has been delineated as a wetland area. As the pipeline passes through this area a General Authorisation was issued by the DWA.

3.10 Groundwater

The Lindum TSF lies above the Zuurbekom dolomitic compartment. The compartment has a storage volume of 35.5 million m³ per 5 m drawdown. The underlying aquifer type is expected to be weathered and fractured rock aquifers of the Witwatersrand Super group. These are also classed as minor aquifers surrounded by dolomitic (karst) aquifers (Malmani Dolomites), according to the Johannesburg 1:500 000 Geohydrological Map series. Dolomite aquifers are known to contain large quantities of groundwater and are commonly associated with sustainable groundwater abstraction. However these formations are not considered to contain economic and sustainable aquifers, but localised high yielding boreholes may exist where significant fractures are intersected.

The old mine workings (mine voids) can be classified as a separate aquifer. Over 100 years of gold mining in the Randfontein and Krugersdorp area created an underground mine void, referred to as the Western Basin Mine Void. The base of the northern section of the Millsite pit and the entire length of the Porges pit either intersects underground workings, or are within a few metres of known underground workings. All the mine workings in the northern Randfontein area are believed to be connected and therefore also connect the aquifers of the Malmani dolomite and the Witwatersrand strata. The mine workings with its shafts and tunnels form preferential flow paths. Preferential flow is one of the primary groundwater flow mechanisms because they act as a major conduit for water, dissolved matter and contaminants.

The approximate elevation of the groundwater level at the Lindum TSF is 1670 mamsl. The annual groundwater recharge in aquifers of the Witwatersrand Super group can be as high as 6.5% of the annual precipitation, whilst the maximum recharge to the dolomitic aquifer is almost 9% for a mean annual precipitation of 800 mm.

3.10.1 Groundwater Use

Groundwater from the Zuurbekom aquifer is extracted for mining and municipal purposes. Only agricultural holdings and farms primarily depend on groundwater as the town is supplied with potable water by the Rand Water. The rural areas are served by utilising groundwater through private boreholes.

3.10.2 Groundwater Quality

Currently the groundwater nitrate and phosphate quantities are within acceptable levels according to the South African Water Quality Standards. Groundwater sampling conducted by Digby Wells in 2009 indicated that the groundwater quality was severely contaminated due to mining practices and had high sulphate content; however, water quality in terms of sulphate appears to have improved when sampling was conducted again in 2012.

3.10.3 Groundwater Ingress

Water ingress into the Western Basin mine void, under which the Zuurbekom dolomitic aquifer falls, is summarised in Table 4.

Table 4: Western Basin water ingress summary

INGRESS AREA	TOTAL VOLUME (ML/DAY)	PERCENTAGE OF TOTAL INGRESS VOLUME (%)
Natural and undisturbed geology	7.70	48
Reef outcrops	0.96	6
Surface mining along the Witpoortjie fault	3.50	22
TSFs and mine dumps base seepage zones	3.36	21
Rivers and water bodies	0.48	3

The opencast pits along the Witpoortjie Fault to the east of the Lindum TSF have been identified as areas of major water ingress to the Western Basin underground mine void, which includes the Zuurbekom dolomitic compartment. Base seepage zones from surrounding TSFs and mine dumps have also been identified as major contributors to mine void ingress. The base of a TSF is expected to be saturated with contaminated water from rainfall. This results in the large contribution of TSFs to the water ingress to the Western Basin mine void. Figure 14 illustrates the various ingress points, with the Lindum TSF illustrated as two red squares.

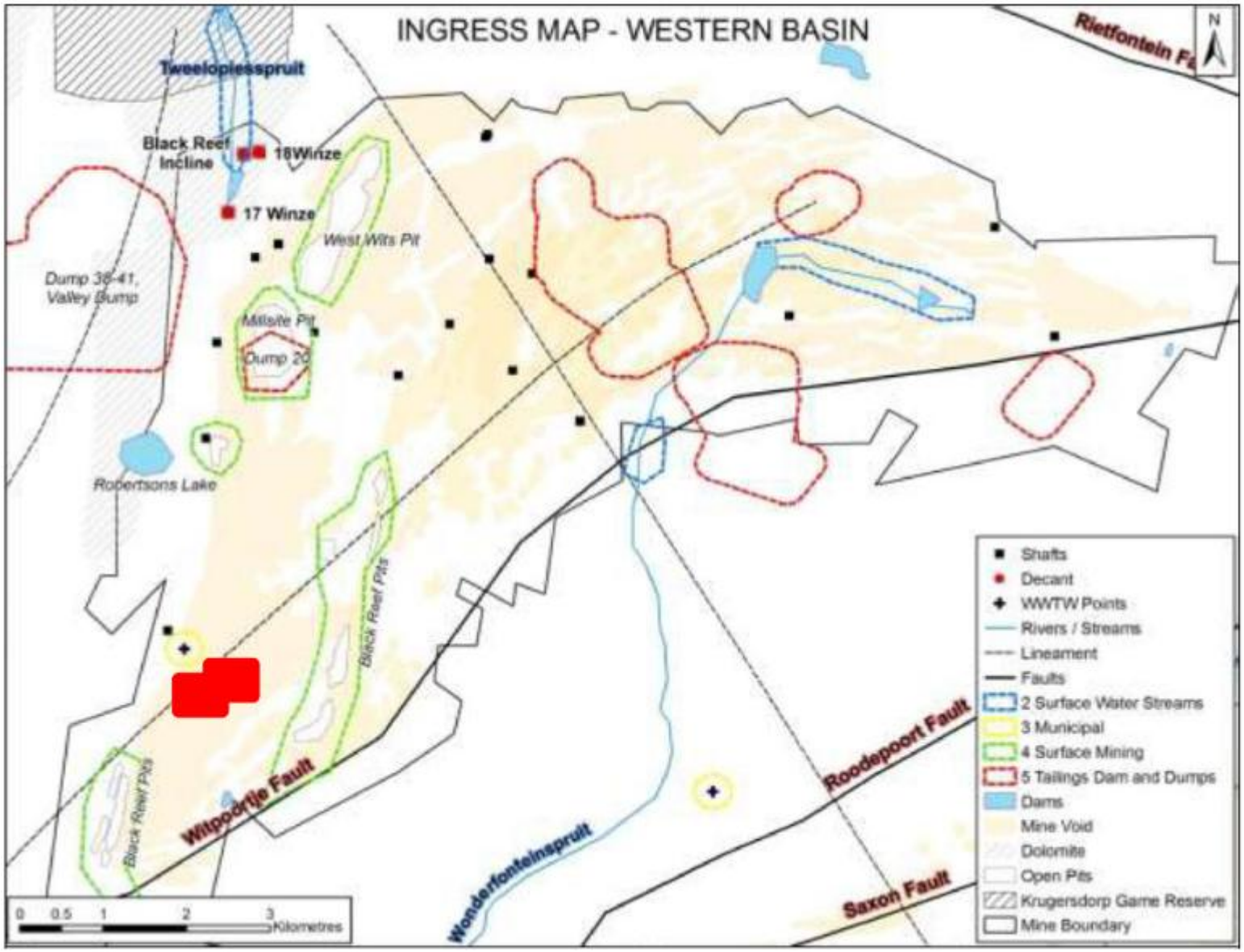

Figure 14: Groundwater Ingress Points

3.10.4 Groundwater Pollution Migration

Groundwater modelling scenarios for the West Rand area indicate the pollution migration under scenarios of mine dewatering, and no dewatering. Contaminant migration illustrated in the modelling scenarios corresponds closely to the total-count radiometric migration of pollution as discussed in Section 3.9. Figure 15 and Figure 16 illustrate the migration patterns of the polluted water after approximately 10 years (3600 days) with, and without, the dewatering of the mine pits. The red square in the north eastern corner of the map illustrates the location of the Lindum TSF.

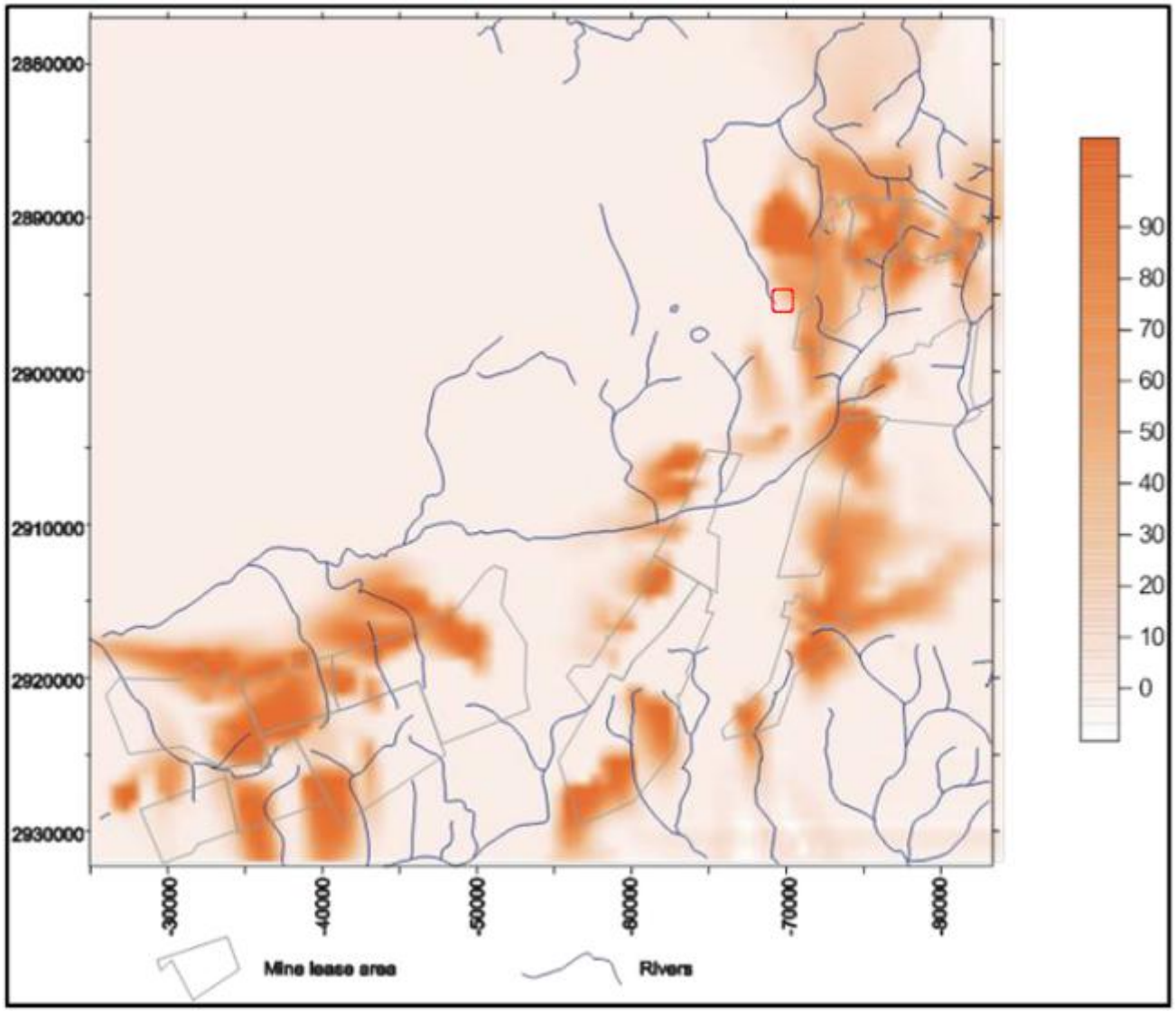

Figure 15: Pollution migration with no dewatering after 3600 days

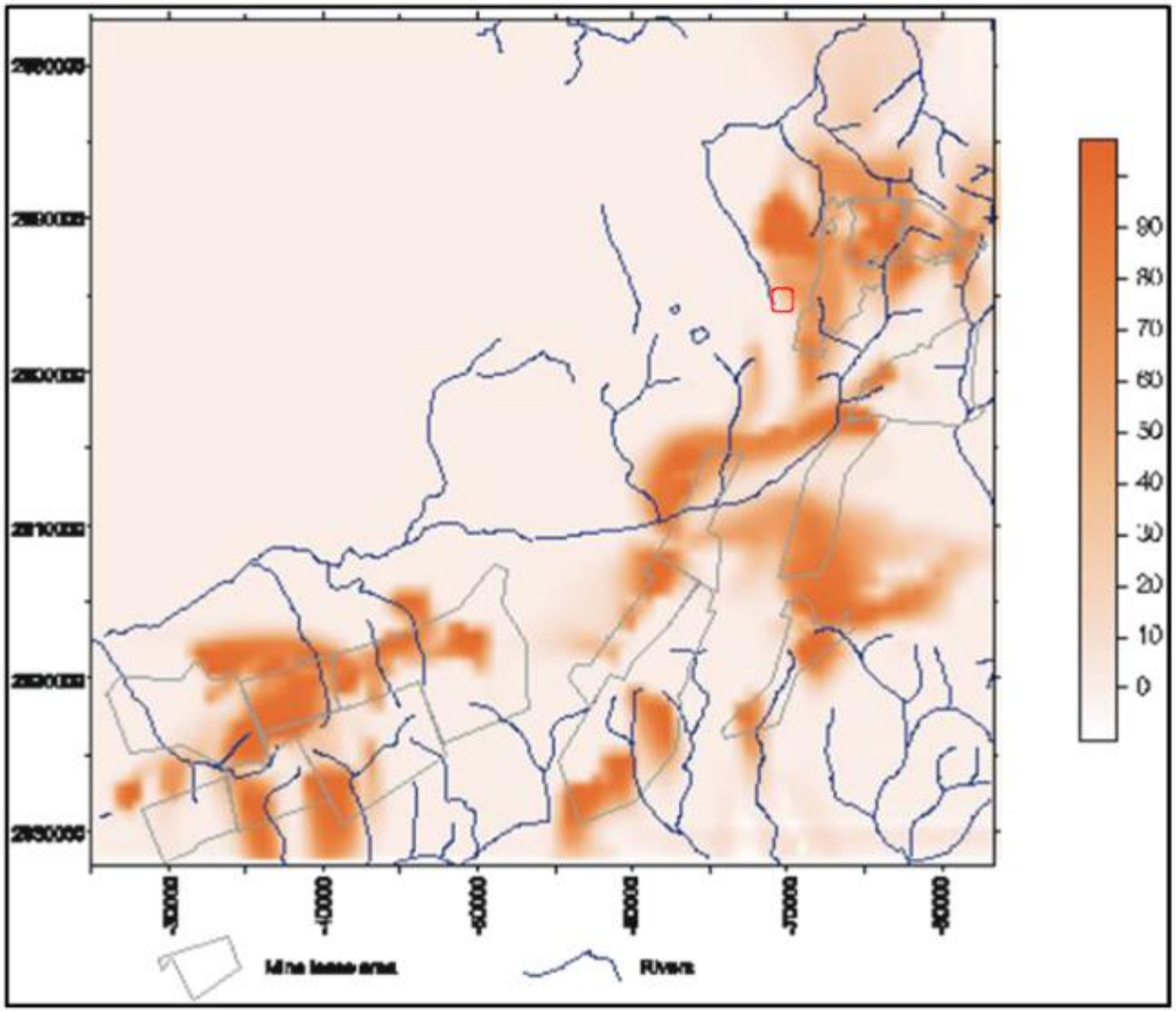

Figure 16: Pollution migration with mine dewatering after 3600 days

3.11 Archaeology

The information presented in this section of the report has been sourced from the specialist Heritage assessment conducted by Dr JA van Schalkwyk in February 2012. (A copy of this report is contained as Appendix 3).

The archaeological study revealed that, due to the fact that the study area has been subjected to intense mining, industrial and urban development for many years, any heritage sites and features dating to the pre-colonial past that might have occurred here would likely already have been destroyed. Furthermore, no relics from the Stone Age or Iron Age were identified.

Despite the above, however, two Grade III structures from the historic period were found within the site footprint (heritage resources worthy of conservation on a local authority level, as opposed to Grade II "Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region"; or Grade I "Heritage resources with qualities so exceptional that they are of special national significance"). The first being the tailings dam itself and the second being the undefined stone structures that could possibly have been related to mining activities in the past.

Tailings dump

Review of the 1944 1:50 000 topocadastal map showed evidence of an existing tailings dump within the current Lindum Footprint. It can therefore be assumed that the tailings dump is older than 60 years, although the exact date of origin is undetermined. Evidence from the 1944 map and current images show that the shape of the dump has changed over time, while remaining within the same footprint.

Undefined Stone structures

A number of large semi-circular structures are located on the southern side of the study area. These stone structures will be referred to throughout the document as "Undefined Stone structures" as per the Heritage Report and should not be confused with chance find structures which may be discovered during operation. They are constructed of large pieces of dressed stone and kept in place with concrete. The exact function of these structures is unknown although it can be assumed that they are related to past mining activities. Due to their location adjacent to the tailings dam it is assumed that they are also older than 60 years.

Figure 17 was taken on the 6th of December 2012 at a site visit conducted. The location of the stone structures is indicated in Figure 18.

Figure 17: Heritage structures which could possibly have been used for early mining purposes, located within the project footprint

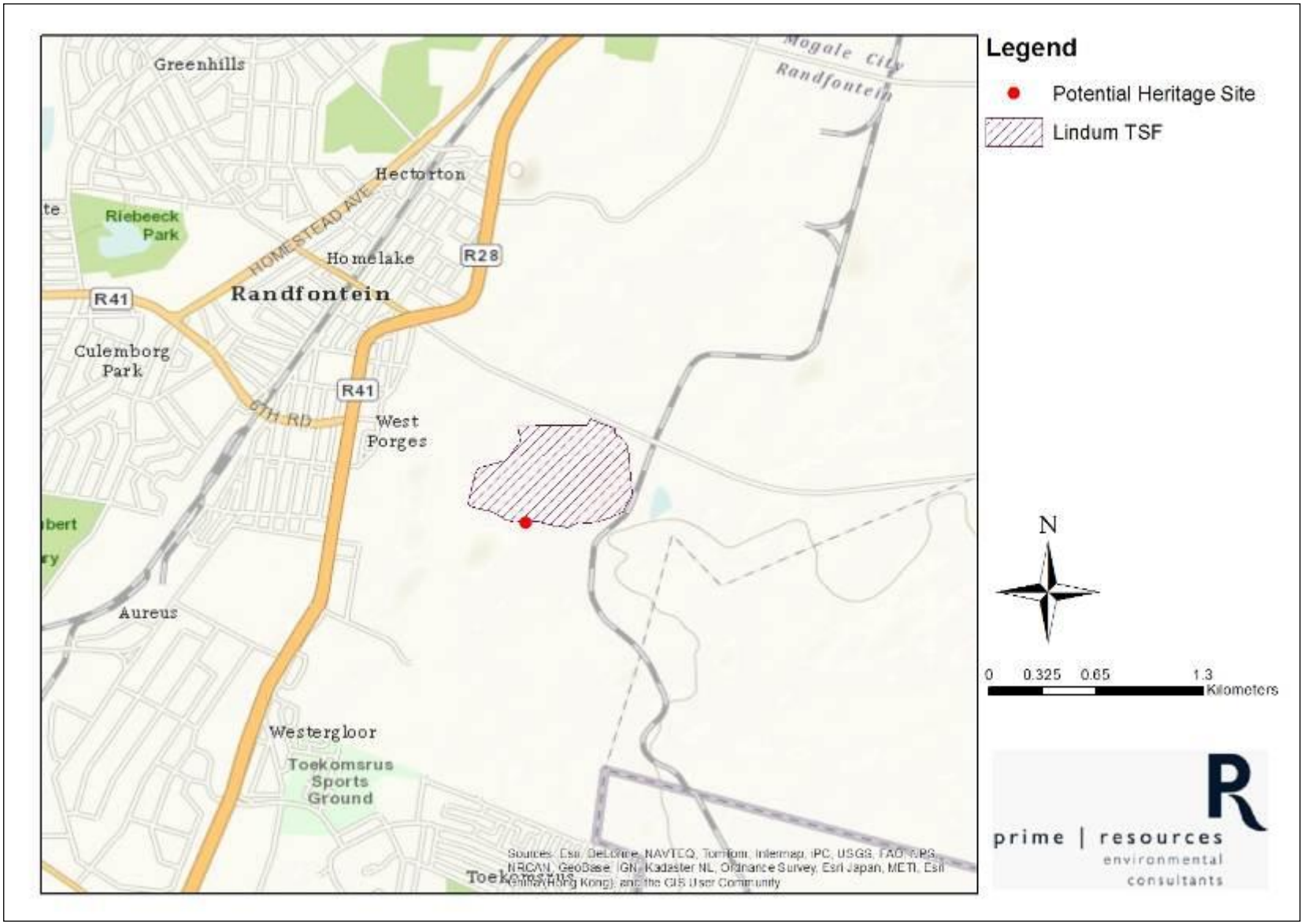

Figure 18: Location of the possible heritage site in relation to the Lindum TSF

3.12 Air Quality

The primary economic activities in the Randfontein area are related to mining and agriculture. Sensitive receptors to poor air quality include the Randfontein Hospital adjacent to the Lindum TSF and the community of Randfontein, (Figure 19). Current sources of pollution within the study area include:

- Vehicle tailpipe emissions;
- Biomass burning e.g. veld fires in September and refuse burning; and
- Waste disposal and treatment e.g. dust emissions at the Uitvalfontein landfill site.

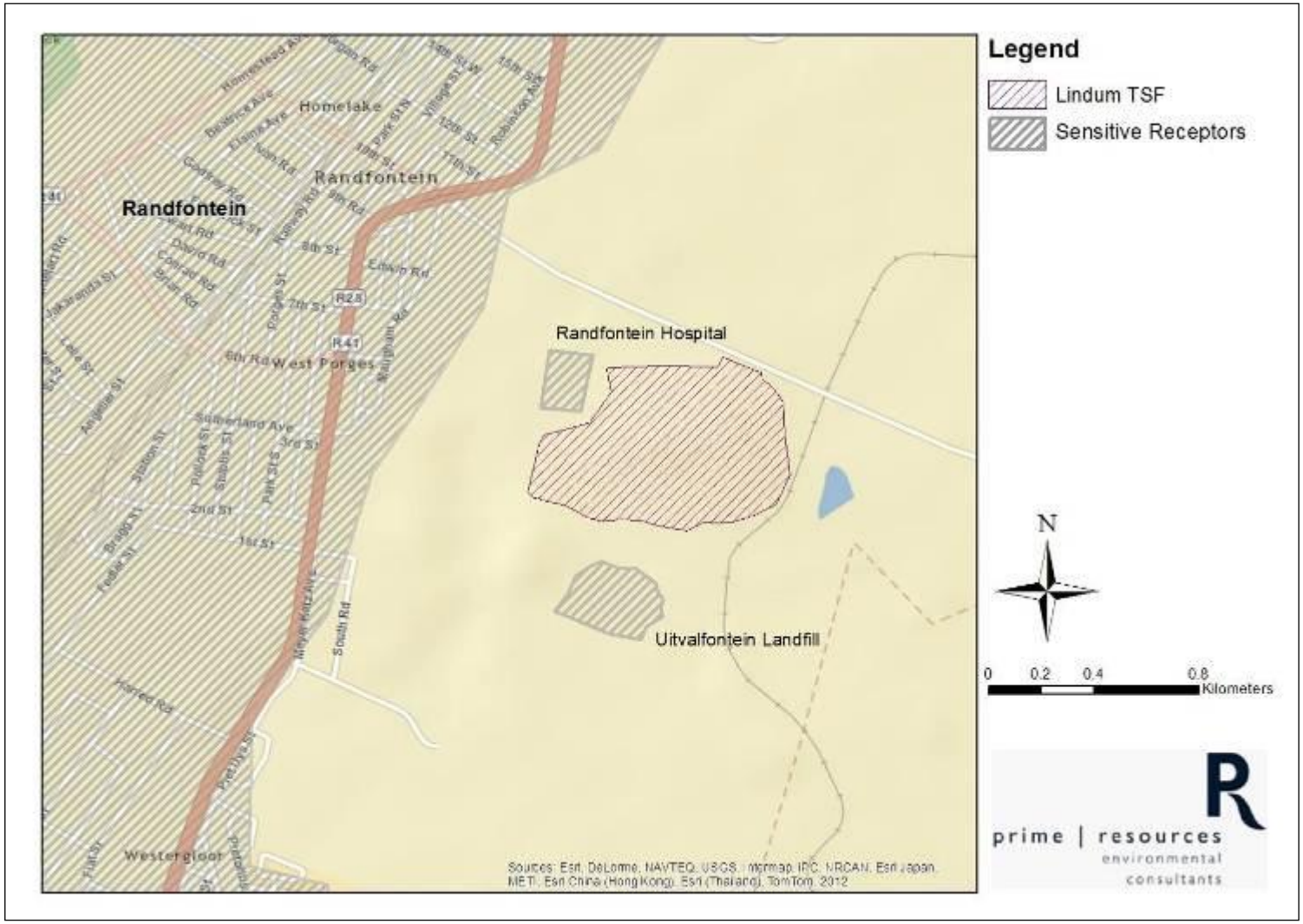

Figure 19: Sensitive receptors surrounding the Lindum TSF

3.13 Traffic

The R41, as seen in Figure 1, is situated adjacent (north) to the Lindum TSF and intersects the access roads to the site at various places. The R28 (Main Reef Road) is in close proximity (1km west) to the Lindum TSF. The Lindum TSF is situated adjacent (east) to the residential area of Randfontein which utilises the R41 and the R28.

3.14 Noise

Existing sources of noise include traffic generated noise on the R41 adjacent to the Lindum TSF. Sensitive receptors include the Randfontein Hospital and the residential area of Randfontein (Figure 19).

3.15 Socio-Economic

3.15.1 Location of the Project

The Lindum TSF Reclamation Project is located to the west of Johannesburg, and south east of the town of Randfontein in the Gauteng Province. The study area falls under the Randfontein Local Municipality (RLM) (Figure 20).

3.15.2 Randfontein Local Municipal District

Population

A census done in 2011 indicated that approximately 149 286 people live in the RLM. This indicates a 14% increase in inhabitants from the 2001 census.

Water and sanitation

Rand Water supplies the RLM district with all of its purified water. No water from local sources it abstracted or purified for use as potable water all the water is obtained from the Vaal River and kept in reservoirs in the municipality area.

In 2007 78% of the households in the RLM district had flush toilets connected to a RLM sewerage system, and 6.6% of households were using pit toilets.

The majority of the households in the RLM district have waste removal services operating. The RLM generates about 129 857 tonnes of general waste per annum. There is one landfill site (the Uitvalfontein site) operating the RLM district.

Access to electricity

Eskom is the main electricity provider for the RLM district. 77.2% of households used electricity in 2007 whereas 17.2% of households used candles for lighting. Paraffin is still used for cooking purposes in some households.

Health care facilities

There is one private hospital, one mining hospital and seven clinics in the RLM. The Randfontein Hospital is located directly next to the Lindum TSF.

Educational resources and Employment

There are 14 primary schools and 8 secondary schools in the RLM. There is also one college in the RLM district. The percentage of adults in the RLM district with no education whatsoever decreased from 10% in 2001 to 5% in 2007.

The RLM has had an increase in employment from 2001. Where 25% of the residents were unemployed in 2001 the percentage in 2007 was 17%.

Housing

The majority of the residents of the RLM reside in brick structures on a separate stand. The second largest group of people live in workers hostels close to the mine. About 20% of the inhabitants live in informal settlements. Informal settlements surrounding the Lindum TSF include Kagiso (2.5km north east of the Lindum TSF) and Mohlakeng (3km south east of the Lindum TSF).

Safety and security

Crime rates in the RLM district increased between 2007 and 2009. Contact crimes decreased, however property related crimes and general crimes increased.

Access to transport

There are no subsidised bus services in the RLM district. The majority (43.4%) of the people in the RLM district rely on private transport. Minibus taxis are the second most popular mode of transport.

3.15.3 Surrounding communities

The communities surrounding the proposed project area are listed in Table 5 and shown in Figure 20. The closest community is the Randfontein community, specifically the Randfontein Hospital and the Uitvalfontein Landfill site which are located approximately 200 m and 500 m away from the western extremity of the proposed project area respectively.

Table 5: Surrounding communities and approximate distances from the proposed project area

COMMUNITY	APPROXIMATE DISTANCE FROM PROPOSED PROJECT
Randfontein	1 km
Toekomsrus	2.7 km
Azaadville	3.5 km

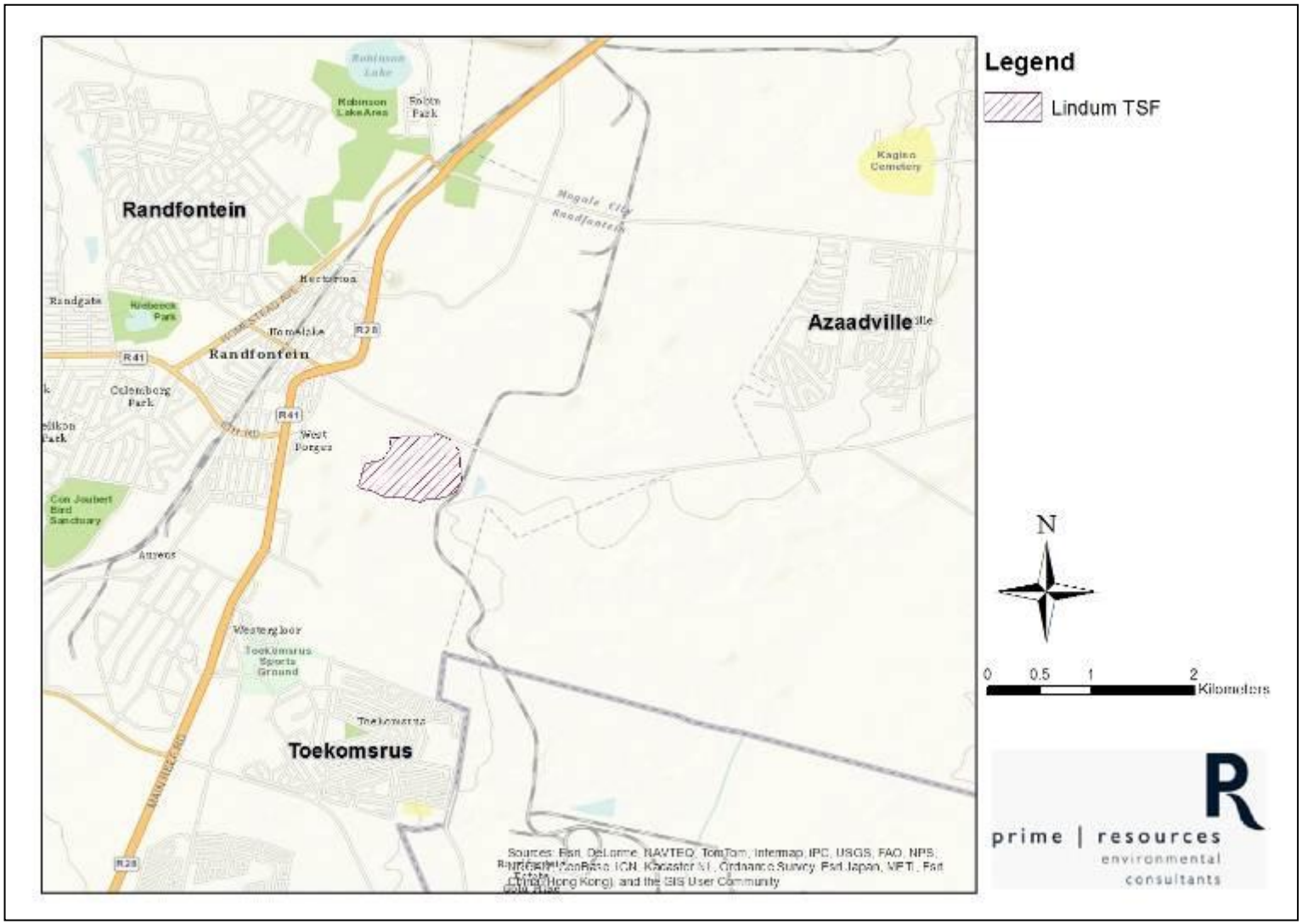

Figure 20: Location of the Lindum TSF in relation to the surrounding towns

3.16 Sensitive and Protected Areas

The sensitive areas disclosed during the scoping phase of the proposed Lindum TSF Reclamation Project are displayed in Figure 19. The Sensitive Vegetation areas are indicated in Figure 8.

The receiving streams and the surrounding residential areas (including the adjacent Randfontein Hospital) are considered to be sensitive to the proposed development.

4 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed Lindum Reclamation Project will take place exclusively within the existing TSF footprint and limited surrounds. The Lindum TSF footprint and surrounds covers approximately 30 Ha and contains approximately 6.2 million dry tons of residue tailings containing an estimated 58 433 ounces of gold (See Figure 1).

4.1 Reclamation Method

Conventional hydraulic mining methods are to be used to process the TSF.

Hydraulic mining

Hydraulic mining entails the use of high pressure streams of water to erode and pulp the tailings in sections, washing the material downwards to a central channel which drains to a sump constructed in the low point of the TSF. In the case of the Lindum TSF, the low point will be located in the south eastern corner of the TSF. The material is then passed through a screen to ensure that no largeor tramp objects are included in the slurry. Once the required density of tailings material is obtained within the sump, the slurry is then to be pumped via an existing pipeline route to the existing Cooke plant for processing. See Figure 21 and Figure 22 below for examples of Hydraulic mining.

Figure 21: Typical Hydraulic mining technique being used to mine tailings

Figure 22: Typical Hydraulic mining technique being used to mine tailings

4.1.1 Processing and deposition

The slurry will be transported along an existing pipeline route to the Cooke Plant through a 200mm pipeline for processing. The existing pipeline corridor forms part of a shared service utility (and the subject of an existing, approved EMP which considers the existing route and which allows for a tailings pipeline, potable and process water pipeline).

Approximately 60 000 tons per month (tpm) of material will be processed from the Lindum TSF at the Cooke Plant facility (which equates to a timeframe of approximately 9 years until the TSF is fully reclaimed). The plant, beyond the milling section, will ultimately be operating at a capacity of 400 000 tpm as part of the overall COP of which the Lindum product will form a part.

The resultant tailings arising from the 400 000 tpm plant feed will initially be deposited on the existing Cooke TSF until the COP is fully implemented, thereafter deposition will take place into disused open cast pits situated within and around Randfontein. The deposition of processed material into the pits as part of the COP is the subject of the current COP environmental process being considered by the DMR and other relevant Competent Authorities.

4.1.2 Supporting Infrastructure

Access Road and pipeline

An existing 5km unpaved access road links the Lindum TSF area with the Cooke Plant. The pipeline corridor largely follows the same route as the access road and will consist of 5 lines:

- 400/450 mm water process line
- 450mm tailings line
- 400mm feed product line

- 152mm Rand water line
- 200mm Lindum line

The pipeline route/corridor forms part of an existing route connecting the Cooke plant to the Millsite area to the north and includes 3 river crossings which have been included under an existing WULA and amendment undertaken by Digby Wells Environmental in October 2012 for the COP.

4.1.3 Bulk Services

Water

A recycled process water supply pipeline for the COP will be available for the purposes of providing process water for hydraulic mining activities at Lindum. Process water for the Lindum TSF reclamation project and the COP project will be sourced predominantly from excess fissure water arising at the Cooke Shafts, as well as return water from the existing Tailings Dams and pits.

Electricity

Power will be supplied from the existing mine substation located to the north-west of the Lindum TSF, fed from an existing overhead line (to be upgraded as part of the COP to 6.6kV).

4.1.4 Water Balance

The water balances indicated in Figure 23 and Figure 24 below were compiled as part of the surface water assessment conducted by AED in February 2013. It was based upon the existing water balance completed by Ilanda Water Services for the overall COP. The volume of water required on average to fluidise a ton of tailings material was used to determine the summer and winter water balance diagrams shown below. Return periods included a seven month rainy season (October-April) and a five month dry season (May-September) in accordance with the original work conducted by Ilanda Water Services. On average, approximately one cubic meter of water is required to hydraulically mine one Ton of tailings material, but these values differ slightly between the rainy and dry seasons, as demonstrated in the two diagrams below.

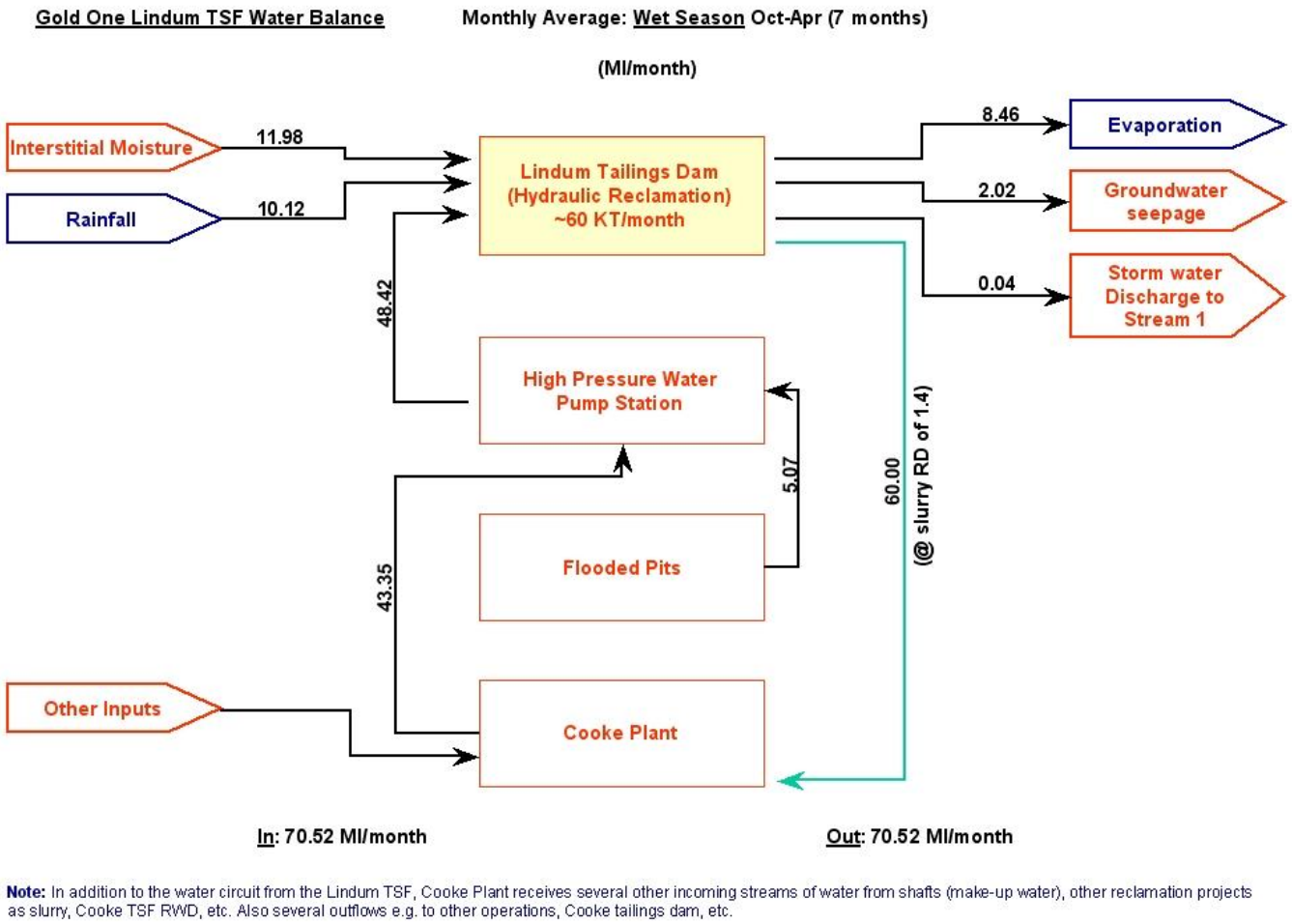

Figure 23: The proposed Lindum TSF water balance for the rainy season (summer), during the period that hydraulic mining of this TSF will take place

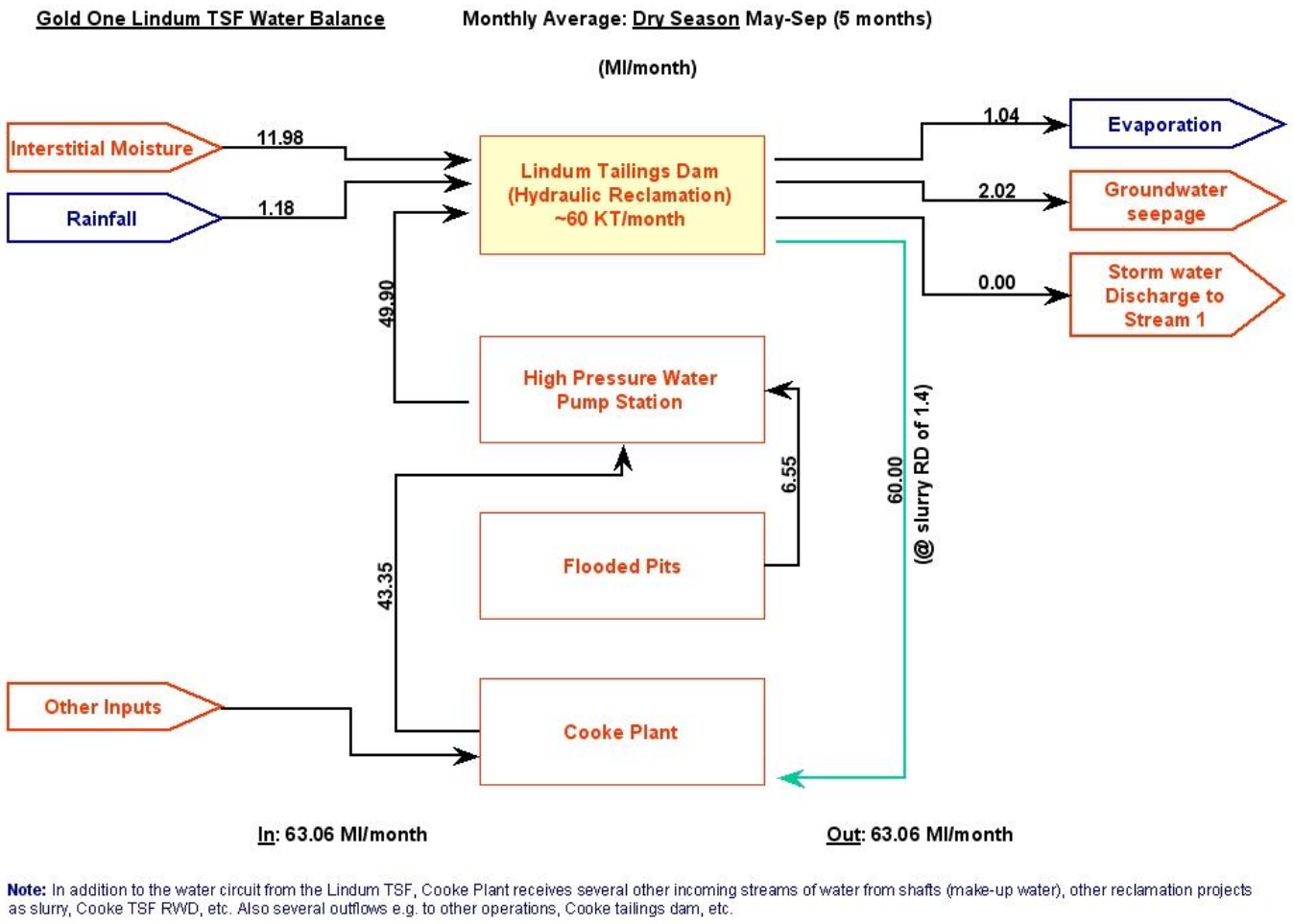

Figure 24: The proposed Lindum TSF water balance for the dry season (winter), during the period that hydraulic mining of this TSF will take place

4.1.5 Solid Waste Management Facilities

Industrial Waste

The solid industrial waste from the project site will be collected at the Cooke 2 salvage yard. Waste will be sorted at the salvage yard and either sold to an appointed contractor or disposed of in an approved manner following collection by the licensed removal company who will dispose of to the appropriate landfill facility.

Screened waste

Waste from the screens fitted at the sump at the Lindum TSF is expected to comprise mostly plant material, and will thus be disposed onto an adjacent TSF (where it can promote vegetative cover), in the adjacent pits or licensed waste disposal facility.

4.1.6 Waste Water Management Facilities

Sewage effluent

Portable toilets will be utilised at the site and will be maintained by service agreement with the relevant contractors.

Pollution Control Dams / Paddocks / Evaporation Dams

A steel process water surge / holding tank will be utilised at the reclamation site. Berm walls, at the Lindum TSF, will be constructed along with trenches to contain contaminated runoff water which may arise from the reclamation area. The berms and trenches will discharge to a point located at a sump located at the South Eastern corner of the TSF. The sump is to be sized to accommodate the volumes of water indicated in Section 3.8. Excess water on site will be reused in the hydraulic mining.

5 PROJECT ALTERNATIVES

5.1 Alternative Locations

Due to the nature of the project, i.e. reclamation of an existing TSF, there are no feasible alternative locations for the proposed activity.

5.2 Alternative Techniques

The reclamation of mineral resources associated with the tailings stored at Lindum will be conducted by hydraulic mining, a "wet" technique proven and utilised extensively for TSF re-mining purposes. Few applicable alternatives currently exist to hydraulic mining apart from mechanical loading and transporting which is prohibitively costly and more environmentally intrusive, and thus no viable alternatives with regard to the reclamation process were considered.

5.3 'No Project' Alternative

The no-project alternative refers to what would happen in the event the proposed TSF Reclamation Project was to not proceed. In this event, the Lindum TSF would remain unused *in situ* as a feature in the landscape, while continuing to exert any existing environmental impacts which may be occurring (e.g. contamination of underlying groundwater resources due to seepage, dust fallout, contaminated runoff) while the potential positive impacts (namely rehabilitation of the contaminated area) would not occur. Furthermore, the potentially exploitable resources would remain caught up in the TSF material, without any additional benefit being derived or extending the viability of the Cooke plant surface operations.

6 PUBLIC PARTICIPATION

This section details the public participation process that has been followed to date for the proposed Lindum TSF Reclamation Project and any further engagement to occur. The public participation process was designed to provide the authorities, surrounding communities (Interested and Affected Parties (IAPs)) and any other stakeholders with information about the proposed project and to allow them the opportunity to register on the IAP database, comment, raise any interests, concerns or comments, or request additional information.

6.1 Scoping Phase Public Participation Process

6.1.1 Identification of Stakeholders

An IAP database was available from previous public participation processes conducted as part of various environmental processes pertaining to activities at the Rand Uranium-Randfontein Surface Operations. This database was updated to include the current contact details of representatives of the relevant authorities (a copy of the IAP database is attached as Appendix 1A) and any further IAPs not currently represented were afforded the opportunity to register on the database.

The relevant authorities identified included:

- Department of Mineral Resources (DMR);
- Department of Water Affairs (DWA);
- Gauteng Department of Agriculture and Rural Development (GDARD);
- South African Heritage Resource Agency (SAHRA);
- West Rand District Municipality (WRDM); and
- Randfontein Local Municipality (RLM).
- National Nuclear Regulator (NNR)
- Federation for a Sustainable Environment (FSE)

The community of Randfontein, including the Randfontein Municipal landfill site and Randfontein Hospital adjacent to the Lindum TSF were also identified as stakeholders, which may be affected by the proposed project.

6.1.2 Background Information Document

A Background Information Document (BID) in both English and Afrikaans, (a copy of which is attached as Appendix 1B), which briefly describes the background to the project, the proposal in brief, the environmental process, where the draft SR can be viewed and the contact details of whom to contact should queries arise, was distributed to the authorities and IAPs via email or registered mail (refer to Appendix1C for the proof of registered mail and emails sent). BIDs in both English and Afrikaans were also made available at the Randfontein Hospital and Randfontein Library for further information.

6.1.3 Media Notice

A media notice, (a copy of which is attached as Appendix 1D), which provides a brief description of the proposed project, the environmental process to be followed, details of applicable legislation, as well as contact details for the EAP, how to register as an IAP, where further information could be obtained, locations where the draft SR was available for public review and commenting periods was published on 22 January 2013 in the Randfontein Herald local newspaper.

6.1.4 Site Notice

Site notices in both English and Afrikaans (a copy of which can be seen in Appendix 1E) were prepared which provided information on how to register as an IAP, contact details allowing all IAPs the opportunity to raise queries and concerns, where the draft SR could be viewed and where further information regarding the proposed project could be obtained. Details concerning the environmental processes to be followed were also included in the site notice, which notified IAPs of the deadlines for the submission of comments. These site notices were posted up for display on 22 January 2013 at visible public locations including the proposed project site itself, the Randfontein Library, the Uitvalfontein Landfill Site and at the adjacent Randfontein Hospital (refer to Appendix 1F for a map illustrating the locations the site notices were posted and photographs of the posted notices).

While posting up a site notice at the Randfontein Hospital, the scope of the project was explained to the hospital manager and the site notices were left with the manager for perusal before posting up at the hospital.

6.1.5 Commenting Period

The commenting period commenced on 22 January 2013 once the media and site notices were published. The media notice, site notices and BID all provided information on how to contact the EAPs and indicated that comments should be submitted before 20 February 2013 when the commenting period ended. The commenting period provided authorities and IAPs with 30 calendar days during which they could register as an IAP and during which any comments, concerns, issues and requests for more information could be raised.

6.1.6 Comments and Issues Trail

The Federation for a Sustainable Environment (FSE) provided Prime Resources with a letter (See Appendix 1G) detailing comments and queries with regards to the Scoping Report. These comments as well as the relevant responses are included in the Integrated Issues Trail (Table 6) found below. Additionally an informal verbal query was made by a hospital employee as to the nature of potential employment opportunities. No comments were received from the authorities.

6.2 Assessment Phase Public Consultation

During the assessment phase this draft EIA / EMP was made available to all registered IAPs (including the relevant Government Authorities) for perusal, review and comment for a 30-day period by placing the report at several locations including the Randfontein local library and at the Mine offices, as well as on Prime Resources' website.

6.2.1 Media Notice

A media notice, (a copy of which is attached as Appendix 1D), which provides a brief description of the proposed project, the environmental process followed, details of applicable legislation, as well as contact details for the EAP, how to provide comments on the report, where further information could be obtained, locations where the draft EIA/EMP was available for public review and commenting periods was published on 17 April 2013 in the Randfontein Herald local newspaper.

6.2.2 Commenting Period

The commenting period commenced on 17 April 2013 once the media notice was published. The media notice provided information on how to contact the EAPs and indicated that comments should be submitted before 17 May 2013 when the commenting period ended. The commenting period provided authorities and IAPs with 30 calendar days during which they could submit any comments, concerns and issues.

6.2.3 Comments and Issues Trail

The FSE once again provided Prime Resources with a letter (See Appendix 1G) commenting on the draft EIA/EMP report. In accordance with MPRDA regulations, a database was compiled detailing the name and contact details of all IAPs (Appendix 1A). As the only comments received were from FSE their comments and issues raised and the responses given are available in Table 6 below, along with reference to the part of the report that has addressed the issue.

Table 6: Integrated Issues Trail

No.	Issue/ Concern/Comment	Response	Mining activity and phase	Section where addressed in document
	Scoping Phase			
1	**FSE appeals to the Applicant that some of the value of the reclamation of gold be ploughed back into the rehabilitation of the entire mining area. As well as appealing to the Applicant to commit to the removal of the <u>entire</u> residue deposit and the rehabilitation of the remaining footprint**	*Rand Uranium have committed to removing all the tailings material within the Lindum footprint and have set aside a sufficient amount (according to the DMR Guidelines) to ensure complete rehabilitation of the entire footprint (30Ha) as well as an amount to facilitate 2-3 years of maintenance and aftercare for the entire rehabilitated area. With regards to the overall Cooke Optimisation Project an additional amount has also been set aside for the overall rehabilitation of the entire mining area.*	Closure	Section 11 & 14
2	**Radiometric surveys over previously reprocessed mine residue deposit footprints have, in some cases, shown elevated levels of residual radioactivity in the soils. It is recommended that regulators and the industry and communities agree on suitable 'soft' end land-uses and buffer zones. The determination of end land use results from following a consultative process, which should commence prior to the operations and which should continue throughout the life of the operation."**	*With regards to end land use, the mine will effectively be rehabilitating the area by removing the TSF and returning the site to a sustainable land use. Land use associated with the Lindum TSF itself includes previous mining activities which have resulted in the creation of the TSF as well as the resultant degradation of vegetation. According to the heritage specialist study the TSF in some form has been in place for over 60 years (see Heritage Specialist study Appendix 3). Throughout the life of mine suitable end land uses will be identified and the potential for residual radioactivity in soils taken into account.*	Closure	Section 7.5.4 and Section 11
3	**"In order to address residual and latent impacts, the FSE strongly recommends that the Applicant adopts the precautionary approach and consider the following risks when determining the subsequent development of the footprint:** • **The near certainty of capillary rise of acid mine drainage;** • **The near certainty of sulphate, chloride, metal and Technologically Enhanced Natural Occurring Radioactive Material (TECNORM) contamination of soils and**	*These comments have been noted. Both Ground and Surface Water specialist studies were commissioned and completed over February/March 2013. The aim of the studies was to assess the potential impacts of the reclamation process on the surrounding water bodies (both ground and surface) and to indicate mitigation measures and monitoring procedures to reduce any impacts identified.* *Additionally Dr Japie van Blerk has been appointed to conduct the Radiological Assessment as part of an Authorisation Change Request for the NNR. This will*	LOM	Section 7 Appendix 2 ,4 and 5

No.	Issue/ Concern/Comment	Response	Mining activity and phase	Section where addressed in document
	sediments; • **The near certainty of sulphate, chloride, metal and TECNORM contamination of surface water bodies and their sediments, and ground water. In addition, the potential contamination of surface soils overlying shallow polluted groundwater via evaporative pathways during dry seasons.** • **The concomitant loss of genetic/biodiversity and potentially ecosystem goods and services on disturbed, fragmented or polluted properties.** • **The potential for bioaccumulation of some metals and TECNORM by flora and fauna.** • **The potential for exposure of fauna and humans to bioaccumulated pollutants.** • **The potential for acute and latent toxicity impacts of bioaccumulated pollutants on humans and the potential for radioactivity impacts from TECNORM on humans.** • **The potential for structural damage to buildings and other structures, and human injury, by mining-exacerbated sink-hole formation.**	*include both Radiological worker and Public safety assessments.*		
4	**The reclamation of the Lindum TSF will necessitate the removal of vegetation which will result in the liberation of contaminated dust. The potential for airborne pollutants from the reclamation operations will be high even if the hydraulic method is used for the remining process.** **The FSE calls upon the Applicant to assess the acute and chronic health impacts as well as the financial, social and nuisance aspects associated with mine dust exposure in its EIA Report.** **The FSE strongly recommends an assessment of the ambient respirable dust and the impacts of**	*The impacts on air quality have been considered during the compilation of this report. Due to the nature of the hydraulic reclamation activity as well as the localised nature of the work area, the impacts were deemed to be low with mitigation measures in place.* *Additionally a Radiological air-pathways study was conducted as part of the NNR process.*		Section 7.3 – 7.6 Appendix 5

No.	Issue/ Concern/Comment	Response	Mining activity and phase	Section where addressed in document
	respirable quartz dust on human health.			
5	**The FSE recommends that EIA Report investigates the risks associated with the radiological air-pathways since the EIA Reports are often silent regarding these risks."**	*A Radiological air pathway study was conducted as part of the NNR Authorisation Change Request.*	LOM	Appendix 5
6	**"The FSE recommends that the Applicant and authorising authorities consider the appended submission on the dust regulations by the FSE to the Parliamentary Portfolio Committee on Water and Environmental Affairs in this regard."**	*Noted.*		
7	**"We recommend that the assessment of hydrology includes a full hydrological cycle in order to encompass and assess ecosystem goods and services, which can be compromised by an accelerated EIA."**	*A full Hydrological and Surface water assessment was conducted by Garfield Krige of AED in February 2013 to assess the potential impacts of the proposed mining activities. Whilst the study did not take place over a full hydrological cycle the study did focus on the full hydrological cycle*	LOM	Appendix 2
8	**"We recommend that the EIA be conducted in the appropriate season since the influence of seasonality on detection of flora and fauna, and evaluation of biodiversity is well recognised worldwide."**	*While the site falls within the sensitive Soweto Highveld Grassland Vegetation, the actual site footprint is already highly disturbed as a result of historical mining activities. As such the reclamation process will take place on an already disturbed footprint and the removal of the tailings material and the rehabilitation of the area will provide the opportunity to revegetate with natural vegetation post closure.*	LOM	Section 3.6

No.	Issue/ Concern/Comment	Response	Mining activity and phase	Section where addressed in document
		Assessment Phase		
9	**FSE agrees that the mitigation and management measures listed in the EMP are acceptable, however they recommend that an environmental forum be established consisting of interested and affected parties, the regulators, Gold One and NGOs in order to establish a platform where IAPs' issues and concerns can be raised and addressed, and where the Applicant can report on its environmental performance to the public.**	*As per Regulation 55 of the MPRDA, an audit will be undertaken every two years by an independent Body, whereby the implementation of the EMP will be investigated. The ECO on site will be responsible for the day to day implementation of the EMP and the management of Lindum TSF will fall under the existing management strategy of the overall COP.*	LOM	Section 10
11	**Care has to be taken not to perpetuate inappropriate land uses.**	*Throughout the life of mine suitable end land uses will be identified and the potential for residual radioactivity in soils taken into account.*	Closure and Decommissioning	Section 11
12	**It is essential that the cyanide be removed from the processed material to a safe level before deposition.**	*Although the processing of the tailings material does not fall within the scope of this EIA/EMP this comment was note.*	LOM	N/A
13	**Due to the findings indicated within the specialist studies conducted during the scoping phase FSE recommends that special care be taken with regards to ground and surface water monitoring. It is therefore important that the dissemination of information to potentially affected water and land users of potential risks or hazards be sustained and on-going and that the pollution of the groundwater be prevented.**	*Groundwater quality monitoring programmes will include monitoring of the groundwater around the TSF during operation and decommissioning as well as post closure to ensure trace elements/metals of concern do not reduce the groundwater quality in compliance to mine standards and WUL requirements.* *Surface water quality monitoring will be completed to determine if any trace remnants of the tailings material enters the nearby streams in compliance to mine standards and WUL requirements*	LOM	Section 10.1 & 10.2

No.	Issue/ Concern/Comment	Response	Mining activity and phase	Section where addressed in document
14	**As noted in Section 1.4.4, the 2010 WUL application, which includes the current Lindum TSF footprint, is currently under final consideration by the DWA.** **FSE advises that:** • **A water use licence application is not a basis to commence operations** • **A delay in issuing the licence does not constituted a "deemed" approval.** • **A flawed water use licence is almost as good as no licence at all – the mine has to be able to comply with the conditions.**	*Noted.*	Prior to mining activities taking place.	Section 1.4.4
15	**FSE strongly recommends that the management of dust fallout and fugitive emissions during the reclamation process be based on international best practice.**	*While the significance of the impact of dust fallout was deemed to be low before and after mitigation a full list of management and mitigation measures have been included.*	LOM	Sections 7.3.1, 7.4.1, 7.5.1, 7.6.1
16	**FSE have recommended additional Land capability mitigation measures to be implemented.**	*These additional mitigation measures have been included in section 9.1 where relevant.*	LOM	Section 9.1

7 DESCRIPTION AND ASSESSMENT OF POTENTIAL IMPACTS

7.1 Introduction

This section will describe the potential impacts that the proposed Lindum TSF Reclamation Project could have on the receiving biophysical and socio-economic environment during construction, operation, decommissioning and post-closure phases. The following tables detail the activities associated with the different phases of the project which may result in the potential impacts identified.

Construction (6 months)

ACTIVITY	DESCRIPTION
Sump/screen /pump	The sump/screen and pump will be constructed in the south eastern corner of the TSF.
TSF	Vegetation on the surface of the TSF will be progressively cleared
High pressure water, slurry and gland service pumps	The high pressure water, slurry and gland service pumps will be transported to site and positioned on the TSF SE corner on suitable foundations and connected electrically.
Portable toilets	Portable toilets will be transported and positioned on site.
Berms	Berms, as necessary will be constructed around the TSF and trenches aligned so as to contain water to the TSF and sump.
Process water holding tank	The process water holding tank will be transported to site And positioned on a suitable foundation-supply connected from existing process water line on nearby pipe route
High pressure water ring main and monitor guns	HP water ring main and monitor guns transported to site and positioned to commence mining

Operation (9 years)

ACTIVITY	DESCRIPTION
Sump/screen/pump	The sump / screen/and pump will be utilised to collect slurry arising from hydraulic mining.
TSF	The TSF material will be mobilised / reclaimed through hydraulic mining.
High pressure water , slurry and gland service	The high pressure water, slurry and gland

Pumps	service pumps will be used in hydraulic mining and to pump the pulped or slurried product to the Cooke plant.
Portable toilets	Portable toilets will be used by personnel on site.
Process water holding tank	The process water holding tank will store the recycled process water that will be used during the hydraulic mining of the TSF.
Water ring main and monitor guns	Will be used continually for mining and advanced according to the mining plan

Decommissioning (2-3 months)

ACTIVITY	DESCRIPTION
Sump/screen/pump	The sump/screen and pump will be removed along with any final excess material contained therein.
TSF site/footprint	Any remaining tailings material will be removed from the TSF footprint and the site will be rehabilitated.
High pressure water, slurry and gland service pumps	The high pressure water slurry and gland service pumps will transported off site and foundations demolished and rubble removed to a suitable disposal site after radiation screening.
Portable toilets	Portable toilets will be transported off site and returned to service provider.
Berms	The berms will be levelled as part of the TSF footprint cleanup.
Process water holding tank	The process water holding tank will be transported off site foundation demolished and removed to a suitable disposal site after radiation screening.

Post-closure (3 to 5 years)

ACTIVITY	DESCRIPTION
TSF footprint	Rehabilitation will be monitored for a period of 3-5 years to ensure effective restoration of land to a sustainable use

7.1.1 Specialist Studies

At the scoping level the relevant studies were identified and the appropriate specialists appointed. Specialist studies were undertaken to investigate the baseline heritage, surface water and ground water conditions and assess the potential impact of the proposed development on the receiving environment. Considering the significance of impacts no other studies were deemed necessary although desktop baseline information was gathered for all environmental factors.

The specialist studies conducted were as follows:

SPECIALIST FIELD	SPECIALISTS	ATTACHED AS APPENDIX
Surface water	African Environmental Development (AED)	2
Archaeology and Heritage	Dr J van Schalkwyk	3
Groundwater	Groundwater Square;	4

7.1.2 Impact Ratings

The environmental impacts are listed according to relevant mining activities associated with a particular environmental receptor. The significance of the potential impacts were then rated according to the rating methodology (discussed in Section 7.2). **Mitigation measures are suggested for all impacts and these impacts are then re-rated post-mitigation (these are the values indicated within square brackets)**. The tabulated impact assessments and mitigation measures are further elaborated upon within Sections 0, 7.4, 7.5 and 7.6 per receptor / specialist study.

7.2 Impact Rating Methodology

As stipulated in Regulation 50(c) of the MPRDA, the EIA must include "an assessment of the nature, extent, duration, probability and significance of the identified potential environmental, social and cultural impacts of the mining operation, including the cumulative environmental impacts". The significance of both positive and negative potential impacts will be determined through the evaluation of impact consequence and likelihood of occurrence.

The following risk assessment model will be used for determination of the *significance* of impacts.

SIGNIFICANCE = (MAGNITUDE + DURATION + SCALE) X PROBABILITY

The maximum potential value for significance of an impact is 100 points. Environmental impacts can therefore be rated as high, medium or low significance on the following basis:

- High environmental significance 60 – 100 points
- Medium environmental significance 30 – 59 points
- Low environmental significance 0 – 29 points

Magnitude (M)	Duration (D)

10 – Very high (or unknown)	5 – Permanent
8 – High	4 – Long-term (ceases at the end of operation)
6 – Moderate	3 – Medium-term (5-15 years)
4 – Low	2 – Short-term (0-5 years)
2 - Minor	1 - Immediate
Scale (S)	**Probability (P)**
5 – International	5 – Definite (or unknown)
4 – National	4 – High probability
3 – Regional	3 – Medium probability
2 – Local	2 – Low probability
1 – Site	1 – Improbable
0 – None	0 – None

7.3 Construction Phase

7.3.1 Air Quality

Impact Assessment

- Air quality could potentially be negatively affected by the gaseous emissions and dust entrained from vehicle movement during the transport of the pumps and portable toilets.
- During the construction of the berms and the sump construction dust entrained from machinery and the removal of the initial vegetative cover on the TSF may increase the fallout of dust and particulate matter. The suspension of particulate matter in the air will potentially reduce the surrounding air quality.
-

Mitigation Measures

- The generation of dust on the TSF due to vegetation removal and construction of the sump and berms could be reduced if pre/ maintenance-wetting is applied to the TSF. Vehicles must be maintained to ensure that any potential gaseous emissions are kept to a minimum.
- To reduce dust from vehicles and windblown dust from materials being transported:
  - Wet suppression or chemical stabilisation of the unpaved access road should be implemented;
  - Vehicles should adhere to strict speed limits (speed limit of 40km/hr recommended on the access road).
- The significance of potential impacts on air quality is ***low***; if the mitigation measures proposed below are implemented, the significance of the potential impact remains ***low***.

7.3.2 Surface Water

Impact Assessment

- The initial clearing of vegetation could lead to an increase in run-off, potentially giving rise to a greater measure of erosion if the clearing takes place during the rainy season.
- Hydrocarbon spills from construction vehicles may enter the stream system.

Mitigation Measures

- Ensuring that the sump and drainage trenches have sufficient capacity to handle a 50 year flood event will ensure that dirty water is contained on site and does not enter the adjacent stream system.
- Limit the construction phase to the dry months if possible.
- Create diversion berms (where these are not already in place) once construction commences to divert clean surface run-off around the sites under construction and contain dirty water.
- The significance rating for the abovementioned impacts is ***low*** without the implementation of mitigation measures stated below and remains ***low*** with their implementation.

7.3.3 Groundwater

Impact Assessment

- The removal of vegetation form the surface may lead to further ingress of water into the soil and subsequently the groundwater. This has the potential to increase the risk of AMD pollution of the groundwater resources.

Mitigation Measures

- Limit the construction phase to the dry months if possible.
- The significance rating of this impact is ***low*** with or without the implementation of mitigation measures.

7.3.4 Land Capability and Soil

Impact Assessment

- Soils may be contaminated by possible hydrocarbon spills from vehicles and machinery used to construct the surface infrastructure and transport the portable infrastructure to site.
- Soil compaction can occur if vehicles transporting surface infrastructure and equipment to site don't utilize existing access roads. Compaction leads to a decrease in porosity of the soil with a subsequent increase in bulk density that can lead to impeded water infiltration and root penetration.
-

Mitigation Measures

- Ensure that vehicles and machinery are maintained at all times to reduce the occurrence of hydrocarbon spills. If a hydrocarbon spills does occur, ensure that the spill is contained and

cleaned up as soon as possible. A spill kit must be kept on-site to be used in the event of a spill.

- To reduce the occurrence of hydrocarbon spills, only designated access roads should be used.
- If hydrocarbons are to be stored on site they should only be placed in suitably bunded areas with 110% retention capacity.
- Vehicles should only be maintained and serviced off-site or in designated areas with drip trays; and any unforeseen breakdowns requiring immediate servicing or maintenance should take place within designated areas and/or with drip trays to the point where the vehicle / equipment in question can be moved off-site for maintenance or repair.
- Potential impacts to soil resources are considered to be of ***low*** significance, and will remain ***low*** when the mitigation measures proposed below are applied.

7.3.5 Ambient Noise

Impact Assessment

- During the construction phase, the presence of heavy vehicles / equipment can potentially increase the ambient noise levels. However, due to the small scale of the project, short duration the impact, as well as the proximity to an operational landfill site, the potential for an increase in ambient noise levels is not envisaged to be significant.

Mitigation Measures

- Silencers should be fitted /maintained to excessively noisy machinery and vehicles where necessary.
- Mechanical equipment should be maintained.
- The significance rating for this impact is ***low*** without the implementation of mitigation measures and ***low*** with their implementation.

7.3.6 Traffic

Impact Assessment

- Vehicles transporting men, equipment and materials will travel to site during the construction phase resulting in a slight increase in traffic in the area.

Mitigation Measures

- Vehicles must abide by the local speed limits for the area.
- Hauling of men, machinery or materials must only take place in daylight hours.
- Drivers must be instructed to drive with their headlights on at all times.
- Due to the small nature of the project this increase in traffic is not foreseen to have a significant impact therefore the significance rating is ***low*** with or without the implementation of mitigation measures.

7.3.7 Socio-Economic

Impact Assessment

- During construction there may be an increase in nuisance impacts (described in the various sections above).

7.3.8 Heritage

Tailings Dam

There is sufficient documentation on the existing tailings dam to conclude that no mitigation would be requiredunless unknown artifacts are uncovered during mining.

Unknown Structures

Impact Assessment

- The structures may be damaged as a result of construction activities on site.

Mitigation Measures

- It is recommended that the structures are fenced off with a buffer zone of 15m from their outer edges.
- If it is deemed necessary to remove the structures they should be documented in full. An application for their destruction must then be applied for.
- The significance rating for this impact is ***low*** without the implementation of mitigation measures and ***low*** with their implementation.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ TSF ▪ Portable high pressure water pumps ▪ Berms	Air Quality	▪ Transportation and construction of surface infrastructure. ▪ Clearing of vegetation. ▪ Construction vehicles emissions.	▪ Increased dust fallout and particulate matter causing a reduction in air quality.	4 [2]	2 [2]	1 [1]	2 [2]	Low [Low]	14 [10]	Air quality mitigation measures associated with the construction phase in Section 7.3.1.	No additional air quality monitoring programme required.
▪ Sump ▪ TSF ▪ Portable high pressure water pumps ▪ Portable toilets ▪ Berms ▪ Process water holding tank	Surface Water	▪ Vegetation clearance leading to erosion of soils. ▪ Hydrocarbon spills from surface infrastructure construction.	• Surface water quality reduced due to hydrocarbon spills. • Sedimentation of surrounding surface water bodies.	2 [2]	1 [1]	1 [1]	1 [1]	Low [Low]	4 [4]	Surface water mitigation measures associated with the construction phase are found in Section 7.3.2.	A surface water monitoring programme is to be implemented and maintained as set out in Section 10.1 of the EMP.
▪ TSF	Groundwater	▪ Increased ingress of contaminated water due to vegetation clearing.	• Generation of AMD.	4 [2]	2 [1]	2 [1]	3 [1]	Low [Low]	24 [4]	Groundwater mitigation measures associated with the operation phase in Section 7.3.3.	Implement and maintain groundwater monitoring programme in Section 10.2 of the EMP.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ TSF ▪ Portable high pressure water pumps ▪ Portable toilets ▪ Berms ▪ Process water holding tank	Land Capability and Soil	▪ Transport of men and materials to construct surface infrastructure. ▪ Hydrocarbon spills from surface infrastructure construction.	▪ Loss of soil resource through erosion as well as compaction. ▪ Contamination of soil due to spills.	4 [4]	2 [2]	1 [1]	2 [2]	Low [Low]	14 [14]	Soil mitigation measures associated with the construction phase in Section 7.3.3.	No soil quality monitoring programme required.
▪ Sump ▪ Portable high pressure water pumps ▪ Portable toilets ▪ Berms ▪ Process water holding tank ▪ TSF	Ambient Noise	▪ Construction of the sump and berms. ▪ Transportation of the pumps, toilets and water tank to site. ▪ Construction vehicles and personnel on site.	▪ Increase in ambient noise levels.	4 [2]	2 [2]	2 [2]	3 [3]	Low [Low]	24 [18]	Noise mitigation measures associated with the construction phase in Section 7.3.5.	No additional noise monitoring programme required.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ Portable high pressure water pumps ▪ Portable toilets ▪ Berms ▪ Process water holding tank	Traffic	▪ Construction vehicles transporting men, equipment and materials to site.	▪ Increase in nuisance traffic. ▪ Degradation of dirt roads. ▪ Increased road safety hazards.	4 [2]	2 [2]	2 [2]	3 [2]	Low [Low]	24 [12]	Traffic mitigation measures associated with the construction phase can be found in Section 7.3.6.	No traffic monitoring programme required.
▪ Sump ▪ Portable high pressure water pumps ▪ Portable toilets ▪ Berms ▪ Process water holding tank	Cultural / Heritage	▪ Construction of the sump and berms. ▪ Transportation of the pumps, toilets and water tank to site. ▪ Construction vehicles and personnel on site.	▪ Loss or damage to cultural / heritage resources.	2 [2]	1 [1]	1 [1]	2 [2]	Low [Low]	8 [8]	Heritage resource mitigation measures associated with the construction phase and a description of sites can be found in Section 7.3.8.	Implement and maintain heritage resources monitoring and awareness plan in Section 0 of the EMP.

7.4 Operation Phase

7.4.1 Air Quality

Impact Assessment

- The hydraulic mining of the tailings material may lead to an increase in dust fallout and particulate matter generation by the disruption of the material during the reclamation process. This may lead to a localised reduction in air quality the process is wet and therefore likely to be positive.

Mitigation Measures

- Surface disruption should be limited to the portion of the TSF being actively worked on as the hydraulic mining process will automatically ensure that the tailings material is wet and thus limiting the amount of dust generated.
- The significance of impacts during the operation phase on air quality will be ***low*** and will remain ***low*** if mitigation measures will be implemented.

7.4.2 Surface Water

Impact Assessment

- If the clean and dirty water management structures (berms, trenches and the sump) aren't adequately designed to accommodate a 50-year event or in the event of a failure thereof, then there is a potential for polluted runoff from the TSF to be transported to the adjacent stream where it could potentially mix with clean stormwater flow. Contaminated water could potentially further reduce the quality of the aquatic ecosystems.
- While the TSF falls within the catchment area of a tributary of the Wonderfonteinspruit, the removal of a very small part of its catchment (i.e. by the collection of contaminated runoff) will subsequently not have any significant impact on the present state of the stream.
-

Mitigation Measures

- Berms must be constructed as necessary along all up-gradient areas along the boundaries of the areas where contamination may potentially develop.
- The sump and berms should be constructed within the site footprint to intercept possible spillages from the reclamation operation.
- Channels must be constructed from all operational areas directly to the sump from where the slurry will be pumped. No spillages are expected, but, should spillages occur, the berms and a suitably sized sump will intercept these spillages.
- The clean and dirty stormwater system is to comply with the requirements of GN704, i.e. the clean and dirty water system will be adequately sized to prevent mixing of water in separate clean and dirty water systems, produced by a storm with a return period of 50 years with a duration of 24-hours.

- In the event of an accidental spillage and failure of the clean / dirty water separation system, these spillages must be cleaned up (by removal of the tailings solids and the water fraction carrying these) and deposited into the sump.
- The significance rating for these impacts is ***medium*** without the implementation of mitigation measures and ***low*** with their implementation.

7.4.3 Groundwater

Impact Assessment

- The current method for reworking of tailings material, by the use of hydraulic mining, could potentially enhance contaminated recharge to the underlying groundwater resources due to the large volumes of water utilised during the reclamation process.

Mitigation Measures

- The main environmental protection activities and mitigation measures during reclamation of the Lindum TSF are:
  - To keep any clean storm water away from the working areas.
  - To prevent rainwater and the process water (used for hydraulic mining) that has fallen on the site from leaving in an uncontrolled fashion by implementing measures as suggested in Section 7.3.2 and 7.4.2.
  - The significance of the impact will be ***medium*** and can be reduced to ***low*** if the proper mitigation measures are implemented.

7.4.4 Land Capability and Soil

Impact Assessment

- The temporary storage of hydrocarbons, the use of portable toilets on-site, rainfall and subsequent run-off, as well as the mobilisation of tailings material during reclamation activities in the operational phase could potentially result in the contamination of adjacent soils in situations of spillage or leakages which are not contained to the dirty water management system (i.e. should the system fail). Such an event would thus serve to reduce the soil quality.
-

Mitigation Measures

- Water that has come into contact with the TSF must be diverted away from exposed soils as per Section 7.3.2 above.
- Clean and dirty water separation measures proposed in Section 7.3.2 and 7.4.2 must be implemented to ensure that contaminated runoff doesn't come into contact with adjacent / surrounding soils.
- If any soils are exposed to hydrocarbon spills, the exposed soils must be remediated by means of a spill kit and the contaminated soil removed and disposed of at a suitable facility.

- The significance of potential impacts to soil resources are considered to be ***low*** and remaining ***low*** with the implementation of the mitigation measures proposed below.

7.4.5 Ambient Noise

Impact Assessment

- Hydraulic mining activities may result in an increase in the ambient noise levels due to the use of the high pressure water/slurry/gland service pumps.

Mitigation Measures

- Ensure that all pumps and equipment are maintained to avoid excess noise.
- Where necessary, use noise dampers/screens on equipment.
- The significance rating of the impact of an increase to ambient noise levels is ***medium*** without the implementation of mitigation measures and ***low*** with their implementation.

7.4.6 Socio-Economic

Impact Assessment

- Apart from the nuisance impacts discussed above, there will not likely be any impacts in terms of the socio-economic environment.

7.4.7 Heritage

Tailings Dam

- While the tailings dam is considered a Grade III historically significant structure, sufficient documentation exists, including maps and aerial photographs, to conclude that no mitigation is required.

Unknown Structures

Impact Assessment

- The structures may be damaged as a result of reclamation activities on-site.

Mitigation Measures

- It is recommended that the structures are fenced off with a buffer zone of 15m from their outer edges.
- If it is deemed necessary to remove the structures during construction or operation they should be documented in full. An application for their destruction must then be applied for.
-
- The significance rating for this impact is ***low*** without the implementation of mitigation measures and ***low*** with their implementation.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ TSF ▪ Portable high pressure water pump	Air Quality	▪ Hydraulic mining of tailings.	▪ Increased dust fallout causing a reduction in air quality.	4 [4]	2 [2]	1 [1]	3 [2]	Low [Low]	14 [14]	Air quality mitigation measures associated with the operation phase in Section 7.4.1.	No additional air quality monitoring programme required.
▪ Sump ▪ TSF ▪ Portable high pressure water pump ▪ Portable toilets ▪ Process water holding tank	Surface Water	▪ Contaminated surface run-off coming into contact with surrounding streams.	▪ Reduction in surface water quality in the adjacent streams.	6 [2]	4 [1]	2 [1]	3 [2]	Medium [Low]	36 [8]	Surface water impact mitigation measures associated with the operation phase in Section 7.4.2.	Surface Water monitoring is detailed in Section 10.1 of the EMP.
			▪ Contamination of aquatic environments	6 [2]	4 [1]	2 [1]	3 [1]	Medium [Low]	36 [4]		
▪ Sump ▪ TSF ▪ Portable high pressure water pump ▪ Portable toilets ▪ Process water holding tank	Groundwater	▪ Contaminated surface run-off seeping into the groundwater.	▪ Reduction in groundwater quality.	6 [2]	4 [1]	2 [1]	3 [1]	Medium [Low]	36 [4]	Groundwater mitigation measures associated with the operation phase in Section 7.4.3.	Implement and maintain groundwater monitoring programme in Section 10.2 of the EMP.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ TSF ▪ Portable high pressure water pump ▪ Portable toilets ▪ Process water holding tank	Land Capability and Soil	▪ Reclaiming of mobilised tailings material. ▪ Contaminated run-off from TSF.	▪ Contamination of surrounding soil resources.	6 [4]	2 [2]	1 [1]	3 [2]	Low [Low]	27 [14]	Soil mitigation measures associated with the operation phase in Section 7.4.4.	No soil quality monitoring programme required.
▪ Sump ▪ Portable high pressure water pumps ▪ TSF	Ambient Noise	▪ Hydraulic mining of tailings material.	▪ Increase in ambient noise levels.	4 [3]	2 [1]	2 [1]	5 [4]	Medium [Low]	40 [20]	Noise mitigation measures associated with operation phase are described in section 7.4.5 above.	No noise monitoring programme required.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ Portable high pressure water pumps ▪ TSF	Cultural / Heritage	▪ Hydraulic mining of tailings material.	▪ Loss or damage to cultural / heritage resources.	2 [2]	1 [1]	1 [1]	2 [2]	Low [Low]	8 [8]	Heritage resource mitigation measures associated with the operation phase and a description of sites can be found in Section 7.4.7.	Implement and maintain heritage resources monitoring and awareness plan in Section 0 of the EMP.

7.5 Decommissioning Phase

7.5.1 Air Quality

Impact Assessment

- The leveling of berms and the use of heavy vehicles / equipment in decommissioning activities may lead to particulate emission and dust generation. The significance of the negative impacts that the decommissioning phase will have on the air quality are ***low*** and will remain ***low*** with mitigation measures.
-

Mitigation Measures

- The recommended management and mitigation measures include the implementation of dust suppression measures to control nuisance dust and the maintenance and regular servicing of vehicles and equipment to prevent the excessive generation of emissions.
- To reduce dust entrained from vehicle movement and windblown dust from cleared areas:
    - Wet suppression or chemical stabilisation of the unpaved road should be implemented.
    - Vehicles should adhere to strict speed limits 40km/hr on the access road is recommended).
- The final removal of tailings material and the rehabilitation of the disturbed footprint will have a subsequent positive impact on the air quality due to the tailings material (comprising a source of fallout / air pollution) having been removed from the area. The positive impact of removing the TSF has a ***medium*** significance rating.

7.5.2 Surface Water

Impact Assessment

- Immediately after the hydraulic mining operation has been completed, the footprint of the TSF will be bare and contaminated surface run-off can potentially enter the adjacent stream.
- There is a potential positive impact on surface water quality in the surrounding resources from the removal of the contaminants associated with the TSF and the rehabilitation of the disturbed footprint.

Mitigation Measures

- The surface area of the TSF footprint should be vegetated as soon as possible after reclamation has been completed or progressively if possible. Some mitigating measures would at that time already have been implemented. These would include the berms (to deflect clean water around the site) and a suitably sized sump to contain any surface water runoff. The footprint area should be ripped, neutralised with the addition of agricultural lime, fertilised and seeded with grass seeds to encourage the establishment of natural

vegetation on the footprint. Paddocks should be included where necessary to prevent runoff.

- Although the bulk of the tailings material would have been removed, it is often found that some leaching of the underlying soil resources had occurred and in this case, a fraction of the original soil underlying the TSF should also be removed to prevent the mobilization of contaminants by storm water falling upon contaminated soil. A radiation survey to be exercised in terms of NNR requirements.
- The significance rating for the negative impact is ***medium*** without the implementation of mitigation measures and ***low*** with their implementation.
- The positive impact on surface water quality by the removal of the TSF has a ***medium*** significance rating.

7.5.3 Groundwater

Impact Assessment

- If any tailings material were to remain on site, it would facilitate the ongoing production of sulphate and acids as a result of sulphide mineral oxidation (i.e. pyrite). If the remaining tailings material comes into contact with water and air it may potentially generate AMD which will have a negative impact on the groundwater quality. However, water ingress potential will be reduced after the Lindum TSF has been reclaimed as the reclaimed footprint will contribute less water per unit area compared to the TSF.

Mitigation Measures

- The complete removal of all tailings material from the TSF footprint will ensure that the potential for AMD generation and sulphide mineral oxidiation is greatly reduced.
- In view of the existing contamination found at the Lindum TSF, and assuming sound water control practices will be employed during the reclamation process that was conducted, the additional impact of post-operational AMD generation will most-likely be insignificant.
- The impact on the groundwater quality has a ***medium*** significance rating without the implementation of mitigation measures and a ***low*** significance rating with their implementation.

7.5.4 Land Capability and Soil

Impact Assessment

- The decommissioning and rehabilitation activities require the presence of heavy vehicles and machinery and thus there is the potential for hydrocarbon spills and soil compaction (should vehicles not adhere to existing access roads).
- Erosion may also occur from the cleared footprints before vegetation is re-established.
-

Mitigation Measures

- Failing normal good maintenance practices and if soil is polluted, the first management priority is to remove contaminated soils and treat the affected area by means of *in situ* bioremediation.
- Erosion control measures should be implemented to ensure that the soil is not washed away and that erosion gullies do not develop prior to vegetation establishment.
- Soil profiles that have been contaminated with acid water have to be ameliorated with agricultural lime.
- The impact ratings of the abovementioned impacts are ***low*** and will remain ***low*** if the following mitigation measures are implemented.

7.5.5 Ambient Noise

Impact Assessment

- During the decommissioning phase vehicles and personnel will be present on site to dismantle infrastructure, transport portable equipment off of the site and rehabilitate the footprint area. The presence of vehicles and personnel on site and the decommissioning activities may result in increased ambient noise levels. However, due to the localised nature and short duration of the project the impact of increased ambient noise levels is not envisaged to be significant.

Mitigation Measures

- Silencers should be fitted to excessively noisy machinery and vehicles where necessary.
- Mechanical equipment should be maintained.
- The significance rating for the impact is ***low*** with and without the implementation of mitigation measures.

7.5.6 Traffic

Impact Assessment

- Vehicles for the transportation of the portable equipment off site, for personnel and for dismantling activities will travel to site during the decommissioning phase resulting in a slight increase in traffic in the area.

Mitigation Measures

- Vehicles must abide by the local speed limits for the area.
- Hauling of men, machinery, cement or materials must only take place in daylight hours.
- Drivers must be instructed to drive with their headlights on at all times.
- Due to the small scale of the project the increase in traffic is not envisaged to have a significant impact therefore the significance rating is ***low*** with or without the implementation of mitigation measures.

7.5.7 Visual / Aesthetic

Impact Assessment

- The removal of the TSF through hydraulic mining and rehabilitation of the TSF footprint will also have a positive impact on the visual quality of the area. The significance rating of this positive impact is ***medium***.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ Portable high pressure water pump ▪ Berms ▪ Portable toilets ▪ Process water holding tank	Air Quality	▪ Vehicle movement on site. ▪ Land rehabilitation. ▪ Leveling of berms.	▪ Dust generation from dismantling and transport of surface infrastructure.	4 [2]	2 [2]	2 [1]	3 [2]	Low [Low]	24 [10]	Air quality mitigation measures associated with the decommis-sioning phase in Section 7.5.1.	No air quality monitoring programme required.
▪ TSF footprint		▪ The rehabilitation of the TSF footprint.	▪ Increase in the ambient air quality from the removal of the TSF (source of air pollution)	4	5	1	4	Medium (Positive)	40	No mitigation required as it is a positive impact.	No air quality monitoring programme required.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ Portable high pressure water pump ▪ Berms ▪ Portable toilets ▪ Process water holding tank	Surface Water	▪ Rainwater running off the now bare surface which used to be occupied by the Lindum TSF.	▪ Possible contamination of surface and groundwater sources.	4 [2]	5 [5]	3 [2]	3 [2]	Medium [Low]	33 [18]	Surface water impact mitigation measures associated with the decommis-sioning phase in Section 7.5.2.	Implement and maintain a surface water monitoring programme in Section 10.1 of the EMP.
▪ TSF footprint		▪ The rehabilitation of the TSF footprint.	▪ Reduction surface water contamination from the removal of the TSF (source of contaminants).	4	5	2	4	Medium (Positive)	44	No mitigation required as it is a positive impact.	
▪ TSF footprint	Groundwater	▪ Seepage of remaining tailings material on site.	▪ Possible contamination of groundwater.	4 [2]	5 [5]	2 [2]	3 [2]	Medium [Low]	33 [18]	Groundwater mitigation measures associated with the decommis-sioning phase in Section 7.5.3.	Implement and maintain groundwater monitoring programme in Section 10.2 of the EMP.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ Portable high pressure water pump ▪ Berms ▪ Portable toilets ▪ Process water holding tank	Land Capability and Soil	▪ Hydrocarbon or chemical spillages. ▪ Heavy vehicle movement over soils transporting surface infrastructure. ▪ Dismantling of surface infrastructure.	▪ Erosion and loss of soil resource. ▪ Possible hydrocarbon spills. ▪ Contamination by remaining mobilised acidic tailings material.	6 [4]	2 [2]	1 [1]	3 [2]	Low [Low]	27 [14]	Soil mitigation measures associated with the decommis-sioning phase in Section 7.5.4.	No soil quality monitoring programme required.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ Portable high pressure water pumps ▪ Portable toilets ▪ Berms ▪ Process water holding tank ▪ TSF footprint	Ambient Noise	▪ Dismantling of the sump and leveling of the berms. ▪ Transportation of the pumps, toilets and water tank off of the site. ▪ Decommis-sioning vehicles and personnel on site. ▪ Heavy machinery for the rehabilitation of the TSF footprint.	▪ Increase in ambient noise levels.	3 [2]	2 [2]	2 [2]	3 [2]	Low [Low]	21 [18]	Noise mitigation measures associated with the decommis-sioning phase in Section 7.5.5.	No noise monitoring programme required.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump ▪ Portable high pressure water pumps ▪ Portable toilets ▪ Berms ▪ Process water holding tank ▪ TSF footprint	Traffic	▪ Vehicles transporting men and equipment for decommis-sioning. ▪ Transportation of the pumps, toilets and water tank off of the site.	▪ Increase in nuisance traffic. ▪ Degradation of dirt roads. ▪ Increased road safety hazards.	4 [2]	2 [2]	2 [2]	3 [2]	Low [Low]	24 [12]	See traffic impact mitigation measures associated with the decommis-sioning phase in Section 7.5.6.	No traffic monitoring programme required.
▪ TSF footprint	Visual / Aesthetic	▪ The rehabilitation of the TSF footprint.	▪ Increase in the visual quality of the area due to the rehabilitation of the TSF.	4	5	2	5	Medium (Positive)	55	No mitigation required as it is a positive impact.	No monitoring is required.

7.6 Post Closure Phase

7.6.1 Surface Water

Impact Assessment

- Water seeping into the groundwater environment directly through the TSF footprint or via the Witpoortjie Fault could potentially contribute to the poor quality of the water of the Western Basin Mine Void (if the TSF footprint is not adequately rehabilitated during the decommissioning phase).

Mitigation Measures

- Re-vegetation of the disturbed footprint must occur during closure. The majority of the tailings material would have been removed during the operation period however it will be necessary to remove a portion of the original soil underlying the TSF which may have become contaminated.
- The site will be engineered to prevent erosion through the construction of paddocks terraces and berms.
- The significance of this impact on the groundwater will be ***medium*** that can be reduced to a ***low*** significance if the correct mitigation measures are implemented.

7.6.2 Groundwater

Impact Assessment

- Water ingress potential will be reduced after the Lindum TSF has been reclaimed seeing as the footprint of the TSF will become smaller as tailings material is reclaimed. The main assumption of such a scenario is that the reclaimed footprint will contribute less water per unit area compared to the TSF.
- AMD generation can potentially be expected after reclamation, and during post-closure, due to any residual mobilised tailings coming into contact with water and air (should the TSF footprint not be completely rehabilitated during the decommissioning phase), thereby generating acid. Certain chemical reactions, especially reactions relating to metals such as Fe, can occur quickly in groundwater and have an impact on the groundwater environment.

Mitigation Measures

- The removal of the TSF and the subsequent rehabilitation of the area would serve as a potential positive impact in the long-term by the removal of the contaminant source.
- In view of the existing contamination found at the Lindum TSF, and assuming sound water control practices will be employed during the reclamation process that was conducted, the additional impact of post-closure phase AMD generation will most-likely be insignificant.

- The existing groundwater monitoring system should be upgraded (in line with current legislation) to:
    - Monitor current and future impacts.
    - Verify impact predictions.
- The significance rating of the positive impact of decreased water ingress potential is ***medium***.
- The significance of this impact on the groundwater will be ***medium*** that can be reduced to a ***low*** significance if the correct mitigation measures are implemented.

7.6.3 Land Capability and Soil

Impact Assessment

- The ongoing production of sulphate and acids as a result of sulphide mineral oxidation, i.e. pyrite, by any remaining tailings material on the surface may cause the acidification of surrounding soils.
- A small change in soil pH and Eh conditions can lead to remobilisation of proportional amounts of contaminants characterised by time-delayed behavior.
- The vadose zone underneath the reclaimed footprint is expected to be contaminated for an extended period of time due to any remaining tailings that have become acidified due to the mobilisation of the tailings.
- The top part of the soil profile may have been contaminated with AMD seepage from the TSF. Radium is often transported into the soil immediately below the TSF. The residual radium will decay to radon, a radioactive inert gas, which can pose a hazard to living beings.

Mitigation Measures

- If buildings are constructed on the rehabilitated Lindum TSF site, special ventilated foundations may be required to ensure radon gas emanating from the soil does not accumulate within the closed buildings, despite the reduced levels of radon found in the soil, due to the pollution source having been removed by the reclamation process of the tailings.
- Measures such as liming could prevent the migration of any residual contaminants from the topsoil into the subsoil and groundwater and would provide suitable conditions for the establishment of a vegetation cover.
- This has a ***low*** impact on the soil quality of soils in the surrounding area.

Mining Activity	Receptor	Process	Impact	Magnitude (M)	Duration (D)	Scale (S)	Probability (P)	Significance		Mitigation and Management Measures	Monitoring
								Rating	Value		
▪ Sump Footprint ▪ TSF Footprint	Surface Water	▪ Water seepage through the TSF footprint contami- ▪ nates water.	▪ Surface water quality reduced due to seepage.	4 [2]	5 [5]	3 [2]	3 [2]	Medium [Low]	36 [18]	Surface water impact mitigation measures associated with the post-closure phase in Section 7.6.1.	Implement and maintain a surface water monitoring programme in Section 10.1 of the EMP.
▪ TSF Footprint	Groundwater	▪ Reduction in water ingress potential due to TSF removal	▪ Reduced negative impact on groundwater quality	6	5	2	4	Medium (Positive)	52	No mitigation required as it is a positive impact.	Implement and maintain groundwater monitoring programme in Section 10.2 of the EMP.
▪ TSF Footprint		▪ Seepage of remaining acidic tailings material.	▪ Negative impact on groundwater quality	4 [2]	5 [5]	2 [2]	3 [2]	Medium [Low]	33 [18]	Groundwater mitigation measures associated with the post-closure phase in Section 7.6.2.	Implement and maintain groundwater monitoring programme in Section 10.2 of the EMP.
▪ Sump Footprint ▪ TSF Footprint	Land Capability and Soil	▪ Remaining acidic tailings material.	▪ Soil quality possibly reduced by any remaining tailings material in the TSF footprint.	6 [4]	5 [5]	1 [1]	2 [1]	Low [Low]	24 [10]	Soil mitigation measures associated with the post-closure phase in Section 7.6.3.	No soil quality monitoring programme required.

8 GAP ANALYSIS AND ASSUMPTIONS

This section, which identifies the gaps in knowledge is required as per Regulation 50(g) of the MPRDA and EIA Regulation GNR543 Section 31(2)(m).

8.1 Surface Water

It is not known whether the poor water quality of the tributary adjacent to the project site is a product of mining activities, the adjacent landfill site, or a combination of both however the proposed activity will have a positive effect on the current mining contribution. As is indicted in the groundwater assessment conducted by AED in February 2013 it is assumed that this tributary recharges groundwater through the Witpoortjie fault during periods of medium to low flow albeit relatively low volumes?.

A further assumption is that suitable berms, canals and a sump can be constructed to contain a 1:50 year flood event with 24 hour duration and hence that no other PCDs will need to be constructed. Furthermore it is assumed that rainfall information from the Zuurbekom Rand Water pump station, which was used to calculate the runoff volumes, accurately reflects the climatic conditions of the Lindum TSF site.

8.2 Groundwater

It is probable that settling and compaction of the TSF is at a maximum and the reduction of oxygen due to this is currently leading to very limited AMD emanating from the dump. The current groundwater quality can probably be considered a worst-case scenario. While AMD generation can be expected during reclamation, in view of the existing contamination, and assuming sound water control practices will be employed, the additional impact will most-likely be insignificant and will only be evident during the re mining period and be enhanced on completion of the rehabilitation

8.3 Wetlands

From a desktop study of the delineated wetlands for the study area in the existing Graphical Information System Databases, no wetlands in their natural state were found to be present within the proposed Lindum TSF Reclamation Project site.

8.4 Terrestrial Ecology

It is assumed that the terrestrial ecology associated with the TSF is already severely disturbed / transformed through a legacy of mining activities and thus no Red Data, Threatened or Endangered species occur at the site and none were observed. Based on this assumption, there is unlikely to be any impact on the terrestrial ecology by the Lindum TSF Reclamation Project but after rehabilitation will be enhanced.

8.5 Air Quality

It is assumed that any dust or particulate matter that may be generated by the project will be below the national limit as set by the National Environmental Management: Air Quality Act (No. 39 of 2004) but will be monitored and should be enhanced by the project.

8.6 Ambient Noise

It is assumed that the levels of noise generated by the reclamation of the Lindum TSF will not exceed acceptable levels for either urban or rural areas as set out by the SANS Code of Practice 10103:2008.

8.7 Soil

It is assumed that the soils resources underlying the Lindum TSF have already been transformed through contamination by seepage from the TSF and therefore the proposed project is unlikely to exert an additional impact on the soil quality associated with the TSF.

According to the groundwater study conducted by Groundwater Square in March 2013 phytotoxic contaminants such as Co, Ni and Zn found in the soil resources could complicate rehabilitation measures as they limit the soil function. As a result, the depletion of buffer minerals and the subsequent acidification could result in the long-term remobilisation of proportional quantities of contaminants into the groundwater. The vadose zone underneath the reclaimed footprint is expected to be contaminated for an extended period of time.

The overall result however should be positive after removal of the tailings and subsequent rehabilitation

9 GENERAL MITIGATION MEASURES APPLICABLE THROUGHOUT LIFE OF MINE

9.1 Soil

The following maintenance is recommended for soil resources during rehabilitation:

- Rehabilitation footprint areas must be patrolled and all animals kept off the area until the vegetation is self-sustaining;
- Where no topsoil is available, it is essential that other overburden materials that may be used, have a satisfactory physical structure. They should be sufficiently porous to store and release water and they should not cap or curst excessively on surface exposure.
- A soil reserve should be retained to repair localised surface subsidence areas.
- Compaction should be minimised by the use of appropriate equipment and replacing soils to the greatest possible thickness in single lifts.
- Soils should be moved when dry to minimise compaction.
- Where multi-layer soil profiles are re-created, running over the lower layers with heavy equipment should be minimised.
- Minimise compaction during smoothing of replaced soils by using dozers rather than graders.
- Where natural revegetation is not possible, the soils should be tilled to produce seed bed suitable for the plant-species selected for seeding.
- If there are risks of capillary rise or action it should be prevented by introducing a capillary break between the offending acid generating horizon and the overlying soil material.
- Traffic should be limited were possible while the vegetation is establishing itself;
- Plants should be watered and weeded as required on a regular and managed basis where possible and practical;
- Check for pests and diseases at least regularly and treat if necessary;
- Replace unhealthy or dead plant material;
- Fertilise, hydro-seeded and grassed areas soon after germination;
- Repair any damage caused by erosion, bulking, cracking or subsidence; and
- The reclaimed footprint will be paddocked prior to final land use to ensure that no runoff enters the river systemsuntil final land use is established.

9.2 Erosion Management

The following mitigation measures should be implemented to reduce erosion on site and the associated impacts of erosion on surface water resources:

- The proposed storm water management system catered for in the design should be implemented as this would prevent sediment runoff; and
- Contour drains will be maintained to limit erosion and avoid soil losses.

9.3 Biodiversity

The following mitigation measures regarding the protection and rehabilitation of biodiversity should be adhered to:

- Surrounding natural vegetation should not be disturbed;
- Any wildlife encountered may under no circumstance be handled, fed, removed or be interfered with by workers;
- No domesticated animals must be allowed on site;
- No non invasive vegetation from the project area may be destroyed or used as fuel; and
- No open fires should be allowed at the project site.

9.4 Surface Water

The following mitigation measures regarding the impacts of the project on the surrounding surface water bodies should be implemented:

- Any waste spills should be cleared up immediately; and
- Abluting anywhere other than in the toilet facilities available will not be permitted.
- Dirty water contained on site or in the process

9.5 Stormwater Management

The following mitigation measures should be implemented to reduce the impacts on soil, surface water, and groundwater resources from ineffective stormwater management:

- Separate clean and dirty water best practices employed. Clean water will be diverted around the TSF, while all contaminated stormwater arising at the TSF must be directed to the sump;
- Ensure the construction of the sump can adequately contain 10 136.5 m^3 of runoff. any pollution control dams(PCDs) must be fitted with adequately sized pumps to pump excess rainwater back into the hydraulic mining water circuit; and
- Should the above not be possible, a PCD/s must be constructed with the capacity to retain a 1:50 year flood event within 24 hours and maintain a freeboard of 0.8 m in accordance with the requirements of GN704.

9.6 Handling of Hydrocarbons

The following mitigation measures should be implemented to reduce the impacts from oil / lubricants or other hydrocarbon spills:

- All mine and contractor-owned generators will be placed on drip trays to catch all spills and leaks, while all maintenance work on equipment, vehicles, machinery, etc. will be done off-site - the servicing of vehicles and equipment will only be permitted at designated areas such as the workshops at the Mine;
- Any spillage of hydrocarbon must be reported to the mine Enviromental Control Officer (ECO);

- Any pumps, machinery or other equipment that require oil, diesel, etc., that are to remain in one position for longer than two days will be placed on drip trays which are to be emptied regularly. Any effluent from the drip trays and any spilled oils and fuels will be collected and stored in drums before being collected and disposed of by a licensed waste removal company;
- Store oils and other lubricants in bunded areas with a capacity of 110%;
- The catchment berms will be maintained at a minimum height of 0.5m to ensure that any spilled hydrocarbons transported by stormwater will not enter areas of accelerated infiltration to underground;
- The Environmental Department must keep copies of all disposal certificates on-site.

9.7 Sewage Treatment

The following mitigation measures should be implemented to reduce the impacts on soil, surface water and groundwater resources from sewage spills:

- Any spillages from toilet facilities must be removed immediately before any contamination of soil, surface water or groundwater resources can occur.

9.8 Handling of General Waste

The following mitigation measures should be implemented to reduce the impacts on soil, surface water and groundwater resources from the incorrect disposal of general waste:

- A waste drums / bin / skip must be made available within the dirty water catchment;
- No waste will be allowed to be buried or burned on site;
- Waste will be collected regularly and temporarily stored at the Mine before being collected and disposed of by the appointed contractor at the nearest licensed landfill site. ;
- The washing of clothing, lunch dishes or vehicles is prohibited at the project area;
- Only contractors and facilities meeting the requirements of the National Environmental Management: Waste Act, No. 59 of 2008 will be utilised for waste management purposes.
- The mine will comply with the requirements of all Material Safety Data Sheets;
- The bund walls for all storage facilities will have sufficient storage capacity of 110% from the combined storage capacity of the tanks; and
- The mine will request a safe disposal certificate that will be kept on-file for the life of the mine.

9.9 Uncontrolled Fires

The following mitigation measures should be implemented to reduce the impacts on air quality and terrestrial ecology from smouldering waste and uncontrolled fires:

- No open fires will be permitted on site;
- Induction sessions for contractors will include fire prevention/ safety precautions, actions and contacts in the event of a fire.

9.10 Rehabilitation

The following rehabilitation measures should be implemented:

- Rehabilitation should be done with indigenous trees, shrubs and grasses species propagated from species dominating the surrounding vegetation types;

10 MONITORING AND MANAGEMENT OBJECTIVES OF ENVIRONMENTAL IMPACTS ACCORING TO REGULATION 50 (E) AND (H) GENERAL MITIGATION MEASURES

10.1 Surface Water

10.1.1 Monitoring Programme

Prior to reclamation activities commencing, Gold One's current surface water monitoring programme must be amended to include a monthly sample of the adjacent tributary (indicated as Stream 1 in Figure 12), downstream from the TSF reclamation operation. Samples collected during the surface water assessment by AED will provide a baseline indication for the water quality found in this stream.

Once reclamation activities have begun, additional monitoring should take place with samples taken from the clean / dirty water management systems within the site footprint. This will enable the project team to identify any additional impact from the Randfontein landfill site and which is thus not attributed to the TSF reclamation project.

Additional monitoring measures to be conducted during the operation of the reclamation project include:

- Visual inspection of sump and berms after rainstorms. Record breaches of dams and propose amelioration measures
- Visual inspection after rainstorms of site, specifically to identify erosion channels resulting from surface run-off.
- Regular inspections of the site after rainfall to identify any breach in the storm water conduits.
- Regular maintenance (cleaning) of storm water canal systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an average period of recurrence of once in 50 years
- As mentioned previously PCDs will only be required in the event that the designed sump and berms are unable to handle a 1 in 50 year flood event. If so they should be inspected daily to ensure that they are emptied back into the service water circuit before the minimum freeboard is reached.

This surface water-monitoring programme should be implemented from when the hydraulic mining begins. This monitoring programme will not only be carried out while the project is actively operating, but will continue after closure or until the authorities are satisfied that no further pollution is emanating from the area which once housed the TSF and it is safe to release surface water directly into the environment.

10.1.2 Monitoring Objectives

The quality of the tributary adjacent to the TSF site is currently very poor. The monitoring of this tributary will indicate whether the mining operations have any additional effect on the quality of water flowing in this stream either positive or negative. The aim should be to not decrease the current quality of the water any more throughout the LOM. If it appears that the mining activities are having an additional negative impact on the quality of the water, then investigations have to be made to determine whether contaminated water is escaping from the PCDs or if pollution such as hydrocarbons, grease, oils, etc are being spilled onsite and coming into contact with the stream.

10.1.3 Monitoring Time Frames

As part of the current surface water monitoring plan implemented by Gold One, samples from the Lindum TSF project discussed above must be collected and recorded on a monthly basis and reports must be compiled and submitted to DWA annually or in terms of current license conditions. The first should be a summary report, briefly describing the first 6 month period water quality from all sample points and should be done once the July analyses results are available each year. The second report should be done after the January sample results are available from the laboratory each year and must include a comprehensive discussion on the surface water quality of the stream adjacent to the mine, identifying any impacts from the reclamation activities and also discussing trends, if any are discernible.

10.1.4 Responsible Officer

The on-site Environmental Control Officer (ECO) is responsible for the sampling and as well as responsible for appointing an independent agency who will interpret the monitoring data.

10.1.5 Monitoring Costs

If mine personnel collect the samples and deliver them to a laboratory, the cost of the surface water sampling programme and production of reports should be an additional R 24 000.00 per annum based on 2 sampling points, monthly for 12 months. This amount includes the laboratory costs and an interpretation and bi-annual report by a professional hydrologist, but excludes the travel and collection/delivery of the samples.

10.2 Groundwater

10.2.1 Monitoring Programme

The existing groundwater monitoring system should be upgraded (in line with current legislation) to monitor current and future impacts associated with the reclamation activities at the Lindum TSF.

10.2.2 Monitoring Objectives

Whilst current baseline conditions for the ground water quality associated with the Lindum TSF footprint are not known it can be assumed that they are currently at a worst case scenario. Removal of the TSF will essentially remove the pollution source. However the vadose zone underneath the reclaimed footprint is expected to be contaminated for an extended period of time. It is necessary to understand the mobility and thus the bioavailability of contaminants and the capacity of the vadose zone to retain and attenuate such pollutants in the long-term.

Therefore although the removal of the TSF and hence the pollution sources will not necessarily lead to further deterioration of ground water sources it is important that the ground water monitoring system be in place to adequately monitor the situation.

10.2.3 Responsible Officer

The on-site Environmental Control Officer (ECO) is responsible for the monitoring programme.

11 ENVIRONMENTAL GOALS AND OBJECTIVES

11.1 Introduction

Regulation 51 (a) of the MPRDA Regulations requires that this EMP describes the goals and objectives specific for:

- The management of identified environmental impacts;
- The cultural and heritage aspects;
- The socio-economic conditions as identified in the social and labour plan; and
- Mine closure.

11.2 Objectives and Goals Relating to the Management of Identified Environmental Impacts

11.2.1 Objectives

The main objective of the mine is to minimise the impacts of current operations on the environment as far as possible and to improve current impacts. The mine commits to the following environmental policy objectives generally and specifically through the activities of this project:

- Comply with legal requirements and voluntary commitments;
- Pollution prevention through the implementation of effective management and mitigation measures;
- Continuous improvement in environmental performance; and
- Sharing information on environmental performance with the community.

11.2.2 Goals

The mine's environmental related goals are as follows and are manifested in the removal and rehabilitation of historic residue deposits of which Lindum is one:

- Implementing the management and mitigation measures stated in the EMP;
- Undertake and implement monitoring programmes stated in the EMP; and
- Ensure that the contractors are aware of the EMP as well as their roles and responsibilities relating thereto

11.3 Objectives and Goals Relating to the Socio-Economic Conditions

While this project will not contribute or detract significantly form a socio-economic perspective, the existing Socio-economic Goals and Objectives for the greater Rand Uranium Surface Operations bear relevance.

11.3.1 Objectives

The objectives relating to the Socio-Economic Conditions as per the approved SLP are summarised below:

- To promote gender equity;
- To establish and implement a career progression plan to expand the skills base of the workforce to enhance the social and economic welfare of the community and thus to provide employment opportunities;
- To meet human capital development requirements through effective human resource development systems and processes, such as the ABET and FET programmes, to ensure fluent roll out of skills and developmental programmes;

11.3.2 Goals

- Employment and Gender Equity

  The objective for Gold One and Randfontein Surface Operations with respect to employment equity is to achieve a 40% Historically Disadvantaged South Africans (HDSA) representation in each management layer and to have a 10% representation of women in mining. Along term strategy for the inclusion of women in mining is listed below:
  - The awareness of the financial implications of converting traditionally male mining environments into female-friendly workplaces, and setting budgets to cater for this;
  - Managing diversity and building gender awareness;
  - Championing social behaviour and mindset changes among male employees.
  - Developing a pipeline to deliver appropriately skilled females to the workplace by investing in a sustainable model; and
  - Addressing the physiological challenges of accommodating females underground to ensure safety and general well-being.

- Employment Opportunities

  Career Progression Plan

  The Randfontein Surface Operation Career Progression Plan considers a specific percentage of employees from the designated groups for all career progression opportunities at all levels. The process identifies career options for employees and assisted in developing skills so that they are better prepared and suitably qualified to assume positions that match their individual career goals with the organisational needs of the Mine.

  Talent Pool

  The objective of the Randfontein Surface Operation Talent Pool includes the following - the development of people; succession and performance management as well as career management; and meeting employment equity targets. The following measures are employed to develop the Talent Pool - mentorship programmes; employment equity measures; specific and individual-based development activities; group and/or mine career

opportunities; opportunities in Gold One's growth projects; and opportunities. All high potential and high performing employees within Randfontein Surface Operation are eligible to be part of the talent pool.

Bursary Programme

The Gold One Bursary programme was established to help historically disadvantaged matriculants to embark on university studies for future mining careers. There is an annual intake of 12 new South African students and the focus of the bursary programme is in the technical fields of mining, engineering, ore reserve management, metallurgy, finance, and information technology.

Mentorship Programme

An internal mentorship programme was developed in order for Randfontein Surface Operation to develop highly competent leaders and a healthy pipeline of HDSA leaders and professionals.

- Adult Basic and Further Education and Training

  Gold One has set a strategic objective to achieve a fully literate workforce. An Adult Basic and Further Education and Training (ABET and FET) programme will ensure that 3% of all employees will be on full-time ABET classes and an additional 8% will be in part-time ABET. The aim is to facilitate further growth and career advancement into specialised training and development.

11.4 Objectives and Goals Relating to Cultural and Heritage Aspects

11.4.1 Objective

The Lindum TSF Reclamation Project's objective regarding cultural and heritage aspects is to ensure that the integrity of any heritage and cultural resources associated with the mining license areas remain intact as far as practically possible.

11.4.2 Goals

The mine's goals relating to cultural and heritage aspects will be to:

- Ensure that the management measures proposed in the EMP which relate to heritage resources are implemented;
- Ensure compliance with the aspects of the National Heritage Resources Act, Act 25 of 1999.
- Minimise potential damage to the unknown features located near to the site (see Section 3.11).

11.5 Objectives and Goals Relating to Closure

11.5.1 Objectives

As per the MPRDA Regulations GNR 527 of 2004, the objectives of the proposed Lindum Reclamation Project relating to mine closure are to ensure that:

- The reclamation operation itself contributes towards mine closure through the removal of a source of pollution. Rehabilitation of the contaminated footprint and will result in the reduction of the long-term impacts from the TSF.
- Public health and safety must be protected;
- Environmental damage must be alleviated or eliminated;
- Short and long term impacts on surface and groundwater quality must be minimised and contained at acceptable levels;
- Land use must be returned to original or pre-mining condition or an acceptable and sustainable land use alternative;
- Socio-economic benefits post-closure must be maximised;
- The need for long term monitoring and maintenance must be reduced or removed; and
- The reclamation operations must be closed efficiently and cost effectively.

During the operational phase of the reclamation process the tailings material will be removed for processing, along with the underlying layer of potentially contaminated material. General surface rehabilitation will then take place over the entire disturbed footprint. This will include the re-vegetation of the exposed footprint as well as ensuring that the surface topography emulates that of the surrounding area.

11.5.2 Goals

The most important aspects to focus on in terms of closure include:

- Water management (groundwater and surface water);
- Return of land capability or sustainable land use;
- Retention of biodiversity;
- Return of aesthetic quality;
- Minimisation of potential health and safety impacts; and
- Contribution to the overall socio-economic well-being.

The goals to accomplish the closure objectives for each of the aforementioned aspects are discussed in the paragraphs that follow:

Groundwater

During operation, good housekeeping will be employed as per the EMP, ensuring that potential sources of groundwater contamination are minimised. Ensuring that no mobilised tailings, either being pumped off-site or trace remnants of the material, are minimised in coming into to contact with local groundwater sources which will contribute to reducing the pollutant load of the aquifers.

Surface Water

By ensuring effective maintenance of machinery and the sump during operation, as well as the clean-up of the remaining mobilised tailings after decommissioning, will ensure that trace remnants of the tailings material will be minimised from coming into contact with the Wonderfonteinspruit or tributaries thereof and thus pollute the resource.

Soil

Ensure that mobilised tailings material have been removed from the site before revegetation takes place using indigenous species. Re-seeding of vegetation must be conducted manually with the use of indigenous species.

Land Capability

The current land use at the Lindum TSF consists of previous mining activities which have resulted in the creation of the TSF as well as the resultant degradation of underlying and some surrounding vegetation. The land uses surrounding the Lindum TSF consists of mining activities, urban settlements, degraded vegetation as well as some agricultural activities. The aim would also be to ensure that indigenous vegetation e.g. Soweto Highland grass is re-established where possible.

Biodiversity

Biodiversity of the post-closure reclamation operation can be improved through the re-establishment of appropriate vegetation communities. Rehabilitation must be carried out using native vegetation and species that will create self-sustaining communities. Disturbed areas must be stabilised in order to prevent erosion. Alien invasive species must be managed through integrated control methods including chemical and physical removal schemes according to legislation and mine standards.

Aesthetic Quality

The aesthetic quality of the Lindum TSF site post closure can be achieved by thoroughly decommissioning the site which includes and all portable structures being dismantled, removed and disposed of appropriately. Rehabilitated areas must be inconspicuous in the surrounding landscape in terms of topography and species composition. Rehabilitated areas must also ultimately be free draining and appropriately re-vegetated. Any eroded areas must also be re-vegetated.

Health and Safety

Health and safety impacts can be minimised post closure by removing of the tailings and reclaimed material from the site. All waste material generated during operation and decommissioning must be disposed of appropriately at a registered landfill site. The rehabilitated areas must ultimately be rendered safe.

Infrastructure

All equipment must be removed for salvage or resale. If an item that has no salvage value to the mine but could be of value to individuals will be treated as waste. All structures at the TSF will be

demolished.

12 ENVIRONMENTAL EMERGENCIES AND REMEDIATION

According to Regulation 51(b) (iii) of the MPRDA, the proposed Lindum TSF Reclamation is required to document a procedure for environmentally related emergencies and remediation. This emergency procedure will ensure that employees are able to:

- Identify potential and actual emergency situations;
- Respond appropriately;
- Prevent and mitigate further environmental impacts; and
- Rehabilitate environmental impacts.

The benefits of emergency preparedness and response are that:

- People are able to respond to emergencies quickly and effectively;
- Employees and contractors are aware of their roles and responsibilities; and
- The risk to health and safety of people and the impacts on the environment are reduced.

12.1 Types of Environmental Emergencies

There are various types of emergencies that may threaten the environment at the proposed Lindum TSF Reclamation Project. Examples of typical emergencies include:

- Accidental discharges to water bodies (e.g. contaminated water runoff or spillages);
- Accidental discharges to land (e.g. oil or chemical spills)
- Uncontrolled fire; and
- Structural collapse of the mining faces of the Lindum TSF.

Not all these incidents will necessarily result in an emergency condition. It is the magnitude and severity of the incident that will determine whether it is an emergency.

12.2 Emergency Response Plan

Although the cause of an emergency may differ, the actions to be followed in an emergency situation are generally the same. The following steps should be followed in an emergency situation:

12.2.1 Notification of Emergency

Any employee or person that notices an emergency condition should immediately alert the relevant Randfontein Surface Operations environmental department or the shift supervisor.

12.2.2 Make Safe

Internal and external emergency services must be notified of the emergency so that it can be addressed using the relevant emergency equipment and emergency response teams. Measures must also be taken to stop the continued environmental degradation by either containing the

contamination or stopping the contamination at source. Measures must be taken to ensure that personnel and public are safe and removed from the area of danger. Medical treatment and transport must be provided to the injured. Emergency evacuation must occur if the safety of people is compromised.

12.2.3 Obtain Information on the Emergency

The relevant Randfontein Surface Operations environmental department should then obtain information on the nature of the emergency, origin, time that it commenced, persons involved, whether people have been injured and potential or actual environmental risks.

12.2.4 Remediate the Associated Environmental Impacts

The environmental impacts related to the emergency must be assessed and remediated. This may require the input of external environmental expertise to assess the nature of damage incurred. Remediation measures must be implemented to mitigate the impacts e.g. clean-up of spill or rehabilitation of vegetation.

12.2.5 Communication

The relevant affected people must be kept informed of the emergency, including when the situation is over and normal work can be resumed. The emergency must be reported to the relevant authorities (such as local municipality, DMR, DWA, NNR, DOA, DEA, local emergency services, fire brigade, etc) and the public when required.

12.2.6 Debriefing Session

After the emergency there should be a debriefing session to discuss the cause of the emergency, extent of damages, extent of emergency preparedness and response. The cause of the emergency must be investigated and corrective and preventative measures implemented to prevent a re-occurrence of the cause of the emergency, or lapses in effective response to the procedure.

12.2.7 Revise Procedure

Any lessons learnt from the emergency must be incorporated into the emergency procedure and it should be revised accordingly.

12.2.8 Training and Emergency Drills

All staff must be trained in how to respond to emergency conditions at the Randfontein Surface Operations and should be aware of the emergency exit points, the actions required in the event of an emergency and which external emergency services to contact.

The emergency procedure for emergencies (with the contact details of external services) must be posted in a visible, easily accessibly place at the Randfontein Surface Operations. Emergency drills (e.g. fire and evacuation drills) should be conducted at periodic intervals.

12.3 Specific Emergencies

12.3.1 Uncontrolled Fires

The Gold One Randfontein Surface Operations environmental department should take measures to prevent fires on the site. All parties will ensure that there is adequate fire-fighting equipment, which is regularly maintained. This department will ensure that specified workers will receive appropriate formal fire-fighting training. Finally, it is the responsibility of the Gold One Randfontein Surf ace Operations environmental department to ensure that there is an adequate system of firebreaks in place and that all fire hazard 'hotspots' have been identified. The fire emergency procedure is as follows:

- Raise the alarm by sounding the fire alarm system, informing site management and/or the mine manager, and informing the fire fighting representative in the area;
- Determine the location and severity of the fire;
- Apply basic fire-fighting procedures if possible and apply evacuation procedures if necessary;
- Assemble at the emergency control point and obey all instructions from the fire fighting representative;
- The emergency number for the closest fire station must be located at the mine manager's office and all other site notice boards.

12.3.2 Traffic Accidents

This procedure addresses accidents that occur on the site. The following actions must be taken in the event of a road accident:

- Establish what has happened, including the location, nature, and status of the accident; the nature and extent of injuries or damage; and the nature and extent of any spills or leaks (where chemicals may be involved – refer to relevant procedures below).
- Isolate the accident scene and spill area, and treat any casualties.
- Inform the responsible manager, emergency response team, Health and Safety Manager and environmental manager. These contact numbers must be on the list of emergency contact details.
- Depending on the seriousness of the accident, notify the closest emergency services the number for which must be located at the manager's office and all other site notice boards.

12.3.3 Oil Spills

Oil spills can occur over most of the site and the major sources will be leaks from vehicles and machinery such as the high pressure water pumps. These spills may be minor (i.e. a few spots) or major (i.e. a 220 ℓ drum falling over onto the soil). Negligence is also a source of oil spills where contractors or site staff are servicing machinery and allow used oil to spill onto the ground. There is also the potential for equipment and machinery breakdowns on the site. Material Safety Data Sheets (MSDS) will be kept at the stores for each type of hydrocarbon on the site. These will

contain information on decontamination procedures and the correct procedure to follow in the event of a spill. The manager will also place emergency spill kits (i.e. plastic tarpaulin, a 220 ℓ drum, a broom and an absorbent to soak up the material) at strategic locations around the site.

The following actions must be taken in the event of an oil spill:

- Establish what has happened, and the nature and extent of the spill. Obtain MSDS.
- The responsible area manager and ECO must be informed. The contact numbers for who must be on the list of emergency contact details.
- To contain and clean a spill, the instructions on the MSDS must be followed. The area must be cordoned off and kept clear, and the spill contained and cleaned up immediately. Any contaminated soil, vegetation or rock must be removed and disposed of at a registered landfill site.

12.3.4 Abnormal Operating Conditions

For any abnormal operating conditions resulting in public complaints (i.e. contamination of surface water as well as any other abnormal operating conditions which may arise the general emergency response plan detailed in Section 12 above should be implemented and followed.

13 ENVIRONMENTAL AWARENESS PLAN

13.1 Introduction

This chapter describes the environmental awareness plan as per the requirement of Section 39(3)(c) of the MPRDA. This section details how Gold One intends to inform its employees of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. The objective of the Gold One environmental awareness plan is to ensure the following:

- Recognise environmental management as an important corporate priority and establish policies, programs and practices for conducting business in an environmentally sound manner as well as making adequate financial provision for the restoration of the environment.
- Integrate environmental policies, programs and practices into all activities of the organisation as well as monitor the performance of these programs to ensure compliance with the company and legislative requirements
- Establish an ongoing program of review and improvement of environmental performance, taking into account technical and economic developments, scientific developments and environmental effects of the operation as well as developing and operating facilities based on the efficient use of energy, resources and material.
- All personnel are made aware of the environmental management requirements at the Lindum TSF, with regard to their role in environmental conservation, as well as the importance of conserving natural resources;
- To identify the environmental training and awareness needs for both employees and contractors at all levels;
- To educate employees in terms of emergency readiness and relevant response requirements;
- To ensure that all personnel, as a minimum, undergo general environmental awareness training, which would highlight the environmental responsibility of all personnel;
- Ensure that all employees understand and are able to fulfil their environmental responsibilities. Encourage dialogue on environmental issues and be responsive to concerns.
- To ensure that those personnel whose functions may have a significant impact on the environment receive the appropriate training, so that they may perform their designated tasks adequately.
- Require contractors and suppliers to comply with the corporate environmental requirements and work co-operatively to identify opportunities to improve environmental performance.
- Liaise and work with government departments and the public to develop effective, efficient, equitable, and sustainable measures to protect the environment as well as socially related aspects.

The benefits of awareness training are numerous and include:

- Awareness of the importance of conforming with the environmental management programme;
- Improvement in environmental performance at the mine; and
- Support for Gold One in its efforts to achieve its environmental management objectives and performance targets.

13.2 Roles and Responsibilities

Environmental awareness training at the Lindum TSF is to be provided to all employees on site, as well as all contractors.

All new employees are to undergo environmental awareness training as part of their induction within the first two weeks of employment. Contractor employees whose work has, or can have, a significant impact on the environment must, upon appointment, have a personalised training programme developed as part of his/her job description and must undergo awareness training prior to the commencement of any such activities. Performance assessments will be conducted on the contractors' compliance on environmental issues under his/her control. After the initial training, refresher courses must be provided annually or upon request from trainee.

The on-site ECO or parties identified and recommended by the ECO, will undertake the environmental awareness training on site. The ECO is responsible for developing training modules, providing environmental training to employees on site, identifying additional training, maintaining a master set of training material, scheduling training sessions, maintaining training records, and updating this procedure as and when necessary. The ECO is to identify additional environmental training (revision and update of course) at least annually.

The environmental awareness plan for the Lindum TSF outlines the environmental aspects for which training must be provided, optional methods of training, scheduling, and content of training sessions.

13.3 Training Requirements

Employees include external contractors. Environmental training will focus on two areas, namely awareness training and competency training.

Awareness training refers to the acquisition of knowledge with regard to Gold One environmental policies, the requirements of the EMP, requirements outlined in the legislation and key environmental issues. The planned awareness training will thus be:

- General in nature;
- Similar in content irrespective of job description;
- Delivered with an environmental thrust; and
- Conducted in a classroom setting as well as on site as appropriate.

The main thrust of awareness training will be delivered at an induction level to all new employees and contractors who will be working on-site. A typical agenda for the environmental awareness course would thus comprise the following aspects:

- What is the environment?
- Why must we look after the environment?
- Details of working areas;
- Employees (including contractors) responsibilities and roles in environmental conservation;
- Types of impacts associated with the various phases of the Lindum TSF Reclamation Project;
- Actions required by workers to prevent or minimise impacts;
- Ablution facilities;
- Waste management;
- Water conservation;
- Dust management;
- Management of petrol, oil and diesel; and
- Emergency procedures and contact numbers.

Competency training, on the other hand, will be specifically job orientated, and will be delivered in such a way as to ensure that any task which could potentially result in an environmental impact is performed properly and responsibly. Competency training is thus:

- Specific in nature;
- Dependent on the job description of the employee;
- Aims to ensure that employees perform certain tasks correctly and responsibly; and
- Involves both classroom instruction together with on-the-job training and task observation/supervision.

Gold One will thus make both types of training available, while the personnel or contractors working at the Lindum TSF Reclamation Project will receive either or both types of training as may be required, depending on their organisation, level of responsibility within that organisation and specific job function.

13.4 Frequency and Scheduling of Training

All new employees and contractors will be expected to undergo environmental awareness training as part of their induction at Gold One. This program could fit into the existing Gold One environmental induction process and should occur within the first two weeks of commencing employment. The current strategy for environmental awareness training of existing employees at Gold One involves an induction when personnel return from leave.

Prior to the commencement of any contractor activities which could have any potential impact on the environment, all contractor employees must undergo the necessary awareness training.

14 FINANCIAL PROVISION

In order to ensure that Gold One provide sufficient funds for the total quantum to cover the rehabilitation, management and remediation of negative environmental impacts, the quantum for closure-related financial provision in terms of Section 41 of the MPRDA has been determined. The quantum calculation associated with the rehabilitation of the proposed infrastructure is included below. Gold One will make provision in this regard available by the means described in Section 53 of the MPRDA.

In 2012 Digby Wells and Associates (DWA) calculated the overall mine level Quantum for Closure Related Financial Provision and for the Cooke Optimisation Project (COP). These unit rates for rehabilitation were used in the calculations below, as well as the DMR guidelines for calculation of financial provision.

The financial provision for the proposed activities at the Lindum TSF was calculated to be **R 3 645 397** should rehabilitation activities be undertaken by the Applicant according to the DMR Guideline for Calculation of the Quantum for Closure Related Financial Provision and the unit rates as supplied by DWA.

Should the Mine be faced with unforeseen closure the financial provision required by the DMR was calculated to be **R 5 070 018** as can be seen in the calculation Table 7 below.

Table 7: Calculation of the Quantum for Closure Related Financial Provision for the Lindum Reclamation Project 2013

MPRDA Regulation 41(3) Calculation of the Quantum for Closure Related Financial Provision for the Year 2013	
Site/Facility Name	Lindum Reclamation Project
Mineral Mined/Saleable By-product	Gold Reclamation
Primary Risk Class	Class A - High Risk
Area Sensitivity	Medium (Determines multiplication factor for 6, 8(C) and 13)
Level of Information Available	Limited
Closure Components, Closure Costs and Weighting Factors	As below

Closure Component No.	Main Description (as per DME Guideline)	Relevant Component On-site (Description)	Unit	Master Rate	Quantity	Multiplication Factor	Nature of Terrain / Relevant Weighting Factor *Flat = 1*	Amount
10	General surface rehabilitation, including grassing of all denuded areas	Includes all disturbed footprints, denuded and hard-standing areas	ha	R 101 881.00	30	1	1	R 3 056 430.00
14	2-3 years of maintenance and aftercare	For all rehabiliated areas forming part of item 10 above	ha	R 13 845.90	30	1	1	R 415 376.89
							SUM OF CLOSURE COMPONENT COSTS	R 3 471 806.89
							SUBTOTAL 1 = (SUM OF CLOSURE COMPONENT COSTS) X (WEIGHTING FACTOR 2 = 1.05)	**R 3 645 397.24**
							PRELIMINARY AND GENERAL MANAGEMENT = 12% OF SUBTOTAL 1	R 437 447.67
							CONTINGENCIES = 10% OF SUBTOTAL 1	R 364 539.72
							SUBTOTAL 2 = (SUBTOTAL 1) + (PRELIMINARY AND GENERAL MANAGEMENT) + CONTINGENCY	R 4 447 384.63
							SUBTOTAL 3 = SUBTOTAL 2 EXCLUSIVE OF VAT AT 14%	R 4 447 384.63
							VAT = 14% OF SUBTOTAL 3	R 622 633.85
							GRAND TOTAL = SUBTOTAL 3 + VAT	**R 5 070 018.48**

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