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Gold One Tailing Backfill Plant and Pipeline Environmental Scoping Report for Public Comment

In terms of
The National Environmental Management Act, 1998 (Act No. 107 of 1998)

Report

Version – Final (for Public Comment)

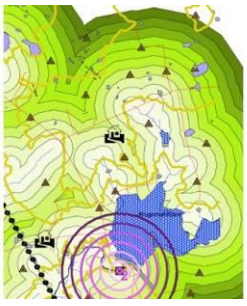
April 2013

Gold One International Limited

GCS Project Number: 12-561

GDARD Reference: GAUT: 002/12-13/E0230

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EXECUTIVE SUMMARY

Introduction

Gold One International Ltd (Gold One) proposes to establish a Full Plant Tailings (FPT) Backfill Plant (the Project) within their existing mining area. The project is situated next to Bekkersdal, near Westonaria in the Gauteng Province of South Africa.

The Gold One Cooke Operation consists of the Cooke Underground Mine, Cooke Plant and Dump 20.

The Cooke 1, 2 and 3 mines are serviced by a developed network of mining and civil infrastructure, with adequate electrical power and water readily available. Dump 20 was created as a result of stamp milling technology that was employed at the Millsite Gold Plant, which was commissioned in 1911. The battery of stamp mills could not fine grind the ore to effectively extract all the contained gold, and this resulted in the creation of Tailings Dam (Dump) 20. Today the Randfontein Surface Operations process Dump 20 at a typical rate of 300,000 tonnes per month and produces some 32,000 ounces per annum.

Reclamation of this sand dam will reduce by the end of 2012, whereupon the Dump 20 sand and slime resource will be processed through the Cooke Plant. The Cooke Plant was upgraded during 2012 to increase feed throughput to 400,000 tonnes per month.

Project Background

The intention of introducing backfill in the underground workings has been proposed in order to make more mineable reserves available. The flexibility this mining method presents in terms of underground support and the improvement of geotechnical stability will result in areas previously not considered feasible as part of the mining plan suitable for underground mining. The Project is proposed for the Cooke Operations, initially to provide backfill to Cooke 2 Shaft with the intention to expand to Cooke 3 Shaft if necessary. By mining these areas Gold One could increase tonnage throughput or utilize the opportunity to replace lower grade tonnage with higher grade pillar material. In addition to the safety benefits and possible increase and/or improvement of tonnages, this method will also reduce the volume of tailing material to be placed on the tailings storage facility

Project Description

For the proposed Project, tailings from the Cooke (gold) plant would require modification in order to be suitable for use as a backfill medium. The Backfill plant will require a 14hr supply per day at a rate of 217m^3/h with a relative density of 1. 4t/m^3 to manufacture 38 850m^3 FPT backfill every month.

Depending on the tailings particle grading approximately two thirds of the solids (the coarse portion) never leaves the gold plant through the cyclone system. Approximately one third (fines) is pumped overland to the thickeners, where flocculent is added to aid in increasing the density. The thickener overflow consists mainly of water but also contains a small quantity of ultra-fines that is pumped back to the gold plant for disposal on a tailings dam. The thickener underflow is mixed with binder and pumped underground. Spillage is also disposed of at the gold plant, diluted greatly by the thickener overflow. The total solids used will be approximately 118 tons per hour.

The Backfill plant will be designed to be modular with all equipment (including the thickeners) being transportable to another site, thereby ensuring the Backfill plant can be relocated. Due to the shallow operations, boreholes located close to the operations can be used to transfer the backfill down the mine. The tailings are then pumped or gravitated underground to fill voids providing local support.

Environmental Authorization Processes

The proposed project requires authorization in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) (NNRA), the National Water Act, 1998 (Act No. 36 of 1998) (NWA) and the Mineral and Petroleum Resource Development Act, 2002 (Act No. 28 of 2002) (MPRDA) before construction may begin.

All listed activities promulgated in terms of Section 24 of the NEMA require environmental authorization issued by the competent authority for the application. In this case the competent authority is the Gauteng Department of Agriculture and Rural Development (GDARD). The listed activities which have been applied for with respect to the proposed Backfill Plant and associated pipeline are described in Table 2.1.

Table 1-1: NEMA listed activities triggered by the proposed development

Relevant Notice no. and date	Activity No.	List activity description	Triggered by
Activities which require Basic Assessment			
GNR 544	9	The construction of facilities or infrastructure exceeding 1000m in length for the bulk transportation of water, sewage or storm water (i) With an internal diameter of 0.36 metres or more; or (ii) With a peak throughput of 120 litres per second or more	Pipeline to transport tailings and return water
GNR 544	23	The transformation of undeveloped, vacant or derelict land to – (i) Residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares;	Establishment of a Tailings Backfill Plant
GNR 544	28	The expansion of existing facilities for any process or activity where such expansion will result in the need for a new, or amendment tor, an existing permit or license in terms of national or provincial legislation governing the release of emission or pollution, excluding where the facility process or activity s included in the list of wate management activities published in terms of section 19 of the NEMWA	Establishment of a Tailings Backfill Plant and the additional pipeline to transport tailings and return water, which will require a WULA in terms of the NWA.
GNR 544	37	The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where: (a) The facility or infrastructure is expanded by more than 1000m in length; or (b) Where the throughput capacity of the facility or infrastructure will be increased by 10% or more	The expansion of pipeline to transport return water
GNR 544	39	The expansion of (i)Canals (ii)Channels (iii)Bridges (iv)Weirs (v)Bulk storm water outlet structures (vi)Marinas;	The expansion of the pipeline bridge across the Wonderfonteinspruit

Relevant Notice no. and date	Activity No.	List activity description	Triggered by
		Within a watercourse or within 32 meters of watercourse, measured from the edge of a watercourse, where such expansion will result in an increased development footprint but excluding where such expansion will occur behind the development setback line	
GNR 544	49	The expansion of facilities or infrastructure for the bulk transportation of dangerous goods: (i) In gas form, outside an industrial complex, by an increased throughput capacity of 700 tons or more per day (ii) In liquid form, outside an industrial complex or zone by an increased throughput capacity of 50 cubic metres or more per day (iii) In solid form, outside an industrial complex or zone, by an increased throughput capacity of 50 tons or more per day	The expansion of pipeline to transport tailings
Activities which require Environmental Impact Assessment			
GNR 545	2	The construction of facilities or infrastructure for nuclear reaction including energy generation, the production, enrichment, processing, reprocessing, storage or disposal of nuclear fuels, radioactive products and nuclear and radioactive waste.	Construction of the Tailings Backfill Plant and associated pipeline
GNR 545	5	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the release of emission or pollution or effluent and which is not identified in Notice No 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the NEMWA, in which case that Act will apply	Construction of the Tailings Backfill Plant and associated pipeline
GNR 545	25	The expansion of facilities for nuclear reaction including energy generation, the production, enrichment, processing, reprocessing, storage or disposal of nuclear fuels, radioactive products and nuclear and radioactive waste.	Expansion of the tailings pipeline.

Activities which have the potential to impact on a water resource require a Water Use License (WUL) issued by the Department of Water Affairs (DWA), under the NWA. A Water Use Licence Application (WULA) and an accompanying Integrated Waste Water Management Plan (IWWMP) must be submitted to the Department of Water Affairs (DWA).

Section 21 of the NWA identifies eleven (11) consumptive and non-consumptive water uses which must be authorized under a tiered authorization system, in terms of Section 40 of the NWA:

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

In terms of the NNRA, Gold One also requires authorisation for the backfill of re-processed tailings into old mine voids. The public and worker safety assessments that will be carried out for the radiological assessment will be included in a separate investigation conducted under the auspices of the NNRA, but the results will be available for inclusion in the Environmental Impact Assessment (EIA) report.

Public Consultation Process (PPP)

The Public Participation Process (PPP) is a vital component of the environmental authorisation application process. The PPP allows for transparency with the Interested and Affected Parties (I&APs), and input from the relevant provincial and local authorities. Regulations with regards to PPP in terms of the MPRDA and NWA are not as prescriptive as those published under NEMA. In order to streamline the PPP and ensure that the PPP for all processes is as comprehensive as possible, the PPP prescribed in terms of Chapter 6 of the NEMA Regulations R543, dated 18 June 2010 was complied with.

The Scoping Phase PPP has comprised the following:

- Pre-Application notification to surface right owners;
- Placement of site notices;
- Advertisement in the Randfontein / Westonaria Herald Newspaper;
- Distribution of Background Information Documents (BIDs);
- Written notifications to landowners;
- A Public meeting held in Westonaria; and
- Consultation meetings with relevant departments.

Potential impacts that have been raised as part of the Scoping Process include the following:

- Possible change in natural topography;
- Compaction of soil, water runoff and soil erosion;
- The pollution of soil;
- Wetland site disturbance and alteration;
- Compacting of wetland soils;
- Sulphuric acid, Ammonia, organic matter and caustic pollution due to spillage from the slurry and fine tailings being pumped;
- Radionuclide and heavy metal contamination due to spillage from the slurry being pumped in the event of infrastructure failure;
- Possible loss of habitat ;
- Loss or degradation of natural vegetation;

- Increase in invasive species;
- Groundwater quality deterioration due to spillage;
- Degradation in surface water quality due to leaks and burst from pipelines;
- Noise nuisance;
- The continued presence of the mine can also be a nuisance to the neighbouring Bekkersdal community and landowners;
- Creation of New Employment Opportunities;
- Improved Quality of Life through the Increase in Household Income;
- Change in geological strata due to backfilling material;
- Improve geotechnical safety;
- Enhanced stability in topography due to the filling of voids; and
- Binders in the backfill help to minimise groundwater contamination.

This Final Environmental Scoping Report (ESR) forms part of the Scoping Phase of the environmental authorisation application process. This report allows I&APs and authorities the opportunity to comment on the proposed project, the Plan of Study for the EIA process and the proposed PPP.

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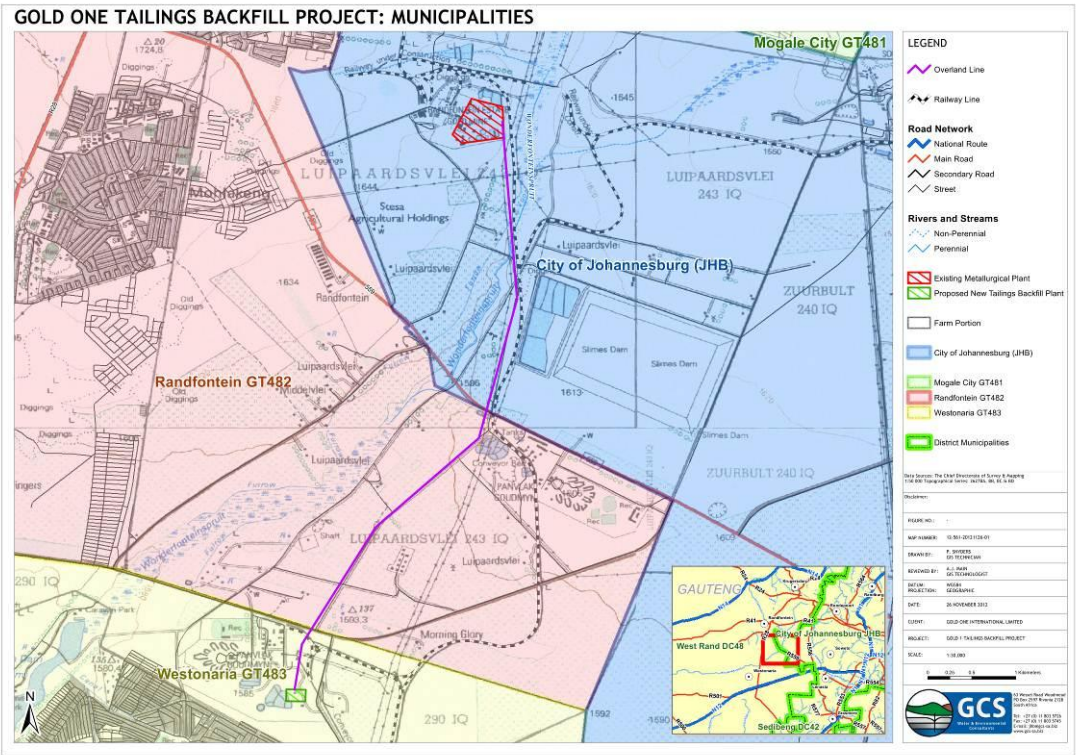
1 INTRODUCTION

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the National Environmental Management Act, 1998 (Act No.107 of 1998) (NEMA).

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(b) A description of the proposed activity

1.1 Background and Project History

The project area is situated next to Bekkersdal, near Westonaria in the Gauteng Province of South Africa (refer to Figure 1-1). The proposed development will fall within a brownfields area, and numerous environmental studies have been conducted for the Cooke Operations (Cooke 1, 2 and 3 underground mining operations, Cooke plant and Dump 20).



[FIGURE NOT TO SCALE- REFER TO A3 MAP ATTACHED]

Figure 1-1: Project Location

The intention of introducing backfill in the underground workings has been proposed in order to make more mineable reserves available. The flexibility this mining method presents in terms of underground support and the improvement of geotechnical stability will result in areas previously not considered feasible as part of the mining plan suitable for future underground mining. The Project is proposed for the Cooke Operations, initially to provide backfill to Cooke 2 Shaft with the intention to expand to Cooke 3 Shaft if necessary. By mining these areas Gold One could increase tonnage throughput or utilize the opportunity to replace lower grade tonnage with higher grade pillar material. In addition to the safety benefits and possible increase and/or improvement of tonnages, this method will also reduce the volume of tailing material to be placed on the tailings storage facility

The latest production profile has been used to determine the required backfill. The stope height of 3.5m has precluded the use of cyclone classified tailings (CCT), also referred to as hydraulic fill. A 100% fill has been designed for the stopes. The backfill has been designed to have a free standing height of 3.5m. The backfill will be placed at a density of 1.75t/m^3. All backfill will have a binder added, with the current design based on a 7% binder addition.

The FTP Backfill Plant will be designed to be modular with all equipment (including the thickeners) being transportable to another site, thereby ensuring the backfill plant can be relocated in future. Due to the shallow operations, boreholes located close to the operations can be used to transfer the backfill down the mine. All excess water will be transferred back to Cooke Plant for disposal.

1.2 The Applicant

The applicant is Gold One International Limited (Gold One).

Gold One is a dual listed (ASX/JSE: GDO) mid-tier mining group with gold operations and gold and uranium prospects across Southern Africa. At the beginning of 2012, the group expanded further with the acquisition of Rand Uranium (Pty) Limited consisting of the Cooke Underground Operations and the Randfontein Surface Operations located in the West Rand, situated 30 kilometres southwest from Johannesburg. Through Gold One's purchase of Rand Uranium (Pty) Limited, the group has also acquired one of the world's most advanced uranium projects, which envisages recovering uranium, gold and sulphur from the Cooke Tailings Dam and underground ores.

The Gold One group is majority-owned by a consortium comprising Baiyin Non-Ferrous Group Co. Limited, the China-Africa Development Fund, and Long March Capital Limited (Figure 1-2).

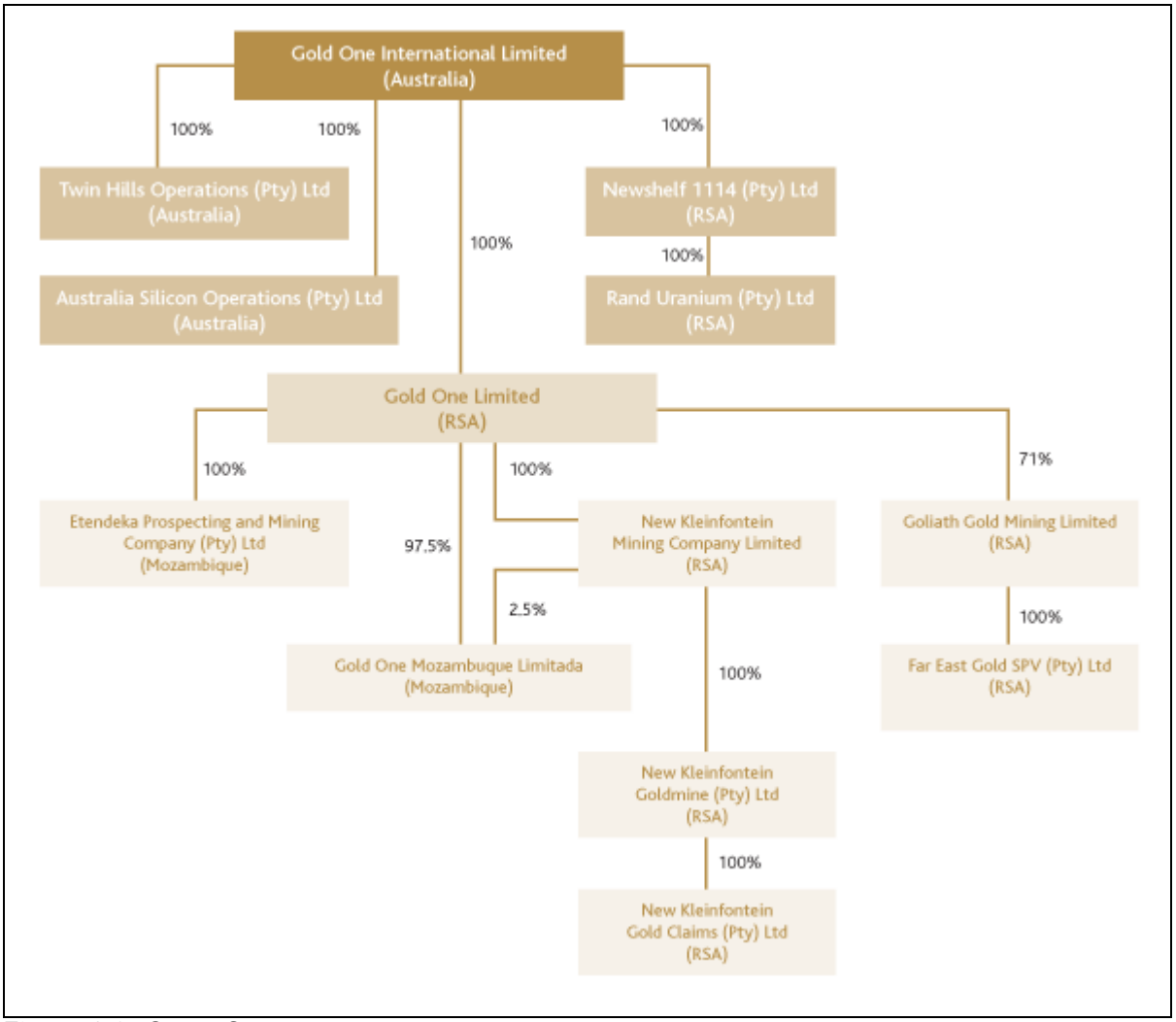


Figure 1-2: Group Structure

The relevant contact details of the applicant are presented in Table 1-1.

Table 1-1: Applicant Contact Details

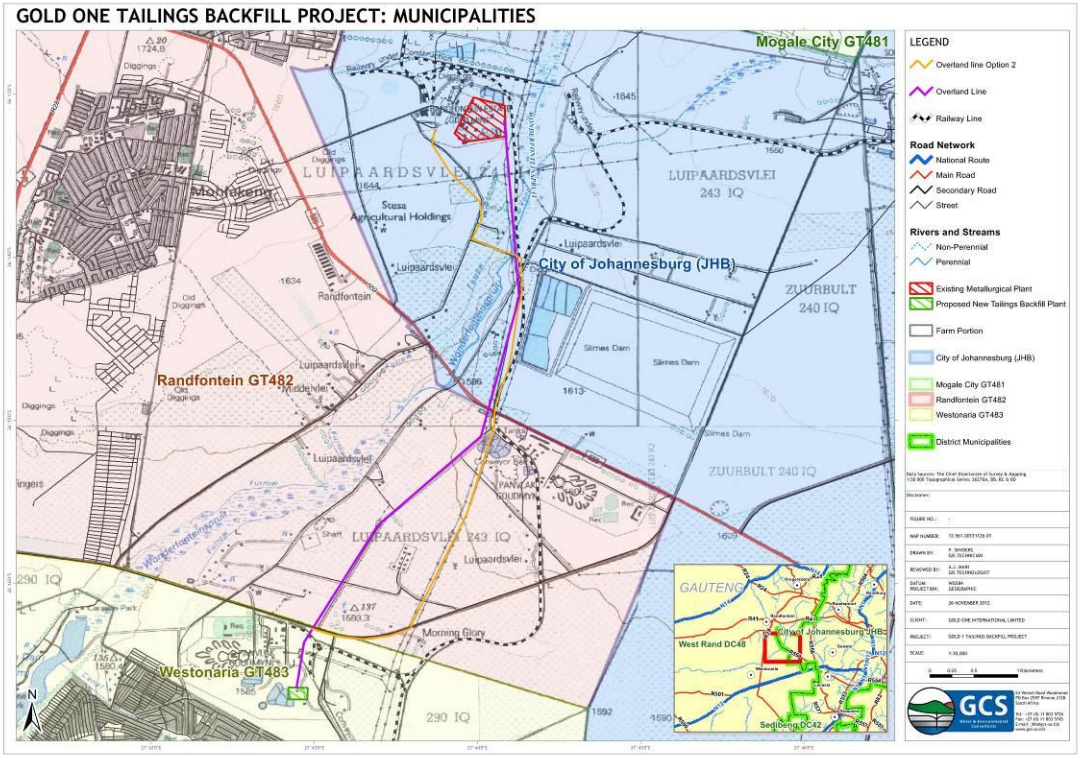
Name of Applicant	Gold One International limited
Contact Person	Jonathan Steinmann
Physical Address	Bridgeview House, Constantia Office Park, Cnr 14th Ave and Hendrik Potgieter Str, Weltevreden Park, 1709
Postal Address	Postnet Suite 115, Private Bag X17, Weltevreden Park, 1715.
Telephone	011 411 6419
Fax	011 278 0000

1.3 Description of Land

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(d) A description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is - *(i) A linear activity, a description of the route of the activity.*

The proposed Backfill project by Gold One in the Randfontein/Westonaria/Johannesburg region, is situated in the West Rand District and Johannesburg Municipalities approximately 40km west of Johannesburg city centre and 40km south west of Mogale City (Krugersdorp), Gauteng Province. The closest towns and residential suburbs to the mining operations are Randfontein (10km North), Westonaria (8km Southwest), Bekkersdal (1km Southwest) Toekomsrus (7km North) and Mohlakeng5km North.



[FIGURE NOT TO SCALE- REFER TO A3 MAP ATTACHED]

Figure 1-3: Municipalities of the project area

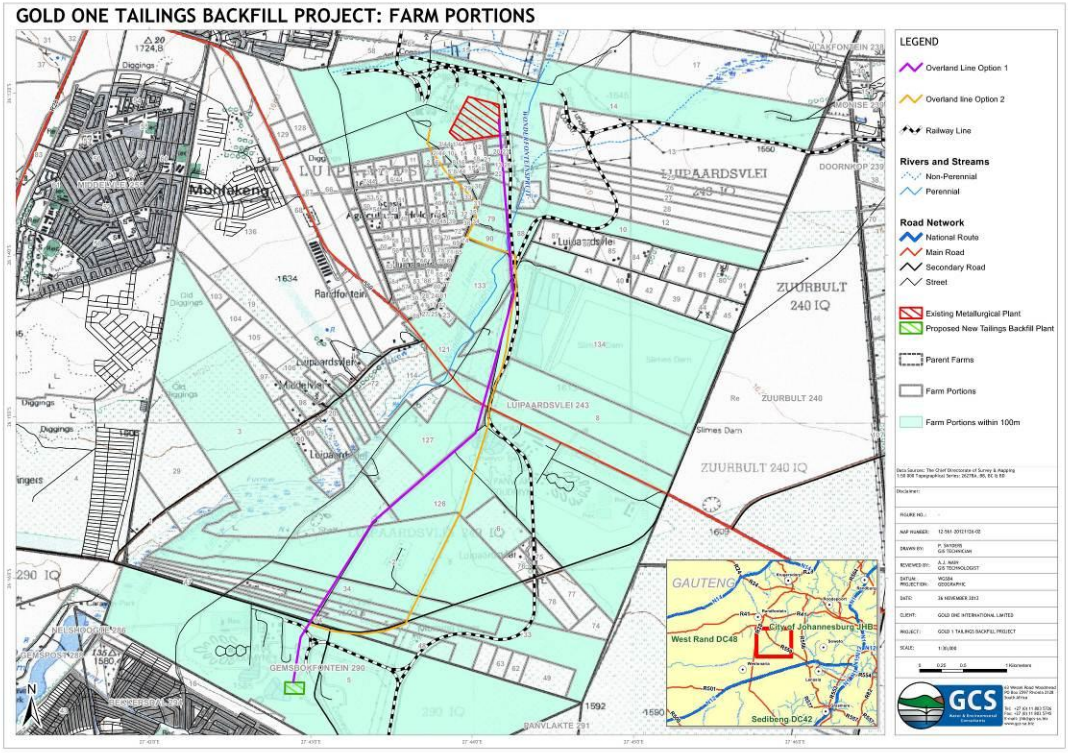
The Project area comprises 2 (two) farms, namely, Luipaardsvlei 243 and Gemsbokfontein 290 in the Johannesburg Registration Division. The proposed Pipeline will cross over the Luipaardsvlei farms, and the FPT Backfill Plant will be situated on the farm Gemsbokfontein 290 (Figure 1-4). The property details for the project were obtained from the government deeds website (www.deeds.gov.za) and are described in Table 1-2

.

Table 1-2: Gold One Tailings Backfill Plant and Pipeline Property Details

Id	Devision	Farm	Portion	Farm_name	Owner
T0IQ00000000024300000	IQ	243	0	Luipaardsvlei	Du Toit Ebenhaezer-Administrators
T0IQ00000000024300002	IQ	243	2	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300003	IQ	243	3	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300005	IQ	243	5	Luipaardsvlei	National Government of The Republic of South Africa
T0IQ00000000024300007	IQ	243	7	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300008	IQ	243	8	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300010	IQ	243	10	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300014	IQ	243	14	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300031	IQ	243	31	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300033	IQ	243	33	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300034	IQ	243	34	Luipaardsvlei	Justice Lunuberg
T0IQ00000000024300046	IQ	243	46	Luipaardsvlei	First Westgold Prop (Pty) Ltd
T0IQ00000000024300058	IQ	243	58	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300059	IQ	243	59	Luipaardsvlei	Arch Import & Export cc
T0IQ00000000024300064	IQ	243	64	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300079	IQ	243	79	Luipaardsvlei	Charles Villet
T0IQ00000000024300088	IQ	243	88	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300090	IQ	243	90	Luipaardsvlei	Nicolaas Johannes Erasmus Coetzee

Id	Devision	Farm	Portion	Farm_name	Owner
T0IQ00000000024300121	IQ	243	121	Luipaardsvlei	Jan Harm Du Plessis
T0IQ00000000024300126	IQ	243	126	Luipaardsvlei	Rand Uranium (Pty) Ltd
T0IQ00000000024300127	IQ	243	127	Luipaardsvlei	Zacharias Johannes Van Greuning / Sakkie Van Greuning
T0IQ00000000024300133	IQ	243	133	Luipaardsvlei	Jan Harm Du Plessis
T0IQ00000000024300134	IQ	243	134	Luipaardsvlei	Randfontein Estates Gold Mining Co Witwatersrand Ltd
T0IQ00000000029000005	IQ	290	5	Gemsbokfontein	Rand Uranium (Pty) Ltd
T0IQ00000000029000005	IQ	290	5	Gemsbokfontein	Rand Uranium (Pty) Ltd



[FIGURE NOT TO SCALE- REFER TO A3 MAP ATTACHED]

Figure 1-4: Proposed Project Area and Farm Portions

1.4 Who is conducting the EIA/EMP Process

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(a) Details of - *(i) The EAP who prepared the report; and* *(ii) The expertise of the EAP to carry out scoping procedures.*

GCS (Pty) Ltd (GCS) were appointed to undertake the required environmental authorization application processes in terms of the NEMA, Mineral and Petroleum Resource Development Act, 2002 (Act No. 28 of 2002) (MPRDA), National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) (NNRA) and the National Water Act, 1998 (Act No. 36 of 1998) (NWA) for the proposed establishment of a Tailings Backfill Plant.

The NEMA regulations require that the Environmental Assessment Practitioner (EAP) conducting the environmental authorization application processes is independent and competent and complies with NEMA.

The Environmental Impact Assessment and Environmental Management Programme (EIA/EMP) in terms of NEMA, radiological assessment conducted in terms of the NNRA and the Integrated Water Use License Application (IWULA) in terms of the NWA, as well as the required Public Participation Process (PPP) will be undertaken by GCS (The Consultant). The Consultant employs highly trained staff that have a wealth of knowledge with respect to environmental legislation, as well as extensive experience in the fields of hydrogeology, hydrology and environmental science as well as environmental law.

The Consultant is independent and has no vested interest in the outcome of the environmental authorization applications.

Table 1-3: EAP Details

Name of EAP	Position	Qualification	Experience
Tanja Bekker	Technical and Quality Control	MSc. (Environmental Management). PrSci Registered	10 years
Estie Retief	Environmental Project Manager	M.A (Environmental Management): University of Johannesburg	7 years
Megan Wuite	Senior Environmental Consultant	MEnvDev (Water Resource Management)	6 years
Riana Panaino	Environmental Consultant	B. Sc (Hons) Biodiversity and Conservation	5 years

1.5 Who will evaluate the applications?

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(p) Any other matters required in terms of Section 24 (4) (a) (b) of the Act

The Consultant will undertake parallel environmental authorization application processes under NEMA, MPRDA, NNRA and NWA. These required documents will be submitted to the competent authorities:

- EIA/EMP under NEMA: Gauteng Department of Agriculture and Rural Development (GDARD);
- EMP Amendment under MPRDA: Department of Mineral Resources (DMR), in Gauteng;
- Assessment under NNRA: National Nuclear Regulator, in Gauteng; and
- IWULA and Integrated Waste and Water Management Plan (IWWMP) under NWA: Department of Water Affairs (DWA).

1.6 Objectives of the Environmental Scoping Report (ESR)

This ESR has been compiled to fulfil the requirements of the relevant Regulations promulgated in terms of the NEMA. As such, the objectives of this ESR are to:

- Provide a brief description of the proposed development, i.e. the proposed construction of the Tailings Backfill Facility and associated infrastructure to the public and potential Interested and Affected Parties (I&APs) and the competent authority;
- Provide a description of the baseline biophysical and socio-economic environment;
- Identify all environmental legislation and guidelines applicable to the proposed development;
- Identify potential environmental impacts and cumulative impacts posed by the proposed development;

- Indicate the methodology that will be applied during the EIA phase to assess the significance of the potential impacts;
- Provide the details of the PPP carried out and to be carried out for the duration of the EIA process; and
- Present a plan of study for the EIA process to be undertaken, i.e. a description of the process to be followed, specialist studies that will be undertaken, authorities' consultation to be undertaken, PPP to be undertaken, etc. The plan of study is presented in Chapter 9 of this document.

The Final ESR will be made available in the public domain for a fourty (40) calendar day comment period (Thursday, 7 February 2013 until Tuesday, 19 March 2013). All inputs received from stakeholders during the comment period will be captured and are incorporated into this Final ESR which will be submitted to the GDARD for consideration. In addition the report will also be resubmitted to the public as a final report for a thirty (30) day comment period.

2 LEGISLATIVE BACKGROUND

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(f) An identification of all legislation and guidelines that have been considered in the preparation of the scoping report
Section 28 (2)	*In addition a scoping report must take into account any guidelines applicable to the kind of activity which is the subject of the application.*

The purpose of this chapter is to provide a brief assessment of the various legislative requirements applicable to the proposed development of a FPT Backfill Plant and associated pipeline in the Gauteng Province. The function of determining the legal requirements is to ascertain the legal obligations and duties imposed on the applicant with regards to the proposed project by the different sets of legislation.

The following legislation is applicable to the proposed project and as such the proposed development will need to comply with the provisions, of inter alia the following:

- The Constitution of South Africa, 1996 (Act No. 108 of 1996);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA);
- National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) (NNRA);
- The National Water Act, 1998 (Act No. 36 of 1998) (NWA); The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA); and
- The Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA).

Other legislation which has been considered, and but are not applicable to the proposed project is:

- Hazardous Substance Act, 1973 (Act No.15 of 1973) (HSA);
- The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA); and
- The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CNRA);

2.1 Constitution of South Africa, 1996 (Act No. 108 of 1996)

The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) (the Constitution) compels all to ensure the fundamental rights of all citizens. Section 24 of the Act states the following:

"Everyone has the right:

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

The environmental legislation promulgated since the Constitution have given legal effect to this section of the Constitution.

2.2 National Environmental Management Act, 107 (Act No. 107 of 1998) (NEMA)

The NEMA is the environmental framework legislation promulgated to ensure that the environmental rights contemplated in Section 24 of the Constitution are realized. NEMA sets out:

- The fundamental principles that need to be incorporated in the environmental decision making process;

- The principles that are necessary to achieve sustainable development;
- Provides for duty of care to prevent, control and rehabilitate the effect of significant pollution and environmental degradation; and
- It allows for the prosecution of environmental crimes.

The Act provides for the identification of listed activities in terms of Section 24. These activities were promulgated under Regulations 544, and 545 in Government Gazette No. 33306 on 18 June 2010 (R544 and R545 repealed R386 and R387, respectively which were published on 21 April 2006). The listed activities require an environmental authorization, granted by the competent authority before they may commence. The impacts of these activities must be investigated, assessed and reported to the competent authority before authorization to commence with such listed activities can be granted.

The listed activities which have been applied for with respect to the proposed Tailings Backfill Plant and associated pipeline are described in Table 2.1.

Table 2-1: NEMA listed activities triggered by the proposed development

Relevant Notice no. and date	Activity No.	List activity description	Triggered by
Activities which require Basic Assessment			
GNR 544	9	The construction of facilities or infrastructure exceeding 1000m in length for the bulk transportation of water, sewage or storm water (i) With an internal diameter of 0.36 metres or more; or (ii) With a peak throughput of 120 litres per second or more	Pipeline to transport tailings and return water
GNR 544	23	The transformation of undeveloped, vacant or derelict land to – (i) Residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares;	Establishement of a Tailings Backfill Plant
GNR 544	28	The expansion of existing facilities for any process or activity where such expansion will result in the need for a new, or	Establishement of a Tailings Backfill Plant and the additional pipeline to transport

Relevant Notice no. and date	Activity No.	List activity description	Triggered by
		amendment tor, an existing permit or license in terms of national or provincial legislation governing the release of emission or pollution, excluding where the facility process or activity s included in the list of wate management activities published in terms of section 19 of the NEMWA	tailings and return water, which will require a WULA in terms of the NWA.
GNR 544	37	The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where: (a) The facility or infrastructure is expanded by more than 1000m in length; or (b) Where the throughput capacity of the facility or infrastructure will be increased by 10% or more	The expansion of pipeline to transport return water
GNR 544	39	The expansion of (i)Canals (ii)Channels (iii)Bridges (iv)Weirs (v)Bulk storm water outlet structures (vi)Marinas; Within a watercourse or within 32 metres of watercourse, measured from the edge of a watercourse, where such expansion will result in an increased development footprint but excluding where such expansion will occur behind the development setback line	The expansion of the pipeline bridge across the Wonderfonteinspruit
GNR 544	49	The expansion of facilities or infrastructure for the bulk transportation of dangerous goods: (i) In gas form, outside an industrial complex, by an increased throughput capacity of 700 tons or more per day (ii) In liquid form, outside an industrial complex or zone by an increased throughput capacity of 50 cubic metres or more per day (iii) In solid form, outside an industrial complex or zone, by an increased throughput capacity of 50 tons or more per day	The expansion of pipeline to transport tailings

Relevant Notice no. and date	Activity No.	List activity description	Triggered by
Activities which require Environmental Impact Assessment			
GNR 545	2	The construction of facilities or infrastructure for nuclear reaction including energy generation, the production, enrichment, processing, reprocessing, storage or disposal of nuclear fuels, radioactive products and nuclear and radioactive waste.	Construction of the Tailings Backfill Plant and associated pipeline
GNR 545	5	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the release of emission or pollution or effluent and which is not identified in Notice No 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the NEMWA, in which case that Act will apply	Construction of the Tailings Backfill Plant and associated pipeline
GNR 545	25	The expansion of facilities for nuclear reaction including energy generation, the production, enrichment, processing, reprocessing, storage or disposal of nuclear fuels, radioactive products and nuclear and radioactive waste.	Expansion of the tailings pipeline.

2.3 Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)

The MPRDA repealed certain sections of the Minerals Act, 1991 (Act No. 50 of 1991). The DMR is the custodian of South Africa's mineral and petroleum resources, and the MPRDA allows the DMR to promote equitable access to these resources. This includes expanding opportunities for historically disadvantaged individuals, including women, to enter the mineral and petroleum industry, promote employment and advance the social welfare of South African's, as well as give effect to Section 24 of the South African Constitution by ensuring the nation's mineral and petroleum resources are developed in an efficient and ecologically sustainable manner.

In terms of Section 102 of the MPRDA, when a change or addition of new activities occurs after an EIA/EMP has been approved, an amendment to the Environmental Impact Assessment and Environmental Management Plan (EIA/EMP) needs to be submitted to the DMR.

2.4 National Water Act, 1998 (Act No. 36 of 1998)

The purpose of the NWA is to ensure that the nation's water resources are protected, sustainably and equitably used, developed, conserved, managed and controlled. The NWA provides several provisions that need to be taken into consideration.

2.4.1 Water Use License Application

Section 21 of the NWA identifies eleven (11) consumptive and non-consumptive water uses which must be authorized under a tiered authorization system, in terms of Section 40 of the NWA:

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

- 21 (k): Using water for recreational purposes.

2.4.2 GN704

Section 26 (1) of the NWA makes provision for the Minister of Water Affairs to make regulations to control, monitor, modify or prohibit various practices related to water use. Government Notice 704 was promulgated by the Minister on 4 June 1999 in Government Gazette vol. 408, No. 20119. The GN 704 Regulations were published in terms of Section 26 (1), (b), (g) and (i) of the NWA and pertain specifically to water uses for mining and related activities.

Section 3 of the GN704 makes provision for exemption from the requirements of the GN 704 schedules. This exemption will only be granted if the mine can prove that they have implemented measures according to the best practice guidelines and regulations that will ensure the protection of the water resources at all times.

Due to the project having a tailings pipeline that crosses a stream (GN 704 (4) (a)) an exemption from the requirements as set out in GN704 will be required. The DWA will however be consulted in this matter through the IWUL Application.

2.5 Mine Health and Safety Act, 1996 (Act No. 29 of 1996)

The purpose of the Mine Health and Safety Act is to provide for protection of the health and safety of employees and other persons that are working on mines or mining infrastructure.

The Act establishes ways to promote and provide for the enforcement of health and safety measures on mines; and governs the actions and participation of employees, employers and the State in order to achieve this aim. The Act also makes provision for effective monitoring systems and inspections, investigations and inquiries to improve health and safety; and specifies training and human resources development. It also seeks to regulate employers' and employees' duties to identify hazards and eliminate, control and minimise the risk to health and safety.

2.6 National Nuclear Regulator Act, 1999 (Act No. 47 of 1999)

The purpose of the NNRA is to provide for the establishment of a National Nuclear Regulator in order to regulate nuclear activities, for its objects and functions, for the manner in which it is to be managed and for its staff matters; to provide for safety standards and regulatory practices for protection of persons, property and the environment against nuclear damage; and to provide for matters connected therewith.

In terms of these Regulations, Gold One requires authorisation for the backfill of re-processed tailings into old mine voids. The public and worker safety assessments that will be carried out for the radiological assessment will be included in a separate investigation conducted under the auspices of the NNRA, but the results will be available for inclusion in the EIA report.

3 ENVIRONMENTAL PROCESS METHODOLOGY

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(f) An identification of all legislation and guidelines that have been considered in the preparation of the scoping report

3.1 NEMA Process

An application for activities listed in terms of the GNR 544 and 545 was submitted to the GDARD, which is the competent authority for the application, on 16 January 2013. A reference number [GAUT: 002/12-13/E0230] was issued by the GDARD on 27 January 2013.

This report has been compiled in accordance with Regulation 28 of the GNR543. The EIA/EMP process in terms of NEMA will be undertaken once this ESR and the Plan of Study herein is accepted by the GDARD.

3.2 MPRDA process

Gold 1 has an approved EIA/EMP in terms of the MPRDA (Reference Number: MR173 and MR09/08). An ESR, as required in terms of Regulation 49 of the MPRDA Regulations, Government Notice R527, will be compiled and submitted to the DMR for the amendment that will be done for the FPT Backfill plant.

The EIA/EMP amendment will be compiled in compliance with regulation 50 and 51 of the MPRDA Regulations R527, and submitted to the DMR.

3.3 NWA process

Once the necessary water uses and required volumes are finalized an Integrated Water Use License Application (IWULA) will be compiled and submitted to the DWA to apply for the authorisation of the water uses applicable to the proposed development.

An Integrated Waste and Water Management Plan (IWWMP) will also be compiled and submitted as a supporting technical document to the IWULA. An IWWMP serves as a management tool for the mine to manage storm water, wastewater, etc.

4 DETAILED PROJECT DESCRIPTION

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(b) A description of the proposed activity

4.1 Overview of Proposed Operations

Gold One Cooke Operations consists of Cooke Underground operations, Cooke Plant and Dump 20.

The primary mining horizons at Cooke Underground are the upper Elsburgs and VCR reefs. While these ore bodies have been mined for 20 to 30 years, the current owners have deployed a range of modern exploration and resource development tools designed to significantly expand the life of these operations.

The Cooke 1, 2 and 3 mines are serviced by a developed network of mining and civil infrastructure, with adequate electrical power and water readily available. The underground ore bodies are exploited by means of conventional hard rock mining methods involving drilling, blasting, scraping, tramming and hoisting.

Dump 20 was created as a result of stamp milling technology that was employed at the Millsite Gold Plant, which was commissioned in 1911. The battery of stamp mills could not fine grind the ore to effectively extract all the contained gold, and this resulted in the creation of Tailings Dam (Dump) 20. Today the Randfontein Surface Operations process Dump 20 at a typical rate of 300,000 tonnes per month and produces some 32,000 ounces of gold per annum.

Reclamation of this sand dump will reduce by the end of 2012, whereupon the Dump 20 sand and slime resource will be processed through the Cooke Plant. The Cooke Plant was upgraded during 2012 to increase feed throughput to 400,000 tonnes per month.

For the proposed FPT Backfill Project, tailings would require modification in order to be suitable for use as a backfill medium. The Backfill plant will require a 14hr supply per day at a rate of 217m^3/h with a relative density of 1.4t/m^3 to manufacture 38 850m^3 FPT backfill every month.

The process diagram is presented in **Error! Reference source not found.** and described briefly in Figure 4-1. Depending on the tailings particle grading approximately two thirds of the solids (the coarse portion) never leaves the gold plant through the cyclone system (3). Approximately one third (fines) is pumped overland to the thickeners (2), where flocculent (5) is added to aid in increasing the density. The thickener overflow (6) consists mainly of water but also contains a small quantity of ultra-fines that is pumped back to the gold plant (7) for disposal on a tailings dam. The thickener underflow (4) is mixed with binder (9) and pumped underground (10). Spillage is also disposed of at the gold plant, diluted greatly by the thickener overflow (6). The total solids used will be approximately 118 tons per hour.

Table 4-1: Process Description

Line	Description	Solids (t/h)
1	Gold Plant Feed	360
2	Cyclone overflow (Fines)	120
3	Cyclone underflow (Coarse)	240
4	Thickener Underflow	117
5	Flocculent addition	0.005
6	Thickener Overflow (Ultra fines)	3
7	Solids waste	9
8	Plant Spillage	6
9	Binder addition	7
10	Finished Backfill	118

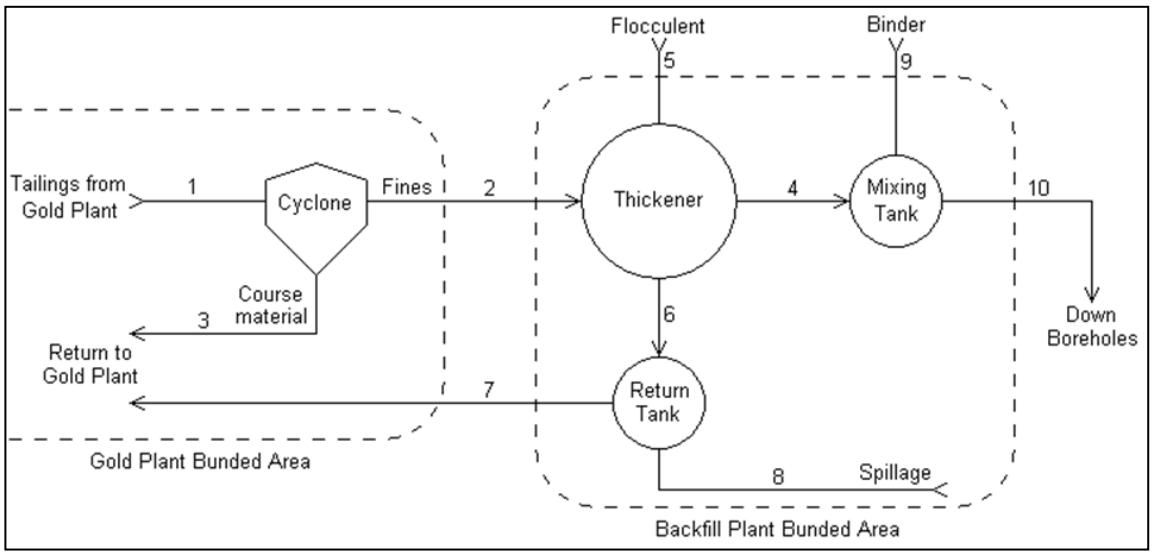
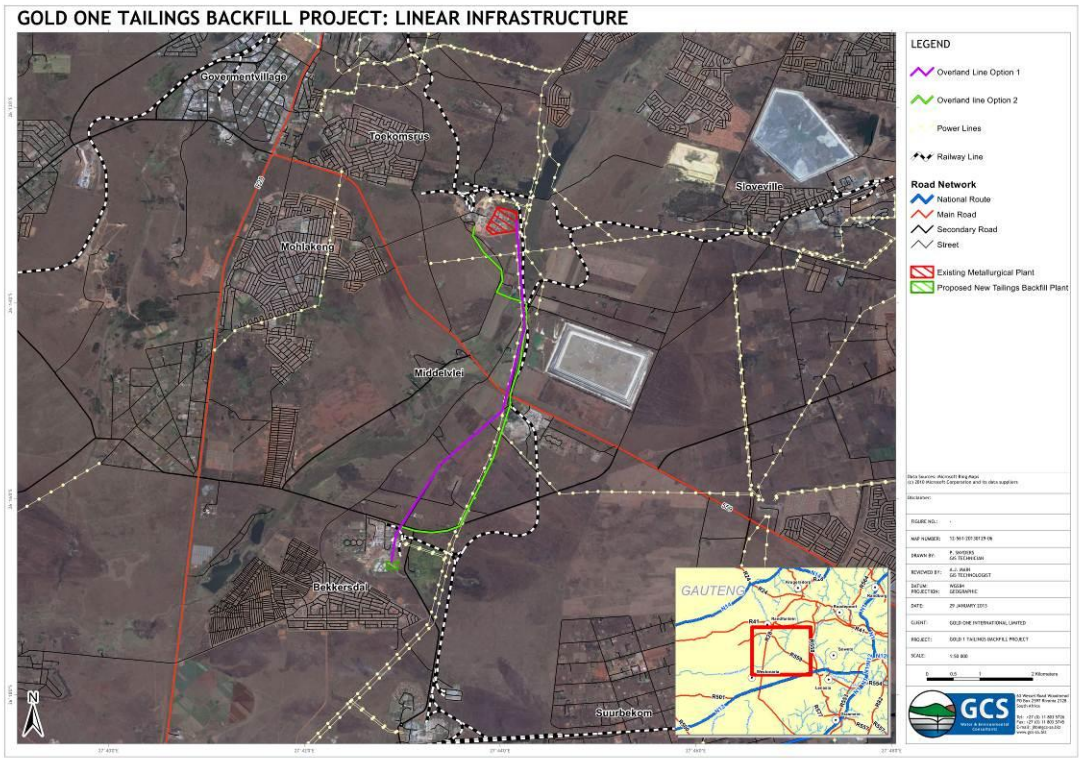


Figure 4-1: Tailings Backfill Plant Process

4.2 Linear Infrastructure

The following Linear infrastructure is located on and adjacent to the project area (Figure 4-2).



[FIGURE NOT TO SCALE- REFER TO A3 FIGURE ATTACHED]

Figure 4-2: Existing linear infrastructure

4.2.1 Roads and Railways

4.2.1.1 Existing

The proposed project area is located within an area with extensive existing road and railway infrastructure (Figure 4-2). The R559 (Main Road) crosses the project area in a south-easterly – north-westerly direction and the R93 crosses the project in a easterly – westerly direction. Two main roads are in close proximity to the project area; the R28, and the N12 highway. The location of the backfill plant is surrounded by entrance roads to the different Cooke offices, as well as several dirt roads to farmsteads and settlements.

4.2.1.2 Proposed Additional Roads and Railways

For the purposes of the FPT Backfill Plant project, it is not anticipated that any additional roads or railway lines will be constructed.

4.2.2 Powerlines

4.2.2.1 Existing

The proposed project area is located within an area with extensive existing infrastructure. Existing Powerlines are located in a northerly – southerly direction passing the proposed Backfill Plant site and following the proposed pipeline route. Some power lines branch off from this line towards the Cooke 2 Shaft area where the FPT Backfill Plant will be located (Figure 4-2).

4.2.2.2 Proposed Additional Powerlines

Electricity for the operation of the proposed FPT Backfill Plant and associated infrastructure will be obtained by connecting to the nearest overhead Eskom power line and routing a supply cable along the shortest feasible route to the facilities. The electricity requirements for the plant are 500kW on average with 4400tons CO2 generation per year. Gold One will establish that Eskom has sufficient capacity to accommodate the proposed scheme beforehand, and will implement any required upgrades if indicated to be necessary by Eskom.

4.2.3 Pipelines

4.2.3.1 Existing

The proposed project area is located within an area with extensive existing infrastructure. Currently there are several pipelines located between the different Cooke underground operations and the Cooke Plant. These pipelines transport sludge and return water between the facilities.

4.2.3.2 Proposed TSF pipeline (Digby Wells Environmental, 2012, GDARD ref no: 002/09-10/N073)

For the proposed Tailings Storage facility (TSF) project (Digby Wells Environmental, 2012, GDARD ref no: 002/09-10/N073), residue tailings, partially thickened or dewatered, will be pumped via a 42km overland pipeline to the consolidated TSF for deposition.

One tailings pipeline will be constructed and provision made for future expansions envisaged at this time. The return water pipeline will transport the return water from the TSF return water dam back to the Cooke plant water storage facility, for re-use in the process. The proposed tailings pipeline is proposed to be a DN450 mm/350 mm carbon steel pipeline with a wear resistant liner; and the return water pipeline will be a DN300mm carbon steel pipeline with epoxy lining. The northern section of this pipeline will be located within existing servitudes, and next to or on, property boundaries.

The location of the pipes will be above ground on precast concrete plinths, which will allow for greater integrity of the installation and access for maintenance purposes. The plinths will simplify leakage and damage detection to the pipeline and will aid in carrying out maintenance and repair operations. Where the pipelines cross roads and other linear infrastructure, a method referred to as “cut and cover” crossings or pipe jacking will be used where appropriate. This will enable the pipeline to pass underneath the obstruction in a precast culvert-like concrete conduit or similar. Where the pipeline has to cross surface water resources, the pipelines will cross above ground over the watercourse and specialized engineered crossings will be used.

4.2.3.3 Proposed Additional Pipelines for the FPT Backfill Plant

Pumps will be installed to transport the overflow product from the cyclone at Cooke plant, via the proposed pipeline to the new backfill plant adjacent to Cooke 2 shaft. The return water pipeline will transport the return water back to the return water dam at the Cooke plant, for re-use in the process.

The tailings pipelines will be 450mm in diameter and rubber lined for erosion and corrosion protection. The return water pipeline, 300mm in diameter, will be coated internally and externally. All three pipelines will be placed in a common servitude and bunded where appropriate. The individual pipes will be placed above ground on precast concrete plinths, which will prevent soil contact; and to simplify damage detection and facilitate maintenance and repair operations.

Where the pipelines cross roads and other linear infrastructure, specific designs appropriate for the particular crossing will be employed. At railway and provincial road crossings, the pipes will pass underneath the obstruction in a precast concrete culverts or jacked structures, whereas at smaller roads, appropriately designed structures will be used. Where watercourse crossings are required, it is envisaged that the pipelines will cross above ground over the watercourse utilising the minimum number of plinths possible, and manual construction methods to minimise construction impact.

Due to provisions made for future expansions (Digby Wells Environmental, 2012, GDARD ref no: 002/09-10/N073) the pipeline route will be specifically selected to ensure that the pipes run along existing servitudes and linear infrastructure to minimise impact on the receiving environment (Figure 4-2).

4.3 FPT Backfill Plant

The proposed FPT Backfill Plant is situated in a brownfields area North of Bekkersdal, near Westonaria in the Gauteng Province. It will further be located adjacent to Cooke 2 shaft complex south of the R93.

The FPT Backfill Plant will receive tailings from the cyclone overflow feed tanks, and tailings are then thickened. Binder is added to thickened tailings to produce cemented FPT before being delivered underground. The plant essentially comprises of three 8 m diameter High Compression Thickeners. Associated tanks and flocculent plants are included in this area.

The entire area will be bunded with brick bund walls to ensure that no spillage occurs outside of the bunded areas.

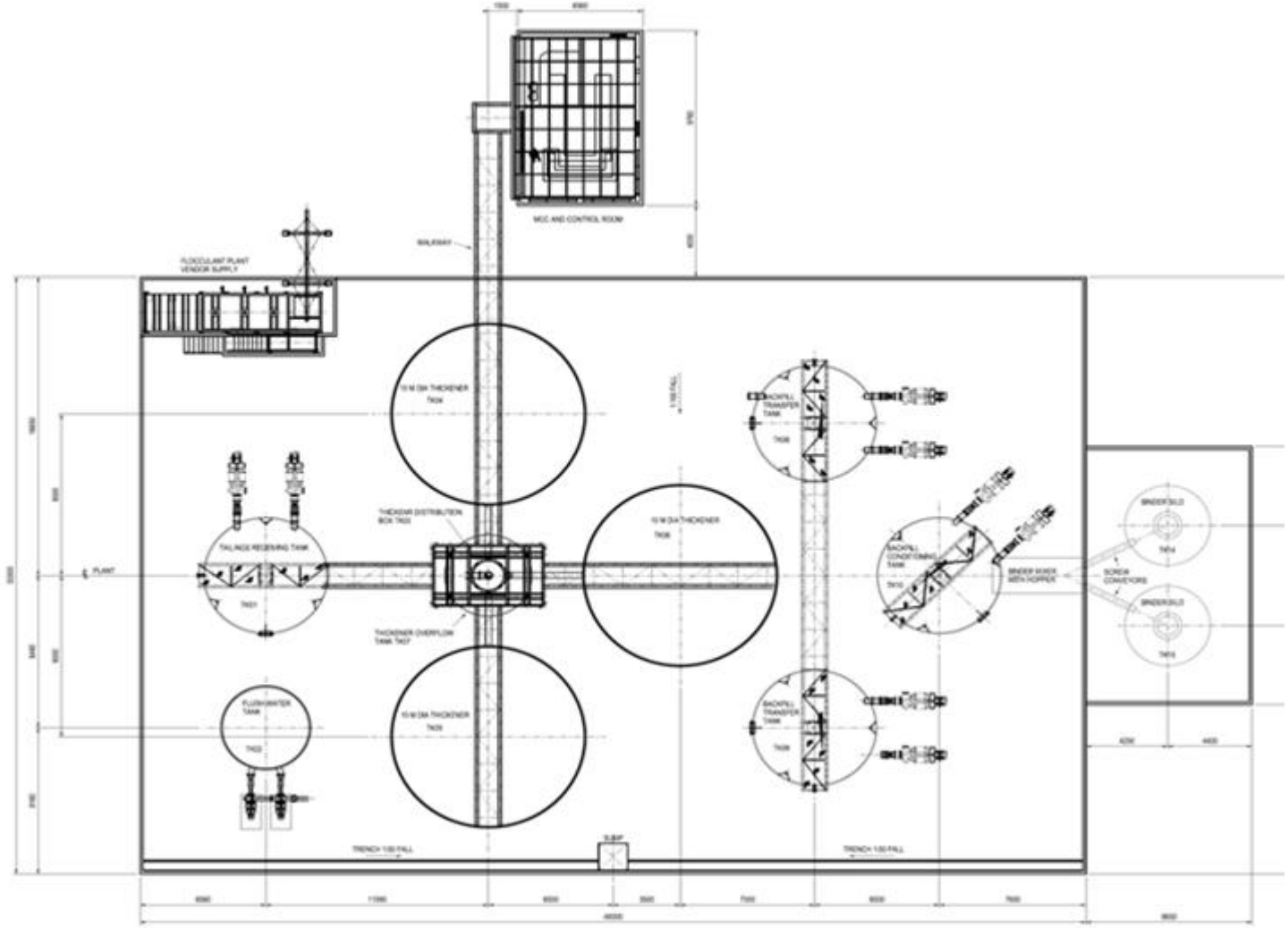


Figure 4-3: Conceptual general arrangement of the backfill Plant

4.3.1 Tailings Receiving Tank

Tailings, from the Cyclone overflow tank at Cooke Plant located 7.4 km to the North will be pumped into the Tailings Receiving Tank, where tailings are then transferred to the thickener distribution tank. Tailings supply is planned to be sourced from Cooke Plant due to the particle size distribution (PSD) of the tailings.

Dilution water will be delivered by variable speed driven mine water pumps from Cooke 2 Shaft. This will be used to dilute the thickener feed to a Specific Gravity (SG) of 1.2t/m^3 if it is too high. The ideal SG for the thickener is 1.2t/m^3. The Tailings Receiving Tank is equipped with mechanical and air agitation devices to ensure continuous agitation of the product. Mechanical agitation will normally be used, with air agitation used for start-up and during mechanical failure of the agitator.

The receiving tank has a capacity of 350m^3 and has been sized to provide buffer capacity to ensure availability of tailings when needed, and will also be sized to accept the full overland line contents in an emergency (290m^3). The tank can also be pre-fabricated and transported to site, thus making it easier to erect and also allowing removal to another location at a later stage.

Pumps will deliver the tailings to a thickener distribution box. Density control will ensure that the correct product density is achieved by measuring the thickener underflow and circulating the product until the correct density is achieved.

4.3.2 Thickener Distribution Box

The thickener distribution box will deliver tailings into any of the three thickeners. The thickener distribution box will have a capacity of 10m^3 and will be installed on a 10m high tower. Three HDPE gravity pipes connected to the thickener distribution box will be used to feed any of the three thickeners with tailings. Each of the gravity pipes will be a 350NB. The Thickener distribution box will be equipped with a fourth, larger diameter gravity pipe feeding back to the tailings receiving tank to take up any excess flow which does not report to the thickener. Flow control valves will be installed to control the flow into each thickener. This will be controlled by the underflow density of the thickeners.

4.3.3 Thickeners

Three 8m diameter High Compression Thickeners (HCT), also known as Deep Cone Thickeners (DCT) have been included in the design. A bolted design is envisaged which would enable the plant to be relocated if required. Each thickener is capable of handling 500m^3/day product (underflow). The thickeners would be configured concentrically to ensure minimal feed and overflow tanks are required.

Tailings are delivered to any of the thickeners at a feed rate of 63m^3/hr. Flocculent is then supplied to the thickener at a rate of 40g/t to facilitate the thickening process. Overflow from all the thickeners report to the thickener overflow tank and the thickener underflow from the thickeners is delivered to the backfill transfer tanks before being delivered underground.

Each thickener is provided with a re-circulation facility to ensure the desired underflow density is attained before the tailings report to the backfill transfer tanks, also to ensure that tailings are returned to the thickener should breakdowns occur in the upper section of the plant. High density variable speed driven centrifugal pumps will be utilized to transport thickener underflow from thickeners to either of the backfill transfer tanks.

4.3.4 Thickener Overflow Tank

The overflow from the thickeners will report to the overflow tank, centrally located between the thickeners. The overflow tank has 100m^3 capacity and is a cone bottomed tank. This tank will also receive all spillage from the backfill plant and will then transfer the water back to Cooke Plant.

4.3.5 Backfill Transfer Tanks

The thickener underflow reports to the backfill transfer tanks, by means of variable speed driven backfill transfer feed pumps. The backfill transfer tanks are mechanically agitated flat bottomed tanks and each has been sized to have a capacity of 350m^3.

They serve a function of holding backfill before being transferred to the binder mixing tank. Pumps will be used to pump the thickener underflow / backfill to the binder mixing tank. The pumps are equipped with mechanical seals to prevent additional gland seal water to dilute the product.

4.3.6 Binder Plant

The binder preparation plant has been designed to have the capability of manufacturing sufficient quantity of binder needed by the new FPT backfill preparation plant. The binder plant will also have enough binder buffer capacity to minimise binder shortage. The binder plant has binder storage capacity of 300 tons which is equivalent to three days storage when the plant consumes binder at 7% by mass. According to the process flow diagram 50t/hr of binder will be produced by the binder plant. This plant will consist of the following equipment:

- 2 x 150ton Binder Storage silos;
- Related screw conveyors;
- Binder mixer; and
- Related plant instrumentation.

Binder will be transferred to a weigh hopper located above the mixer. Once the mixer has a load of slurry, the weigh hopper will discharge and the mixer will mix the product. The mixing process will take approximately 6 seconds. The product will discharge into a transfer tank which will then be pumped to four boreholes where the product is transferred via pipelines to the underground workings.

4.3.7 Borehole Tanks – Flushing circuit

The mine water tank will provide flushing water to the 65NB backfill ranges at any given time. Each range is able to deliver 60m^3/hr of water. Water can be used to flush the backfill ranges all the way to the stopes.

4.4 Control System

The FPT Backfill Plant will be controlled using a supervisory control and data acquisition (SCADA) control. All density meters, flow rate, transmitters and mass measurements will report to the control room, located above the MCC to the North of the binder preparation plant. The operator will have access to the plant via an overhead walkway which will traverse the thickeners, and provide access to all tanks and control valves.

4.5 Waste Management

4.5.1 Process waste

Process waste will consists mainly of water, but also containing a small quantity of ultra-fines, and binder that might spill during the processing of the backfill.

The entire area will be bunded to ensure that no spillage occurs outside of the bunded area. All spillage inside the bunded area will be transferred back to Cooke Plant for disposal on a tailings dam. This will either be done through a dedicated return line, or a line which links to the Cooke 2 disposal pipeline.

4.5.2 Sewage Facilities

Ablution facilities will be located on site and sewage from the ablutions will be handled via septic tank arrangement.

4.6 Water Storage and Management

4.6.1 Water Balance

The water balance is very similar to the FPT Backfill Plant process with the exception of mine water (11) and rainfall (14). Mine water consists of both flushing water used to clean pumps and pipes (12) and wash water (13), used to clean the bund of spillages. Ultimately, all excess water is sent to the gold plant (7) for disposal. The total water used will be approximately 38m^3/hr with 108m^3/hr returned to the gold plant.

Table 4-2: Water balance within process

Line	Description	Water (m^3/h)
1	Gold Plant Feed	433.2
2	Cyclone overflow (Fines)	144.4
3	Cyclone underflow (Coarse)	288.8
4	Thickener Underflow	48.9
5	Flocculent addition	9.6
6	Thickener Overflow (Ultra fines)	93.3
7	Waste water	107.8
8	Plant Spillage	7.2
9	Binder addition	3.15
10	Finished Backfill	37.6
11	Mine water supply	7.2
12	Dilution Water	0
13	Wash Water and Flushing water	7.2
14	Rainfall Water	0.10

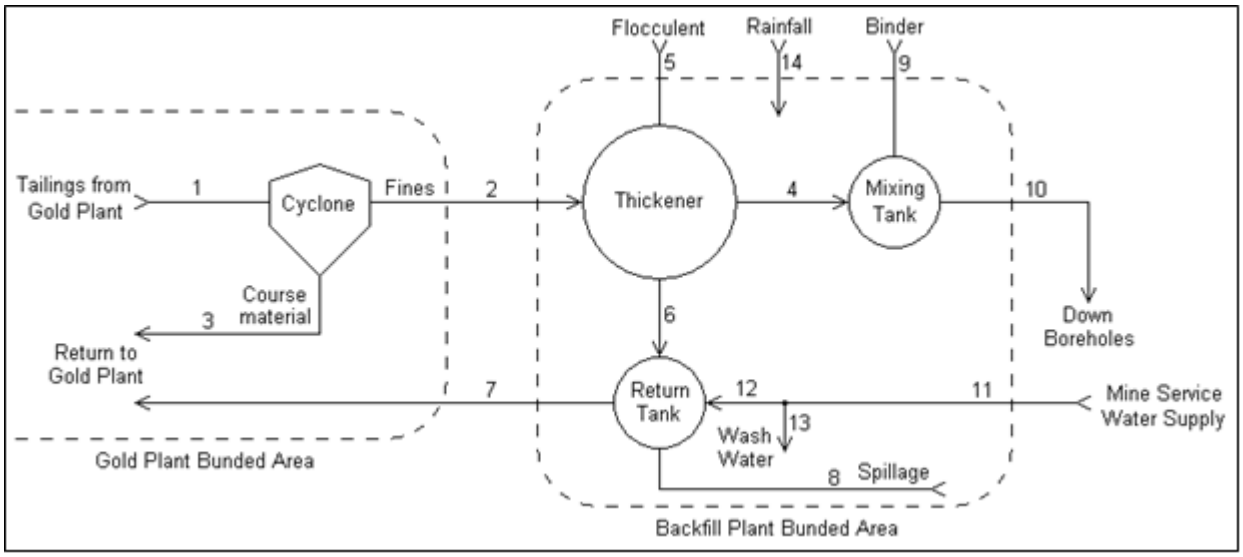


Figure 4-4: Water Balance within Process

4.6.2 Clean Water and Dirty Water Storage Facilities

Potable water and dirty water will stay unmixed and will be stored in separate tankage, Braithwaite tanks are typically used for potable or mine water. Most of the dirty water is handled at the cyclone plant (288.8m^3/hr). Of the 144.4m^3/hr of dirty water sent to the backfill plant only 37.6m^3/hr (25%) is used to transport backfill underground and the balance returned back to the cyclone plant 107.8m^3/hr(75%).

The plant layout will be designed such that no accumulation of water on the floor will occur. Floors will be graded with a slope of 1:100, to allow water to collect into a sump where water will be disposed-off in a controlled manner. The plants will have bund walls for spillage containment with volume of 120% of single biggest tank. At the cyclone plant existing storm water drainage will be used and a dedicated sump will be provided for storm water/ spillage catchment purposes.

4.6.3 Conceptual Storm Water Management Plan (SWMP)

The Storm Water Management will be assessed in terms of DWA best practice guidelines and GN704.

4.7 Water Supply

4.7.1 Potable Water

Potable water provision will be required. It is anticipated that potable water will be obtained from existing sources, should this not be a feasible option, Gold One will explore the possibility of obtaining water from alternate sources.

Average potable water consumption is 15m^3 per hour (consumers for this would be flocculent plant, gland service water and humans)

4.7.2 Process Water

Dilution water will be delivered by variable speed driven mine water pumps from Cooke 2 Shaft. This will be used to dilute the thickener feed if it is too high. The mine water tank will provide flushing water (at 7.2m^3/h) to the 65NB backfill ranges at any given time.

5 ENVIRONMENTAL STATUS QUO

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(e) A description of the environment that may be affected by the activity and the manner in which activity may be affected by the environment.

Below is the environmental baseline description of the proposed Gold One FPT Backfill Plant area and the path of the associated pipeline which was compiled by means of a literature review. The information provided is based on specialist studies previously undertaken for the purposes of the Cooke Uranium Project: Long Term TSF conducted by Digby Wells Environmental (2012).

5.1 Geology

The Randfontein area and Johannesburg in general, lie in the area of outcrop of several groups of rocks. The source of the Cooke Dump tailings are the gold-bearing rocks of the Witwatersrand Supergroup which consists of sediments deposited in an ancient basin.

The Witwatersrand Basin is underlain by an Archaean age (>3.1 Ga) granite-greenstone basement and the 3.086 Ma to 3.074 Ma Dominion Group. The basin is unconformably overlain by rocks of the Ventersdorp 2.7 Ga), Transvaal (2.6 Ga) and Karoo (302 Ma to 180 Ma) Supergroups. The Witwatersrand Supergroup is divided into two groups, the West and Central Rand Groups and is composed predominantly of a succession of shales, meta-quartzites and conglomerates (CCIC, 2006). The proposed project lies on rocks of the Transvaal Supergroup. The Transvaal Supergroup in this area can be considered as two main units, namely, the Black Reef Formation and the overlying Malmani dolomites.

5.1.1 Black Reef Formation

In the project area, the Black Reef Formation unconformably overlies steeply dipping strata of the West and Central Rand groups of the Witwatersrand Supergroup, and the Klipriviersberg lavas of the Ventersdorp Supergroup. The reef dips at approximately 15^{o} to the northeast and is highly undulating in places (CCIC, 2006). This formation is about 25m thick in places. The formation consists of quartzite with lenses of grit stone and conglomerate especially along the base. The top of the formation often consists of shale where it gradually merges into the overlying Malmani dolomite (Visser et. al., 1989).

5.1.2 Malmani Subgroup

From the 1:250 000 geological map (2626 West Rand) it can be seen that the site is underlain by rocks of the Malmani Subgroup of the Chuniespoort Group of the Transvaal Supergroup. These rocks predominantly consist of poorly-bedded dolomite and limestone with chert layers.

5.1.3 Geological structure

The 1:250 000 scale geological map (2626 West Rand) shows major fault zones in the region, with the Roodepoort Fault being particularly significant in this study.

Faults and dykes are significant since they may act as preferential pathways for groundwater flow.

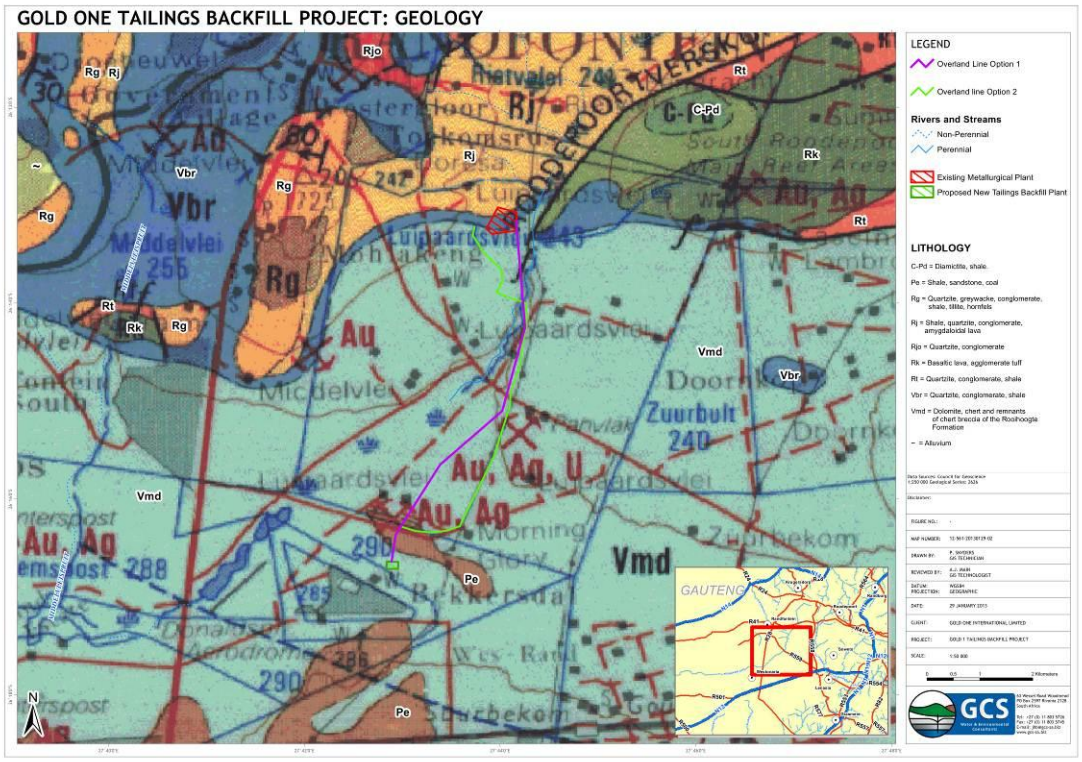


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Figure 5-1: Regional Geology

5.2 Topography

The topography of the overall area is relatively flat to rolling with a gradual slope towards the wetland system. The only significant topographical features are the low ridgelines that traverse the landscape from east to west in a number of places. The elevation of the general area rises from 1550 metres above mean sea level (m.a.m.s.l) to 1730m.a.m.s.l.

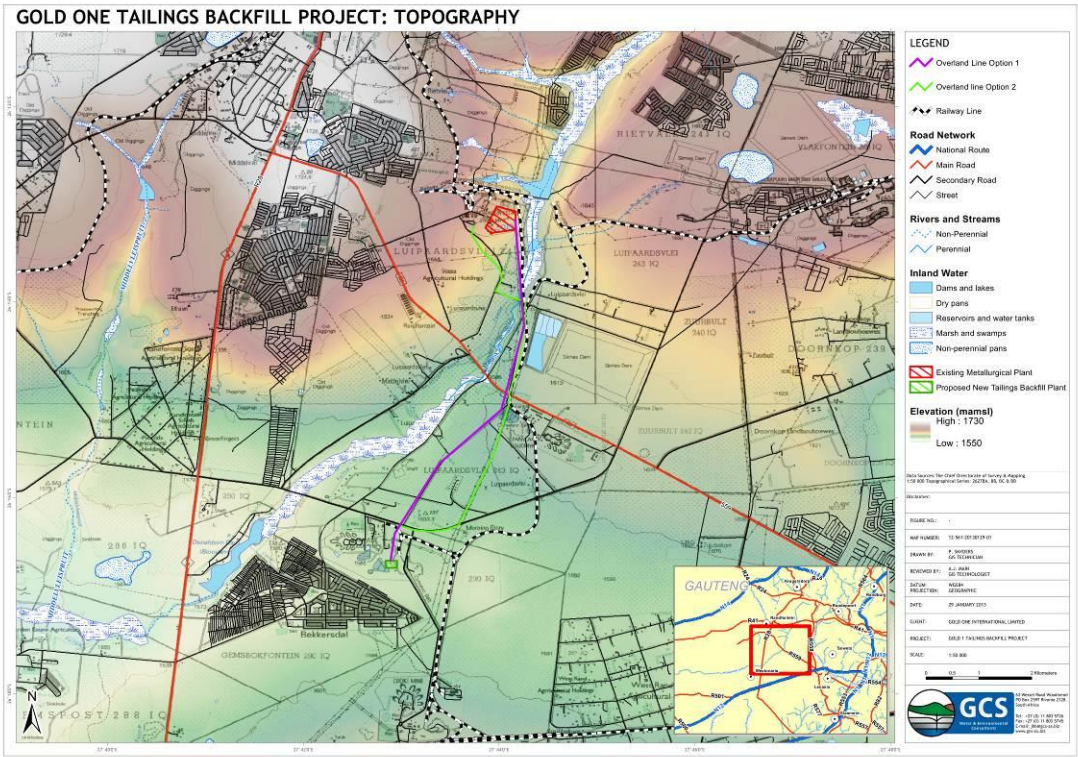

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Figure 5-2: Topography

5.3 Climate

The climate is typical for the Gauteng Highveld and is characterised by warm summers with rainfall. Winters tend to be dry and mild during the day and cold at night with regular frosts. Modelled meteorological data for the period January 2009 to December 2011 was obtained for a point South of the project site (26.533722 S, 27.629725 E).

The average daily maximum temperatures range from 22.9°C in December to 8.1°C in July, with daily minima ranging from 21.5°C in December to 7.1°C in July. Annual mean temperature is given as 16.8°C.

The area falls within the summer rainfall region with low rainfall between May and September (less than 25 mm a month). The highest monthly maximum precipitation (266.4 mm) occurs for January. The rate decreases down to 8.1 mm in July. The monthly minimum precipitation ranges between 191.3 mm in January and 0 mm in July and August.

The predominant wind direction is from the north, north-north west and north northeast, with frequent winds also occurring from the north east and eastern quadrant.

The annual maximum, minimum and mean monthly evaporation rates for the area for the period 1957-1987 are 244 mm, 130 mm and 178 mm, respectively. The highest monthly maximum evaporation (332.2 mm) occurs for November. The rate decreases significantly down to 121.6 mm in June. The monthly minimum evaporation ranges between 200.7 mm in December and 69.9 mm in June.

5.4 Soils, Land Type, Land Use and Land Capability

Information with regards to the Soils, Land Type, Land Use and Land Capability study were sourced from the Environmental Impact Assessment (EIA) for the proposed Uranium Plant and Cooke Dump Reprocessing Infrastructure (Permit 1): Soils and Land Capability Specialist Study by Golder, February 2010.

The pipeline stretching from the Cooke plant to the proposed Backfill Plant is located on Land Types Ab7 and Fb 5. Land Type Ab7 is dominated by deep red soils while Land Type Fb 5 is dominated by shallow stony soils. The land use is dominated by grazing across Land Type Ab7, Fb5 found within the project area.

The land capability of the Land Types on the pipeline routes are arable Class II and grazing Class VI.

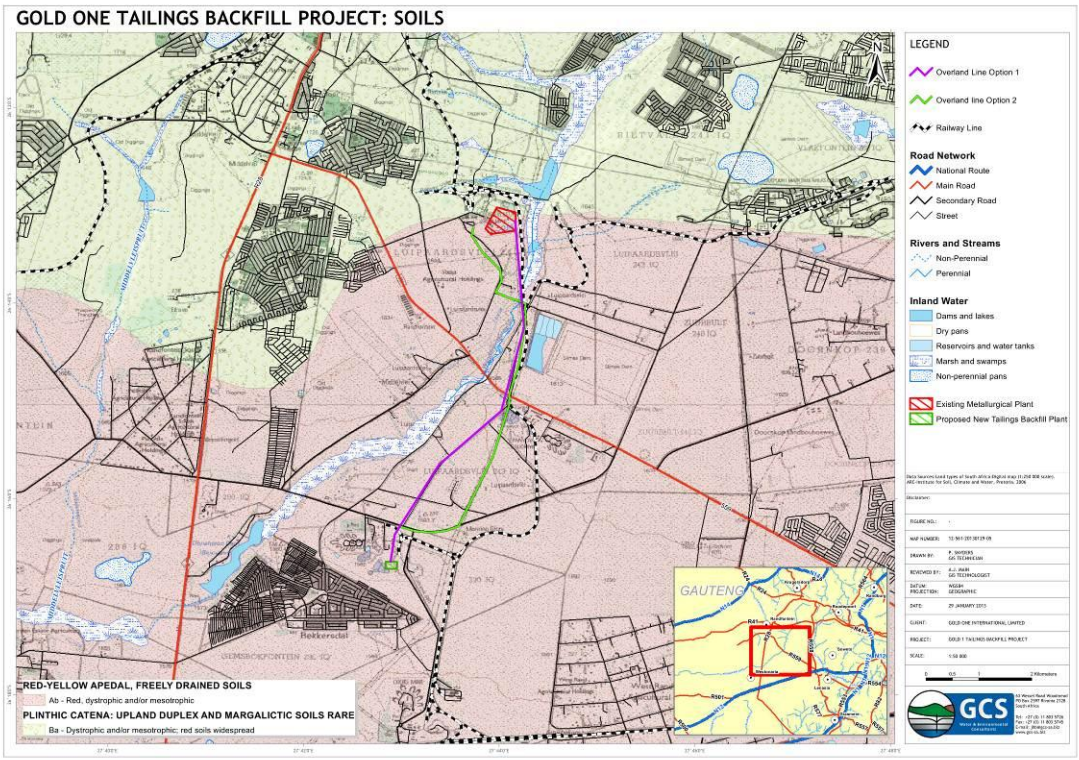

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Figure 5-3: Soils found in the project area

5.5 Flora and Fauna

The fauna and flora studies were conducted by Golder associates for the Cooke Uranium plant in 2009 and by Digby Wells Environmental in 2012 for the Geluksdal Mega TSF Project. The study area is comprised of Grassland and Transformed areas and is described below.

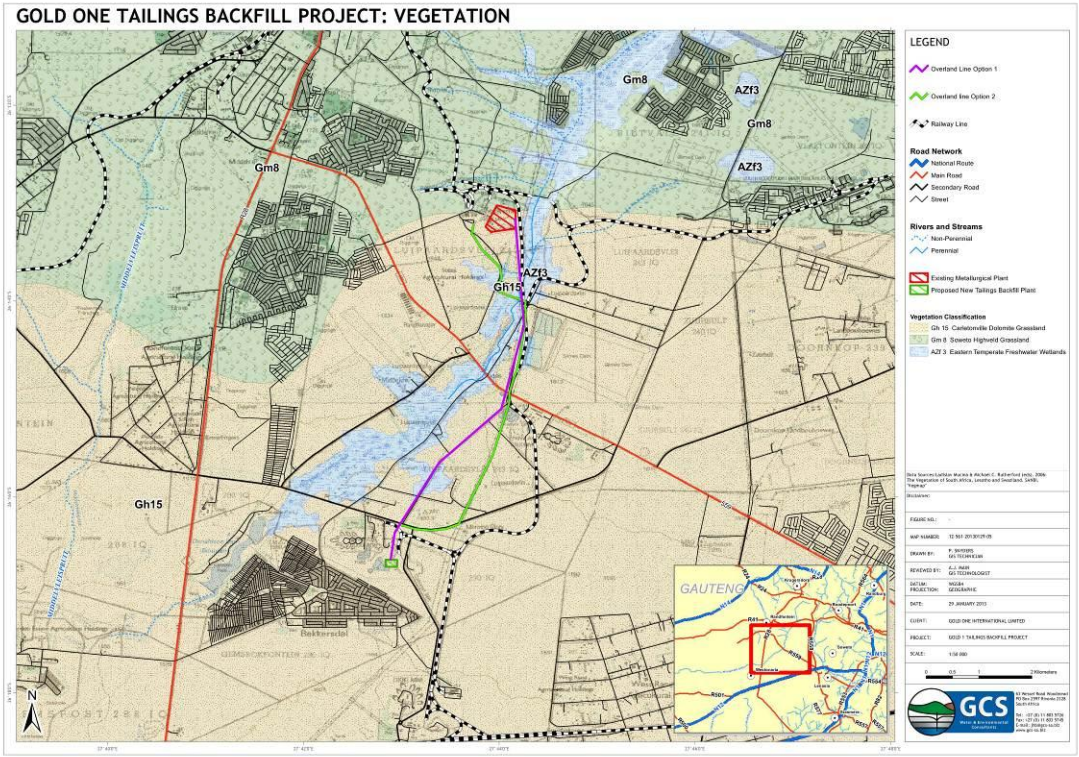

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Figure 5-4: Vegetation types (Mucina and Rutherford, 2006)

The *Eragrostis gummiflua - Hyparrhenia hirta* grassland community was found in the project area. This grassland community falls within the Carletonville Dolomite Grassland (Mucina and Rutherford, 2006) (Figure 5-4).

Large portions of natural vegetation have been replaced by both alien vegetation which is comprised of exotic tree stands, disturbed areas which have been colonised by alien invasive vegetation and agricultural lands. Transformed vegetation is not regarded to have high ecological importance due to poor integrity, limited ecosystem functioning and abundance of introduced alien vegetation species.

No Red Data Flora species have been identified during previous environmental authorization process field surveys. A number of endemic and biogeographically Important Species are however expected to occur within the project area (Digby Wells Environmental, 2012c).

No Listed or Red Data Mammals have been identified during previous environmental authorization process field surveys. Also no Listed Red Data bird species were identified during the 2012 field surveys, however the Grass Owl (*Tyto capensis*), has previously been identified within the project area (Golder, 2008). No amphibians were encountered during during previous environmental authorization process field surveys. A number of threatened butterflies have been identified during previous environmental authorization process field surveys within the surrounding area.

5.6 Wetlands

Wetlands were defined in terms of the NWA, as follows:

"*Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.*"

The soil composition of the wetland at the pipeline bridge has been impacted by anthropogenic activities. Poplar (*Populus canescens*) trees were growing within the wetland seasonal zone adjacent to the pipeline bridge. A pipeline support wall was constructed from building sand alongside a road. The road and stream crossing impeded the floodplain water flow. The stream bank was very steep and eroded on the eastern side. Grazing occurred within the temporal zone. This wetland has been classified as irreplaceable according to C-plan (Compaan, Pfab, Coetzer, Forsyth, Wittington-Jones, & Peinke, 2005) (Figure 5-5).

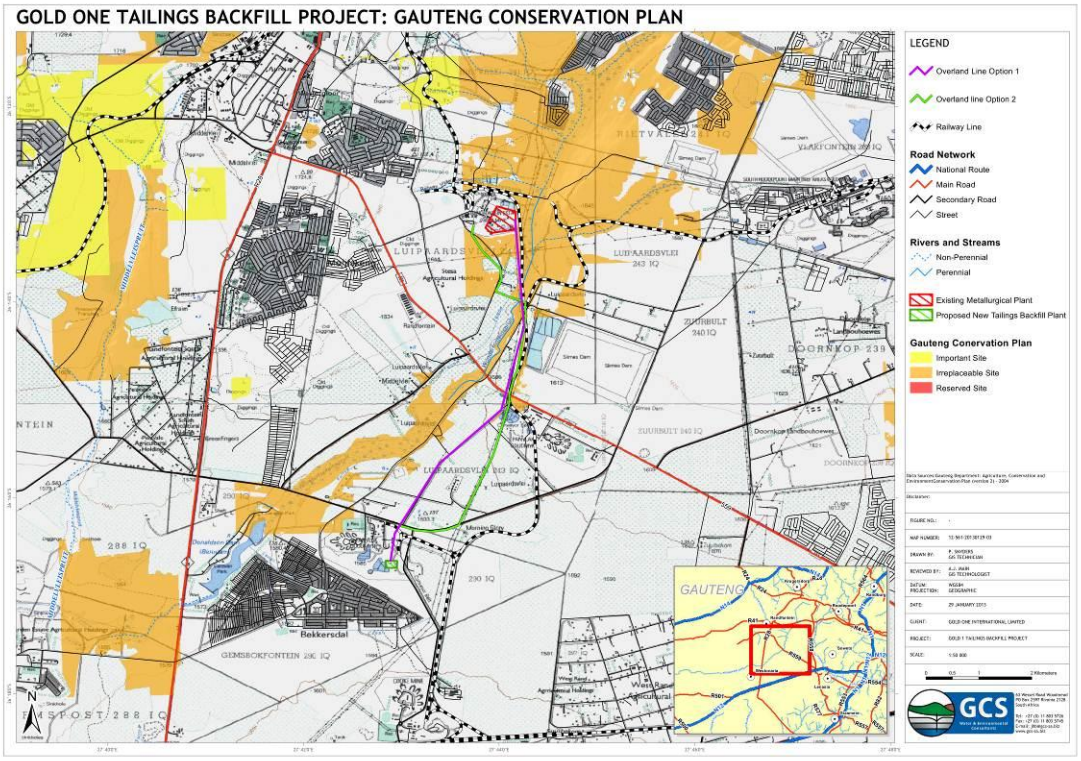

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Figure 5-5: Gauteng Conservation Plan (C-Plan)

The wetland found on site was classified as a floodplain wetland (Kotze, et al., 2005). Floodplains usually receive their water during high flow periods as water overtops the riverbanks. These types of wetlands are important for flood attenuation and do not significantly contribute to streamflow regulation.

During the assessment of the wetland it was found that the wetland's integrity was very low. Wetlands with very low integrity have an extensive loss of natural habitats and ecosystem functions

The wetland habitat was found to be largely modified with a large loss of natural habitat, biota and basic ecosystem functions, scoring only 61.7%. This puts the wetland in a C/D category. During the survey it was found that the wetland was highly degraded.

The Riparian Vegetation of the Wonderfonteinspruit determined (VEGRAI) to be moderately modified due to the loss and change of natural habitat and biota which has occurred, but the basic ecosystem functions are still predominantly unchanged.

According to the assessed score this wetland is considered ecologically important and sensitive on a provincial or local scale, with the biodiversity of the floodplains not being sensitive to flow and habitat modifications. This wetland can play a role in moderating the quantity and quality of water of its receiving river due to its location. Although due to the impacted nature of the wetland the role it plays is probably very small. The absence of high biodiversity can also be contributed to the impacted nature and large amount of invasive plant species present.

5.7 Aquatic Ecosystems

The aquatic study was conducted by Digby Wells Environmental in 2012 for the pipeline of the Geluksdal Mega TSF.

The project area is situated within the Upper Vaal Water Management Area (WMA 8), within Quaternary Catchment C23D. The ecological importance and sensitivity classification for the quaternary catchment C23D is considered to be high which in the default ecological management class category is considered to be a sensitive system. The present ecological status category for the system is described as largely modified (Class D). The attainable ecological management class for the system is a Class C (moderately modified)

The Cooke Plant and proposed pipeline for the plant are associated with the Wonderfonteinspruit, which is a perennial system and considered to be largely modified by local land uses and anthropogenic activities.

The overall in situ water quality was determined to be in a modified state with the conductivity and dissolved oxygen saturation being a limiting factor for aquatic diversity. The pH values for the low and high flow surveys are considered to be acceptable. Electrical conductivity was also acceptable. The in situ DO saturation was within the sub-lethal recommended for aquatic ecosystems and may be a limiting factor for aquatic biota.

Overall the constituents included in the *in-situ* water quality analysis were within the Target Water Quality Range (TWQR) with the exception of conductivity. Due to the high levels of conductivity recorded during both high and low flow surveys the conductivity is seen to be a limiting factor for aquatic biota. During the high flow survey (Conducted in the summer months of 2012) it was noted that the conductivity of the aquatic systems showed an increasing trend. This is expected to be as a result of the surrounding land uses which includes the activities such as agriculture and mining.

Direct and indirect inputs from the local agricultural activities and mining operations have contributed to the physic-chemical modifications of the systems due to the release of chemicals, nutrients and toxics. These local land uses, as well as considering local infrastructure development have also contributed to the modifications of the streambeds due to sedimentation which will also impact on the water quality of these systems. The river banks of the catchment have also been modified by the local agricultural and mining activities which have encroached into these areas, resulting in the banks being eroded as a result. Owing to the land uses and local development of the catchment, the state of the habitat of the catchment areas was determined to be moderately modified (Class C). This is an indication that a loss and change of natural habitat and biota has occurred, but the basic ecosystem functions are still predominantly unchanged.

The habitat associated with the Wonderfonteinspruit was determined to be “Adequate” to support macroinvertebrate diversity. The site consisted of a variety of habitat types which included the stones biotope, gravel, sand and mud as well as vegetation. In addition to this, a variety of flow-depth scenarios were also presented, and these include slow-shallow and fast-shallow areas in particular.

The only fish species sampled from the Wonderfonteinspruit system was the exotic species *Micropterus salmoides*. The state of the fish communities was determined to be in a critical state (Class F).

The low ASPT scores (< 5) recorded at the Wonderfonteinspruit may be an indication that impaired water quality may be the dominant driving component of the system, with habitat modifications providing secondary impacts.

The Riparian Vegetation of the Wonderfonteinspruit determined (VEGRAI) to be moderately modified due to the loss and change of natural habitat and biota which has occurred, but the basic ecosystem functions are still predominantly unchanged.

The Overall EcoStatus for the survey location on the Wonderfonteinspruit was determined to be largely modified (Class D). This is an indication that a large loss of natural habitat, biota and basic ecosystem functions has occurred.

5.8 Surface water

The Uranium Plant, Cooke Dump and the pipelines fall in the Wonderfonteinspruit catchment which falls in the C drainage region of the Vaal River Catchment. The Wonderfonteinspruit catchment comprises quaternary catchments C23D, C23E and part of C23G. The Wonderfonteinspruit is a tributary of the Mooi River which joins the Vaal River below the Vaal Barrage (Figure 5-6).

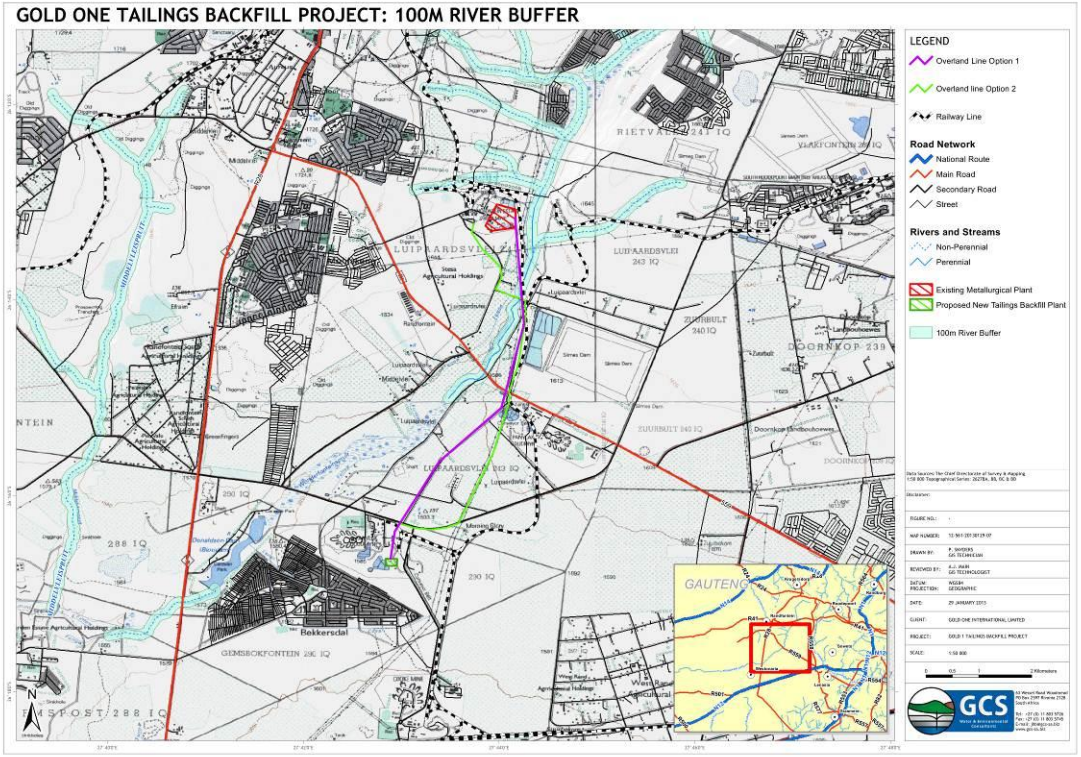

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Figure 5-6: Wonderfonteinspruit drainage lines with 100m buffer

The source of the Upper Wonderfonteinspruit comprises a diffuse seepage 1 – 2km upstream of Lancaster Dam. This dam is now largely filled with gold tailings eroded from the surrounding tailings dams.

The 1:50-year and the 1:100-year floodlines were determined using the available information (Golder Associates Africa, 2009c) (Figure 5-7). The sensitivity analysis showed that the water surface elevations were not sensitive to the conditions at the R559 road bridge.

The pipelines from the FPT Backfill plant will cross over the Wonderfonteinspruit via an existing pipeline bridge (Figure 5-6).

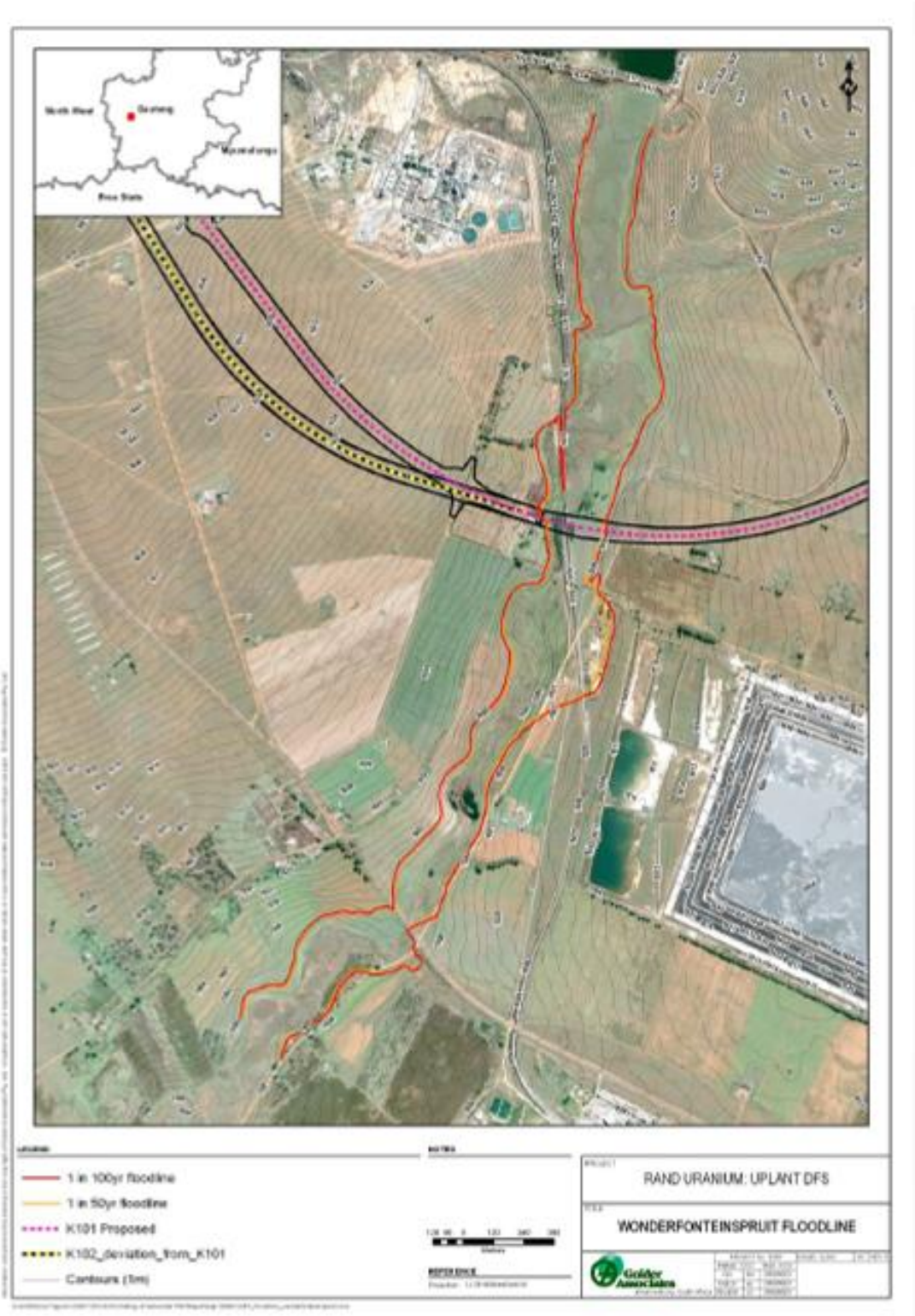

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Figure 5-7: Wonderfonteinspruit floodline

5.9 Groundwater

Golder (2009) conducted a groundwater study in the vicinity of the Cooke Plant (adjacent to the proposed U-Plant). A hydrocensus was not conducted during the study, although relevant borehole and surface information from a previous study at the nearby Coetzee Dairy were incorporated into the database. The National Groundwater Database (NGDB) was also referenced for additional data. The borehole locations are shown on Figure 5-8. The database indicates that borehole depth varies between 15 mbgl (metres below ground level) and 100 mbgl with an average depth of 38 mbgl.

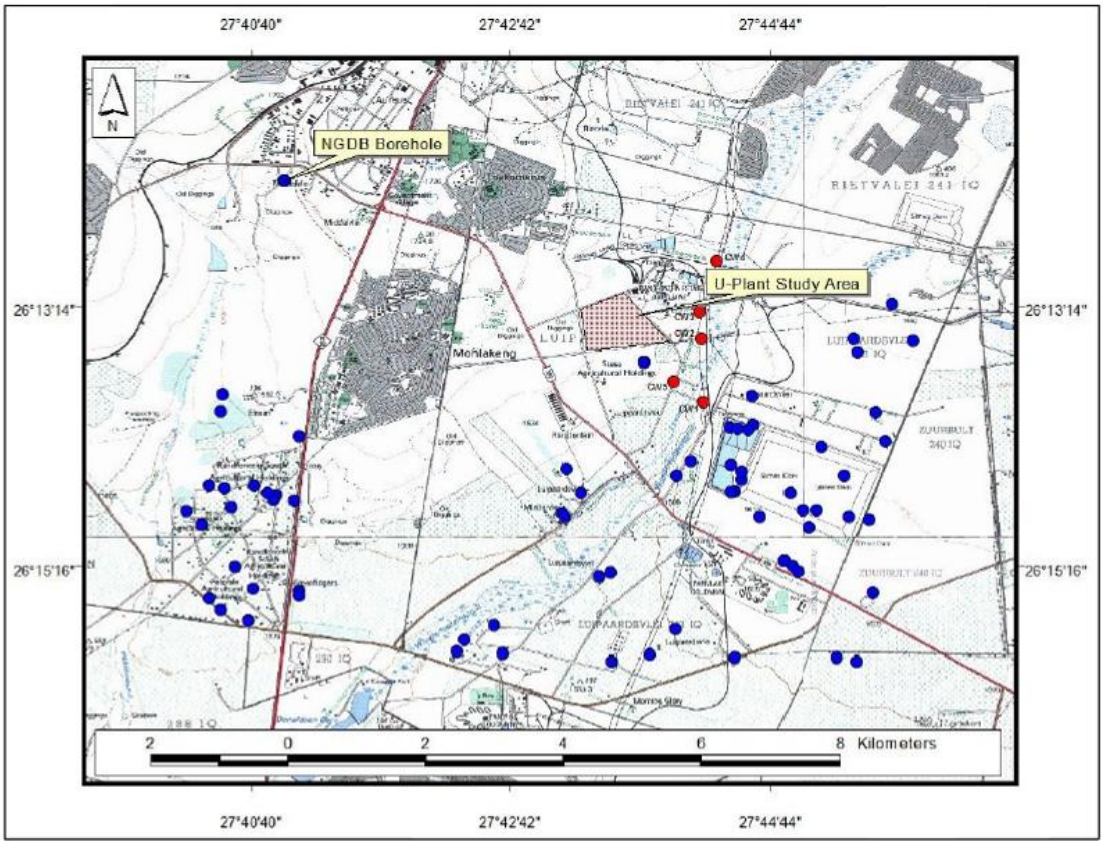

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Figure 5-8: Borehole database showing the NGDB boreholes and sample points around the Coetzee Dairy

Information gathered on site indicates that the aquifer underlying the site is poorly developed and might be controlled by residual intrusive material (syenite). The residual intrusive material prevents the aquifer from being laterally extensive and may result in perched groundwater, as evidenced by highly variable water levels over short distances across the northern section of the site.

In the northern section of the site the water quality is classed as Class 1 according to the SANS 241 standard. Iron and manganese concentrations are elevated to the Class 2 standard. This is considered to be due to the local geology and is considered baseline groundwater quality.

The generalised hydrogeology of the northern section of the site is summarised below.

Two main aquifers exist in the area:

- A moderately deep semi-confined aquifer associated within the weathered and residual dolomite (WAD); and
- A deeper aquifer which is developed in dissolution cavities within the Malmani dolomite.

The focus of this groundwater study is the shallower aquifer developed within residual dolomite (WAD). The shallower aquifer is approximately 15m thick where syenite intrusions are not present. Recharge to the shallow aquifer takes place from a number of sources:

- Infiltration of rainwater. Based on experience of similar formations elsewhere, this is estimated to be no more than 3 % of MAP, which equates to 22.5 mm/year.
- Infiltration from water courses into the subsurface along certain portions of the Wonderfonteinspruit.
- Artificial groundwater recharge as a result of seepage from infrastructure such as water storage dams, leaking pipes and tailings dams.

The deep dolomite aquifer begins around 45mbgl and extends to greater depth that was not determined during the drilling program. The Malmani dolomite has been compartmentalised by dolerite dykes, creating dolomite compartments in which the separated groundwater bodies may have very different groundwater levels and quality. The Department of Water Affairs and Forestry (DWAF) classify the deeper underlying aquifer as type d5 which is karst and generally yields in excess of 5 l/s.

It is known that, in similar geological terrains, a relationship exists between the groundwater table and the topography. This indicates that groundwater flow will be towards low points in the topography, which may or may not be occupied by watercourses.

An interpolated piezometric surface was developed and shows that groundwater flow occurs from the northwest towards the southeast (Wonderfonteinspruit) at a gradient of 2.8%.

Considering an average topographic gradient of 2.8%, porosity of 10% and a hydraulic conductivity of 0.001 m/day, an average groundwater flow velocity of approximately 0.1m/year is estimated towards the Wonderfonteinspruit. This flow velocity suggests that groundwater moves very slowly, however, flow can be orders of magnitude higher along preferential flow paths such as fault zones or dyke margins.

5.10 Air quality

Monitoring conducted by DD Science over the period December 2008 to March 2009 indicated relatively high PM10 background concentrations and dust fallout levels. The average PM10 background concentration and dust fallout levels were found to be 66 ìg/m^3 (SA proposed PM10 Standard: Annual average: 40ìg/m^3, Daily Average: 75ìg/m^3) and 556mg/m^2/day (SANS residential target value: 600mg/m^2/day (based on 30 day average), SANS industrial target value: 1200mg/m^2/day (based on 30 day average)). Strategic Environmental Focus (SEF) reported background gaseous data received in 2007 from the Randfontein and Mogale City Local Council. The background SO2 concentration throughout 2007 varied between 5ìg/m^3 and 25 ìg/m^3 (SA proposed SO2 Standard: Annual average: 50µg/m^3), with the highest concentrations recorded during the winter months.

The passive diffusive ambient monitoring conducted over the period August to September 2009 indicated average background levels of 10.2 and 14.2ìg/m^3 for SO_2 and NO_2 respectively.

The air quality in the area is influenced by the tailings dumps, dirt roads, farming and industrial operations.

Based on the conceptual Project description there will not be an impact on Air Quality.

5.11 Sites of Historical and Cultural Importance

From Previous studies the following was found for the area.

Pistorius (2009c) conducted a survey for the proposed pyrite project near the Cooke Gold Plant. Only a single graveyard was identified. This heritage resource is given a high significance rating and is recommended to remain in situ.

The proposed pipeline routes lay within existing servitudes and potential impacts on heritage resources are not expected. One cemetery (RAN1386/DW001) and several built complexes occur in close proximity to the proposed pipeline routes, but potential impacts to these structures are either negligible or minimal

5.12 Noise

Baseline measurements were used from previous studies done in the area, such as baseline information from J H Consulting for the proposed Uranium Plant and Cooke Dump reprocessing infrastructure as well as from two schools in the townships of Bekkersdal and Simunye in Westonaria. The overall baseline values indicate that ambient noise levels are typical of that which is expected of rural and suburban districts.

Noise propagation calculations performed for the construction of the pipeline, indicated that the construction noise (to the east and west) will not measure above the SANS rural limit guidelines of 45dBA, further than 950m or not measure above the SANS suburban limit guidelines of 50dBA, further than 590m. There are a number of farmsteads and agribusinesses within the 950m buffer along the pipeline.

Noise impacts during operational phase are mostly negligible because of limited noise sources as well as limited dispersion potential of the noise sources.

5.13 Traffic

The R559 (Main Road) crosses the project area in a south-easterly – north-westerly direction and the R93 crosses the project in a easterly – westerly direction. The R559 is the main road between the R28 (Toekomsrus and Mohlakeng) and the N12 at Protea Glen. The R93 links the R559 to the R28 at Bekkerdal.

Two main roads are in close proximity to the project area; the R28, and the N12 highway. The location of the backfill plant is surrounded by entrance roads to the different Cooke offices, as well as several dirt roads to farm steads and settlements.

From previous assessments conducted by BKS (2012) the traffic volumes are not expected to increase with regards to the project description and therefore no impact is expected and a detailed traffic assessment is not proposed.

5.14 Social Conditions

Most of the project site falls within the West Rand District Municipality – more specifically, within two local municipalities that form part of this district municipality: Westonaria and Randfontein. Part of the pipeline route and the Cooke dam (to be reclaimed) also traverses the City of Johannesburg Metropolitan Municipality.

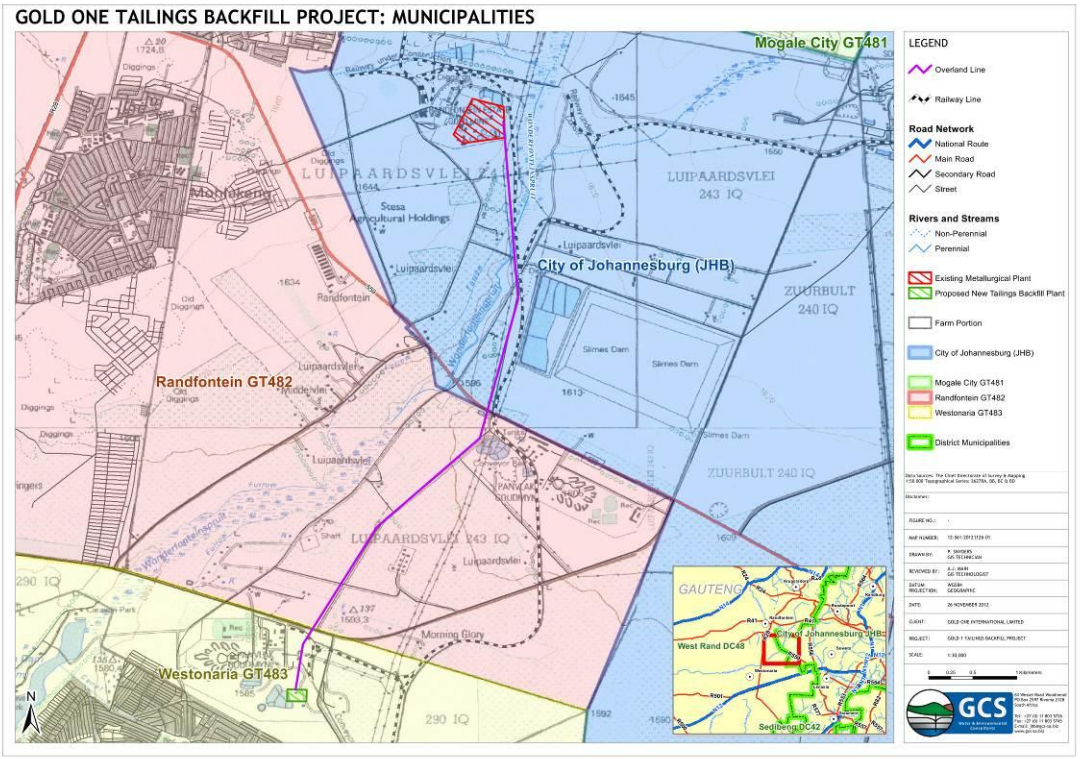

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Figure 5-9: Municipal Boundaries

The Backfill plant and pipeline project site overlaps with several municipal wards; these are listed below:

- Westonaria Local Municipality
    - Ward 12 - section of pipeline. Contains part of the town of Bekkersdal.
- Randfontein Local Municipality
    - Ward 14 - section of pipeline from the R559 to R93. Consists mainly of agricultural holdings. Contains a portion of Mohlakeng Township.
- City of Johannesburg Metropolitan Municipality
    - Ward 53 - section of pipeline from Cooke Plant southwards. Contains a portion of the suburb of Protea Glen, Doornkop Township and Slovoville.

Westonaria Ward 12 has the smallest population of all the affected wards with 3 987. The proportion of men and women is fairly even in this ward, averaging at 50% male and female.

The population densities of Westonaria Ward 12 are high having the highest (780 people per squared kilometre) as well as the highest average number of persons per household (3.8 people). The average ages of residents is 28.6 years, making these fairly young populations that are likely to be more transient and altering than the older, more established wards. Westonaria Ward 12 is a largely Setswana speaking area due to 53% of residents speaking the language.

The level of informal settlement in Westonaria Ward 12 is 34%. Westonaria Ward 12's access to water, sanitation and electricity is above 70%.

The levels of education, as with most of the wards, are fairly low. In Westonaria Ward 12 31% of the population over 20 years old that has grade 12 or higher. People employed in craft/trade or elementary occupations account for just over 41% of Westonaria wards 12. Correspondingly, unemployment is higher in Westonaria Ward 12. Westonaria Ward 12 has 29% of households with no income. A portion of the town of Bekkersdal is situated in Westonaria Ward 12.

Randfontein Ward 14 is a small ward with a population of 14 052, whereas the CoJ Ward 53 has a population of 46 633. The two wards are situated alongside each other on the northern section of the pipeline.

The most commonly spoken language in Randfontein Ward 14 is Setswana (38%) and in CoJ Ward 53 it is isiZulu (45%). The population densities are similarly high - 660 people per squared kilometre in Randfontein Ward 14 and 650 people in CoJ Ward 53. The average age of the CoJ Ward 53 population is 27.9 years old, the youngest of all the wards. This is largely due to Johannesburg being a thriving city that attracts many youth who seek work opportunities. The Randfontein Ward 14 population is also young, the average age being 29.1. It is likely host to many overflow immigrants from Johannesburg City.

Informal settlement in Randfontein Ward 14 is far higher (60%) than in CoJ Ward 53 where it is close to zero. There may be greater controls by the CoJ Metropolitan Municipality to keep informal settlement out, given the administrative significance of the city, provincially and nationally. The provision of municipal services is far greater in CoJ Ward 53 than in Randfontein Ward 14. Thirty-one percent and 39% of households in Randfontein Ward 14 have access to flush toilets and piped water inside the dwelling or yard respectively. Only 17% have access to electricity for lighting. In CoJ Ward 53, access to these services is 96%, 99% and 98%.

While these two wards are situated alongside each other, their economic status varies quite substantially. Randfontein Ward 14 has the largest portion of households with no income (38%) out of all the wards, while in CoJ Ward 53 it is 14%. Fifty-nine percent of households in Randfontein Ward 14 are in craft/trade or elementary occupations while in CoJ Ward 53 it is 31%. One could assume that because the CoJ population has the largest portion of the population aged 20 and older with grade 12 or higher (41%) out of all the wards that few people will be in elementary occupations. In Randfontein Ward 14 only 14% of the population over 20 years old has grade 12 or higher. Similarly, CoJ Ward 53 has the highest annual household income (R40 700), while Randfontein Ward 14 has the lowest (R14 800). Randfontein Ward 14 consists mainly of agricultural holdings and contains a portion of Mohlakeng Township. CoJ Ward 53 hosts a portion of the suburb of Protea Glen, Doornkop Township and Slovoville.

6 PROJECT ALTERNATIVES

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(c) A description of any feasible and reasonable alternatives that have been identified
	(j) A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity

6.1 Pipeline Alternatives

One pipeline alternative was to follow power lines for majority of the way and linking up with the western side of the Cooke Gold Plant. This alternative would have been in close proximity to a wetland area East of the FPT Backfill Plant and would have required additional infrastructure for the pipeline and was thus the less preferred option.

The preferred option was to follow the current pipeline servitude and possibly use an existing pipeline and link up on the eastern side of the Cooke Gold Plant.

6.2 Pipeline Design Alternatives

It is common practice for large civil and utility infrastructure pipelines to be buried underground. This is done so that the pipelines do not form physical obstructions in the landscape; are protected by the surrounding earth; and do not pose a safety risk to people.

Pipelines that are used to transport slurried tailings (tailings material that is mixed with water and moved through the pipeline, either under the influence of gravity or under pressure provided by a booster pump) are usually positioned above-ground, for a number of reasons:

- The construction operations and trenching required to bury a pipeline require a significant amount of earthworks potentially resulting in a larger temporary construction servitude, and causes greater environmental impact than is the case with pipelines constructed above ground.
- Pipelines that cross watercourses and wetlands above ground on plinths or suspended by other means have the potential of causing far less environmental impact on the water body and associated habitat that it crosses, especially if low-impact manual construction methods are used in these areas.
- Detecting potential leaks in any of the pipes is much easier than with buried pipes, as the leaks are visible and can therefore be identified more quickly and accurately.
- Maintenance and repair actions which require rotating of the pipes from time to time are simpler and less intrusive on the environment to carry out, as the pipe does not have to be re-exposed as would be the case with a buried pipeline.
- It is cheaper than buried lines, which is a significant consideration where large distances are involved.

For the reasons above, Gold One will construct the pipeline / pipelines aboveground. For the purposes of this project, the pipelines will not have embankments or buttresses along the entire length of the pipeline, and these will only be built in significantly steeper areas, where surface runoff may potentially cause erosion within the servitude. Should a backfill spillage occur on private property, Gold One will be responsible for the cleanup and rehabilitation back to original condition of the affected area.

6.3 Supply Alternatives

Initially the tailings supply was planned to be sourced at the South West corner of the tailings dam, near Cooke 1 Shaft. This was changed to source tailings from Cooke Plant due to the required particle size distribution (PSD) of the tailings.

A PSD of two samples taken from the tailings at Cooke Plant indicated a high concentration of coarse material. This is due to the current sand treatment process, and has created tailings which will not be suitable for the production of backfill. The tailings would require modification in order to be suitable for use as a backfill medium.

This course material from the tailings dam will be difficult to pump directly due to its high settlement tendencies. This however will be blended with the original tailings at the Cooke Plant which will not be passing through the cyclone (pumps will be installed to transport the overflow product) and transported to the new backfill plant.

6.4 Location of Backfill Plant

The proposed location for the Tailings Backfill plant was chosen as it was already heavily impacted on and located in a disturbed (brownfields) area. The location is also in close proximity to the Cooke 2 Shaft complex which will aid in the supply of process water and is also the location for the area to be backfilled.

The brownfields area was the preferred option for the reasons stated above, and due to the fact that no greenfields areas will be impacted. No further alternatives were therefore investigated.

6.5 Benefit / Motivation of the Project

The purpose of backfill is to provide support for mined out areas up to 4m in height in order to maximise ore extraction as well as reduce the ventilation requirements underground. The risk of fires is also reduced, and surface environmental pollution is mitigated by the transfer of tailing underground. Furthermore it will:

- Reduce tailing material to be placed on the tailings storage facility.
- Improve geotechnical safety in the workplace.

6.6 No-Go Option

The implications of the no-go option are:

- The potential local and national economic benefits that could be derived from the beneficiation of precious metals and uranium from the Cooke Dump and others will be lost;
- The environmental benefit/opportunity of removing pyrite in the current tailings will be lost;
- Rand Uranium's current underground operations (life of mine) in the Randfontein area will not be extended;
- Job opportunities will not be realised; and
- The opportunity to improve geotechnical safety in the workplace will be lost.

7 STAKEHOLDER ENGAGEMENT PROCESS

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(h) Details of the public participation process conducted in term of regulation 27 (a)

The Public Participation Process (PPP) forms an integral part of the environmental authorization application in terms of the following legislative processes:

- MPRDA: Section 48 (f) and 49(f) respectively of the MPRDA Regulation R527, published in terms of Section 107(1) of the MPRDA Government Gazette No. 26275, dated 23 April 2004;
- NEMA: Chapter 6, R543, Government Gazette No. 33306 dated 18 June 2010; and
- NWA: Section 41 (4) of the NWA provides that the competent authority (DWA) may, at any stage of the application process, require the applicant to place a suitable notice in newspapers and other media, and to take other reasonable steps as directed by the competent authority to bring the application to the attention of relevant organs of state, interested persons and the general public.

The PPP has been integrated to address all the above-mentioned legislation as far as possible.

7.1 Identification of Interested and Affected Parties (I&APs)

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(h) Details of the public participation process conducted in term of regulation 27 (a), including - *(iii) A list of all persons or organisations that were identified and registered in terms of regulation 55 as interested and affected parties in relation to the application*

The following stakeholder groups were identified and informed of the project:

- Landowners;
- Lawful occupiers of land;
- Relevant authorities;
- Utilities; and
- Members of the public within the Randfontein, Westonaria and Johannesburg areas.

The stakeholder database for the FPT Backfill Plant Project is provided under Appendix B of this report.

7.1.1 Landowner Consultation

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(h) Details of the public participation process conducted in term of regulation 27 (a), including - *(i) The steps that were taken to notify potentially interested and affected parties on the application*

Landowners were consulted in the following manner:

- Letters were delivered to landowners surrounding the site notifying them of the proposed project;
- Written communication (Background Information Document) sent via email; and
- A Public meeting will be held on 27 February 2013 in Westonaria (Refer to the description under Section 7.2.4.1 of this report). The meeting has been scheduled post submission of the ESR to the stakeholders to award all the opportunity to comment on the report.

7.1.2 List of Authorities consulted

The following authorities were informed, in writing, of the project application processes being undertaken:

- Randfontein Local Municipality;
- Westonaria Local Municipality;
- West Rand District Municipality;
- Gauteng Department of Agriculture and Rural Development (GDARD);
- Department of Mineral Resources;
- Provincial South African Heritage Resources Agency (SAHRA);
- Department of Water Affairs (DWA); and
- National Nuclear Regulator (NNR).

These authorities were automatically registered as I&APs on the stakeholder database developed for the project.

7.2 Notification of Stakeholders

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(h) Details of the public participation process conducted in term of regulation 27 (a), including - *(ii) Proof that notice boards, advertisements, and notices notifying potentially interested and affected parties of the application have been displayed, placed or given.*

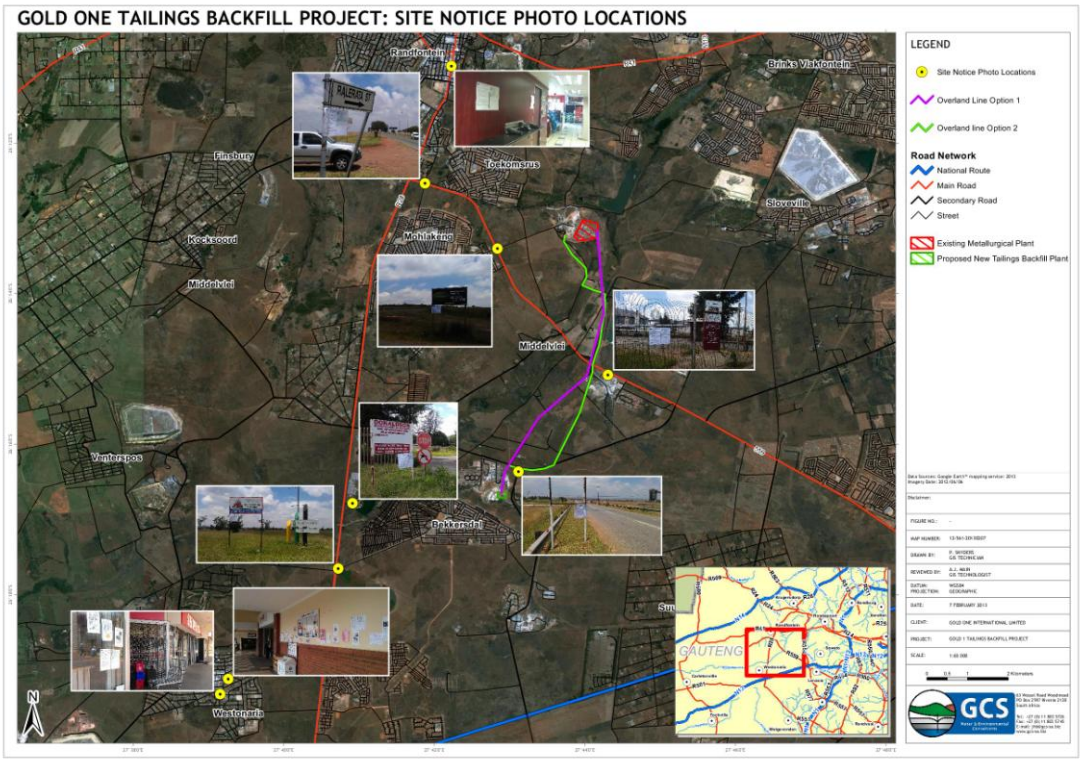
Various methods of written notification were utilized to inform the I&APs. The process undertaken thus far is described in this section of the report and proof thereof is attached under Appendix B of this report.

Each of the documents which were used to notify stakeholders and the public of the project contained the following information:

- The geographic location of the project;
- The name of the applicant;
- The reference numbers issues for the environmental authorization application which were issued by the GDARD;
- The applications being undertaken in terms of the NNRA, MPRDA,NEMA and NWA;
- The listed activities being applied for in terms of the NEMA regulations;
- An invitation to register as an I&AP;
- The contact details and deadline for registration; and
- Notification that a public meeting will be held to present the project (as part of the NEMA and NWA), informing the public that all registered I&APs will be informed of the date, time and venue for the public meeting once these details have been finalized.

7.2.1 Site Notices

Site notices were placed at six (6) locations on the proposed project area. The locations where these site notices were placed are shown in Figure 7.1 and the copy of the site notices and proof of placement (photographs) is presented in the proof of public participation document under Appendix B.



[Figure not to scale- refer to A3 figure attached]

Figure 7-1: Location of Site Notices

7.2.2 Media advertisement

An advertisement was placed in the Randfontein / Westonaria Herald Newspaper on Tuesday, 12 February 2013. Due to the newspaper not being published by the time this report went out the proof of advertisement will only be submitted in the final ESR.

7.2.3 Background Information Documents (BIDs)

Background Information Documents (BID) were distributed via email, fax and post to the following people listed on the Gold One stakeholder database:

- Landowners of the properties within the proposed Project Area;
- Local, provincial and national authorities;

- All I&APs who contacted GCS following the placement of the advertisement in the Randfontein / Westonaria Herald on Tuesday, 12 February 2013, and
- BIDs (including registration forms) were placed on the table underneath the site notice at the respective libraries.

7.3 Meetings

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(l) Copies of the minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants

7.3.1 Preliminary Informal Meetings (Pre NEMA Application)

Notification letters were hand-delivered to the landowners identified from the exiting Gold One database. The following landowners were visited and notified of the application for the current project:

Table 7-1: Pre-consultation informal meetings with landowners

Landowner	Comment
ZJ van Greuning	Accepted the notification and also took a notification letter for his father (Mr van Greuning Sr.)
NJE Coetzee	Accepted the notification and commented that his farm has been severely impacted by historic mining activities. His daughter Mrs Villet was present when the notification letter was delivered and the project explained. She is the wife of Charles Villet who is one of the adjacent landowners.
JH du Plessis	Mr du Plessis' son accepted the notification on his behalf. Mrs Du Plessis' was also present when the project was explained.

7.3.2 Introductory Public Meeting

A public meeting will be held on the 27th of February 2013 at the Westonaria Civic Centre. Minutes and an attendance register will be taken and presented in the Final ESR.

7.3.3 Authorities Consultation Meetings

An authority consultation meeting will be held to discuss the project and obtain the views and comments of the decision makers on the projects. Minutes will be taken and presented in the EIA Report.

7.4 Stakeholder Database

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(h) Details of the public participation process conducted in term of regulation 27 (a), including - *(i) A list of all persons or organisations that were identified and registered in terms of regulation 55 as interested and affected parties in relation to the application*

A stakeholder database was developed for the project. The database contains the contact details of the landowners, local, provincial and national authorities as well as all people who requested registration.

7.5 Issues and Responses

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(h) Details of the public participation process conducted in term of regulation 27 (a), including - *(iii) A summary of the issue raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues*

The issues raised during the public consultation period thus far are summarized in Table 7-2. Any issues received from I&AP's will be recorded and presented as the process progresses.

Table 7-2: Issues and Response Trail for Gold One Tailings Backfill Plant Stakeholder Engagement Process

No	Comment Raised	By Whom	Designation	Where and Date	Environmental Parameter Impacted	Response by EAP
1	The farm has been severely impacted by historic mining activities	NJE Coetzee	Owner Luipaardsvlei 243, Portion 90	14-Jan-13		Comment will be addressed during the EIA process
2	How and who will be employed for the proposed project	Lucas Moloto	Resident in Bekkersdal	13-Feb-13	Social	Gold One will always try to appoint as many local people as possible, and they are now in a drive to get people back. Ronnie, the HR manager will do the best to serve the local community.
3	As a long-standing resident of Bekkersdal, I am interested in joining you to adding value into your project's Public Participation Process by acting as an interface/facilitator between your organisation and the local communities. I trust that you find this correspondence to be in order.	Lucas Moloto	Resident in Bekkersdal	14-Feb-13	Social	Comment noted, and Mr Moloto registered as I&AP
4	There is little work for him and he is looking for something new.	Lucas Moloto	Resident in Bekkersdal	27-Feb-13	Social	Additional employment opportunities will be made available. The exact figures aren't finalised yet and will be more accurate as the process progresses

No	Comment Raised	By Whom	Designation	Where and Date	Environmental Parameter Impacted	Response by EAP
5	With the influx of mines into the area from years ago there were noise and tremors that seems as if they are not being addressed.	Lucas Moloto	Resident in Bekkersdal	27-Feb-13		Comment noted and will be relayed to Gold One for commenting.
6	GCS should elaborate on the social aspect of the project.	Lucas Moloto	Resident in Bekkersdal	27-Feb-13		The social aspect will be more detailed in the EIA
7	Will the pipeline be above or below ground and will it be enclosed	Lucas Moloto	Resident in Bekkersdal	27-Feb-13	Engineering	Pipeline will be above ground and enclosed at the Wonderfonteinspruit crossing
8	What mechanisms will be put in place for maintenance and spills	Lucas Moloto	Resident in Bekkersdal	27-Feb-13	EIA/EMP	The EMP will dictate what management measures should be followed, also the pipeline will not operate 24/7 which allows for time to do maintenance should it be required. The pipeline will be operated eighteen hours a day.
9	Who will be liable for spills should they happen, the mine or the government.	Lucas Moloto	Resident in Bekkersdal	27-Feb-13	Social	The mine will be liable, and if there are spills the mine will clean it. After closure the mine must re-establish the pre-construction environment.
10	How will this project relate to Acid Mine Drainage (AMD)	Lucas Moloto	Resident in Bekkersdal	27-Feb-13	Groundwater	The project won't contribute to AMD as AMD is present in areas that are not operational. This mine is still operational and water is still being pumped to the Cooke Plant and treated.

No	Comment Raised	By Whom	Designation	Where and Date	Environmental Parameter Impacted	Response by EAP
11	Site notices be place in high density public places to inform more members of the public. Places such as Taxi ranks and churches should be considered.	Lucas Moloto	Resident in Bekkersdal	27-Feb-13	Public Participation	Site notices within Bekkersdal will be considered.

7.6 Document Review

The reports which have been, and will be submitted for public review are listed in Table 7.1. The reports were/will be available in the following manner:

- One (1) hard copy at the Randfontein Library, the Westonaria Library and at the Gold 1 Security Office);
- The GCS website (www.gcs-sa.biz);
- On CD which will be posted to the I&AP upon request.

Table 7-3: Documents for public review

Report	Public Review period
Draft ESR in terms of NEMA	7 February 2013 until 19 March 2013
Final ESR in terms of NEMA for all I & AP's	5 April 2013 until 15 April 2013
Final ESR in terms of NEMA for GDARD	18 April 2013 until 2 June 2013
EIA/EMP amendment Report compiled in terms of the MPRDA	June until November 2013
Drat EIA/EMP in terms of NEMA	June until July 2013
Final EIA/EMP in terms of NEMA	July until October 2013
IWULA and IWWMP in terms of the NWA	June 2013

8 POTENTIAL IMPACTS

This section of the Darft ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(g) A description of environmental issues and potential impacts, including cumulative impacts, that have been identified.

One of the objectives of the scoping phase is (with the aid of desktop information, existing specialist reports and input from I&APs and authorities) to identify potential environmental, socio-economic and cultural-historic impacts posed by the activities during the various phases of the project. The impacts identified are assessed through specialist investigations to determine the magnitude, extent, duration of the potential impacts, the probability of the impacts occurring, and the significance of the potential impacts. The proposed impact assessment process as well as the specialist investigations which have been commissioned is described in Chapter 9 of this document as part of the Plan of Study for the EIA.

Table 8-1: Potential impacts related to the proposed pipeline

Type of Environment	Potential Impact Description	Phase of Project
Geology	No impacts envisaged	Construction Phase
	No impacts envisaged	Operational Phase
	No impacts envisaged	Operational Phase

Type of Environment	Potential Impact Description	Phase of Project
Topography	Possible change in natural topography caused by vegetation removal and shaping of landscape	Construction Phase
	Possible change in natural topography caused by uncontrolled erosion of surfaces during heavy rainfall events, or leaking pipes..	Construction Phase Operational Phase
	Change of natural topography due to the establishment of surface infrastructure	Construction Phase
	Positive impact on topography due to rehabilitation activities.	Decommissioning Phase
Soils, Land Use and Land Capability	Construction of the proposed pipeline will remove very little topsoil as relatively small soil areas are impacted on through the digging of foundation trenches.	Construction Phase
	Compaction of soil, water runoff and soil erosion especially during the rainy season due to heavy vehicle movement	Construction Phase Operational Phase
	Temporary storage of hazardous products or spillage may cause the pollution of soil.	Operational Phase
	Improved soil conditions due to rehabilitation activities.	Decommissioning Phase
Wetlands	Wetland site disturbance and alteration due to construction of the pipeline. Construction rubble and oil spills on wetland, due to poor construction practices. Compacting of wetland soils, due to construction and maintenance vehicles entering wetland	Construction Phase
	Sulphuric acid, Ammonia, organic matter and caustic pollution due to spillage from the slurry and fine tailings being pumped in the event of infrastructure failure Radionuclide and heavy metal contamination due to spillage from the slurry being pumped in the event of infrastructure failure Possible loss of habitat and species of significance downstream.	Operational Phase
	Slurry or fine tailings spillage due to lack of maintenance or damage of pipelines	Decommissioning Phase

Type of Environment	Potential Impact Description	Phase of Project
Fauna	Direct impacts on interactions with structures & personnel caused by footprint clearance and construction; Loss or degradation of natural fauna habitat	Construction Phase
	Loss or degradation of natural fauna habitat due to spillage from the pipeline	Operational Phase
	The replacement of topsoil and re-vegetation thereof may result in the reduction of available space for alien invasive species, soil erosion and soil compaction, associated with top soil storage areas.	Decommissioning phase
Flora	Loss or degradation of natural vegetation; Increase in invasive species.	Construction Phase Operational Phase
	The replacement of topsoil and re-vegetation thereof may result in the reduction of available space for alien invasive species, soil erosion and soil compaction, associated with top soil storage areas.	Decommissioning Phase
Air Quality	Based on the conceptual Project description there will not be an impact on Air Quality.	Construction Phase Operational Phase : Decommissioning Phase
Surface Water	Spillage associated with construction and decommissioning activities pose a risk to groundwater quality	Construction Phase Decommissioning Phase
	Degradation in water quality due to leaks and burst from pipelines.	Operational Phase :
Groundwater	Spillage associated with construction activities pose a risk to groundwater quality.	Construction Phase
	Spillage of acid, chemicals and, tailings pose a risk to groundwater quality Leaching of contaminants from contaminated soils on site pose a risk to groundwater quality	Operational Phase:

Type of Environment	Potential Impact Description	Phase of Project
Heritage and Archaeology	The proposed pipeline routes lay within existing servitudes and potential impacts on heritage resources are not expected.	Construction Phase: Operational Phase: Decommissioning Phase
Noise	Noise from the machinery involved in laying the pipeline	Construction Phase
	Noise from the periodic maintenance activities	Operational Phase
	Noise from the demolition activities of the pipeline	Decommissioning phase
Traffic	No impacts envisaged	Construction, Operational Phase, Decommisioning Phase
Visual	Activities related to the construction phase of the pipeline will affect the receiving visual environment.	Construction Phase
	After the demolition phase has been carried out and the rubble has been removed, it is likely that the landscape character of the pipeline route area will be more favorable.	Decommissioning Phase
Socio-economic	The establishment of the proposed pipeline infrastructure will directly create employment opportunities during the construction period at the site. Increasing the income received in households where additional people are employed. Noise from construction activities can cause a nuisance to the neighbouring Bekkersdal community	Construction Phase
	Nuisance can be caused due to possibility of infrastructure failure (spillage of tailings, etc) The continued presence of the mine can also be a nuisance to the neighbouring Bekkersdal community and landowners.	Operational Phase
	Creation of New Employment Opportunities Improved Quality of Life through the Increase in Household Income	Decommissioning Phase

Table 8-2: Potential impacts related to the proposed FPT Backfill Plant

Type of Environment	Potential Impact Description	Phase of Project
Geology	No impacts envisaged	Construction Phase
	No impacts envisaged	Operational Phase
	No impacts envisaged	Operational Phase
Topography	Possible change in natural topography caused by altering of landscape	Construction Phase
	Possible change in natural topography caused by construction and presence of infrastructure.	Construction Phase Operational Phase
	Positive impact on topography due to rehabilitation activities.	Decommissioning Phase
Soils, Land Use and Land Capability	Compaction of soil, water runoff and soil erosion especially during the rainy season due to heavy vehicle movement	Construction Phase
	Temporary storage of hazardous products may cause the pollution of soil.	Operational Phase
	Improved soil conditions due to rehabilitation activities.	Decommissioning Phase
Wetlands	No impact envisaged as the FPT Backfill plant is not located in close proximity to a wetland.	Construction Phase Operational Phase Decommissioning Phase
Fauna	Possible loss or degradation of fauna habitat	Construction Phase
	Death of fauna due to poor management of domestic waste which may attract scavengers. Hazardous products could potentially leak resulting in toxic pollution of the project area which will result in ecological degradation and a loss in the ecological integrity.	Construction Phase Operational Phase
	Death of animals caused by hydrocarbon storage.	Operational Phase

Type of Environment	Potential Impact Description	Phase of Project
	The replacement of topsoil and re-vegetation thereof may result in the reduction of available space for alien invasive species, soil erosion and soil compaction, associated with top soil storage areas.	Decommissioning phase
Flora	Possible loss/ degradation of surrounding habitat; Increase in invasive species;	Construction Phase Operational Phase
	The replacement of topsoil and re-vegetation thereof may result in the reduction of available space for alien invasive species, soil erosion and soil compaction, associated with top soil storage areas.	Decommissioning Phase
Air Quality	Based on the conceptual Project description there will not be an increased impact on Air Quality.	Construction Phase Operational Phase : Decommissioning Phase
Surface Water	Water quality degradation due to spillage of contaminated stormwater structures.	Construction Phase Operational Phase : Decommissioning Phase
Groundwater	Spillage associated with construction activities and structures such as fuel/storage tanks will pose a risk to groundwater quality. Leaching of contaminants from contaminated soil, for example, from vehicle oil spills, will also potentially compromise groundwater quality.	Construction Phase
	Spillage of acid, chemicals and, tailings will pose a risk to groundwater quality Leaching of contaminants from contaminated soils on site will pose a risk to groundwater quality	Operational Phase:
Heritage and Archaeology	Potential impacts on heritage resources are not expected.	Construction Phase: Operational Phase: Decommissioning Phase
Noise	Noise from the machinery involved in construction may be a nuisance	Construction Phase

Type of Environment	Potential Impact Description	Phase of Project
	Noise from the operation activities may be a nuisance	Operational Phase
	Noise from the demolition activities of the FPT Backfill Plant may be a nuisance	Decommissioning phase
Traffic	No impacts envisaged	Construction Phase Operational Phase Decommisioning Phase
Visual	Activities related to the construction phase might affect the receiving visual environment.	Construction Phase
	The receiving environment will be negatively affected by the presence, operation and maintenance of the FPT Backfill Plant	Operational Phase
	After the demolition phase has been carried out and the rubble has been removed, it is likely that the landscape character of the project area will be more favorable.	Decommissioning Phase
Socio-economic	Overall the development of the pipeline infrastructure will have a positive economic stimulus. A positive relation between production volumes and GDP volumes exists such that the increased production levels in affected sectors will temporarily increase their value added and result in the overall growth of the national GDP, albeit for only during the construction period. The establishment of the proposed pipeline infrastructure will directly create employment opportunities during the construction period at the site. Increasing the income received in households where additional people are employed. Noise from construction activities can cause a nuisance to the neighbouring Bekkersdal community	Construction Phase

Type of Environment	Potential Impact Description	Phase of Project
	The operation of the FPT Backfill Plant will have a positive economic stimulus on the local area During the operational period, the proposed FPT Backfill Plant will create and support additional permanent employment opportunities As the project has a positive impact on employment that is sustainable throughout the lifespan of the project, it follows that specific households will experience an improvement in their livelihoods. The continued presence of the mine can also be a nuisance to the neighbouring Bekkersdal community and landowners.	Operational Phase
	Creation of New Employment Opportunities Improved Quality of Life through the Increase in Household Income	Decommissioning Phase

Table 8-3: Potential impacts related to the proposed backfill of tailings.

Type of Environment	Potential Impact Description	Phase of Project
Geology	Change in geological strata due to backfilling material Improve geotechnical safety	Operation and post closure
Topography	Enhanced stability in topography due to the filling of voids.	Operation and post closure Phase
Soils, Land Use and Land Capability	No impacts envisaged	Operation and post closure Phase
Wetlands	No impacts envisaged	Operation and post closure Phase
Fauna	No impacts envisaged	Operation and post closure Phase

Type of Environment	Potential Impact Description	Phase of Project
Flora	No impacts envisaged	Operation and post closure Phase
Air Quality	Based on the conceptual Project description there will not be an impact on Air Quality.	Operation and post closure Phase
Surface Water	No impacts envisaged	Operation and post closure Phase
Groundwater	Binders in the backfill help to minimise groundwater contamination in the long term	Operation and post closure Phase
Heritage and Archaeology	No impacts envisaged	Operation and post closure Phase
Noise	No impacts envisaged	Operation and post closure Phase
Traffic	No impacts envisaged	Operation and post closure Phase
Visual	No impacts envisaged	Operation and post closure Phase
Socio-economic	The operation of the proposed FPT Backfill plant will have a positive economic stimulus on the local area As the project has a positive impact on employment that is sustainable throughout the lifespan of the project, it follows that specific households will experience an improvement in their livelihoods. The continued presence of the mine can also be a nuisance to the neighbouring Bekkersdal community and landowners.	Operational Phase

9 PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(n) Plan of study for the environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application

Based on the outcome of the scoping phase, i.e. if the ESR is accepted by the GDARD, the EIA/EMP phase will be initiated. The proposed activities to be undertaken, as required by the NEMA Regulations, GNR543, is described in this section of the report.

9.1 Project Team

The project team is comprised of the following:

- Project Management and public consultation team (GCS); and
- Specialists (listed in Table 9.1).

9.2 Public participation

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(n) Plan of study for the environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include - *(iv) Particulars of the public participation process that will be conducted during the environmental impact assessment process*

The PPP to be undertaken is described under Chapter 7 of this report. The timeframes which are required as per the NEMA Regulations, GNR543 will be adhered to, as described under Table 9.1, under section 9.6 of this report. The proposed public participation is summarized below:

- Submission of Draft and Final ESR for stakeholder review and comment;
- Scoping Phase public consultation meeting;
- Submission of Draft and Final EIA/EMP Report for stakeholder review and comment;
- EIA/EMP Public Feedback Meeting; and
- Notify I&APs of the decision reached by the GDARD

9.3 Specialist Studies

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(n) Plan of study for the environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include - *(i) A description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialized processes, and the manner in which such tasks will be undertaken*

A number of specialist investigations were reviewed for the project to ensure that all issues relating to the biophysical and socio-economic impacts are addressed with the appropriate level of detail.

Each specialist study will address the standard requirements for an investigation of this nature. The specialist investigations that were considered are presented in Table 9.1.

The specialist reports which will be used for the compilation of the environmental impact assessment are listed in Table 9.2.

Table 9-1: Specialist Investigations

Specialist Study	Conducted by	Period conducted
Biodiversity (fauna and flora)	Digby Wells Environmental	2012
Geohydrology (groundwater)	Golder Associates	2009
Hydrology (surface water)	Golder Associates	2009
Soils, Land Use and Land Capability	Digby Wells Environmental	2012
Heritage Impact Assessment	Digby Wells Environmental	2012
Wetland and Riparian Area Delineation and Assessment	Golder Associates	2009
Aquatics Study	Digby Wells Environmental	2012
Social Impact Assessment	Digby Wells Environmental	2012
Visual assessment	Digby Wells Environmental	2012
Noise assessment	Digby Wells Environmental	2012
Radiological Assessment	Japie van Blerk	To be initiated

9.4 Compilation of the EIA/EMP

This section of the Final ESR relates to Section 28 of the Environmental Impact Assessment Regulations published in Government Notice R.543 in Government Gazette No.33306 of 18 June 2010, under Section 24(5) of the NEMA.

Section 28 (1)	*A Scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include -*
	(n) Plan of study for the environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include - *(i) A description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialized processes, and the manner in which such tasks will be undertaken* *(iii) a description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity*

9.4.1 Impact Assessment methodology

To ensure uniformity, the assessment of potential impacts will be addressed in a standard manner so that a wide range of impacts is comparable. For this reason a clearly defined rating scale will be used to assess the impacts associated with the various biophysical and socio-economic aspects.

Each impact identified will be assessed in terms of probability (likelihood of occurring), scale (spatial scale), magnitude (severity) and duration (temporal scale). To enable a scientific approach to the determination of the environmental significance (importance), a numerical value will be linked to each rating scale.

The following criteria will be applied to the impact assessment for the EIA/EMP:

Occurrence

- Probability of occurrence (how likely is it that the impact may occur?); and
- Duration of occurrence (how long may impact last?).

Severity

- Magnitude (severity) of impact (will the impact be of high, moderate or low severity?); and

- Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site?).

In order to assess each of these factors for each impact, the following ranking scales were used:

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

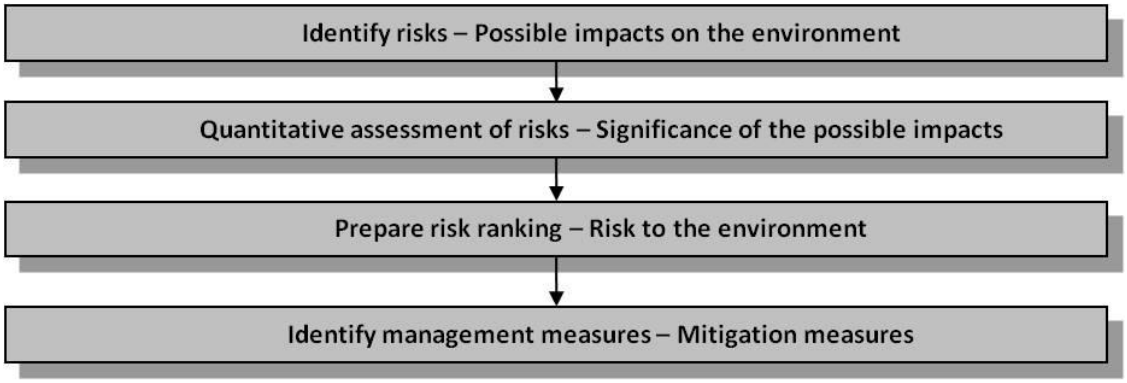
Once the above factors had been ranked for each impact, the environmental significance of each was assessed using the following formula:

SP = (magnitude + duration + scale) x probability

The maximum value is 100 Significance Points (SP). Environmental effects were rated as either of high, moderate or low significance on the following basis:

- More than 60 SP indicated **high (H)** environmental significance;
- Between 30 - 60 SP indicated **moderate (M)** environmental significance; and
- Less than 30 SP indicated **low (L)** environmental significance.

The following process will be followed:



The activities that will be assessed are described in Section 6.1 of this report.

9.5 Report Compilation

An EIA/EMP Report will be compiled, which fulfills the requirements as set out in Regulation 31 and 33 of the NEMA Regulations GNR543. This report will be compiled as one EIA/EMP Report to eliminate duplication, as there are information requirements listed under Regulation 31 and 33 which overlap.

The EIA/EMP Report will be a culmination of the specialist studies, and will take into consideration all aspects of the proposed mine from construction to decommissioning and post closure maintenance.

9.5.1 Environmental Impact Assessment

The EIA will include, but is not limited to, the following, in compliance with Regulation 31 of the impact assessment regulations, R543 of NEMA:

- Details, as well the expertise of EAP who compiled the report;
- Description of the location of the proposed project, as well as the property on which the proposed project will take place;
- Description of the environment which is likely to be impact on;
- Identification of potential impacts (direct, indirect and cumulative)on the biophysical, social, economic and cultural aspects of the environment;

- Assessment of the significance of the above mentioned impacts;
- Identification of measures to prevent, mitigate or manage the identified impacts, as well as an assessment of the significance of these impacts with the implementation of the proposed measures;
- Description of the public consultation process undertaken, as well as record of how the issues were addressed;
- Description of the findings of the existing specialist reports were relate directly to the proposed project area;
- Description of assumptions made, information gaps and the adequacy of predictive methods, and the underlying assumptions and uncertainties encountered in compiling the require information;
- Description of the arrangements for the monitoring and management of identified impacts and procedures for assessing the effectiveness of the procedures; and
- Description of the need and the desirability of the project;
- Description of identified potential alternatives to the proposed activity;
- Indication of the methodology used in determining the significance of potential environmental impacts;
- Description of all environmental issues identified during the environmental impact assessment process;
- Description of assumptions ,uncertainties and gaps in knowledge; and
- A draft Environmental Management Plan (EMP) containing the aspects contemplated in Regulation 33.

9.5.2 Environmental Management Plan

The EMP will be compiled in compliance with Regulation 33 of the NEMA Regulations GNR543:

- The details and expertise of the person who prepared the report;
- Information on any proposed management or mitigation measures;
- A detailed description of the aspects of the activity that are covered by the draft EMP;

- Persons responsible for the implementation of management or mitigation measures;
- Proposed environmental monitoring programme;
- Post mining rehabilitation measures;
- Timeframes for the implementation of proposed management and mitigation measures;
- Environmental awareness plan; and
- Closure plans, including closure objectives.

9.6 Legislative Timeframes

The applicable timeframes as per the GNR 543 timeframes are described in Table 9.1.

Table 9-2: NEMA Process Timeframes

ACTIVITY	TIMEFRAME
Submission of Draft ESR to GDARD	Draft ESR to the public (Sufficient copies will be provided to distribute to other State Departments)
	Other State Departments will be given forty (40) days to comment on the Draft ESR
Submission of Drat ESR to public	Thirty (30) calendar days will be provided for public comment and review
Public Meeting	To be held approximately two (2) weeks after the Draft ESR is made available for public review
Submission of Final ESR to public and GDARD (for submission to other State Departments)	I&APs and State departments will be given seven (7) calendar days to comment on the Final ESR
Submission of Final ESR with comments to GDARD	GDARD must acknowledge receipt thereof within fourteen (14) days
	GDARD must accept or reject the report within thirty (30) days of acknowledging receipt. *The GDARD may request amendments to the Final ESR, or may reject the ESR. If it is rejected, it may be revised and resubmitted, in which case, the GDARD will have fourteen (14) days after re-submission to acknowledge receipt and thirty (30) days thereafter to review the report.

ACTIVITY	TIMEFRAME
Submission of Draft EIA/EMP to GDARD (this will be complied once the Final ESR has been accepted)	Ten (10) days prior to submission of the Draft EIA/EMP to the public (Sufficient copies will be provided to distribute to other State Departments)
	Other State Departments will be given forty (40) calendar days to comment on the Draft EIA/EMP.
Submission of Draft EIA/EMP to public	Thirty (30) calendar days will be provided for public comment and review
EIA/EMP Public Feedback Meeting	To be held two (2) weeks after the Draft EIA/EMP is made available for public review
Submission of Final EIA/EMP to public and GDARD (for submission to other State Departments)	I&APs and State departments will be given twenty-one (21) calendar days to comment on the Final EIA/EMP.
Submission of Final EIA/EMP with comments to GDARD	GDARD must acknowledge receipt thereof within fourteen (14) days.
	GDARD must accept or reject the report within sixty (60) days of acknowledging receipt. * The GDARD may request amendments to the Final EIA/EMP Report, or may reject it. If it is rejected, it may be revised and resubmitted, in which case, the GDARDwill have sixty (60) days after re-submission to review the report and accept or reject it.
	The GDARD must grant or refuse the application with forty-five (45) days of accepting the EIA/EMP report.
	The GDARD must notify the applicant of the decision with two (2) days of reaching the decision.
Notify I&APs of the decision reached by the GDARD	I&APs will be notified of the decision reached by the GDARD within twelve (12) days of receiving feedback from the GDARD.

Along with the NEMA application, public participation will be included for the WULA and MPRDA components of the project as well – following the prescribed timeframe.

10 CONCLUSION

This Final ESR has been compiled in compliance with the NEMA regulations, Section 28. In terms of the NEMA, compliance with R543, dated 18 June 2010 has been ensured.

The purpose of this report is to provide a background to the project and to obtain approval from the GDARD regarding the proposed Plan of Study for the EIA. This report will also be submitted to the public for review and comment (as per regulation 56 (6) of the NEMA R543). The EIA process will be approached holistically as all potential impacts on the socio-economic and biophyscial environment will be investigated.

This report is a culmination of a review of existing information, including specialist studies undertaken at proposed project area for the Geluksdal TSF and Pipeline (conducted from 2009 to 2012), as well as the Scoping Phase PPP. This report incorporates issues raised by I&APs and authorities thus far and presents the proposed environmental authorisation application processes under NEMA, MPRDA and the NWA, as well as the proposed PPP. The Scoping Phase aims to collect available information, identify potential issues and fatal flaws, and plan for the EIA phase of the environmental authorisation application process.

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APPENDIX A: FIGURES

APPENDIX B: PUBLIC PARTICIPATION PROCESS