Synergistics Environmental Services

Proponent: **SISHEN IRON ORE COMPANY (PTY) LTD**

Project: **ARTIFICIAL RECHARGE OF AQUIFERS ON FARMS LEEUFONTEIN 488 AND KAPPIES KAREEBOOM 540 AT THE SISHEN IRON ORE COMPANY'S KOLOMELA MINE, NEAR POSTMASBURG.**

Report Name: **Basic Assessment Report (BAR)**

Report Status: **Draft for public review**

Revision No: 01

Report Date: 13 August 2013

Report Number: SO592/AR

Prepared by: Roelof Letter

Johannesburg: Tel: +27 11 326 4158
Fax: +27 11 326 4118
PO Box 68821, Bryanston, 2021

Suite 5 & 6, Block B, Hurlingham Office Park
59 Woodlands Avenue, Hurlingham Manor

KwaZulu Natal: Tel/Fax: +27 33 343 5826
2 Wattle Grove, Hilton, 3201

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Northern Cape Province
DEPARTMENT OF
ENVIRONMENT & NATURE
CONSERVATION

Porofensi Ya Kapa Bokone
LEFAPHA LA TIKOLOGO LE
TSHOMARELO YA TLHAGO

BASIC ASSESSMENT REPORT

ARTIFICIAL RECHARGE OF AQUIFERS ON FARMS LEEUFONTEIN 488 AND KAPPIES KAREEBOOM 540 AT THE SISHEN IRON ORE COMPANY'S KOLOMELA MINE, NEAR POSTMASBURG (DENC REF: NC/BA/12/SIY/TSA/KOL/2013 & NCP/EIA/0000217/2013).

Project applicant:	**Sishen Iron Ore Company (Pty) Ltd**		
Business reg. no./ID. no.:	**2000/011085/07**		
Contact person:	**Jaco Lambrechts**		
Postal address:	**Private Bag X3003, Postmasburg**		
Telephone:	**053 313 7600**	Cell:	**071 865 4530**
E-mail:	**jaco.lambrechts@angloamerican.com**	Fax:	**078 560 5600**

Prepared by:

Environmental Assessment Practitioner/Firm:	**Synergistics Environmental Services (Pty) Ltd**		
Business reg. no./ID. no.:	**2003/030216/07**		
Contact person:	**Kerry Fairley**		
Postal address:	**P.O Box 68821, Bryanston, 2021**		
Telephone:	**011 326 4158**	Cell:	**082 871 2959**
E-mail:	**kerry@synergistics.co.za**	Fax:	**011 326 4118**

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

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Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2010.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.

2. The report must be typed within the spaces provided in the form. The size of the spaces provided are not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.

3. Where applicable **tick** the boxes that are applicable or **black out** the boxes that are not applicable in the report.

4. An incomplete report may be returned to the applicant for revision.

5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.

6. This report must be handed in at offices of the relevant competent authority as determined by each authority.

7. No faxed or e-mailed reports will be accepted.

8. The report must be compiled by an independent environmental assessment practitioner.

9. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.

10. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section? **YES**
If YES, please complete form XX for each specialist thus appointed:
Any specialist reports must be contained in Appendix D.

1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail:

1. Introduction

The Sishen Iron Ore Company (Pty) Ltd (SIOC) proposes to direct surplus groundwater generated from the de-watering process at the Kolomela Mine into aquifers located within the Groenwaterspruit to the east of the mine. The need for this has arisen because the mine uses relatively little water in comparison to the dewatering process, and Sedibeng Water (who manages the Vaal Gamagara pipeline) cannot, at this stage, receive the surplus. The Vaal Gamagara Water Scheme is situated approximately 80km west of Kimberley, just outside Delportshoop. The core function of the scheme is the distribution of purified bulk water for mining, industrial and domestic use in the Northern Cape Province. The scheme consists of a raw water pump station, purification works, pump stations, several reservoir facilities and a pipeline network of about 1 700km.

The SIOC, part of Kumba Iron Ore Limited (Kumba), owns and operates Kolomela Mine (previously called the Sishen South Mine) located approximately 12 km south east of Postmasburg in the Northern Cape Province. The area falls within the district of the Siyanda district municipality and Tsantsabane Local Municipality.

The Kolomela Mine is an opencast mining operation aimed at producing approximately 9 million tonnes of iron ore per annum. The Minister of Mineral Resources granted a mining right for iron ore on 5 May 2008 authorising the exploitation of iron ore by Kumba on the following farms: Ploegfontein 487; Remainder of Leeuwfontein 488; Strydfontein 614; Remainder of Klipbankfontein 489; Portions 1, 2, 3, and the Remainder of Kapstevel 541; Wolhaarkop 485; Welgevonden 476; and Welgevonden 486. Kumba is also the holder of the surface rights of these properties. The Kolomela mining right {Ref: (NC) 069 MR}, is valid until 17 September 2038 unless cancelled or suspended.

Current mining operations involve mining from three pits on the farms Leeuwfontein 488, Strydfontein 614, Remainder of Klipbankfontein 489, and portions 1, 2, 3, and the Remainder of Kapstevel 541. Iron ore reserves have also been identified on the farms Ploegfontein 487 and Kapstevel 541. Existing processing facilities involve a direct shipping ore (DSO) operation, involving crushing and screening of recovered ore material into stockpiles of 'lump' and 'fines' for transportation by rail to Saldanha Bay.

The Kolomela Mine also has an existing Water Use License (Ref: 16/2/7/D73A/1) to abstract an average of 1 940 m^3/h of water to drop the natural groundwater level below the pit excavations. This process is referred to as dewatering which is required to continue safely with mining operations.

Kolomela Mine abstracted on average 1,042 560 m^3 per month of water over the past three months of which Sedibeng only acquired 831 843 m^3 /month (27 348 m^3/day). Approximately 133 363 m^3 /month (4 384 m^3/day) of the surplus water was released into the environment. Kolomela Mine has now proposed to artificially recharge the local aquifer rather than discharging the surplus water into the environment.

2. Site description and infrastructure

The preferred site alternative option (S1) involves aquifer recharging along the ephemeral stream, the Groenwaterspruit, and is located on the mine-owned properties Leeufontein 488 (designated the LF Area) and Kappies Kareeboom 540 (the KK Area). A second site alternative (S2) was investigated and involves artificial recharging in Postmasburg area via injection boreholes. The locations of the areas are shown in Appendix A1.

Groundwater Africa conducted a specialist investigation to assess the potential of diverting the surplus water into underground (aquifer) storage (Appendix D2 & D3). The two options that were considered in this assessment included:

- Artificial recharge via infiltration trenches/borehole injection at/near the Groenwaterspruit (LF and KK areas); and
- Artificial recharge via injection boreholes in Postmasburg located ~10 km from the mine.

SIOC decided to peruse aquifer recharging in the Groenwaterspruit based on the result of the abovementioned study conducted. Aquifer recharging into Postmasburg is therefore not considered further in this report. The study also initially assessed the feasibility of installing recharge trenches across the Groenwaterspruit at the LF and KK areas These trenches would then be filled with water and infiltrated into the sub-surface. It was however determined that the shallow unconsolidated material in the Groenwaterspruit is not sufficiently permeable for the trench option and the borehole injection was therefore chosen as the preferred option.

The infrastructural requirements for the proposed facility include the following:

- Two (2) separate pipelines with an internal diameter of 0.3 m (300 mm):
  - Pipelines with an internal diameter of 0.3 m (300mm); will be constructed to the LF and KK areas (Appendix A2 & C). The two (2) pipelines will be required to transport water from pit dewatering activities to the recharge sites and will be constructed above ground (Figure 1).
  - The pipeline to the LF area will be located within the existing Kolomela firebreak and will run parallel to the old de-proclaimed Witsand Road (Figure 2). The road is currently used as an alternative access road to the

Kolomela Mine.
- The pipeline to KK area will run within existing firebreaks on the farms Klipbankfontein 489, Kapstevel 541 and Kappies Kareeboom (Figure 3).
- The LF and KK pipelines will mostly run above ground as per the detailed designs contained in Appendix C.
- LF and KK pipelines will cross the R383 underneath the road (Appendix C).
- All pipelines constructed within the delineated floodlines/wetlands (Appendix A2, D4 & D6) will be placed underground to ensure that the infrastructure does not obstruct the flow of the ephemeral Groenwaterspruit. Trenches 1 m deep will be excavated to install the pipelines and subsequently backfilled and rehabilitated as required.
- The pipeline constructed to the LF area will be connected to eleven (11) boreholes and the KK pipeline will be connected to eight (8) boreholes (Appendix A2, A4 and C).
- **Please Note**: The pipeline does not trigger any listed activity in terms of GNR 544, 545 or 546 requiring environmental approval before commencement. It has however been included in the assessment to ensure that placement thereof has the least environmental impact.

- Injection boreholes:
  - All the required boreholes will be drilled to a depth of between 10 - 20 m and fitted with a casing and concrete slab to support the borehole (Figure 4). The boreholes will also need to be fitted with air release valves, flow meters, piezometer tubes (two 32 mm diameter, HDPE, will be installed at 12 mbgl; one for a water level data logger and one for hand readings on each borehole) as well as a source water quality sampling tap. Please refer to Appendix A2 & A4 for the location of injection boreholes within the LF and KK areas.
  - Once all the pipelines and boreholes have been installed, water will gravitate or be pumped to the areas for water disposal.

Figure 1: Visual example of required above ground water pipelines to the LF and KK areas.

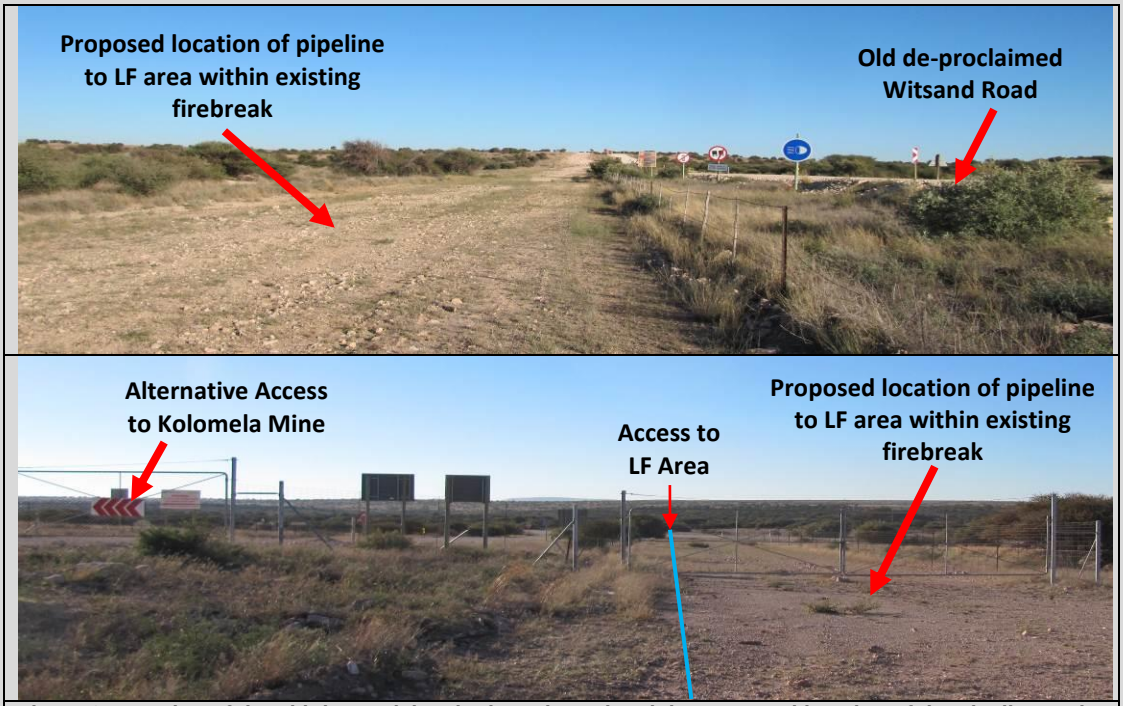

Figure 2: Location of the old de-proclaimed Witsand Road and the proposed location of the pipeline to the LF area within the Kolomela firebreak.

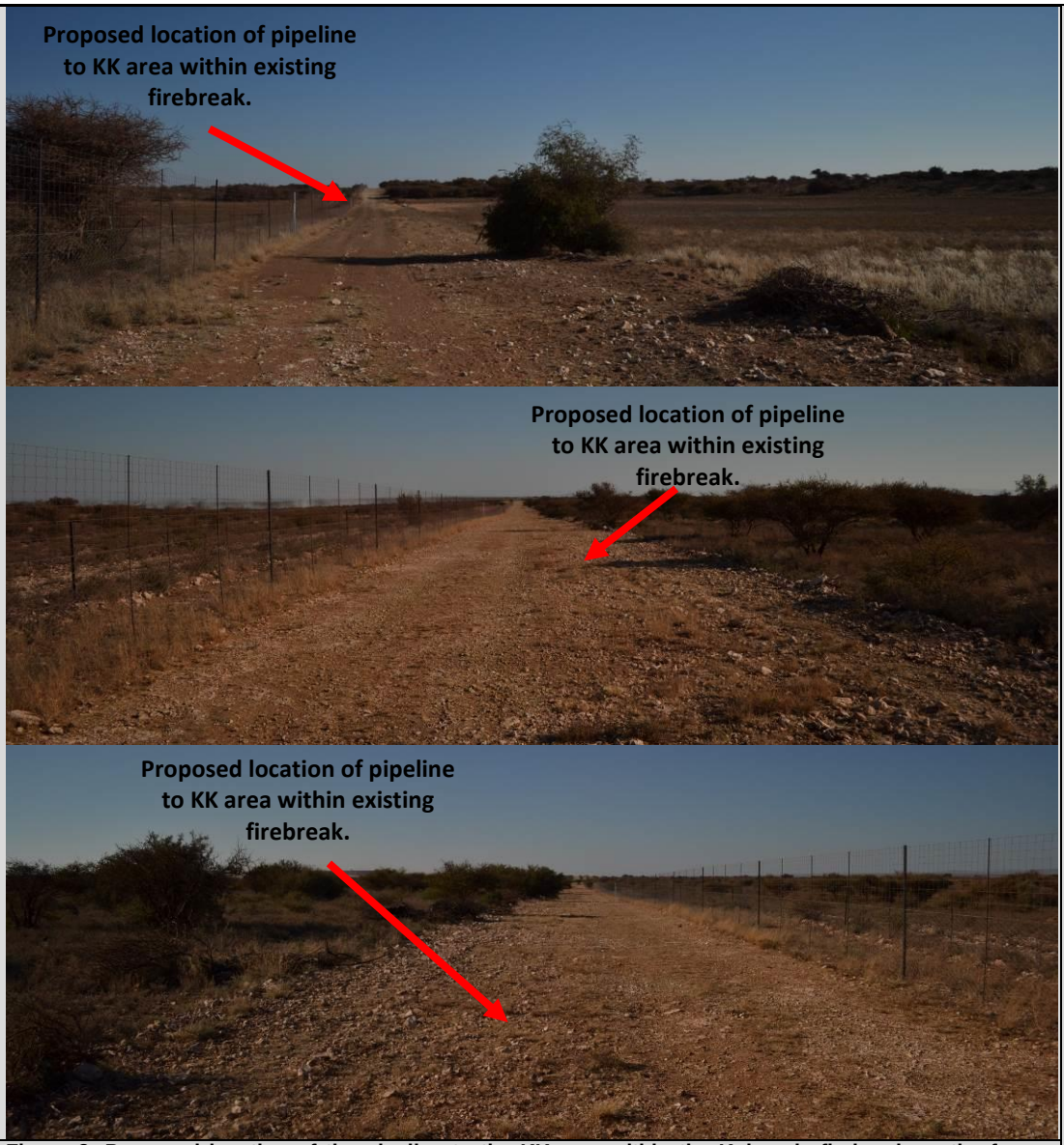

Figure 3: Proposed location of the pipeline to the KK area within the Kolomela firebreak on the farms Klipbankfontein 489, Kappies Kareeboom 543 and Kapstevel 541.

Figure 4: Visual example of borehole, casing and concrete slab required at the LF and KK areas.

3. Project Description

Artificial recharge will involve pumping or gravitating water from dewatering activities on the mine via pipelines into injection boreholes located within the Groenwaterspruit. The source water quality is constantly monitored by the Kolomela Mine and from these results there is no indication of water contamination. A total of eleven (11) boreholes at the LF area and eight (8) boreholes at the KK area will be used for water disposal from dewatering activities of the mine pits. The project also forms part of the requests made by the Department of Water Affairs (DWA) to investigate alternative water uses and discharge points other than complete disposal into the Vaal Gamagara pipeline. The aquifer recharging activities will occur on the LF and KK areas as follows:

- Leeufontein Area (LF Area)
  At the LF area the boreholes will be drilled to a depth of 10 - 20 m to penetrate the < 5 m thick gravel layer. Eleven (11) boreholes will be used within the Leeufontein Area (See Appendix A2). It is estimated that the gravel layers are sufficiently permeable to receive up to 10 L/s with long term injection rates to be between 2 and 8 L/s for each individual borehole. It is estimated that the LF area will be suitable to inject water at a rate of 30 L/s (2592 m^3/day) into the underlying aquifer (gravels layer/aquifer), which will take about 40 - 100 days to fill the area.

  Once the storage areas (gravels/aquifer) have been filled; water will naturally leave the aquifer through evapotranspiration and through-flow. The long terms potential for aquifer recharging in the area is estimated at 30 – 50 L/s when taking evapotranspiration and through-flow into consideration. Recharging rates is also expected to be less in winter than in summer. Estimated mid-winter recharge rates will range between 20 – 25 L/s and mid-summer between 50 – 80 L/s.

- Kappies Kareeboom Area (KK Area)
  At the KK area, the boreholes will be drilled to a depth of 10 - 20 m to penetrate the < 5 m thick gravel layer. Eight (8) boreholes will be linearly located within 200 m of each other (See Appendix A2). It is estimated that the KK area will be suitable to inject water at a rate of 18 L/s (1555 m^3/day) into the underlying aquifer, which will take approximately two months to fill the estimated 100 000 m^3 space within the gravels. Once the storage areas (gravels/aquifer) have been filled; water will naturally leave the aquifer through evapotranspiration and through-flow. The long term potential for aquifer recharging in the area is estimated at 20 - 30 L/s when taking evapotranspiration and through-flow into consideration. Recharging rates is also expected to be less in winter than in summer. Estimated mid-winter recharge rates will range between 12 – 25 L/s and mid-summer between 30 – 90 L/s.

The above information was sourced from the feasibility study conducted by Groundwater Africa for aquifer recharging within the Groenwaterspruit (See Appendix D2). Various infiltration and borehole injection tests was undertaken to determine the feasibility of implementing aquifer recharging at the Kolomela Mine. A Geophysics assessment supported the selection of the various borehole test sites. The aquifer recharging tests consisted of short-term (up to 2 days) and medium-term (two six (6) day test cycles) pumping and injection testing.

It should be noted that the aquifer recharge capacity for both LF and KK areas is ultimately equivalent to the losses achieved via evapotranspiration and through-flow from the aquifer. The water injection potential is estimated as being ˜30 L/s for the LF area and ˜18 L/s for the KK area. The combined injection potential for both LF and KK is estimated to be **50 L/s (4 320 m^3/day)**. This is regarded as the best estimated injection capacity based on the aquifer permeability and equivalent to the combined lower through-flow and evapotranspiration estimates (also approximately 50 L/s). Using this estimate it would be possible to recharge the LF and KK areas at 50 L/s for all months except winter (most likely only occurring at 40 L/s in winter). During the summer months the recharge rates will be equal to or greater than the maximum estimated borehole capacity of 50 L/s. It is however recommended that if more water is required for discharge the spread of additional boreholes should be located beyond the Kolomela properties.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

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

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Alternatives

The preferred site alternative option (S1) involves aquifer recharging along the ephemeral stream, the Groenwaterspruit, and is located on the mine-owned properties Leeufontein 488 (designated the LF Area) and Kappies Kareeboom 540 (the KK Area). A second site alternative (S2) was investigated and involves artificial recharging in Postmasburg area via injection boreholes. The locations of the areas are shown in Appendix A1.

Groundwater Africa conducted a specialist investigation to assess the potential of diverting the surplus water into underground (aquifer) storage (Appendix D2 & D3). The two options that were considered in this assessment included:

- Artificial recharge via infiltration trenches/borehole injection at/near the Groenwaterspruit (LF and KK areas); and
- Artificial recharge via injection boreholes in Postmasburg located ~10 km from the mine.

SIOC decided to peruse aquifer recharging in the Groenwaterspruit based on the result of the abovementioned study conducted. Aquifer recharging into Postmasburg is therefore not considered further in this report. The study also initially assessed the feasibility of installing recharge trenches across the Groenwaterspruit at the LF and KK areas These trenches would then be filled with water and infiltrated into the sub-surface. It was however determined that the shallow unconsolidated material in the Groenwaterspruit is not sufficiently permeable for the trench option and the borehole injection was therefore chosen as the preferred option.

Please also note that The LF & KK Pipelines have been optimally located within existing firebreaks and relocating or adjusting these proposed localities will result in an additional disturbance to the environment.

No Go Alternative

The no-go option refers to the alternative of the proposed development not going ahead at all. This alternative will avoid potentially positive and negative impacts on the environment, and the *status quo* of the area would remain. Should this alternative be exercised, the socio-economic and environmental benefits of the proposed aquifer recharge will not be realised. These benefits would include the following:

- Maximise natural storage: Long term, storage, emergency and diurnal storage;
- Resource savings;
- Sustainable management of valuable renewable resources;
- Ecological benefits: maintaining the reserve, minor environmental imprint and minimal land use;
- Climate friendly development and can also mitigate local effects of climate change;
- Support for international agreements;
- Result in improved groundwater quality in the area.
- Acceptability to society;
- Employment creation;
- Hindrance of evaporation; and
- Could enhance the well field production of the area and restore groundwater levels.

3. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.
List alternative sites if applicable.

Alternative:	**Latitude (S):**		**Longitude (E):**	
Alternative S1[1] (preferred or only site alternative) **Kappies Kareeboom 540 (KK Area)**	**28°**	**26.966'**	**22°**	**58.172'**
Leeufontein 488 (LF Area)	**28°**	**23.584'**	**23°**	**1.114'**
Alternative S2: **Postmasburg Area**	**28°**	**19.703'**	**23°**	**4.239'**
Alternative S3 (if any)	**N/A**		**N/A**	

In the case of linear activities:

Alternative:	**Latitude (S):**			**Longitude (E):**		
Alternative S1 (preferred or only route alternative)						
LF Pipeline						
• Starting point of the activity	**28°**	**23'**	**9.70"**	**22°**	**59'**	**22.76"**
• Middle point of the activity	**28°**	**23'**	**12.10"**	**22°**	**0'**	**26.90"**
• End point of the activity	**28°**	**23'**	**27.71"**	**22°**	**1'**	**23.64**
KK Pipeline						
• Starting point of the activity	**28°**	**25'**	**28.79"**	**22°**	**57'**	**59.41"**
• Middle point of the activity	**28°**	**26'**	**16.31"**	**22°**	**57'**	**52.48"**
• End point of the activity	**28°**	**26'**	**35.30"**	**23°**	**58'**	**23.83"**

[1] "Alternative S.." refer to site alternatives.

Alternative S2 (if any): **The LF & KK Pipelines is optimally located within existing firebreaks and relocating or adjusting these proposed localities will result in an additional disturbance to the environment.**

• Starting point of the activity	**N/A**		**N/A**	
• Middle point of the activity	**N/A**		**N/A**	
• End point of the activity	**N/A**		**N/A**	

Alternative S3 (if any)

• Starting point of the activity	**N/A**		**N/A**	
• Middle point of the activity	**N/A**		**N/A**	
• End point of the activity	**N/A**		**N/A**	

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

A COMPLETE LIST WITH CO-ORDINATES TAKEN EVERY 250 M ALONG THE LF AND KK PIPELINES ROUTE IS ATTACHED AS APPENDIX A4.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	**Size of the activity:**
Alternative A1[2] (preferred activity alternative):	
Aquifer Recharging via Injection Boreholes	
• **LF area (Eleven injection sites)**	**Injection boreholes and associated infrastructure equals 25 m^2 (Approx. 2.25 m^2/per site).**
• **KK Area (Eight injection sites)**	**Injection boreholes and associated infrastructure equals 18 m^2 (Approx. 2.25 m^2/per site).**
Alternative A2 (if any)	
Alternative A3 (if any)	

or, for linear activities:

Alternative:	**Length of the activity:**
Alternative A1 (preferred activity alternative):	**LF Pipeline: 5 270 m**
Aquifer Recharging via LF & KK Pipelines.	**KK Pipeline: 3 540 m**
Alternative A2 (Activity alternative):	
Alternative A3 (if any)	

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	**Size of the site/servitude:**
Alternative A1 (preferred activity alternative)	
Alternative A2 (if any)	
Alternative A3 (if any)	

5. SITE ACCESS

Does ready access to the site exist?	**YES**
If NO, what is the distance over which a new access road will be built	

Describe the type of access road planned:

N/A

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

6. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

6.1 the scale of the plan which must be at least a scale of 1:500;

6.2 the property boundaries and numbers of all the properties within 50 metres of the site;

[2] "Alternative A.." refer to activity, process, technology or other alternatives.

6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
6.4 the exact position of each element of the application as well as any other structures on the site;
6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
6.6 all trees and shrubs taller than 1.8 metres;
6.7 walls and fencing including details of the height and construction material;
6.8 servitudes indicating the purpose of the servitude;
6.9 sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
- rivers;
- the 1:100 year flood line (where available or where it is required by DWA);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or invested with alien species);

6.9 for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
6.10 the positions from where photographs of the site were taken.

7. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this form**.** It must be supplemented with additional photographs of relevant features on the site, if applicable.

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

9. ACTIVITY MOTIVATION

S1: PREFERRED ALTERNATIVE & S2: SITE ALTERNATIVE 2

9(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	**R16000000**
What is the expected yearly income that will be generated by or as a result of the activity?	**The aquifer recharging will not result in any income.**
Will the activity contribute to service infrastructure?	**NO**
Is the activity a public amenity?	**NO**
How many new employment opportunities will be created in the development phase of the activity?	**The construction of the infrastructure will create a few short term job opportunities. The infrastructure will be erected by a contractor who will make use of his regular staff. Additional staff may need to be employed, but new job opportunities will be for <10 people.**
What is the expected value of the employment opportunities during the development phase?	**Not sure**
What percentage of this will accrue to previously disadvantaged individuals?	**30% or more**

How many permanent new employment opportunities will be created during the operational phase of the activity?	**None**
What is the expected current value of the employment opportunities during the first 10 years?	**-**
What percentage of this will accrue to previously disadvantaged individuals?	**Cognisance will be given to the Kolomela Mines Social and Labour Plan commitments in terms of procurement of martials and the employment of local labour during construction or operations.**

9(b) Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

The Kolomela Mine abstracts an average of 1 940 m^3/h of water, which lower the natural groundwater level below the pit excavations, a process referred to as dewatering. This is required to continue mining operations safely. SIOC is proposing to discharge the surplus groundwater obtained from the de-watering process at Kolomela Mine into aquifers located away from the mine. The need for this has arisen because the mine uses relatively little water in comparison to the dewatering process, and Sedibeng Water (who manages the Vaal Gamagara pipeline) cannot, at this stage, receive the surplus. The recharging scheme would therefore allow Kolomela Mine to discharge of their surplus groundwater in a way that does not cause unacceptable harm to the environment, for example, through the direct disposal of water to surface water resources. The need for aquifer recharging is motivated by requests from Mr. Abe Abrahams from the DWA to the Kolomela Mine. The Mine has investigated alternative water uses and discharge points for water disposal as opposed to discharge of all surplus water into the Vaal Gamagara pipeline. The project, therefore, forms part of the future strategy of the Kolomela Mine to ensure a sustainable form of water management to the local surrounding environment.

Indicate any benefits that the activity will have for society in general:

The proposed aquifer recharge project will benefit the local society as water will be stored or returned to the local catchment. The water stored below ground can therefore be used to meet domestic, agricultural and environmental needs. Storing large quantities of water below the surface will reduce the evaporative losses of water comparing to dams. The recharging scheme will ultimately restore groundwater levels in the local catchment and will therefore maintain the local reserve which is already affected by dewatering activities at the Kolomela Mine. The source recharge water is considered to be clean uncontaminated water and will potentially improve the water quality of the local aquifer. The project will also require minimal land use, and infrastructural requirements will have a minor environmental imprint. The project can also locally offset the effects of global temperature increases caused mainly by greenhouse gas emissions. The water stored below surface will be protected from evaporation losses and provide a sustainable long source of fresh water in a very arid region in the Southern Africa.

Indicate any benefits that the activity will have for the local communities where the activity will be located:

Surplus water that will be discharged into the aquifer will be of an acceptable quality for use in agricultural activities, as well as for basic human needs. The water discharged to the aquifer will recharge groundwater and to some extent mitigate impacts from the mine's dewatering activities (S1). The groundwater underlying the Groenwaterspruit will receive a constant source of recharge and thus be available for use by local communities in the surrounding area. Mainly short term construction employment would be created during the construction phase of the project for members of the local community (as available skills allow). The project will therefore maximize local natural storage, improve water quality, restore groundwater levels, improve well field production, maintain the groundwater reserve, have a minor environmental imprint, require minimal land use and store large quantities of water for current and future use.

DESIRABILITY:			
1.	Does the proposed land use/development fit the surrounding area?	**YES**	
2.	Does the proposed land use/ development conform to the relevant structure plans, SDF and planning visions for the area?	**YES**	
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	**YES**	
4.	If the answer to any questions 1-3 was NO, please provide further motivation / explanation		
5.	Will the proposed land use / development impact on the sense of place?		**NO**

6.	Will the proposed land use / development set a precedent?		**NO**
7.	Will any persons rights be affected by the proposed land use / development?		**NO**
8.	Will the proposed land use / development compromise the "urban edge"?		**NO**
9.	If the answer to any of the questions 5-8 was YES, please provide further motivation / explanation.		

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline:	Administering authority:	Date:
National Environmental Management Act (Act No 107 of 1998)	**Northern Cape Department of Environment and Nature Conservation (DENC)**	**29 January 1999**
Environmental Impact Assessment Regulations, 2010: • **GN. R. 543;** • **GN. R. 544; and** • **GN. R. 546.**	**DENC**	**18 June 2010**
Mineral and Petroleum Resources Development Act (Act No 28 of 2002)	**Department of Mineral Resources**	**10 Oct 2002**
National Water Act (Act No 36 of 1998)	**Department of Water Affairs (DWA)**	**20 Aug 1998**
National Environmental Management: Biodiversity Act (NEM:BA), 2004 (Act No. 10 of 2004)	**DENC**	**7 June 2004**
Northern Cape Nature Conservation Act (Act No 9 of 2009)	**DENC**	**18 March 2010**
National Heritage Resources Act (Act No 25 of 1999)	**South African Heritage Resources Agency (SAHRA)**	**28 April 1998**
Conservation of Agricultural Resources Act (Act No 43 of 1983)	**Department of Agriculture, Forestry and Fisheries (DAFF)**	**1983**
National Forests Act (Act No 84 of 1998)	**DAFF**	**30 Oct 1998**
Regulations on the National Forests Act, 1998 (NFA, No. of 1998)	**DAFF**	**29 Apr 2009**
National Veld and Forest Fire Act (Act No 101 of 1998)	**DAFF**	**19 Nov 1998**
Nature and Environmental Conservation Ordinance 19	**DENC**	**1974**
A practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones"	**DWA**	**2005:**

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	**YES**
If yes, what estimated quantity will be produced per month?	**5 m^3**

How will the construction solid waste be disposed of (describe)?

Solid waste (general waste) produced during the construction phase of the project will be transported to, and temporarily stored within, the Kolomela Mine waste storage areas for appropriate collection and disposal. The mine also has an approved Waste Management License (WML) for a general waste landfill site; which is currently not in operation. All waste produced will be stored on site in water tight containers or skips and collected weekly from the site and taken to the waste storage areas.

Any hazardous waste produced during the construction phase (although none is anticipated) would be stored temporarily within the designated area at the Kolomela Mine and collected by a hazardous waste management contractor for disposal at a suitably licensed waste disposal facility. Safe disposal certificates will be kept for record purposes of all hazardous wastes removed from the Kolomela Mine.

Where will the construction solid waste be disposed of (describe)?

The general waste from the Kolomela Mine will either be transported from the mine by waste contractors which require records of waste disposal certificates or be disposed of at the mine's licensed general waste disposal facility.

Will the activity produce solid waste during its operational phase?	**NO**
If yes, what estimated quantity will be produced per month?	**0 m^3**

How will the solid waste be disposed of (describe)?

N/A: If any waste is produced in relation to the proposed activity it will be temporarily stored within the Kolomela Mine waste storage areas for appropriate collection and disposal. The mine also has an approved WML for a general waste landfill site; which is currently not in operation.

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

N/A

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?	**NO**
If yes, inform the competent authority and request a change to an application for scoping and EIA.	
Is the activity that is being applied for a solid waste handling or treatment facility?	**NO**

If yes, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

11(b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	**NO**
If yes, what estimated quantity will be produced per month?	
Will the activity produce any effluent that will be treated and/or disposed of on site?	**NO**

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?	**NO**

If yes, provide the particulars of the facility:

Facility name:	
Contact person:	
Postal address:	
Postal code:	
Telephone:	Cell:
E-mail:	Fax:

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

N/A

11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?	**NO**
If yes, is it controlled by any legislation of any sphere of government?	

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

N/A

11(d) Generation of noise

Will the activity generate noise?	**YES**
If yes, is it controlled by any legislation of any sphere of government?	**NO**

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

There will be limited noise during the construction period. No directly affected sensitive receptors have been identified within close proximity to the site. During operation there will be very little to no noise from the activity.

12. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es)

	Groundwater		**The activity will not use water**

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month: **80 litres/per second**

Does the activity require a water use permit from the Department of Water Affairs? **YES**

If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

13. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The option to use mainly gravity to transport the water from the dewatering activities instead of electrical pumps. Control valves will be operated from solar power units. No other energy will be required.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Solar power will be utilised for the remote control valve operations.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A): [ ]

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? **YES**

If YES, please complete form XX for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat

Alternative S2 (if any):

Alternative S3 (if any):

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

~~2.1 Ridgeline~~
~~2.2 Plateau~~
~~2.3 Side slope of hill/mountain~~
~~2.4 Closed valley~~
~~2.5 Open valley~~
2.6 Plain
~~2.7 Undulating plain / low hills~~
~~2.8 Dune~~
~~2.9 Seafront~~

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:		**Alternative S2 (if any):**	**Alternative S3 (if any):**
Shallow water table (less than 1.5m deep)		**NO**		
Dolomite, sinkhole or doline areas		**NO**		
Seasonally wet soils (often close to water bodies)	**YES**			
Unstable rocky slopes or steep slopes with loose soil		**NO**		
Dispersive soils (soils that dissolve in water)		**NO**		
Soils with high clay content (clay fraction more than 40%)		**NO**		
Any other unstable soil or geological feature		**NO**		
An area sensitive to erosion		**NO**		

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

PLEASE REFER TO APPENDIX D2 & D3: SPECIALIST GROUNDWATER INVESTIGATION CONDUCTED AS PART OF THIS PROJECT; INCLUDING THE RESULTS OF THE INJECTION TEST UNDERTAKEN FOR THE PROPOSED PROJECT.

4. GROUNDCOVER

S1: PREFERRED ALTERNATIVE

Indicate the types of groundcover present on the site:

4.1 Natural veld – good condition [E]
4.2 Natural veld – scattered aliens [E]
~~4.3 Natural veld with heavy alien infestation [E]~~
~~4.4 Veld dominated by alien species [E]~~
~~4.5 Gardens~~
~~4.6 Sport field~~
~~4.7 Cultivated land~~
~~4.8 Paved surface~~
~~4.9 Building or other structure~~
4.10 Bare soil

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	**Natural veld with scattered aliens[E]**		
			Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

Has a specialist been consulted?			**YES**
If YES, please complete the following:			
Name of specialist:	**Dr PC Zietsman (OMNI EKO Environmental Consultants)**		
Qualification(s) of specialist:	**Masters in Environmental Management UFS (2004) Ph.D. University of the Free State (Botany) (1989) M.Sc. University of Pretoria (Botany) (1982) B.Sc. (Hons) University of Pretoria (Ecology) (1979) B.Sc. University of Pretoria (Botany & Zoology) (1978)**		
Postal Address:	**P.O. Box 30305 Pellissier**		
Postal Code	**9322**		
Telephone:		Cell:	**083 450 5355**
E-mail:	**ziets@gmail.com**	Fax:	**086 624 9573**
Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?			YES
If YES, specify and explain			

Synergistics appointed Omi Eko to conduct a specialist vegetation assessment for activities associated with the construction of the boreholes and water pipelines to recharge the Groenwaterspruit aquifer. The study only focused on the study areas for the aquifer recharging located within the Groenwaterspruit; designated the LF and KK areas (Appendix A1). The survey of the water pipelines to the LF and KK areas was excluded from the study as construction of these will be located within the existing Kolomela firebreaks (See Appendix A2). All vegetation within the firebreaks has been previously removed and therefore no additional vegetation clearance is required for the construction of the pipelines. Please note the necessary environmental approvals were obtained from Northern Cape: DENC for the construction of the Kolomela Firebreaks (DENC Ref: NC/SIY/TSA/POST 01/2009).

The vegetation study within the LF and KK areas focused on the occurrence of red data, vulnerable and protected plant species that might be affected by the proposed development. The study also included an investigation of the possible effect that dust and fluctuation of the Groenwaterspruit's water level might have on the immediate environment and vegetation in particular. The LF and KK areas (preferred areas) selected for the aquifer recharging within the Groenwaterspruit is discussed separately below:

- **Leeufontein Area (Figure 5)**
  The LF area is located within the Postmasburg Thornveld (Veld type SVk14); within the eastern Kalahari Bushveld Bioregion of the Savanna Biome. Numerous endemic or near-endemic plant species occur in the area, however it is not regarded as a veld type needing protection. The LF area is characterised by red Aeolian sand of the Kalahari group underlying the volcanic and sediment of the Griqualand West Supergroup. Very little of the Postmasburg Thornveld has been transformed (Mucina & Rutherford 2006). There are five smaller plant communities within the LF area:
  - **Groenwaterspruit community: This plant community is mainly dominated by sedges (*Juncus, Schoenoplectus* and *Scirpus* spp.). There is virtually no riparian vegetation. Numerous alien invader plants (Kabelturksvy) were observed. This area is not regarded as sensitive.**
  - **Nananthus Community: Plant community is restricted to the limestone outcrop on the western bank of**

the Groenwaterspruit. Two Vygie species were observed and other small cryptic succulents are also expected to occur in this habitat. .

- **Ziziphus Bush Clump Community: The community mainly consist of Buffalo Thorn, Bloubos, River Karee, Wolwedoring, Kruisbessie and Wild Olive. No Swarthaak was observed in this community. A small patch of Camel thorn trees (*Acacia erioloba*) were observed next to the firebreak on the northern fence of this community. *Acacia erioloba* is a protected tree and may not be removed by the development.**
- **Nerine Community: Vleilelie is a common geophytic species in this veld type and associated with areas that are seasonally waterlogged. This species was not observed in the Groenwaterspruit although this species is protected in the Northern Cape it can be easily relocated as part of rehabilitation activities.**
- **Boophone – Mesem Community: The community has the highest concentration of protected plant communities. These include Bushman Poison Bulb, three Vygies species and Vleilelies. Bushman Poison Bulb is a medicinal plant and under severe threat in other parts of the country. This plant may under no circumstance be removed for personal purposes. This area is regarded as being of conservation value and it is recommended to remain untouched.**

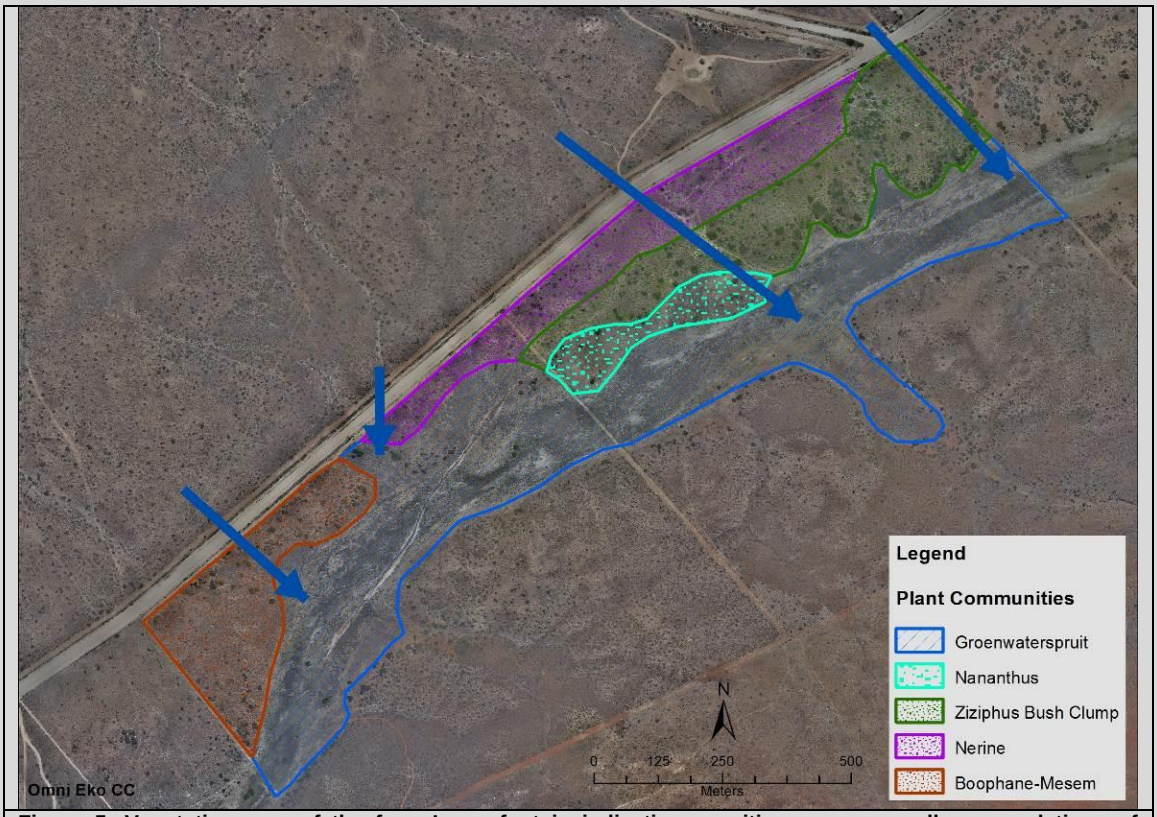

Figure 5: Vegetation map of the farm Leeuwfontein indicating sensitive areas as well as populations of sensitive and protected plant species. The blue arrows represent areas where access to the recharge points is less problematic (Ziets, 2013)

- **Kappies Karee Area (Figure 6)**

  The KK area is located within the Northern Upper Karoo that forms part of the Upper Karoo Region in the Nama Karoo Biome. Both KK and LF areas form part of the Ghaap plateau which is regarded as a unique area where many near-endemic succulent plant species may occur. Approximately 4% of this veld type has been physically transformed and is regarded as being of Least Concern (Mucina & Rutherford 2006). There are seven smaller plant communities within the KK area:

  - **Groenwaterspruit Community: Community characterised mainly by sedges (*Juncus, Schoenoplectus* and *Scirpus* spp.); mainly associated with wet conditions but not with open water. None of these plant species are protected. No *Prosopis glandulosa* were noted in the community. This area is not regarded as sensitive.**
  - **Flood Plain Community: Large floodplains exist to the north of the Groenwaterspruit at KK and most likely only waterlogged during extreme flooding. The area is dominated by grass communities (Such as *Eragrostis truncata)* associated with vlei areas. Kabelturksvy was also observed and must be removed as it' is a very aggressive invader. This area is not regarded as sensitive.**
  - **Calcrete Bank Community: Limestone outcrops consist of a variety of small succulent plants of which most are very cryptic. The plant species are not necessarily endemic to the area but might be worthwhile to conserve. A large number of Swarthaak regarded as an invader species was observed in the community.**
  - **Acacia Karroo Community: A cluster of Sweet Thorn trees occur in the area. These trees commonly occur along drainage lines in the Postmasburg area. Although this is a common species which is not protected they should not be removed as they would have various advantages for the proposed project in terms of regulating water levels from the underlying aquifer**

- **Nananthus Community: Mesmem (Vygie) and Portulacaceae (Hasiekos) families are protected in the Northern Cape. Vygie habitats quite often house hasiekos species. This area should be regarded as sensitive and no development must be allowed within.**
- **Ziziphus Bush Clump Community: The community is located between the floodplain and the Groenwaterspruit. It consists mainly of Buffalo Thorn, River Karee, Bloubos and Wolwedoring. The bush clumps in this area from an important habitat and refuge for animals and birds, and no development should take place in these areas. The area is therefore regarded as being sensitive.**
- **Poplar Community: Poplar trees are regarded as an invader species and pose a serious threat to the Groenwaterspruit and its surroundings. The area has a high density of Poplars and no associated local indigenous vegetation. This area is not regarded as being sensitive and the entire community should be removed from site.**

Various plant communities were identified as sensitive or protected and were mapped accordingly. Please refer to Appendix A2 and D1 for the relative location of all identified protected species.

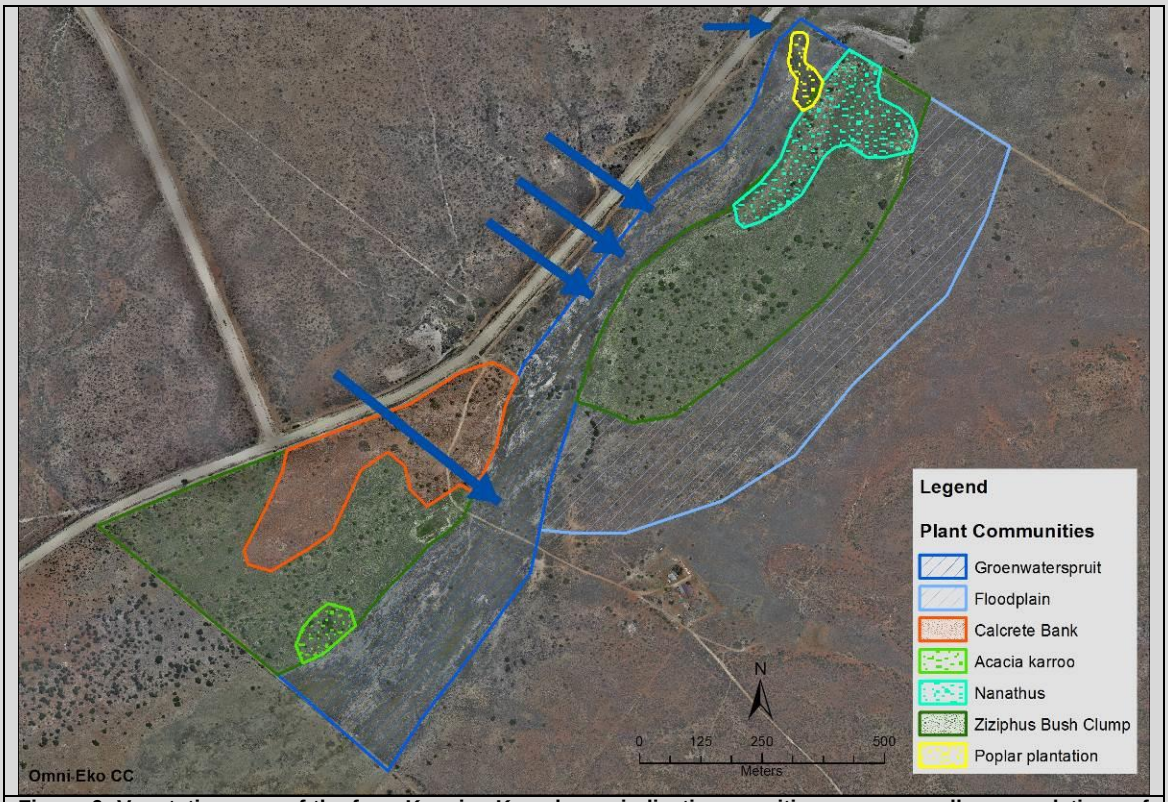

Figure 6: Vegetation map of the farm Kappies Kareeboom indicating sensitive areas as well as populations of sensitive and protected plant species. The blue arrows represent areas where access to the recharge points is less problematic (Ziets, 2013).

PLEASE REFER TO APPENDIX D1: SPECIALIST VEGETATION ASSESSMENT CONDUCTED AS PART OF THIS PROJECT (PREFERRED OPTION ONLY).

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	
Non-Perennial River	**YES**
Permanent Wetland	
Seasonal Wetland	**YES**
Artificial Wetland	
Estuarine / Lagoonal wetland	

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

Has a specialist been consulted?	**YES**

If YES, please complete the following:

Name of specialist:	**Scientific Aquatic Services**
Qualification(s) of specialist:	**S van Staden (Pr. Sci. Nat)**

	N van de Haar (Pr. Sci. Nat)		
Address:	**91 Geldenhuis Rd, Malvern East, Ext 1**		
Telephone:	**011 616 7893**	Cell:	[redacted]
E-mail:	**admin@sasenvironmental.co.za**	Fax:	**011 615 6240**

Briefly explain the findings of the specialist**:**

Aquifer recharging at the LF and KK areas is located within the ephemeral river, the Groenwaterspruit. The study area falls within the Southern Kalahari Aquatic Ecoregion and also falls within the D73A quaternary catchment. The system is classified as a Resilient System which, in its present state, can be considered a Class B (largely natural) stream (Kleynhans; 1999).The Groenwaterspruit River is characterised by wetland soil as well as *Eragrostis. bicolor*, considered to be facultative wetlands species. The terrain units associated with the Groenwaterspruit and its associated tributary were assessed within the study area, cannot be described as open conduits with clearly defined margins. The features can more accurately be described as valley bottom wetlands alternating between being channelled and un-channelled systems, most likely due to the erosion potential within certain areas being higher.

No wetland characteristics as defined by DWA (2005) were noted within any of the tributaries of the major drainage features in the area. However, enough water has accumulated within the main channel of the Groenwaterspruit River as well as the one tributary of this system to result in the formation of hydromorphic soils.

Hydromorphic soil was found within the Groenwaterspruit River, which sustained facultative wetland vegetation at the time of the specialist assessment. The vegetation within the temporary zone of the Groenwaterspruit River did however show an increase in floral species diversity with special mention of species of the families Juncaceae and Cyperaceae. Species of these families are not found within any other wetland feature associated with the area. The temporary zone of the tributary of the Groenwaterspruit River was dominated by *Eragrostis bicolor* with a slight increase in abundance of *Eragrostis echinochloidea* comparing to other wetland pans in the area. The terrestrial zones of the valley bottom wetlands were distinctive with *Themeda triandra* – *Eragrostis lehmanniana* dominated grassland.

No surface water was present at the time of the assessment. However, moisture of soil samples increased after auguring approximately 30 cm deep. The Groenwaterspruit wetland was delineated using; "DWA, 2005: A practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones". A buffer area of 100 meters was allocated for the Groenwaterspruit within the study area. The buffer will aid in the conservation of habitat and will also help to ultimately achieve the ecological management class of the wetland features as determined by the South African Wetland Assessment Classification System. The delineated wetland and buffer zones pertaining to the Groenwaterspruit wetland are included in Figure 7.

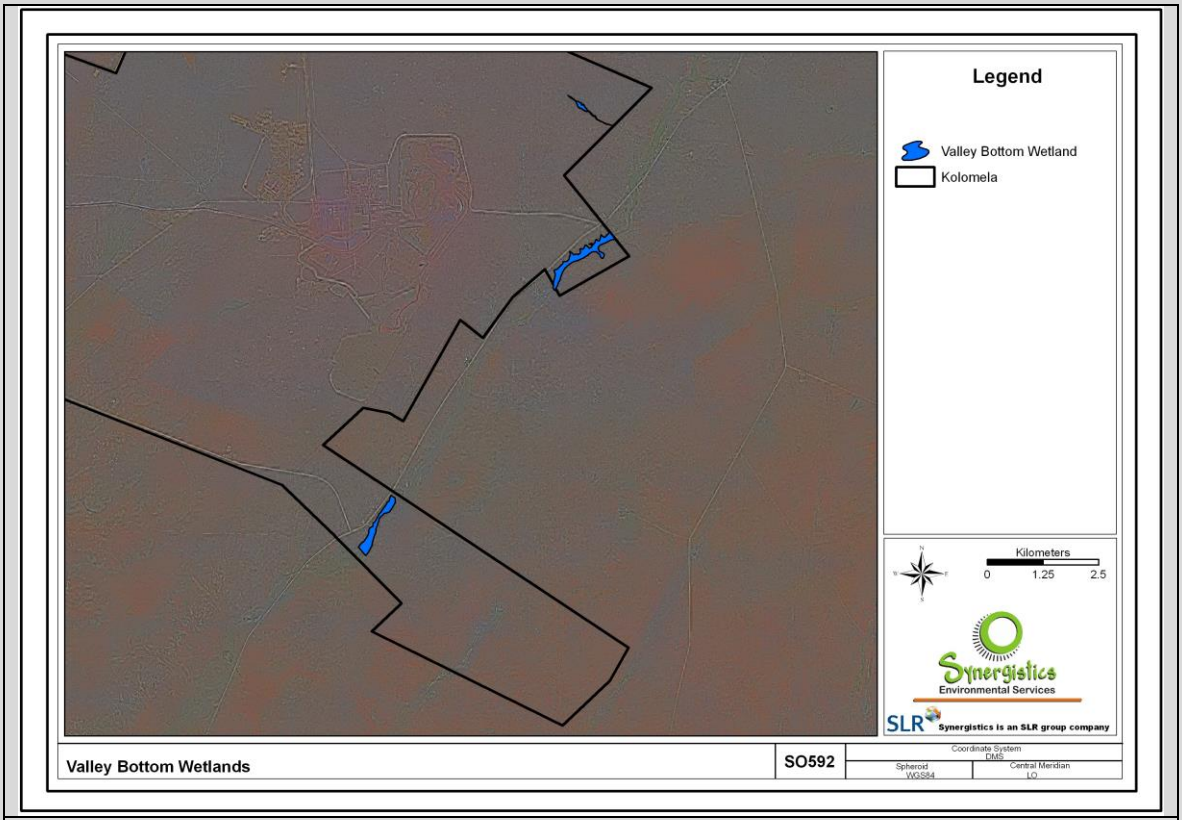

Figure 7: Wetland delineation and buffer zones pertaining to the Groenwaterspruit wetland.

The Tsantsabane Local Municipality is abstracting a significant amount of water from the Groenwaterspruit River system to aid with water supply for domestic use to the town of Postmasburg. As a result, DWA recommended that surplus water, obtained from dewatering activities at the Kolomela Mine, be discharged, back into the system.

Therefore, the effects from the Groenwaterspruit dewatering by the Postmasburg Municipality will be offset through the proposed aquifer recharge program by the Kolomela mine. The degree to which the recharge is effective will need to be determined over time through monitoring of both groundwater conditions and wetland integrity.

The portion of the river system earmarked for this activity is located downstream from Postmasburg and was one of the alternative sites selected as part of this assessment. The Groenwaterspruit River is considered a Freshwater Ecosystem priority Areas (FEPA) river and should remain in a good condition in order to contribute to national biodiversity goals and support sustainable use of water resources (NFEPA database, 2011). The possibility exists that ongoing water abstraction will result, in future loss of wetland habitat due higher lying areas drying up. Another consequence might be a loss of permanent wetland zones downstream of the study area that presently support facultative wetland species such as *Phragmitis australis*. However, it is deemed possible that by supplementing the system with the surplus water from the mine, impacts due to water extraction could be mitgated and to some extent result in the re-establishment of wetland conditions within the system which are already lost.

From the results of the assessment, it is evident that the features encountered within the study area cannot be regarded of exceptional importance in terms of function and service provision. This is mainly as a result of lack of water for extended periods of time limiting the ability to support any aquatic ecological communities. The formation of seasonal and permanent wetland zones that could support a more diverse wetland floral community, that would also in turn increase the wetland features assimilation capacity as well as sediment trapping ability.

The lack of flowing water within the Groenwaterspruit decreased the importance in terms of stream flow regulation, flood attenuation and water supply. However, considered to be of some importance in terms of sediment trapping due to the sandy nature of soil with evidence of erosion in some areas. The Groenwaterspruit wetland is considered to be largely unchanged by anthropogenic activities. The largest impairment to the wetland integrity has occurred as a result of hydrological changes to the system along with changes to geomorphological structure and function of the systems. The proposed aquifer recharging is expected to have a positive impact on these impairments.

PLEASE REFER TO APPENDIX D4: SPECIALIST AQUATIC ASSESSMENT CONDUCTED FOR THE KOLOMELA MINE.

6. LAND USE CHARACTER OF SURROUNDING AREA

S1: PREFERRED ALTERNATIVE

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

5.1 Natural area
~~5.2 Low density residential~~
~~5.3 Medium density residential~~
~~5.4 High density residential~~
~~5.5 Informal residential~~[A]
~~5.6 Retail commercial & warehousing~~
~~5.7 Light industrial~~
~~5.8 Medium industrial~~[AN]
5.9 Heavy industrial [AN]
~~5.10 Power station~~
~~5.11 Office/consulting room~~
~~5.12 Military or police base/station/compound~~
~~5.13 Spoil heap or slimes dam~~[A]
~~5.14 Quarry, sand or borrow pit~~
~~5.15 Dam or reservoir~~
~~5.16 Hospital/medical centre~~
~~5.17 School~~
~~5.18 Tertiary education facility~~
~~5.19 Church~~
~~5.20 Old age home~~
~~5.21 Sewage treatment plant~~[A]
~~5.22 Train station or shunting yard~~[N]
~~5.23 Railway line~~[N]
~~5.24 Major road (4 lanes or more)~~[N]
~~5.25 Airport~~[N]
~~5.26 Harbour~~
~~5.27 Sport facilities~~
~~5.28 Golf course~~
~~5.29 Polo fields~~
~~5.30 Filling station~~[H]
~~5.31 Landfill or waste treatment site~~
~~5.32 Plantation~~
5.33 Agriculture
5.34 River, stream or wetland
~~5.35 Nature conservation area~~

~~5.36 Mountain, koppie or ridge~~
~~5.37 Museum~~
~~5.38 Historical building~~
~~5.39 Protected Area~~
~~5.40 Graveyard~~
~~5.41 Archaeological site~~
~~5.42 Other land uses (describe)~~

If any of the boxes marked with an "N "are ticked, how this impact will / be impacted upon by the proposed activity.

If YES, specify and explain:	

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	**The proposed project forms part of the Kolomela mining operations and therefore there is no direct impact on the industrial activities presently being undertaken at the mine. The Kolomela Mine is the only industrial land use presently occurring in the direct surrounding of the proposed project.**

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site?	**YES**	
		NO

If YES, explain:

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist:

African Heritage Consultants CC (AHC) compiled a Heritage Management Plan (HMP) for the Kolomela Mine close to Postmasburg, in the Northern Cape. In 2005 a phase 1 Archaeological Impact Assessment of the then proposed Kolomela Mining was undertaken by David Morris. A phase 2 assessment as required by SAHRA was also conducted for the mine. AHC accordingly conducted an investigation to provide an updated review of the heritage resources at the Kolomela mine and to compile the HMP. The heritage resources in terms of the proposed aquifer recharging; including the pipelines to the LF and KK areas are discussed below:

- Pipeline to LF and KK: The pipelines will be located within the existing constructed firebreak which has already been completely disturbed. The pipeline will not be located within close proximity to any historical structures as identified within the mine's HMP.
- Leeufontein Area: There are two historical structures highlighted in the HMP which should not be disturbed by the proposed development. It is however not expected that the proposed locations for the aquifer recharging and its associated activities will be in close proximity to these structure (See Appendix A2). The occurrence of middle stone age (MSA) and later Stone Age (LSA) lithic assemblages have been identified throughout the Kolomela Mine to be associated with pans and drainage lines. Kolomela Mine personnel is trained in identifying these artefacts and if found within these areas, a specialist will be consulted.
- Kappies Karee Area: The KK area is within close proximity to "Kappies se Plek" farmyard identified within the HMP. The farmyard consists of a historical and current house, sheep kraal, dam and the Gouws cemetery. These areas have been indicated on the site layout (Appendix A2). The proposed aquifer recharging will not directly impact on these sensitive areas. The occurrence of MSA and LSA lithic assemblages has been identified throughout the Kolomela Mine to be associated with pans and drainage lines. Kolomela Mine personnel are trained in identifying cultural or historical artefacts and, if found within these areas, a specialist will be consulted.

Please note that SAHRA has exempted the proposed project from conducting a project specific specialist archaeological investigation (See Appendix E8). The main motivation for this was due to the wealth of historical studies conducted for the mine (See Appendix D5). SAHRA provided recommendations which will be integrated into the project's Environmental Management Programme Report (EMPr) (See Appendix F).

Will any building or structure older than 60 years be affected in any way?		**NO**
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?		**NO**

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

PLEASE REFER TO APPENDIX D5: SPECIALIST HERITAGE ASSESSMENTS CONDUCTED FOR THE KOLOMELA MINE.

SECTION C: PUBLIC PARTICIPATION

7. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

(a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
  (i) the site where the activity to which the application relates is or is to be undertaken; and
  (ii) any alternative site mentioned in the application;
(b) giving written notice to—
  (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  (v) the municipality which has jurisdiction in the area;
  (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  (vii) any other party as required by the competent authority;
I placing an advertisement in—
  (i) one local newspaper; or
  (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54I(ii); and
I using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
  (i) illiteracy;
  (ii) disability; or
  (iii) any other disadvantage.

8. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

(a) indicate the details of the application which is subjected to public participation; and
(b) state—
  (i) that the application has been submitted to the competent authority in terms of these Regulations, as the case may be;
  (ii) whether basic assessment or scoping procedures are beingapplied to the application, in the case of an application for environmental authorisation;
  (iii) the nature and location of the activity to which the application relates;
9. where further information on the application or activity can be obtained; and
  (iv) the manner in which and the person to whom representations in respect of the application may be made.

10. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

11. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

12. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before the application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to this application. The comments and response report must be attached under Appendix E.

13. AUTHORITY PARTICIPATION

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least 30 (thirty) calendar days before the submission of the application.

List of authorities informed:

1. **Department of Water Affairs;**
2. **South African Heritage Resources Agency;**
3. **Department of Agriculture, Forestry and Fisheries (DAFF);**
4. **Northern Cape Department of Environment and Nature Conservation;**
5. **Siyanda District Municipality;**
6. **Tsantsabane Local Municipality;**
7. **Northern Cape Department of Agriculture and Land Reform; and**
8. **Department of Mineral resources (DMR).**

List of authorities from whom comments have been received:

None received to date.

7. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for linear activities, or where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub regulation to the extent and in the manner as may be agreed to by the competent authority.

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application at least 30 (thirty) calendar days before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders? **YES**

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

Please refer to Appendix E: Public Participation Report containing the comment and response report. It contains all current public consultation and feedback undertaken as well as correspondence between the various parties.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

Mr. Albertus Viljoen:

1. The southern recharge point does not make sense and feels that the northern section will have more positive advantages to the ecology.
2. What is the status of the Kolomela Mines amendment to their Integrated Water Use Licence (IWUL).

Mr. Johan Kotze (Farm Floradale):

3. In terms of the two aquifer recharging sites in the Groenwaterspruit, can we not have one recharge point in the Groenwaterspruit and the other recharge point in the watercourse to the west of Wolhaarkop?
4. This can then offset the dewatering of the Kapstevel pit which is much closer to this point.
5. This will result in the western portion of Kolomela also receiving water recharge in the direction of the underground contours from the Kapstevel pit.
6. This is the area where farm Floradale already receives degraded water quantities.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report):

EAP Response:

1. The aquifer recharging will take place in phases with the LF area being implemented first followed by the

KK area. The project is only proposed to be implemented on mine owned properties. These locations could potentially be expanded in the future. It should also be noted that without expanding the project into surrounding properties, which is not owned by the mine the northern recharge point cannot at this stage receive more water than presently proposed;.

2. The amendment of the mines IWUL is still under review by the Department of Water Affairs (DWA).
3. This is considered a potential phase two option for expanding the aquifer recharging project. As the location indicated is outside the mine owned properties and due to the current required infrastructure not being sufficient, it will not be considered further within the current project. The Kolomela Mine expansion project is currently investigating the feasibility of exploiting the Kapstevel South pit which would result in additional dewatering requirements. This would enable the mine to develop the appropriate infrastructure etc. to potentially implement a second phase to the west of the Kolomela Mine. The proposed project would enable the mine to gain the necessary experience in implementing aquifer recharging schemes. This experience can then be used for the potential second phase.
4. Noted (See above response)
5. Noted (See above response)
6. Noted (See above response)

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

Alternative (preferred alternative)

1.1. PLANNING AND DESIGN PHASE

No impacts are anticipated for the planning and design phase of the prospecting.

1.2. CONSTRUCTION PHASE

The table below summarises the anticipated impacts associated with the construction phase of the aquifer recharging and associated infrastructure. Limited to no impacts are anticipated for the planning and design phase. Please also refer to Appendix G for the impact rating tables developed for the proposed project which contains the proposed mitigation measures.

Please note that all mitigation measures identified for the construction phase that may eliminate or reduce the potential impacts are listed within Appendix G and have been integrated into the associated EMPr (Appendix F).

1.1.1 DIRECT CONSTRUCTION IMPACTS			
Appendix G: Impact rating table 1 - section reference	**Impact**	**Impact Significance (No Mitigation)**	**Impact Significance (Mitigation)**
PHYSICAL NATURAL ENVIRONMENT			
1.1.1.1.	Climate change and Greenhouse Gas Emissions	Low	Low
1.1.1.2.	Air Quality	Moderate	Low
1.1.1.3.	Soils and land capability	Low	Low
1.1.1.4.	Surface and groundwater quality and quantity	Moderate	Low
1.1.1.5.	Alteration of local relief	Low	Low
1.1.1.6.	Noise	Low	Low
BIOLOGICAL NATURAL ENVIRONMENT			
1.1.1.7.	Loss of natural vegetation	High	Moderate
1.1.1.8.	Impacts on species of special concern	High	Low
1.1.1.9.	Increased invasion by exotic plant species following vegetation disturbance	High	Low
1.1.1.10.	Loss of animal life	High	Low
SOCIAL AND ECONOMIC ENVIRONMENT			
1.1.1.11.	Increased job opportunities	Low (+)	Low (+)
1.1.1.12.	Roads, Traffic and Infrastructure	Low	Low
1.1.1.13.	Visual Impact	Low	Low
CULTURAL AND HERITAGE RESOURCES			
1.1.1.14.	Cultural and Heritage Resources	Low	Low

1.1.2. INDIRECT CONSTRUCTION IMPACTS			
Appendix G: Impact rating table 1 - section reference	**Impact**	**Impact Significance (No Mitigation)**	**Impact Significance (Mitigation**
PHYSICAL NATURAL ENVIRONMENT			
1.1.2.1.	Dust generation	Low	Low
BIOLOGICAL NATURAL ENVIRONMENT			
1.1.2.2.	Alien and invasive Plants	Moderate	Low
SOCIAL AND ECONOMIC ENVIRONMENT			
1.1.2.3.	Roads, Traffic and	Low	Low

	Infrastructure		

1.1.3. CUMULATIVE CONSTRUCTION IMPACTS				
Appendix G: Impact rating table 1 - section reference	Aspect	Existing Impacts	Incremental (Additional) Impacts	Cumulative Impacts
PHYSICAL NATURAL ENVIRONMENT				
1.1.3.1.	Climate change and Greenhouse Gas Emissions	Low (-): Long Term	Low (-): Short Term	Low (-): Long Term
1.1.3.2.	Soils and land capability	Moderate (-): Long Term	Low (-): Short Term	Moderate (-): Long Term
1.1.3.3.	Watercourses	Low (-): Long Term	Low (-): Short Term	Low (-): Long Term
1.1.3.4.	Air Quality	Moderate (-): Long Term	Low (-): Short Term	Moderate (-): Long Term
1.1.3.5.	Noise/Vibrations	Moderate (-): Long Term	Low (-): Short Term	Moderate (-): Long Term
BIOLOGICAL NATURAL ENVIRONMENT				
1.1.3.6.	Ecology and Biodiversity	High (-): Long Term	Low (-): Short Term	High (-): Long Term
1.1.3.7.	Alien and Invasive Plants	Moderate (-): Long Term	Low (-): Short Term	Moderate (-): Long Term
SOCIAL AND ECONOMIC ENVIRONMENT				
1.1.3.8.	Aesthetics	High (-): Long Term	Low (-): Short Term	High (-): Long Term
1.1.3.9	Roads, Traffic and Infrastructure	Moderate (-): Long Term	Low (-): Short Term	Moderate (-): Long Term
1.1.3.10.	Visual Impact	Moderate (-): Long Term	Low (-): Short Term	Moderate (-): Long Term

1.2. OPERATIONAL PHASE

The table below summarises the anticipated impacts associated with the operational phase of the aquifer recharging and associated infrastructure. Please also refer to Appendix G for the impact rating tables developed for the proposed project which contains proposed mitigation measures.

Please note that all mitigation measures identified for the operational phase that may eliminate or reduce the potential impacts are listed within Appendix G and have been integrated into the associated EMPr (Appendix F).

1.2.1 DIRECT OPERATIONAL IMPACTS			
Appendix G: Impact rating table 1 - section reference	Aspect	Impact Significance (No Mitigation)	Impact Significance (Mitigation
PHYSICAL NATURAL ENVIRONMENT			
1.1.2.1.	Soils and land capability	Moderate	Low
1.1.2.2.	Groundwater Quantity	High	Low
1.1.2.3.	Groundwater Quality	High (+)	High (+)
BIOLOGICAL NATURAL ENVIRONMENT			
1.1.2.4.	Increased invasion by exotic plant species following vegetation disturbance	High	Low
1.1.2.5.	Pedestrian and vehicle traffic will disturb vegetation; create tracks and pathways on the site.	Moderate	Low
1.1.2.6.	Collecting of medicinal plants.	High	Low
1.1.2.7.	Loss of animal life	Moderate	Low
SOCIAL AND ECONOMIC ENVIRONMENT			
1.1.2.8.	Roads, Traffic and Infrastructure	Low	Low
1.1.2.9.	Society in general	High (+)	High (+)
1.1.2.10.	Economic Impact	High (+)	High (+)

1.2.2. INDIRECT OPERATIONAL IMPACTS

Appendix G: Impact rating table 1 - section reference	Aspect	Impact Significance (No Mitigation)	Impact Significance (Mitigation
No noteworthy negative, indirect impacts on the environment are expected due to the operational phase of the aquifer recharging.			

	1.2.3. CUMULATIVE OPERATIONAL IMPACTS			
Appendix G: Impact rating table 1 - section	Impact	Existing Impacts	Incremental (Additional) Impacts	Cumulative Impacts
PHYSICAL NATURAL ENVIRONMENT				
1.2.3.1.	Groundwater Quantity (Positive +)	Low (-): Long term	Moderate (+): Long term	Moderate (+): Long term
1.2.3.2.	Groundwater Quantity (Negative -)	Low (-): Long term	Moderate (-): Long term	Low (-): Long term
SOCIAL AND ECONOMIC ENVIRONMENT				
1.2.3.2.	Society in general	Low (-): Long term)	Moderate (+): Long term	Moderate (+): Long term

1.3. DECOMMISSIONING AND CLOSURE PHASE

The table below summarises the anticipated impacts associated with the decommissioning and closure phase of the aquifer recharging and associated infrastructure. Please also refer to Appendix G for the impact rating tables developed for the proposed project which contains proposed mitigation measures.

Please note that all mitigation measures identified for the decommissioning phase that may eliminate or reduce the potential impacts are listed within Appendix G and have been integrated into the associated EMPr (Appendix F).

1.3.1. DIRECT/INDIRECT AND CUMULATIVE DECOMMISSIONING/CLOSURE IMPACTS			
Appendix G: Impact rating table 1 - section	Impact	Impact Significance (No Mitigation)	Impact Significance (Mitigation
The facility is expected to exist until the Kolomela Mine is decommissioned. If the Kolomela Mine is closed, the decommissioning will include the disassemblance of the components of the facility, site preparation and site rehabilitation depending on the final land use of the affected area. Decommissioning by itself is therefore not assessed in detail. The reason for this is that all activities associated with the decommissioning phase are similar in nature to construction impacts; however this is adequately addressed in the EMPr (Appendix F). Any recyclable materials such as steel structures or piping will be sent to recycling facilities with other infrastructure disposed of in accordance with the EMPr.			

Alternatives

- **No alternative location for the pipelines to the LF and KK areas were considered. The main reason being that the pipelines will be situated within the existing Kolomela Mine firebreak and therefore would not require additional vegetation clearance. The pipelines will therefore be place within the most preferred location from an environmental point of view.**
- **The optimum location within the Groenwaterspruit was selected based on specialist inputs.**
- **The option to artificially recharge aquifers within the town of Postmasburg was also considered. Due to various factors it was not assessed further.**
- **Artificial recharge using a trenching system across the Groenwaterspruit was also considered. Upon further investigation it was determined that the shallow unconsolidated material in the Groenwaterspruit is not sufficiently permeable and therefore the borehole injection was chosen as the preferred option.**

No-go options

The no-go option refers to the alternative of the proposed development not going ahead at all. This alternative will avoid potentially positive and negative impacts on the environment, and the *status quo* of the area would remain. Should this alternative be exercised, the socio-economic and environmental benefits of the proposed aquifer recharge will not be realised. These benefits would include the following:

- **Maximise natural storage: Long term, storage, emergency and diurnal storage;**
- **Resource savings;**
- **Sustainable management of valuable renewable resources;**
- **Ecological benefits: maintaining the reserve, minor environmental imprint and minimal land use;**
- **Climate friendly development and can also mitigate local effects of climate change;**
- **Support for international agreements;**
- **Result in improved groundwater quality in the area.**
- **Acceptability to society;**
- **Employment creation;**
- **Hindrance of evaporation; and**
- **Could enhance the well field production of the area and restore groundwater levels.**

3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative A (preferred alternative)

The SIOC's proposed aquifer recharging project entails recharging the local aquifer in the Groenwaterspruit with surplus water from mine pit dewatering activities at the Kolomela Mine. The most significant impact of the development at the LF and KK areas would be the clearance and disturbance of natural vegetation for the required development footprint and associated loss of biodiversity that would result. However, the net positive socio--economic benefits of the project are deemed to outweigh the potential impacts on the regional biodiversity. The majority of the anticipated direct impacts will be of short duration and can be managed through the implementation of appropriate mitigation measures. The following conclusions can be made:

- **Various plant communities and areas that are protected or sensitive were observed at the sites and mapped accordingly. The vegetation specialist concluded that the proposed development will have a small negative impact on the immediate environment. The impact on flora and fauna has been significantly reduced by placing the required water pipelines to the LF and KK areas within the existing Kolomela firebreak as far as possible. The direct impact on vegetation will be localised to only the installation of the required infrastructure within the Groenwaterspruit.**
- **Management of the increase in the water level is absolutely critical. One can assume that if the water level is constantly too high it will convert the ephemeral river into a permanent vlei with even a few small patches of open water. This will obviously dramatically change the plant species composition of the current Groenwaterspruit community. To understand and manage the fluctuation in water levels it is imperative to conduct a long term study on the water balance of this system. This should ideally be integrated into the Kolomela Mine's groundwater- and botanical studies.**
- **The impacts on the Groenwaterspruit wetland may be lowered to less significant impact levels through the implementation of appropriate management measures, as far as possible, during the proposed drilling activities.**
- **The construction of the injection boreholes and pipelines can result in exposed areas which can trigger soil erosion, appropriate mitigation measures have been identified to ensure the development will have a low impact on exposed soils.**
- **Dust is only expected to be generated during the construction phase of the project. The duration of dust generation is too brief to have any negative effect on the environment.**
- **The proposed project is expected to have a long term, positive impact on the surrounding environment, if managed appropriately.**
- **Through the implementation of the EMPr (Appendix F), it is expected that impacts on identified areas can be mitigated to acceptable levels.**

Refer to Appendix G in this report for the complete set of tables with the anticipated project impacts throughout the entire life of the project.

Alternatives
N/A

No-go alternative (compulsory)

If the no-go alternative is imposed the natural environment will remain in its current state and none of the environmental features will be negatively impacted. The no-go alternative will however mean that Kolomela Mine will continue to dispose of the surplus dewatered water directly into the Welgevondenspruit as well as exporting water away from the local catchment through the Vaal Gamagara pipeline. None of the positive aspects identified in this assessment will become a reality.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	**YES**
Is an EMPr attached?	**YES**

The EMPr must be attached as Appendix F.

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment):

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

It is the Environmental Assessment Practitioners (EAP's) opinion that the BA process to date has been undertaken correctly and within the bounds of the applicable regulatory environment. It is, therefore, recommended that the BA Report be accepted by the DENC. Furthermore, it is the EAP's opinion that the respective applications be viewed favourably by the Competent Authority, provided that the proposed mitigation and conditions put forward in this report and associated EMPr are adhered to and made legally binding to the Proponent (i.e. SIOC). The positive project impacts are deemed significant and negative project impacts can be mitigated to the extent that no significant, or residual, environmental damage will result through project approval(s). The following conditions should be included in the Environmental

Authorisation (EA):

- **All sensitive areas identified in Appendix A and D1 should be avoided as far reasonably possible by the development and no access to these areas should be allowed. It development is to take place within these areas care should be taken not to remove any sensitive or protected species.**
- **All pipeline requirements within the delineated floodlines and wetlands must be placed underground and the surface area should be sufficiently rehabilitated after construction to as per EMPr.**
- **All mitigation measures detailed in this report, specialist reports (Appendix D and draft EMPr (Appendix F)) must be implemented.**
- **The EMPr must be binding to the proponent as well all contractors.**
- **The EMPr is a living document and should be updated as determined or required.**
- **An Environmental Control Officer (ECO) must be appointed to monitor compliance with the attached EMPr for the entire life of the facility.**
- **To clearly understand and proactively manage the influence of the fluctuating water level on the immediate environment an interdisciplinary study, involving specialists in soil science, soil water balance, groundwater and botany should be launched before project commencement and continued throughout project implementation. This would ensure that all aspects relating to the fluctuation of water levels on the receiving environment are accurately monitored. This would ensure a proactive approach to identification of potential negative impacts as a result.**

SECTION F: APPENDICES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s)

- A1: Regional Location of the Kolomela Mine close to Postmasburg, Northern Cape.
- A2: Preliminary Site layout of proposed aquifer recharging Project.
- A3: Heritage and archeological features within SIOC owned properties.
- A4: Co-ordinates of LF and KK pipelines

Appendix B: Photographs

- B1: LF area photo plates
- B2: KK area photo plates

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

- D1: Specialist Vegetation survey
- D2: Kolomela Mine: Results of the injection tests in Groenwaterspruit for mine water disposal conducted by Groundwater Africa
- D3: Kolomela Mine: Options for disposing groundwater through artificial recharge conducted by Groundwater Africa
- D4: Wetland delineation study for the Kolomela Mine
- D5: Heritage studies conducted for the Kolomela Mine
- D6: 1:100 & 1:50 year's floodline delineations for the Groenwaterspruits

Appendix E: Public Participation report

- E1: Comments and Responses Report
- E2: Interested and Affected Parties Database
- E3: Proof of Newspaper placements
- E4: Proof of placement of Site Notices
- E5: Background Information Document
- E6: Proof of distribution of BID to all I&Aps
- E7: Minutes of meeting held
- E8: SAHRA exemption letter for conducting a project specific specialist archaeological investigation

Appendix F: Environmental Management Programme (EMPr)

Appendix G: Impact Assessment tables

- Appendix G1: Impact Assessment Methodology
- Appendix G2 Impact Assessment Tables

Appendix H: Details of EAP and expertise