



## **BASIC ASSESSMENT REPORT**

**FOR THE  
PROPOSED ESTABLISHMENT OF A PASSIVE  
WATER TREATMENT PLANT AT VRYHEID  
CORONATION COLLIERY IN KWAZULU-NATAL FOR  
THE TREATMENT CONTAMINATED MINE DRAINAGE  
DECANTING FROM THE WEST ADIT**

**NEAS REF: DEA/EIA/0001710/2013**

**DEA REF: 14/12/16/3/3/3/71**

**AUGUST 2013**



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### environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:

Application Number:

Date Received:


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

#### 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. This report format is current as of **1 September 2012**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is 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.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. 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.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. 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.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

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14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included on the electronic copy of the report submitted to the competent authority.

## SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?

	NO
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If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

### 1. PROJECT DESCRIPTION

#### a) Describe the project associated with the listed activities applied for

Anglo American Thermal Coal (AATC), a subsidiary of Anglo Operations Proprietary Limited, is applying for environmental authorisation and a waste management licence (integrated application) for the proposed establishment of a passive water treatment plant at Vryheid Coronation Colliery (VCC) in KwaZulu-Natal (KZN). Operations will include the treatment of contaminated mine drainage decanting from the West Adit.

The project involves the use of passive water treatment technology to neutralise the water (pH 6.5 – 7.5) and remove metals (Fe < 1 mg/l, Mn < 4 mg/l, Al < 1 mg/l) from the mine water currently decanting from West Adit at VCC into the KwaNotshelwa River. Some sulphate reduction will also take place (1 500 mg/l) but this is not the main objective and a potential future upgrade will deal with sulphate removal.

During Phase I, only 200m<sup>3</sup>/day will be treated. Allowance will however be made for four (4) other trains to upgrade the system to 1 000<sup>3</sup>/day.

**Process and associated infrastructure:** The project will include:

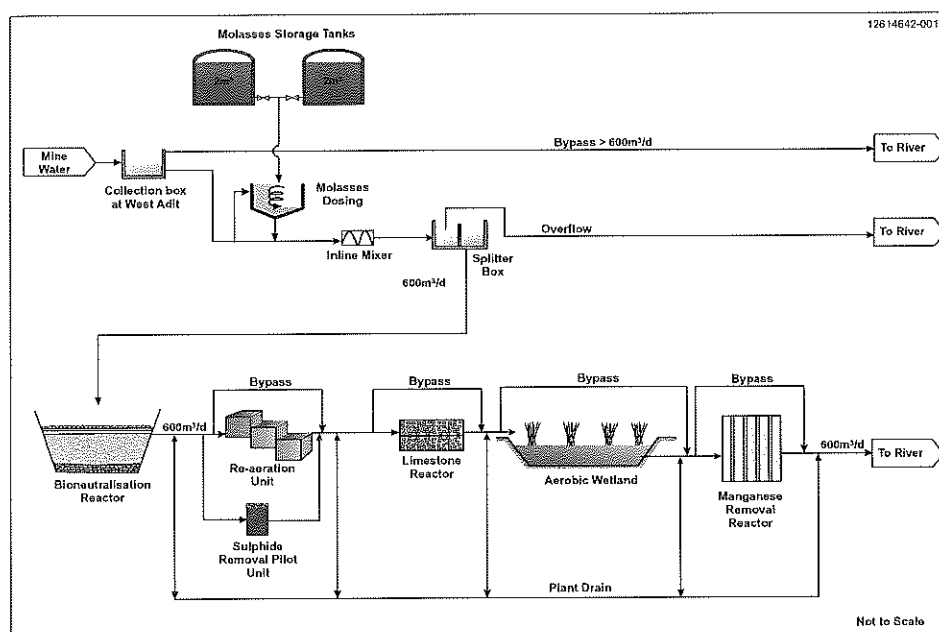
- The collection of the West Adit decant in a sump/weir located close to the stream bed. A reinforced concrete collection reservoir will be constructed in order to capture the seepage and protect it from dilution and mixing with upstream catchment runoff. It may also be necessary to construct river bank protection systems to ensure that the upstream catchment runoff cannot enter the collection reservoir. The system will be fenced for security reasons.
- The piping of the collected water over approximately 3km, in a HDPE pipe, to the treatment plant. An outlet will be placed at a low point in the collection reservoir wall in order to allow seepage to discharge freely down the pipeline as and when it emanates from the ground. The HDPE pipeline from the collection reservoir down to the passive water treatment plant site will be routed along an existing concrete canal and pipeline route and will be buried with inspection/maintenance sumps every 300m. A dual pipe system will be installed to allow for maintenance / cleaning. A cleaning box will be provided at 300m intervals. A jet cleaning system will be used to remove scaling and the jet will allow cleaning up to 150m to either side from the cleaning box.
- The passive water treatment plant (also refer to schematic diagram below) which includes:
  - A splitter box (1 217mamsl) to split flow and consisting of an adjustable rectangular weir set to allow 600m<sup>3</sup>/day over v-notch weir; a fixed v-notch weir that will allow all flows < 600m<sup>3</sup>/day into the flow splitter; and a fixed v-notch weir plate with 5 notches to ensure the flow is split into five (5) equal portions. Flow exceeding design flow will go back into the river. The splitter box is a control mechanism aimed at protecting the DPBR from high flows and releasing a controlled volume of water to the DPBR for treatment. The splitter box will also provide a point for the addition of molasses.
  - A degrading packed bed reactor (DPBR) at 1 214mamsl, designed and operated as a bionutralisation reactor.
  - An aeration/oxidation cascade(s) and sulphide scavenging reactor (biofilter type scrubber) at

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1 189mamsl to remove sulphides, allow for oxidation of manganese and control flow of effluent (partially treated water) from the plant and discharge into wetland as well as allow oxygen to enter the circuit.

- Limestone reactor to allow for the re-oxidation of  $H_2S$  to sulphate and/or sulphur.
- Aerobic wetland (1 181mamsl) to polish water and remove residual COD, sulphides, ammonia, phosphate and oxidised metal compounds.
- Manganese (Mn) removal unit (oxidising cascade).
- Discharge of treated water into the KwaNotshelwa River.

In preparing a plant layout, space will be allocated for potential future expansion of the plant to provide a sulphate reduction capability, by allowing space for five (5) primary biological sulphide oxidation reactors, five (5) secondary sulphate reducing reactors and five (5) secondary sulphide oxidation reactors.



Process schematic

- b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN R.544, 545 and 546	Description of project activity
<p><b>Example:</b></p> <p><b>GN R.544 Item 11(3): The construction of a bridge where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</b></p>	<p><b>A bridge measuring 5 m in height and 10m in length, no wider than 8 meters will be built over the Orange river</b></p>

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<p><u>NEMA: GNR 544 (18 June 2010):</u></p> <p>Activity 9: The construction of facilities or infrastructure exceeding 1 000metres in length for the bulk transportation of water, sewage or storm water -</p> <p>(i) with an internal diameter of 0,36 metres or more; or</p> <p>(ii) with a peak throughput of 120 litres per second or more,</p> <p>Activity 11: The construction of:</p> <p>(i) canals;</p> <p>(ii) channels;</p> <p>(iii) bridges;</p> <p>(iv) dams;</p> <p>(v) weirs;</p> <p>(vi) bulk storm water outlet structures;</p> <p>(vii) marinas;</p> <p>(viii) jetties exceeding 50 square metres in size;</p> <p>(ix) slipways exceeding 50 square metres in size;</p> <p>(x) buildings exceeding 50 square metres in size; or</p> <p>(xi) infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p> <p>Activity 12: The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010;</p> <p>Activity 18(i): The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from</p> <p>(i) a watercourse</p> <p>Activity 23(i): The transformation of undeveloped, vacant or derelict land to-</p> <p>(i) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares.</p> <p>(ii) residential, retail, commercial, recreational,</p>	<p>A 3 km (3 000metres) long pipeline will be constructed between the decant point and the passive water treatment plant for the bulk transportation of water. At this point in time, the diameter planned is 110 – 160 mm and only 7 litres/second will be transported and therefore the activity might not be applicable.</p> <p>A sump/weir will be constructed adjacent to the water course to collect the decant. A pipeline will be buried in a trench constructed to run adjacent to the existing canal. Two (2) river crossings at existing bridges for the pipeline will also form part of the application. All other infrastructure (treatment plant) will be constructed outside the flood lines and further than 100 m from the water course.</p> <p>The degrading packed bed reactors (DPBR) and wetland may be seen as off-stream water storage.</p> <p>The sump/weir to capture the West Adit water will be constructed adjacent to the water course. The trench to bury the pipeline will be adjacent to the banks of the canal.</p> <p>The land on which the passive water treatment plant is planned covers more than 5ha surface area. The area is described as settlement in the Zululand District Municipality Spatial Development Plan (SDP) and Integrated Development Plan (IDP). The Abaqulusi IDP (2011/2 draft) describes it as an urban settlement.</p>
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<p>industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares</p> <p><u>NEMA: GNR 545 (18 June 2010):</u>  Activity 3: The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.</p> <p>Activity 5: The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.</p> <p><u>NEMWA: GNR 718 (3 July 2009, Category B):</u>  Activity 1: The storage including the temporary storage of hazardous waste in lagoons.</p> <p>Activity 6: The treatment of hazardous waste in lagoons.</p> <p>Activity 7: The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic metres or more.</p> <p>Activity 11: The construction of facilities for activities listed in Category B or this Schedule (not in isolation to associated activity)</p>	<p>The contaminated mine water can be considered a dangerous good due to its elevated metal content and it will be stored and handled in the passive water treatment plant. Each of the degrading packed bed reactors (DPBR) as well as the aerobic wetland which all form part of the passive water treatment plant will be bigger than 500m<sup>3</sup>.</p> <p>A water use licence is also required in terms of Section 21 of the National Water Act, 1998 (Act 36 of 1998).</p> <p>The contaminated mine water being stored temporarily is seen as hazardous (due to its high metal content) and the degrading packed bed reactors (DPBR) may be considered lagoons used for storage during biological reaction which requires a retention time.</p> <p>The contaminated mine water being treated is seen as hazardous (due to its high metal content) and the degrading packed bed reactors (DPBR) may be considered lagoons.</p> <p>7 litres/second or 600m<sup>3</sup>/day of contaminated mine water decant will be treated. Phase I only allows for 200m<sup>3</sup>/day but allowance has been made to expand the treatment plant.</p> <p>A passive water treatment plant will be constructed.</p>
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## 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 as required by Regulation 22(2)(h) of GN R.543. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) 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.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

### a) Site alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Sub-division 1 & 21 of the farm Veelsgeluk 171 HU, Abaqulusi, KwaZulu-Natal (KZN) (Passive Water Treatment Plant)	27° 40' 15.58" S	31° 04' 06.12" E
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)



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No site alternative was considered for the Passive Water Treatment Plant due to the following reasons:

- This is where historic underground mining took place. The historic mining and subsequent ceasing of mining activities resulted in the underground workings being flooded and a decant occurring at West Adit located on this property.
- The passive treatment technology relies on gravitational flow and therefore the site for the Passive Water Treatment Plant had to be selected based on topographical heights (metres above mean sea level) and allowing sufficient topographical fall/gradient for the gravitational (natural) flow of water from West Adit to the treatment plant as no pumping is planned.
- Based on cost considerations and good environmental practice, the treatment plant had to be established as close as possible to the origin of the contaminated mine water that requires treatment.

In the case of linear activities: (Pipelines)

### Alternative:

Alternative S1 (preferred) Pipeline 4

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

### Latitude (S):

### Longitude (E):

27° 40' 20.66" S	31° 02' 46.48" E
27° 40' 08.53" S	31° 03' 28.97" E
27° 40' 15.58" S	31° 04' 06.12" E

Alternative S2 (if any) Pipeline 3

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

27° 40' 20.66" S	31° 02' 46.48" E
27° 40' 18.07" S	31° 03' 32.42" E
27° 40' 15.58" S	31° 04' 06.12" E

Alternative S3 (if any) Pipeline 2

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

27° 40' 20.66" S	31° 02' 46.48" E
27° 40' 23.45" S	31° 03' 36.17" E
27° 40' 15.58" S	31° 04' 06.12" E

Alternative S4 (if any) Pipeline 1

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

27° 40' 20.66" S	31° 02' 46.48" E
27° 40' 29.92" S	31° 03' 39.06" E
27° 40' 15.58" S	31° 04' 06.12" E

**Four (4) different alternatives were therefore considered to get the contaminated mine water from West Adit to the Passive Water Treatment Plant.**

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.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A.

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### b) Lay-out alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
The collection of decant at the West Adit that will flow via piping over approximately 3km to the treatment plant. An outlet will be placed at a low point in the collection reservoir wall in order to allow seepage to discharge freely down the pipeline as and when it emanates from the ground. The HDPE pipeline from the collection reservoir down to the passive water treatment plant site will be routed along an existing concrete canal and pipeline route.	27° 40' 15.58" S	31° 04' 06.12" E
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
N/A		
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)
N/A		

Besides the different pipelines routes (pipeline routes 1 – 4), no layout alternatives were considered due to the following reasons:

- The starting point, West Adit, is fixed as this is the origin of the polluted mine water on surface.
- The Passive Water Treatment Site was selected considering available surface area, proximity to West Adit etc
- The layout had to allow for gravitational flow from one process unit to the next as passive treatment technology makes use of natural flow and does not allow for pumping.

### c) Technology alternatives

Alternative 1 (preferred alternative)
The project involves the use of passive water treatment technology to neutralise the water (pH 6.5 – 7.5) and remove metals (Fe < 1 mg/l, Mn < 4 mg/l, Al < 1 mg/l) from the mine water currently decanting from West Adit at VCC into the KwaNotshelwa River. Some sulphate reduction will also take place (1500 mg/l) but this is not the main objective and a potential future upgrade will deal with sulphate removal.
Alternative 2
N/A
Alternative 3
N/A

No alternative treatment technologies were considered due to the following reasons:

- A passive treatment technology was selected because the mine is no longer operational and any active treatment technology would require equipment and skilled operators, all of which are no longer available on the site.
- Passive water treatment technology has been researched and developed over decades specifically to address the treatment of contaminated mine water at decommissioned/closed mines.

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- Based on financial considerations, passive treatment technology has a medium capital cost and low operational and maintenance cost compared to the high capital and operational cost of an active treatment plant.
- A passive treatment plant, though it extends over a larger area than an active treatment plant, has a lower visual impact since it is visually more natural (limited metal and concrete structures).
- Contamination risk with passive treatment plants is lower during the operational phase as no hazardous chemicals are used.
- Active treatment plants are noisy and this can cause a disturbance to the neighbouring communities.
- Passive treatment technology is energy efficient as no external power supplies are required since it makes use of natural energy sources (solar energy and gravitational flow).
- Security is always a problem with treatment plants in remote areas or close to settlements. Passive treatment plants have no equipment (pumps etc) that is expensive and attractive to remove and resell.
- An active industrial water treatment plant will be in conflict with the current land use

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)		
Due to the pollution and impact being exerted onto the KwaNotshelwa River, the schedule and demand are identified as urgent. The design of the plant is based on the constituents of concern which needs to be addressed through treatment. The current scale is small (Phase I) but the design allows for the enlargement of the plant as part of later phases.		
Alternative 2		
N/A		
Alternative 3		
N/A		

e) No-go alternative

Currently contaminated mine water is being decanted directly into the KwaNotshelwa River. The mine water has a low pH (2.6 – 3.0), high heavy metal content (50 mg/l Fe; 25 mg/l Mn; 75 mg/l Al) and high sulphate concentration (1 600 mg/l). This situation is detrimental to the environment and water resources.

Paragraphs 3 – 13 below should be completed for each alternative.

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### 3. PHYSICAL SIZE OF THE ACTIVITY

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

**Alternative:**

Alternative A1<sup>1</sup> (preferred activity alternative) Passive Treatment Plant  
Alternative A2 (if any)  
Alternative A3 (if any)

**Size of the activity:**

20 000 m <sup>2</sup>
m <sup>2</sup>
m <sup>2</sup>

or, for linear activities:

**Alternative:**

Alternative A1 (preferred activity alternative)  
Alternative A2 (if any)  
Alternative A3 (if any)  
Alternative A4 (if any)

**Length of the activity:**

1 820 m
1 800 m
2 140 m
2 650 m

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

**Alternative:**

Alternative A1 (preferred activity alternative)  
Alternative A2 (if any)  
Alternative A3 (if any)

**Size of the site/servitude:**

197 562 m <sup>2</sup>
m <sup>2</sup>
m <sup>2</sup>

### 4. SITE ACCESS

Does ready access to the site exist?

If NO, what is the distance over which a new access road will be built

YES	<input checked="" type="checkbox"/>	
		m

Describe the type of access road planned:

Access can be obtained from the R69 via a tar road to Coronation from where gravel roads lead to various points on the site.

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.

<sup>1</sup> "Alternative A.." refer to activity, process, technology or other alternatives.

### 5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s);
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (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).

**Please see Appendix A.**

### 6. LAYOUT/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:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

**Please see Appendix A.**

### 7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWA);
- ridges;
- cultural and historical features;

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- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

**Please see Appendix A.**

### 8. 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 report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

**Please see Appendix B.**

### 9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 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.

**Please see Appendix C.**

### 10. ACTIVITY MOTIVATION

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

<b>1. Is the activity permitted in terms of the property's existing land use rights?</b>	<b>YES</b>	<input type="checkbox"/>	Please explain
The site was a mine site (Vryheid Coronation Colliery) and some mine infrastructure remains (rehabilitated mine dumps, buildings). The area also contains some urban settlements such as Thukuzela and belongs to the Zibambeleni Khondlo Community Trust who gave permission for the project to proceed. The project aims to mitigate the residual impacts from the historic underground coal mining activities in terms of treating contaminated mine water.			
<b>2. Will the activity be in line with the following?</b>			
<b>(a) Provincial Spatial Development Framework (PSDF)</b>	<b>YES</b>	<input type="checkbox"/>	Please explain
Any spatial development includes the maintaining of natural water resources in an acceptable condition. This project will improve water quality in the KwaNotshelwa river through the treatment of contaminated mine water currently discharging into this water resource and contributing to the pollution of the water resource. The project is required in terms of duty of care (Section 28 of NEMA and Section 19 of NWA)			
<b>(b) Urban edge / Edge of Built environment for the area</b>	<b>YES</b>	<input type="checkbox"/>	Please explain
This project will have no effect on the urban edge.			

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<b>(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
The proposed project will not compromise the integrity of the existing SDF and IDP as the project will take place where mining was conducted and aims to mitigate residual mining impacts on the environment and local community.			
<b>(d) Approved Structure Plan of the Municipality</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
The proposed project will mitigate residual mining impacts on the environment, specifically the water environment.			
<b>(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
The proposed project will not compromise the current EMF and integrity of environmental management priorities for the area, as it aims for a sustainable environment by addressing a current pollution source. This will have environmental and social benefits.			
<b>(f) Any other Plans (e.g. Guide Plan)</b>	<b>YES</b>	<b>NO</b>	Please explain
Not applicable.			
<b>3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
As part of the IDP, water resources are identified as priorities because these are utilised as water supply to the surrounding communities. The water resources are currently not suitable for use due to the direct decant of contaminated mine water into the KwaNotshelwa River. The proposed project will improve water quality in the KwaNotshelwa River due to the treatment of the contaminated mine water prior to discharge.			
<b>4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
The treatment of contaminated mine water that decants into water resources is a national priority. The treatment of contaminated mine water is required as it will improve environmental conditions where pollution currently affects the quality of natural water resources.			

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<b>5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
No additional services or additional capacity in terms of existing service infrastructure will be required as the project utilises natural resources such as solar energy and gravitational flow and will not require municipal services.			
<b>6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</b>	<input checked="" type="checkbox"/>	<b>NO</b>	Please explain
No impact on infrastructure planning of municipality. The proposed project is required to mitigate environmental impacts. No additional services will be required from the municipality.			
<b>7. Is this project part of a national programme to address an issue of national concern or importance?</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
Though this project does not form part of the national programme to address contaminated mine water decanting into water courses, the treatment of contaminated mine water decanting into water courses is an issue of national concern and importance. The pollution of rivers is a national concern as the natural environment and the human population remain dependent on natural water resources.			
<b>8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
The location of the water treatment plant needs to be in the vicinity of the source of water that (contaminated mine water decant) requires treatment. Due to the use of gravitational flow, the location of the water treatment plant had to be at a lower topographical height than the decant. The location of the treatment plant also had to consider that sufficient surface area was available for its construction.			
<b>9. Is the development the best practicable environmental option for this land/site?</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
The proposed project aims to treat a pollution source (contaminated mine water) that is impacting on natural water resources. The treatment of contaminated water prior to discharge into the KwaNotshelwa River is regarded as the best practicable environmental option. Passive treatment is considered the best practicable environmental option in terms of treatment due to the reasons mentioned in Section A.2c of BAR.			
<b>10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
A pollution source (contaminated mine water) will be treated prior to its discharge into the KwaNotshelwa River. This will therefore result in a positive impact on the surrounding environment and specifically the water resource as currently the contaminated mine water decants untreated in to river and causes pollution of a natural water resource.			



## BASIC ASSESSMENT REPORT

<b>11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?</b>	<b>YES</b>	<input checked="" type="checkbox"/>	Please explain
It would be to the benefit of the environment and surrounding community if the management and treatment of pollution sources sets a precedent within the municipality. Though Phase I allows for a small scale treatment plant, the design does allow for expansion.			
<b>12. Will any person's rights be negatively affected by the proposed activity/ies?</b>	<input checked="" type="checkbox"/>	<b>NO</b>	Please explain
The property belongs to the Zibambeleni Khondlo Community Trust who has given permission for the project to proceed. The area is currently not used by the land owner. The project aims to improve environmental conditions which are in line with any individual's constitutional right in terms of Section 24 of the Constitution (Act 108 of 1998) to have access to an environment that is not detrimental to their health.			
<b>13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?</b>	<input checked="" type="checkbox"/>	<b>NO</b>	Please explain
The proposed project will have no effect on the urban edge.			
<b>14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?</b>	<input checked="" type="checkbox"/>	<b>NO</b>	Please explain
The project does not specifically contribute to any of the seventeen (17) SIPS projects.			
<b>15. What will the benefits be to society in general and to the local communities?</b>	Please explain		
Job creation (construction phase but minimal during operational phase) and a cleaner environment specifically the local natural water resources (KwaNotshelwa River).			
<b>16. Any other need and desirability considerations related to the proposed activity?</b>	Please explain		
<p>The status quo is that West Adit is decanting contaminated mine water directly into the KwaNotshelwa River. The mine water has a low pH (2.6 – 3.0), high heavy metal content (50 mg/l Fe; 25 mg/l Mn; 75 mg/l Al) and high sulphate concentration (1 600 mg/l). This situation is detrimental to the environment and water resources. In terms of duty of care (Section 28 of NEMA and Section 19 of NWA), urgent intervention is required.</p> <p>The project will result in a net positive impact on the environment and water resources as water quality in the KwaNotshelwa River will improve and discharge of mine water directly into a watercourse will cease. The mine water will be piped for treatment to neutralise the pH (6.5 – 7.5), reduce the heavy metal content (&lt; 1 mg/l Fe; &lt; 4 mg/l Mn; &lt; 1 mg/l Al) and reduce the sulphate concentration (1 500 mg/l) before discharge or use.</p>			
<b>17. How does the project fit into the National Development Plan for 2030?</b>	Please explain		
The project will create a few job opportunities (especially during the construction phase) and improve the living environment of the surrounding community; therefore it is in line with the National Development Plan.			

**18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.**

The project has taken the objectives of IEM into account by:

- Identifying and evaluating the actual and potential impacts on the environment, socio-economic conditions and cultural heritage;
- Considering the risks and consequences and alternatives and options for mitigation of activities, with a view to minimise negative impacts and maximise benefits;
- Ensuring adequate and appropriate opportunity for public participation; and
- Promoting compliance with the principles of environmental management set out in Section 2.

**19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.**

The proposed project is in line with the principles of environmental management as set out in Section 2 of NEMA:

The proposed project minimises and remedies the disturbance of ecosystems and loss of biodiversity (Section 2(4)(a)(i)) by establishing the treatment plant on an already disturbed area.

Section 2(4)(a)(ii) of NEMA requires that pollution and degradation of the environment be avoided, or, where they cannot be altogether avoided, are minimised and remedied. The uncontrolled decant of contaminated mine water from West Adit into the KwaNotshelwa River currently leads to pollution and degradation of the environment. This impact can only be remedied through the treatment of the contaminated water and the subsequent discharge.

The proposed project further avoids the disturbance of sites that constitute the nation's cultural heritage (Section 2(4)(a)(iii)) by not considering pipeline route 3 feasible due to its route traversing grave sites.

The proposed project takes a risk-averse and cautious approach, which takes into account the limits of current knowledge about the consequences of decisions and actions (Section 2(4)(a)(vii)) through development in phases.

The proposed project further anticipates negative impacts on the environment and on people's environmental rights and ensure these are minimised and remedied (Section 2(4)(a)(viii)) through an Environmental Management Programme (EMP)

## 11. 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	Applicability to the project	Administering authority	Date
Constitution of South Africa, 1996 (Act 108 of 1996) Section 24	Provides every citizen the right to an environment that is not harmful to their health and well-being, and to have the environment protected for the benefit of present and future generations through legislative and other reasonable measures. The treatment of the contaminated mine water decant is required to protect the environment.	Constitutional Court	1996
Minerals and Petroleum Resources Development Act (MPRDA), 2002 (Act 28 of 2002) Section 38 (responsibility to remedy) Section 41 (financial provision to remedy) Section 43 (closure certificate)	The proposed project forms part of addressing the residual impacts of historic underground coal mining activities and therefore relates to this legislation.	Department of Mineral Resources (DMR)	2002
National Water Act (NWA), 1998 (Act 36 of 1998) Section 19 (duty of care) Section 21 (water uses)	The project requires water use licences in terms of Section 21 (a), (c), (i), (f) & (g).	Department of Water Affairs (DWA)	1998
National Environmental Management Act (NEMA), 1998 (Act 107 of 1998). Sections 24(5), 24M & 44 GNR 543, 544, 545 & 546 Sections 54 – 57 in GNR 543 re Public Participation	The proposed project triggers activities listed under GNR 544 and GNR 545, therefore Environmental Authorisation is required. See Section A.1b of BAR.	Department of Environmental Affairs (DEA)	1998

## BASIC ASSESSMENT REPORT

National Environmental Management Waste Act (NEMWA), 2008 (Act 59 of 2008) GNR 718	GNR 718 (3 July 2009) in terms of this act indicate activities requiring waste management licences. This project (the treatment of waste water) is such an activity. See Section A.1b of BAR	Department of Environmental Affairs (DEA)	2008
National Heritage Resources Act, 1999 (Act 25 of 1999)	The impact on heritage resources due to the proposed project must be taken into consideration by determining and areas of concern prior to construction.	AMAFA (Heritage KwaZulu-Natal)	1999
National Environmental Management: Biodiversity Act, 2004.	The impact on biodiversity due to the proposed project must also be taken into consideration as it includes vegetation removal for construction activities as well as possible operational impacts.	Ezemvelo KZN Wildlife and DEA	2004
<u>Guidelines:</u> Guideline 3: General (2006) Guideline 4: Public Participation (2005) Guideline 6: EMF (2005) Public Participation (2009) GNR 657 (2006)	Guidance on processes etc	DEA	2005 – 2009
Draft Integrated Development Plan (IDP) 2012-2016 (March 2012)	Alignment of project with IDP	Zululand Municipality District	2012
Spatial Development Framework (SDF)	Alignment of project with SDF	Zululand Municipality District	Not dated
Draft 2011/12 Integrated Development Plan (IDP)	Alignment of project with IDP	Abaqulusi Municipality Local	2011

### 12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

#### a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

If YES, what estimated quantity will be produced per month? (In total)

YES	<input checked="" type="checkbox"/>
50 000 m <sup>3</sup>	

## BASIC ASSESSMENT REPORT

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

Biodegradable/organic waste will include:

- Vegetation waste (as a result of vegetation clearance) and soil (as a result of excavation for DPBR) which can be converted to compost at a composting facility or used on the site.

General domestic type waste will include:

- Waste generated by construction workers on site (food containers etc) which will be collected in skips (to be placed on site by the construction contractor).

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

Biodegradable/organic waste can be disposed on site or recycled at a composting facility.

General domestic type waste will be disposed at the local municipal waste disposal facility (Vryheid) by the construction contractor. No special handling or disposal methods will be required and landfill/landbuild is adequate due to the general nature of the waste. Minimal quantities are expected.

Will the activity produce solid waste during its operational phase?

☒ **NO**

If YES, what estimated quantity will be produced per month?

☐ m<sup>3</sup>

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

Not applicable.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

Not applicable.

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

Not applicable.

*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 NEM:WA?

☒ **NO**

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

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. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

### 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?

☐ m<sup>3</sup>

Will the activity produce any effluent that will be treated and/or disposed of on site?

**YES** ☒

## BASIC ASSESSMENT REPORT

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. **Consultation was conducted. No need for scoping & 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:

<b>Facility name:</b>	Not applicable		
<b>Contact person:</b>			
<b>Postal address:</b>			
<b>Postal code:</b>			
<b>Telephone:</b>		<b>Cell:</b>	
<b>E-mail:</b>		<b>Fax:</b>	

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

The proposed project encompasses a water treatment facility for water that has been impacted by historic underground coal mine workings and that currently decants into the KwaNotshelwa River. The proposed treatment process will incorporate flow control, neutralization, biological sulphate reduction with associated iron and aluminium removal. The post treatment process incorporates sulphide removal, pH correction, polishing treatment (aerobic wetland) to remove residual biodegradable carbon (represented as COD) and ammonia-nitrogen. Finally, manganese is removed before discharge to the stream.

### c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities?

YES



If YES, is it controlled by any legislation of any sphere of government?



NO

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. **Consultation completed.**

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

The treatment plant is an open system and therefore hydrogen sulphide (H<sub>2</sub>S), which can form under reducing conditions, can escape the system into the air. To reduce the sulphide concentration and consequently to minimise the release of H<sub>2</sub>S into the surrounding environment, the design will allow for the oxidation of Sulphide to Sulphate/Sulphur in an oxidation cascade. Any H<sub>2</sub>S that may volatilise will be vented through a biofilter where the H<sub>2</sub>S will be utilised biologically.

### d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?

YES



If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority. **Integrated application.**

## BASIC ASSESSMENT REPORT

### e) Generation of noise

Will the activity generate noise?

<input checked="" type="checkbox"/>	NO
<input type="checkbox"/>	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 noise in terms of type and level:

Noise will only be generated during the construction phase due to construction vehicles/equipment/activities. However, the noise level will be minimal, only during working hours and of short term duration. Due to the fact that the treatment plant is passive, natural systems such as gravitational flow will be used rather than generators, motors, pumps and fans used in active treatment facilities. Therefore, noise during the operational phase is regarded as negligible and not a concern.

### 13. WATER USE

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

Municipal	Water board	Groundwater	River, stream, dam or lake	Other	<b>The activity will not use water</b>
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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: **The activity will only abstract mine decant water from West Adit that currently discharges into the river (KwaNotshelwa) for treatment. After treatment it will be discharged to the same river (KwaNotshelwa) again.**

N/A litres

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?

YES

☒

If YES, please provide proof that the application has been submitted to the Department of Water Affairs. **Please see Appendix J.**

### 14. ENERGY EFFICIENCY

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

The passive treatment plant excludes mechanical equipment such as motors/fans/pumps that requires electrical input. Gravitational flow, solar energy and biological reactions are used as part of the process and it is therefore considered energy efficient.

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

The proposed passive treatment plant will consist of the following unit processes, none of which require an external power supply:

West Adit decants naturally due to the water level in the underground mine workings. The collection sump and pipeline connected to it will transfer inflow contaminated mine water (decant) to the passive water treatment plant via gravitational flow.

The molasses make-up, storage and dosing system will mix molasses with the feed water in a vortex cone mixer that will be permanently flowing due to the provided feed chamber with a height of 2 m.

The molasses rich water will then be combined with the main feed stream and pass through a static inline mixer before entering the splitter box.

The Bioneutralisation Reactor process uses an organic carbon or energy source (molasses) as electron donor and converts Sulphate (as electron acceptor) to Sulphide.

The subsequent oxidation of Sulphide is mediated by biological agents (Sulphide oxidizing bacteria that occur naturally).

Bacterial activity is aided by solar energy.

The water from the Sulphide Removal process will flow by gravitation through a Limestone Reactor (addition of  $\text{CaCO}_3$  to the water) to stabilise the pH without significantly impacting the general chemistry. This process step will stabilise the pH to about pH 6.0 as required for the downstream Polishing Aerobic Wetland. Flow through the bed is plug flow.

The Mn will be biologically removed through the use of Mn-oxidising bacteria in a limestone bed or limestone channel (well established process).

In summary:

- Gravitational flow is therefore used for the transfer of water from one unit process to the next rather than a pumping mechanism requiring an external power supply.
- Bacterial or biological processes are used for the water treatment rather than chemical processes which require external energy inputs.
- Natural materials such as molasses are provided as a carbon and energy source for bacterial activity in terms of biological processes.
- Bacterial processes are further aided through solar power/energy.



## SECTION B: SITE/AREA/PROPERTY DESCRIPTION

### Important notes:

- 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 B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):

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

- Has a specialist been consulted to assist with the completion of this section? ☒ YES ☐ NO

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

**Property description/physical address:**

<b>Province</b>	KwaZulu-Natal
<b>District Municipality</b>	Zululand District Municipality
<b>Local Municipality</b>	Abaqulusi Local Municipality
<b>Ward Number(s)</b>	Ward 6 - Coronation
<b>Farm name and number</b>	Veelsgeluk 171 HU
<b>Portion number</b>	Sub-division 1 and 21
<b>SG Code</b>	N0HU00000000017100001 N0HU00000000017100021

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

**Current land-use zoning as per local municipality IDP/records:**

The area is described as settlement in the Zululand District Municipality Spatial Development Plan (SDP) and Integrated Development Plan (IDP). The Abaqulusi IDP (2011/2 draft) describes it as an urban settlement.

It is further mentioned that Coronation was developed for housing of mine workers and that mining is a relevant land-use zoning for the project area.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?

☒ YES ☐ NO

## BASIC ASSESSMENT REPORT

### 1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

#### Alternative S1:

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1:20 – 1:15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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#### Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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#### Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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A certain gradient was required between the decant point (origin of contaminated mine water to be treated) and the treatment site to allow for gravitational flow.

### 2. LOCATION IN LANDSCAPE

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

2.1 Ridgeline	<input type="checkbox"/>	2.4 Closed valley	<input type="checkbox"/>	2.7 Undulating plain / low hills	<input checked="" type="checkbox"/>
2.2 Plateau	<input type="checkbox"/>	2.5 Open valley	<input type="checkbox"/>	2.8 Dune	<input type="checkbox"/>
2.3 Side slope of hill/mountain	<input type="checkbox"/>	2.6 Plain	<input type="checkbox"/>	2.9 Seafront	<input type="checkbox"/>

### 3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	<input checked="" type="checkbox"/> NO	YES NO	YES NO
Dolomite, sinkhole or doline areas	<input checked="" type="checkbox"/> NO	YES NO	YES NO
Seasonally wet soils (often close to water bodies) – <b>wetland areas &amp; KwaNotshelwa River</b>	YES <input checked="" type="checkbox"/>	YES NO	YES NO
Unstable rocky slopes or steep slopes with loose soil	<input checked="" type="checkbox"/> NO	YES NO	YES NO
Dispersive soils (soils that dissolve in water)	<input checked="" type="checkbox"/> NO	YES NO	YES NO
Soils with high clay content (clay fraction more than 40%) – <b>wetland areas</b>	YES <input checked="" type="checkbox"/>	YES NO	YES NO
Any other unstable soil or geological feature	<input checked="" type="checkbox"/> NO	YES NO	YES NO
An area sensitive to erosion	<input checked="" type="checkbox"/> NO	YES NO	YES 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

## BASIC ASSESSMENT REPORT

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. **Conducted a specialist geohydrology study (Appendix D).**

### 4. GROUNDCOVER

Indicate the types of groundcover present on the site. 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 <sup>E</sup>	<b>Natural veld with scattered aliens<sup>E</sup></b>	Natural veld with heavy — alien infestation <sup>E</sup>	Veld — dominated by alien species <sup>E</sup>	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	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. **Conducted a specialist flora study (Appendix D).** The KwaZulu-Natal Landcover Map (SANBI BGIS) was also used to determine land-cover and it was indicated to be open Grassland mostly (Appendix A).

### 5. SURFACE WATER

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

Perennial River	YES	NO	UNSURE
Non-Perennial River	YES	NO	UNSURE
Permanent Wetland	YES	NO	UNSURE
Seasonal Wetland	YES	NO	UNSURE
Artificial Wetland	YES	NO	UNSURE
Estuarine / Lagoonal wetland	YES	NO	UNSURE

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

The KwaNotshelwa River runs through the project area. The proposed project includes the treatment of contaminated mine water that currently decants into this river. Wetlands that were identified include a Channelled Valley Bottom and Hillslope Seepage Wetland. Surface water flow and system are discussed in more detail in the specialist study included in Appendix D.

## BASIC ASSESSMENT REPORT

### 6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that 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:

Natural area	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station <sup>H</sup>
<b>Medium density residential - Thukuzela</b>	<b>School – primary school within Thukuzela</b>	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential <sup>A</sup>	<b>Church</b>	<b>Agriculture</b>
<b>Retail commercial &amp; warehousing</b>	Old age home	<b>River, stream or wetland - KwaNotshelwa</b>
Light industrial	<b>Sewage treatment plant<sup>A</sup></b>	Nature conservation area
Medium industrial <sup>AN</sup>	Train station or shunting yard <sup>N</sup>	<b>Mountain, koppie or ridge</b>
Heavy industrial <sup>AN</sup>	Railway line <sup>N</sup>	Museum
Power station	Major road (4 lanes or more) <sup>N</sup>	Historical building
<b>Office/consulting room – old mine offices</b>	Airport <sup>N</sup>	Protected Area
Military or police base/station/compound	Harbour	<b>Graveyard</b>
<b>Spoil heap or slimes dam<sup>A</sup> – rehabilitated mine dumps</b>	<b>Sport facilities – associated with school</b>	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

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

Not applicable.

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

No impact. The old mine dumps have been rehabilitated.

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

Not applicable.

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES	NO
Core area of a protected area?	YES	NO
Buffer area of a protected area?	YES	NO
Planned expansion area of an existing protected area?	YES	NO
Existing offset area associated with a previous Environmental Authorisation?	YES	NO
Buffer area of the SKA?	YES	NO

## BASIC ASSESSMENT REPORT

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

### 7. 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? If YES, explain:

YES

NO

Uncertain

Graves were identified along Alternative Route 3 for the pipeline. Due to the identification of the graves, Alternative Route 3 was considered as a non-feasible option. Further details on the heritage specialist study can be seen in Appendix D. The preferred pipeline route is Alternative Route 4. Should the proposed project be approved, it is likely that the preferred option, Alternative Route 4, will be developed and therefore there will be no impacts on the identified graves.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist: **See Appendix D.**

The identified site on Alternative Route 3 of the pipeline contains a large number of graves. Many types of grave dressing were found including stone, bricks, granite and cement. Some of the graves have headstones and others not. All three (3) categories of graves were identified, those older than 60 years, those without a date of death and those younger than 60 years. The site is still being used for burials and an extension is planned. No other heritage features were identified.

Will any building or structure older than 60 years be affected in any way?

YES

NO

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

YES

NO

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

### 8. SOCIO-ECONOMIC CHARACTER

#### a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

It was previously indicated that the age composition of the population in Abaqulusi comprises mostly of children who are under the age of 15 and who are not accounted as the labour force. The active labour force is estimated at 61 849 individuals who are between the ages of 18 – 64. Approximately 40% (24 645) of the active labour force is unemployed.

Economic profile of local municipality:

The collapse of the coal mining industry over the last three decades had a serious impact on the economy of Abaqulusi Municipality area. The rate of unemployment has increased from 42.7% in

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1996 to 59.4% in 2001. Correspondingly, Gross Value Added has also declined significantly with the area experiencing a -3.0% growth rate between 1996 and 2003. The Abaqulusi Municipal economic structure is dominated by tertiary services which include government services, community services, transportation and trade. The important primary sectors are Agriculture and Mining. Secondary manufacturing sectors are not well developed and contribute to a lesser extent to the economic structure. Abaqulusi municipality contributes largely to the Transportation, Trade, and Government Services, Mining and Agricultural sectors of the district. In total, the Municipality contributed 36.90% of the Zululand district economy in 2007.

Level of education:

Approximately 16% of the adult population (18 – 85+) can be considered as illiterate since they did not obtain any schooling. The majority of the population (32% or 68 029 individuals) had attended school but did not complete primary school which further increases the illiteracy levels. A total of 31% (66 082 individuals) of the population obtained secondary education and approximately 9% (18 844 individuals) of the population comprises matriculants who can be classified as semi-skilled. There are relatively few individuals who can be considered as skilled and who were able to reach a tertiary level of education, these individuals account for 4% (9 120 individuals) of the population. In terms of the sectoral departments and municipal own competencies, there is a need to address skills training, adult education and increased access to job opportunities. This in turn means implementing the necessary educational programmes as well as encouraging local economic activity. Education levels are very low, with 23.13% (47 459 individuals) having no formal education. This has a significant impact on employability, the type of job opportunities that can be sought and the vocational distribution of the economically active population.

### b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 8 million	
What is the expected yearly income that will be generated by or as a result of the activity?	R 0	
Will the activity contribute to service infrastructure?	YES	NO
Is the activity a public amenity?	YES	NO
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	20	
What is the expected value of the employment opportunities during the development and construction phase?	R 350 000	
What percentage of this will accrue to previously disadvantaged individuals?	95%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	3	
What is the expected current value of the employment opportunities during the first 10 years?	R 400 000	
What percentage of this will accrue to previously disadvantaged individuals?	100%	

## 9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS

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Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

- a) **Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)**

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	

- b) **Indicate and describe the habitat condition on site**

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	%	
Near Natural (includes areas with low to moderate level of alien invasive plants)	%	
Degraded (includes areas heavily invaded by alien plants)	%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	100%	<p>The proposed project area has been impacted by a number of impacts, namely:</p> <ul style="list-style-type: none"> <li>• Coal mining activities including associated structures and infrastructure. Most of this area, including old mine dumps, has been rehabilitated and the majority of the site is now covered in pioneer grasses.</li> <li>• Agricultural activities and a golf course which was associated with the mine. Both activities have ceased which allowed for secondary growth and the occurrence of scattered invasives/exotics. Very few natural species/vegetation was observed.</li> <li>• Urbanisation such as human settlement with associated support structures and infrastructure – grave yard, school, sewage treatment plant etc.</li> </ul>

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**c) Complete the table to indicate:**

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems						
<b>Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)</b>	Critical	Wetland (including rivers, depressions, channelled and unchannelled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline	
	Endangered							
	Vulnerable							
	Least Threatened	YES	NO	UNSURE	YES	NO	YES	NO

**d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)**

The project area is located within the Drakensberg Grassland Bioregion and within the KwaZulu-Natal Highland Thornveld. The landscape is hilly and undulating with broad valleys supporting tall tussock grassland with occasional savannoid woodlands with scattered trees including *Acacia sieberiana* var. *woodii* Paperbark Thorn) and *A. karroo* (Sweet Thorn). No Red Data or endemic species were recorded although the vegetation type is identified as Vulnerable. Vegetation type is discussed in more detail in the specialist study included in Appendix D.

The KwaNotshelwa River runs through the project area. The proposed project includes the treatment of contaminated mine water that currently decants into this river. Wetlands that were identified include a Channelled Valley Bottom and Hillslope Seepage Wetland. Surface water flow and system are discussed in more detail in the specialist study included in Appendix D.



## SECTION C: PUBLIC PARTICIPATION

### 1. ADVERTISEMENT AND NOTICE

<b>Publication name</b>	Vryheid Herald	
<b>Date published</b>	31/05/2013	
<b>Site notice position</b> (4 Site notices)	<b>Latitude</b>	<b>Longitude</b>
	27° 40' 21.18" South	31° 4' 12,78" East
	27° 40' 39.42" South	31° 3' 51,12" East
	27° 40' 44.64" South	31° 3' 45,18" East
	27° 40' 30.48" South	31° 3' 40,92" East
<b>Date placed</b>	30/05/2013	

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

### 2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 54(2)(e) and 54(7) of GN R.543.

- Conducted an authority meeting in Dundee with Department of Water Affairs (DWA) – Dundee and Durban office as well as KZN Department of Agriculture and Environmental Affairs (DAEA) on 14 November 2013.
- Placed four (4) notices on and around the site on the 30<sup>th</sup> May 2013 at places where these would be most visible to the public and community concerned.
- Conducted a site visit on the 30<sup>th</sup> of May 2013 and distributed information and summary documents by hand.
- Placed a newspaper notice in the Vryheid Herald on the 31<sup>st</sup> of May 2013.
- Identified all local, provincial and national government departments that may have an interest in the project. Ten (10) government departments/authorities were identified with a number of contact people within each of these. Searched contact details and persons for each of these through official websites. Send information and summary documents to each.
- Identified all neighbouring properties and properties within 100m of the site. Eighteen (18) properties were identified. Conduct Windeed searches to find owner details for each of these properties. Send information and summary documents to each.
- Conducted a meeting with the Zimbabweleni Khondlo Community who owns the property.

Key stakeholders (other than organs of state) identified in terms of Regulation 54(2)(b) of GN R.543:

<b>Title, Name and Surname</b>	<b>Affiliation/ key stakeholder status</b>	<b>Contact details (tel number or e-mail address)</b>
Anglo Operations Ltd Mr Ranganai Chinamatira & others	Applicant. Owner of neighbouring properties (north & west of site): <ul style="list-style-type: none"> <li>• Portion 5 of the farm Diepkloof 152 HU</li> <li>• Remaining extent of portion 1 of the farm Diepkloof 152 HU</li> <li>• Portion 4 of the farm Vrede 154 HU</li> </ul>	Tel no: 011 638 3168  email: ranganai.chinamatira@angloamerican.com henk.lodewijks@angloamerican.com jj.vanderwalt@angloamerican.com sidney.sekhukhune@angloamerican.com

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	<ul style="list-style-type: none"> <li>• Portion 3 of the farm Makalusi 245 HU</li> </ul>	
Government RSA (Department of Rural Development and Land Reform) Mr Bonqinchozi Zulu – Chief Director	Owner of neighbouring properties (south west of site): <ul style="list-style-type: none"> <li>• Remaining extent of portion 3 of the farm Veelsgeluk 171 HU</li> <li>• Portion 7 of the farm Veelsgeluk 171 HU</li> <li>• Portion 10 of the farm Veelsgeluk 171 HU</li> <li>• Portion 20 of the farm Vrede 154 HU</li> </ul>	Tel no: 033 355 4300  e-mail: RDGONIWE@ruraldevelopment.gov.za
Gereformeerde Kerk in Suider-Afrika Vryheid	Owner of neighbouring property (south west of site): Portion 6 of the farm Veelsgeluk 171 HU	Tel no: 034 982 2862  e-mail: admin@vryheidklipkerk.co.za
Zimbambeleni Khondlo Community Trust Mrs Thuleleni Mbatha-Mntambo	Owner of project site and neighbouring properties: <ul style="list-style-type: none"> <li>• Remaining extent of portion 9 of the farm Veelsgeluk 171 HU</li> <li>• Portion 1 of the farm Veelsgeluk 171 HU</li> <li>• Portion 21 of the farm Veelsgeluk 171 HU</li> <li>• The farm Yorkshire 328 HU</li> <li>• The farm Waterval 310 HU</li> </ul>	Address: P.O. Box 11, Vryheid Coronation 3107
KZN Department of Rural Development Mr. Denver Since	Owner of neighbouring property (south west of site): Portion 17 of the farm Vrede 154 HU	Tel no: 033 355 4341  email: dsince@ruraldevelopment.gov.za

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

### 3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
<b>“Bio-swiss”- Organic Factory group – Mr Mandla Ngcobo:</b> Interested in partnering with the local community on the vegetable farming/purchasing	Noted
<b>Mr Simon Hlothe:</b> Worked on the VCC pilot plant and would like to be considered for employment on the full scale plant	Noted
<b>Mr Londwa Dlamini:</b> Looking for employment / internship	Noted

## BASIC ASSESSMENT REPORT

<b>Ezemvelo KZN Wildlife - Mr Dominic Wieners:</b> Requested a hard copy of the BAR.	BAR was couriered upon completion of the report.
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### 4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR 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 the Final BAR as Appendix E3.

### 5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Or gan of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Abaqulusi Local Municipality	Ms E.M. Ndlovu	034 982 2133	034 980 9637	mndlovu@abaqulusi.gov.za	P.O. Box 57 Vryheid 3100
Ward Councillor	Mr A.M. Masondo	072 517 0748		masondoabsa@gmail.com	
Zululand District Municipality	Z. Dladla Z. Cele S. Landman E. Forrester	035 874 5500	035 874 5591	zdladla@zululand.org.za zcele@zululand.org.za slandman@zululand.org.za eforrester@zululand.org.za	Private Bag X76 Ulundi 3838
KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZN DAEA)	Mr Haroon Karodia Mr Gerald Willis- Smith Nozipho Mthembu Celimpilo Mntungwa Mxolisi Ngubane	034 299 9671	034 299 9674	Gerald.willissmith@kzndae.gov.za Nozipho.mthembu@kzndae.gov.za Celimpilo.mntungwa@kzndae.gov.za Mxolisi.ngubane@kzndae.gov.za	P.O. Box 125 Dundee 3000
Department of Environmental Affairs (National DEA)	Ms Fatima Rawjee Kim Balutto Pumeza Skepe- Mngcita Mpho Tshitangoni Mr Lucas Mahlangu Ms Zingisa Pholo	012 310 3002	012 320 7539	frawjee@environment.gov.za Kbalutto@environment.gov.za PSkepe@environment.gov.za mtshitangoni@environment.gov.za lmahlangu@environment.gov.za zphohlo@environment.gov.za	
Department of Agriculture, Forestry and Fisheries	Mr. B. Msoni Mr David Kleyn	012 319 7484		CDESRM@nda.agric.za CDESRM@daff.gov.za davidkl@nda.agric.za	

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(DAFF)					
Ezemvelo KZN Wildlife	Mr Azrah Essop  Mr Dominic Wieners	033 845 1917		essopa@kznwildlife.com  wiensd@kznwildlife.com	P.O. Box 13053 Cascades 3202
Department of Water Affairs (DWA)	Mr S. Govender Zakhele Mndaweni Halalisiwe Mdletshe	031 336 2810 034 212 1188		Govenders2@dwa.gov.za mndawenic@dwa.gov.za  mdletshe@dwa.gov.za	
South African Heritage Resources Agency (SAHRA)	Bernadette	033 394 6543	033 394 6552	amafa.pmb2@mweb.co.za  through SAHRIS website	P.O. Box 2685 Pietermaritzburg 3200
Department of Mineral Resources (DMR)	Karoon Moodley	031 355 9636		Karoon.moodley@dmr.gov.za	

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

### 6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) 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.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

## 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. 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

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts 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. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

#### CONSTRUCTION PHASE

Activity	Impact summary	Significance (Prior to mitigation)	Proposed mitigation
<b>Alternative 1 (preferred alternative Pipeline Route 4)</b>			
<b>Fauna and flora</b> (Site clearance)	<b>Direct impacts:</b> Loss of ecological diversity and functioning	Moderate - low	<ul style="list-style-type: none"> <li>• Re-vegetation of all disturbed areas</li> <li>• Use will be made of indigenous species for rehabilitation of disturbed areas.</li> <li>• To remain in demarcated areas</li> <li>• All exotic species and / or invasive trees along or within the disturbed area will be removed</li> <li>• Habitat of fauna such as mole heaps and burrows will not be disturbed during construction to prevent harm to fauna species. If encountered, relocation of species is recommended.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Surface water</b> (Alteration in stormwater and river flow)	<b>Direct impacts:</b> Change in surface water quantity and quality. Causes of this impact can be due to: <ul style="list-style-type: none"> <li>• Spillage of fuels or lubricants (oils &amp; greases) from construction vehicles or equipment.</li> <li>• Spillage of other chemicals.</li> </ul>	Moderate - low	<ul style="list-style-type: none"> <li>• All construction vehicles and equipment will be in a good working condition.</li> <li>• No chemicals that can cause contamination are used in the process, only natural material (such as molasses and limestone) is used.</li> <li>• Clean-up of spills as soon as they occur.</li> </ul>

## BASIC ASSESSMENT REPORT

Activity	Impact summary	Significance (Prior to mitigation)	Proposed mitigation
	<ul style="list-style-type: none"> <li>Inadequate storm water management around the site.</li> <li>The dumping of construction material, including fill or excavated material into, or close to surface water features that may then be washed into these features.</li> <li>Lack of provision of ablutions that may lead to the 'informal ablutions' within or close to surface water.</li> </ul>		<ul style="list-style-type: none"> <li>Gabions and backfill will be placed to ensure the river follows its original course and does not mix with West Adit decant.</li> <li>Stormwater diversion works will also be undertaken at the treatment plant site.</li> <li>Construction activities will at all times be kept more than 100m away from the KwaNotshelwa River (outside 1:100-year flood line), except for the construction of the pipeline.</li> <li>Adequate ablutions for construction employees.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Groundwater</b> (Spillages, sewage management)	<b>Direct impacts:</b> Change in groundwater quality	Low	<ul style="list-style-type: none"> <li>All building materials are effectively stored and managed.</li> <li>In the unlikely event of a spillage, sufficient clean-up procedures will be carried out immediately.</li> <li>All reagents, reagent storage tanks and mixing units will be supplied with a bunded area.</li> <li>Any hazardous substances will be handled according to the relevant legislation.</li> <li>All construction vehicles and equipment will be in a good working condition.</li> <li>Suitable ablution facilities</li> <li>Waste Management</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Wetland</b> (Wetland functioning alteration through construction)	<b>Direct impacts:</b> Change in wetland hydrology and quality	Moderate - low	<ul style="list-style-type: none"> <li>Access to the site will be restricted to the existing tracks.</li> <li>Use of heavy machinery within the river channel or wetland will be avoided.</li> <li>All materials temporarily stockpiled on site will be stockpiled outside the active channel of the river and wetlands.</li> <li>The footprint of construction</li> </ul>

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Activity	Impact summary	Significance (Prior to mitigation)	Proposed mitigation
			<p>activities will be minimised.</p> <ul style="list-style-type: none"> <li>Excavated soils will be stockpiled on the upslope side of the excavated trench.</li> <li>Soils will be landscaped to the natural landscape profile</li> <li>No fires will be allowed on site.</li> <li>Any disturbed wetland area will be rehabilitated immediately.</li> <li>An alien vegetation management plan will be implemented.</li> <li>Disturbance of the original river channel, specifically the removal of vegetation or soil, will be avoided.</li> <li>The structure to prevent natural runoff mixing with West adit decant, will be anchored into the side slopes to prevent erosion around the edges of the structure.</li> <li>A storm water management plan will be implemented during the construction phase.</li> <li>Sediment traps such as Bidim walls or fibre rolls will be installed.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Noise and Air</b> (Pollution and noise resulting from construction activities)	<b>Direct impacts:</b> Construction activities are associated with noise as vehicles and equipment are used, construction workers are present and surface areas are disturbed. Emissions may be released into the atmosphere resulting from vehicles and machinery (carbon monoxide emissions, smoke), dust (site clearance) and cooking fires (workers).	Moderate - low	<ul style="list-style-type: none"> <li>Construction contractor will ensure vehicles are road worthy. Construction will take place only during regular working hours (7:00 – 17:00) and not on weekends or public holidays.</li> <li>All vehicles and machinery/equipment used on, or entering the site, will be maintained and serviced regularly.</li> <li>The contractor's representative or environmental officer will ensure that all on-site vehicles comply with the old SABS 0181 standards</li> <li>Dust must be suppressed, during dry periods.</li> <li>No ad hoc cooking fires are to be allowed on site.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None

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Activity	Impact summary	Significance (Prior to mitigation)	Proposed mitigation
<b>Archaeology</b> (Disturbance or loss of sites of value)	<b>Direct impacts:</b> Pipeline Route 4 have no sites of archaeological/heritage value.	Low	No mitigation required.
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Visual</b> (Open area will be developed on)	<b>Direct impacts:</b> The project area (treatment site) is currently a green rehabilitated area (historic golf course). Construction of a passive treatment plant will affect the sense of place as sites will be cleared.	Moderate - low	Cleared areas not forming part of the treatment process will be rehabilitated with indigenous species.
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Security</b> (Pipeline construction option)	<b>Direct impacts:</b> Pipeline Route 4 does not go through the community, therefore the security risk is minimal	Low	No mitigation required.
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Alternative 2 (Pipeline Route 3)</b>			
<b>Archaeology</b> (Disturbance or loss of sites of value)	<b>Direct impacts:</b> Pipeline Route 3 traverses through a graveyard / cemetery	High	Due to the fact that Pipeline route 3 traverses a graveyard, mitigation cannot be applied to reduce significance and therefore this option is not considered feasible from a cultural perspective.
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Security</b> (Pipeline construction option)	<b>Direct impacts:</b> Pipeline Route 3 does not go through the community; therefore the security risk is minimal.	Low	No mitigation required
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None



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Activity	Impact summary	Significance (Prior to mitigation)	Proposed mitigation
<b>Alternative 3 (Pipeline Route 2)</b>			
Archaeology (Disturbance or loss of sites of value)	<b>Direct impacts:</b> No site of archaeological/heritage value were identified		No mitigation required
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Security</b> (Pipeline construction option)	<b>Direct impacts:</b> Pipeline Route 2 does go through the community; therefore there is a security risk.		Due to the fact that Pipeline route options 1 and 2 traverse through the urban settlements, security and damage are risks that cannot be sufficiently mitigated and therefore this option is not considered feasible from a cost perspective. These routes also pose possible gravitational flow restrictions.
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Alternative 4 (Pipeline Route 1)</b>			
Archaeology (Disturbance or loss of sites of value)	<b>Direct impacts:</b> No site of archaeological/heritage value were identified		No mitigation required
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Security</b> (Pipeline construction option)	<b>Direct impacts:</b> Pipeline Route 1 does go through the community; therefore there is a security risk.		Due to the fact that Pipeline route options 1 and 2 traverse through the urban settlements, security and damage are risks that cannot be sufficiently mitigated and therefore this option is not considered feasible from a cost perspective. These routes also pose possible gravitational flow restrictions.
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None

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### OPERATIONAL PHASE

Activity	Impact summary	Significance (Prior to mitigation)	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
<b>Fauna and Flora</b> (Pollution and encroachment of exotics)	<b>Direct impacts:</b> Site clearance of vegetation and disturbance through the project activities allow for the growth/encroachment of exotics/invasive species. The contaminated mine decant transported in the pipeline can leak from the pipeline, which will result in environmental contamination.	Moderate - low	<ul style="list-style-type: none"> <li>• Inspection of the project area is done twice annually and all exotics/invasive species identified and removed.</li> <li>• Removal must take place manually rather than chemically.</li> <li>• Inspect the pipeline fortnightly to ensure that the pipeline is in full repair and working condition.</li> <li>• An emergency response plan will need to be in place.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Surface Water</b> (Discharge through passive water treatment plant)	<b>Direct impacts:</b> POSSITIVE impact. The project process involves the treatment of contaminated mine decant currently flowing into the KwaNotshelwa River and then discharging the treated water reducing the pollution.	Moderate - low	No mitigation required
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Surface Water</b> (Change in surface water quality)	<b>Direct impacts:</b> Pollution through erosion, flood events or failure of downstream treatment units.	Low	<ul style="list-style-type: none"> <li>• Ensure that there are no open areas not vegetated by indigenous species.</li> <li>• Future retrofitting of infrastructure must be kept out of the two flood line recurrence intervals.</li> <li>• The pipeline joints need to be checked fortnightly.</li> <li>• Any leaks should be fixed immediately and areas rehabilitated.</li> <li>• Shut down the plant until the problem is rectified if failure occurs.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None

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Activity	Impact summary	Significance (Prior to mitigation)	Proposed mitigation
<b>Groundwater</b> (Pollution through pipeline or unit leakage)	<b>Direct impacts:</b> Spillage/leakage/bursts of the pipeline can cause soil, runoff and groundwater contamination. However, currently all decanting contaminated mine water enters the environment untreated.	Low	<ul style="list-style-type: none"> <li>Emergency Response Plan must be in place.</li> <li>Individuals will be trained to carry-out the plan.</li> <li>An incident report sheet will be completed and always available on site and to authorities.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Wetland</b> (Quantity and quality deterioration)	<b>Direct impacts:</b> Increased flows due to pipe leakage, storm water discharge and water quality deterioration due to pipeline leakages/failure of infrastructure.	Moderate - low	<ul style="list-style-type: none"> <li>Fortnightly inspections of the pipeline route which crosses a hillslope wetland zone.</li> <li>The area affected will likely be only 12 ha in size and located outside the wetland area.</li> <li>Storm water runoff will be managed.</li> <li>Areas between the units will be rehabilitated to a natural state.</li> <li>All units within the water treatment plant will be lined with suitable engineered liners to prevent seepage and leakage</li> <li>A surface water quality monitoring plan will be implemented.</li> <li>Fortnightly inspections and maintenance of the collection reservoir and other infrastructure will also be undertaken.</li> <li>A detailed log of maintenance activities and inspections will be kept.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Wetland</b> (Increased wetland extent and diversity)	<b>Direct impacts: POSITIVE</b> impact. A polishing wetland will be constructed downstream of the treatment plant to remove nitrates generated as a result of the treatment process. Additional wetland habitat will thus be	Moderate - high	Design of the polishing wetland incorporates biodiversity considerations in addition to water treatment, which is the primary objective. Efficient functioning of the polishing wetland will be maintained through regular maintenance and inspections.

## BASIC ASSESSMENT REPORT

Activity	Impact summary	Significance (Prior to mitigation)	Proposed mitigation
	created. The created wetland will also differ from the existing wetlands in the area, increasing the overall wetland habitat diversity in the area.		
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Noise and Air</b> (Hydrogen sulphide (H <sub>2</sub> S) can form and escape the system)	<b>Direct impacts:</b> Bio-neutralisation effluent will have an estimated pH of between 5 and 6 which will result in sulphide being present in the dissolved hydrogen sulphide (H <sub>2</sub> S) form, due to its equilibrium characteristics. Exposure to aerobic conditions, turbulence and aeration may volatilise H <sub>2</sub> S into the environment.	Moderate - low	<ul style="list-style-type: none"> <li>To reduce the sulphide concentration and consequently to minimise the release of H<sub>2</sub>S into the surrounding environment, the design allows for the oxidising of Sulphide to elemental Sulphur or Sulphate in an oxidation cascade.</li> <li>Any H<sub>2</sub>S that may volatilise will be vented through a biofilter where the H<sub>2</sub>S will be utilised biologically.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None

### DECOMMISSIONING PHASE

Activity	Impact summary	Significance (Prior to mitigation)	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
<b>Fauna and Flora</b> (Re-vegetation and re-establishment of ecological integrity as part of rehabilitation)	<b>Direct impacts: POSITIVE</b> impact. The removal of exotics/invasive species will be required throughout the life of project including the rehabilitation phase. All waste will be removed accordingly as per rehabilitation and waste management plan. All areas cleared as part of the decommissioning phase will be rehabilitated.	Moderate - low	<ul style="list-style-type: none"> <li>Natural grass and herb species will return. Indigenous species will be used as part of the rehabilitation procedure.</li> <li>Ensure that inspection of the project area is done twice annually and all exotics/invasive species identified and removed. Removal must take place manually rather than chemically.</li> <li>Removal of waste (building rubble) must take place according to the waste management plan.</li> </ul>
	<b>Indirect impacts:</b>		None

## BASIC ASSESSMENT REPORT

Activity	Impact summary	Significance (Prior to mitigation)	Proposed mitigation
	<b>Cumulative impacts:</b>		None
<b>Surface Water</b> (Surface water treatment will cease)	<b>Direct impacts:</b> Decommissioning may leave large barren areas that may increase erosion risk, which might increase the amount of suspended solids in downstream surface water. The project objective is to treat contaminated mine decant. Decommissioning of the project will cease treatment of the contaminated water.	Moderate - high	<ul style="list-style-type: none"> <li>• Current plans are to expand the treatment plant in order to allow it to treat larger volumes of contaminated mine decant.</li> <li>• Decommissioning should only be allowed if there is no longer contaminated mine decant or an alternative treatment technology will be implemented.</li> <li>• The total disturbed area is relatively small and it is likely that erosion will be minimal upon closure.</li> <li>• Topography will return to pre-construction.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None
<b>Wetland</b> (Change in water quality and quantity and wetland diversity)	<b>Direct impacts:</b> Disturbance of riparian and aquatic habitats, increased erosion risk and sediment movement into the river and mobilisation of pollutants.	Moderate - low	<ul style="list-style-type: none"> <li>• Decommissioning activities will stay within the disturbed footprint.</li> <li>• Any disturbed wetland area will be rehabilitated immediately.</li> <li>• An alien vegetation management plan will be implemented.</li> <li>• Vegetation/infrastructure clearing will be phased to minimise the extent of exposed bare soil areas at any one time.</li> <li>• Flow concentration and increase in flow velocities will be minimised. Preferential flow paths such as ruts running perpendicular to the slope will be blocked and repaired.</li> <li>• Sediment barriers, in the form of bidim walls, will be installed.</li> <li>• All contaminated material on site, will be removed and disposed of in suitable waste disposal facilities.</li> </ul>
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b>		None

## BASIC ASSESSMENT REPORT

### NO-GO OPTION

Activity	Impact summary	Significance	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
<b>Surface water / Health Risk</b>	<b>Direct impacts:</b> Contaminated mine water will continue to decant into river, posing threats to health of downstream users and aquatic health.	Moderate - high	Project must be authorised/continue.
	<b>Indirect impacts:</b>		None
	<b>Cumulative impacts:</b> The accumulation of pollutant in the surrounding environment.	Moderate - high	Project must be authorised/continue.
<b>Ecology</b>	<b>Direct impacts:</b> Pollution and environmental degradation and loss of biodiversity.	Moderate - low	Project must be authorised/continue.
	<b>Indirect impacts:</b>		
	<b>Cumulative impacts:</b>		

A complete impact assessment in terms of Regulation 22(2)(i) of GN R.543 must be included as Appendix F.

## 2. 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)

Adverse impacts due to the construction are minimal, none of which score a higher significance than moderate-low. Most impacts have a low significance after mitigation that is short-term in duration after and during the construction phase (maximum of two (2) weeks). Most importantly, the project entails positive impacts including the treatment of contaminated mine water decant, the improvement of environmental integrity for human use and the establishment of a wetland system, all of which are long term/permanent in duration.

### Alternative B (Pipeline 3)

Due to the fact that this option transverses a grave yard (cemetery), mitigation is costly and will delay the project (by years perhaps), it is no longer viable as an option.

### Alternative C (Pipeline 2)

Due to the fact that pipeline option 2 runs through the community, it poses a security and damage risk that cannot be sufficiently mitigated and therefore this option is not considered feasible from a cost perspective. It also poses possible gravitational flow restrictions.

### Alternative D (Pipeline 1)

Due to the fact that pipeline option 1 runs through the community, it poses a security and damage risk

that cannot be sufficiently mitigated and therefore this option is not considered feasible from a cost perspective. It also poses possible gravitational flow restrictions.

### **No-go alternative (compulsory)**

The following negative impacts in terms of the no-go option were identified.

**Pollution:** The existing untreated and contaminated mine water decant will continue to be discharged into the KwaNotshelwa River which will result in environmental degradation, poor water quality in the surface water resource, unusable water, destruction of aquatic life and health as well as possible destruction of the surface water resource in the long-term.

**Health Risks:** Health effects due to consumption or use of the water by biotic organisms (including humans) as it contains contaminants which can affect health of aquatic organisms living in the surface water course, other animals drinking the water and humans consuming and using the water for washing, cooking, swimming etc.

**Loss of environmental integrity and biodiversity:** Continual pollution will lead to a loss of environmental integrity as well as the possible loss of life in animals/organisms that utilise the water, leading to loss in biodiversity.

## 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

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).

Not applicable.

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.

- Rehabilitation including re-vegetation of all disturbed areas.
- Use will be made of indigenous species for rehabilitation of disturbed areas.
- Remain in demarcated areas.
- All exotic species and / or invasive trees along or within the disturbed area will be removed
- Habitat of fauna such as mole heaps and burrows are not disturbed during construction to prevent harm to fauna species. If encountered, relocation of species is recommended.
- All construction vehicles and equipment will be in a good working condition.
- Clean-up of spills as soon as they occur.
- Gabions and backfill will be placed to ensure the river follows its original course and does not mix with West Adit decant. The structure to prevent natural runoff mixing with West adit decant, will be anchored into the side slopes to prevent erosion around the edges of the structure.
- Construction activities will at all times be kept more than 100m away from the KwaNotshelwa River (outside 1:100-year flood line), except for the construction of the pipeline.
- Adequate ablutions for construction employees.
- Waste Management Plan will be implemented throughout the project life.
- Access to the site will be restricted to the existing tracks.
- Use of heavy machinery within the river channel or wetland will be avoided.
- All materials temporarily stockpiled on site will be stockpiled outside the active channel of the river and wetlands.
- Excavated soils will be stockpiled on the upslope side of the excavated trench (for pipeline).
- Soils will be landscaped to the natural landscape profile.
- Disturbance of the original river channel, specifically the removal of vegetation or soil, will be avoided.
- A storm water management plan will be implemented during the construction phase.
- Sediment traps such as Bidim walls or fibre rolls will be installed.
- Construction contractor will ensure vehicles are road worthy. Construction will take place only during regular working hours (7:00 – 17:00) and not on weekends or public holidays.
- Dust must be suppressed, during dry periods.
- No ad hoc cooking fires are to be allowed on site.
- Inspection of the project area is done twice annually and all exotics/invasive species identified and removed.
- Inspect the pipeline fortnightly to ensure that the pipeline is in full repair and working condition.
- Any leaks should be fixed immediately and areas rehabilitated.
- Shut down the plant until the problem is rectified if failure occurs.
- An incident report sheet will be completed and always available on site and to authorities.
- An emergency response plan will need to be in place. Individuals will be trained to carry-out the emergency plans.
- Future retrofitting of infrastructure must be kept out of the two flood line recurrence intervals.
- All units within the water treatment plant will be lined to prevent seepage and leakage



## BASIC ASSESSMENT REPORT

- Suitable engineered liners will be utilised within the water treatment plant.
- A surface water quality monitoring plan will be implemented.
- Fortnightly inspections and maintenance of the collection reservoir and other infrastructure will also be undertaken.
- A detailed log of maintenance activities and inspections will be kept.
- Decommissioning should only be allowed if there is no longer contaminated mine decant or an alternative treatment technology will be implemented
- Flow concentration and increase in flow velocities will be minimised.

Is an EMPr attached?

YES

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

\_\_\_\_\_  
NAME OF EAP

\_\_\_\_\_  
SIGNATURE OF EAP

\_\_\_\_\_  
DATE

**SECTION F: APPENDIXES**

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information