



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Private Bag X6076, Port Elizabeth, 6000
Tel: (041) 396 3934
Fax: 0865768004
Cnr. Diaz and Mount Roads
Mount Croix
Port Elizabeth, 6001

Enquiries: D. A. Watkins
E-mail: deidre.watkins@dme.gov.za

Reference:
Date:

EC30/5/1/3/3/2/1(0439)EM
4 May 2010

South African Heritage Resources Agency
P.O. Box 758
GRAHAMSTOWN
6140

Case ID: 2443

ATTENTION: MR. T. LUNGILE

Sir

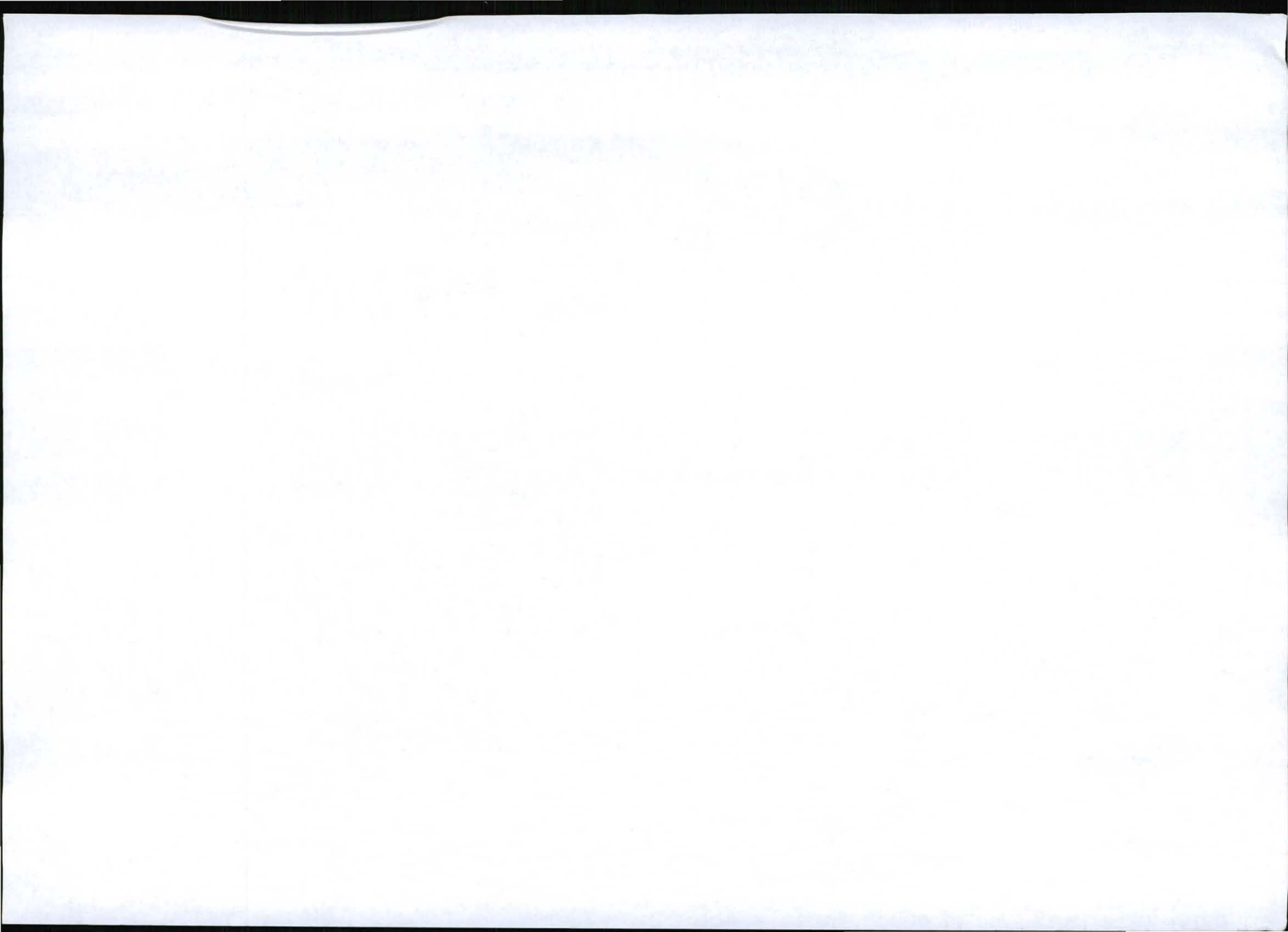
**CONSULTATION IN TERMS OF SECTION 40 OF THE MPRDA OF 2002:
ENVIRONMENTAL MANAGEMENT PLAN (EMP); BORROW PITS FOR UPGRADE OF
UGIE TOWN STREETS, WARD 2**

1. Attached herewith, a copy of an EMP received from Elundini Municipality for your comments.
2. Any written comments or requirements your department may have in this regard can be forwarded to this office no later than **2 July 2010**. Failure to do so, will lead to the assumption that your department has no objection(s) or comments with regard to the said documents. Comments may be submitted at your earliest convenience e.g. 30 days from the date hereof in order to reduce the turn around time for the application process.
3. Consultation in this regard has also been initiated with other relevant State Departments.
4. Please use the reference number (EC) 30/5/1/3/3/2/1(0439) EM in all future correspondence.
5. Your co-operation is appreciated.

Sincerely,

REGIONAL MANAGER

EASTERN CAPE



PROPOSED UPGRADING OF UGIE TOWN STREETS, WARD 2

ENVIRONMENTAL MANAGEMENT PLAN FOR TWO (2) BORROWPITS

Submitted to the Department of Minerals and Energy in compliance with Section 5(4)a of the Minerals and Petroleum Resource Development Act, Act No 28 of 2002.



April 2010

Prepared For:

ELUNDINI MUNICIPALITY

PO Box 1
MACLEAR
5480



Application received in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002),
IN CAPE REGION

30 APR 2010

Print Name: S. LERWENGA

Signature: *[Handwritten Signature]*

DEPARTMENT OF MINERALS AND ENERGY

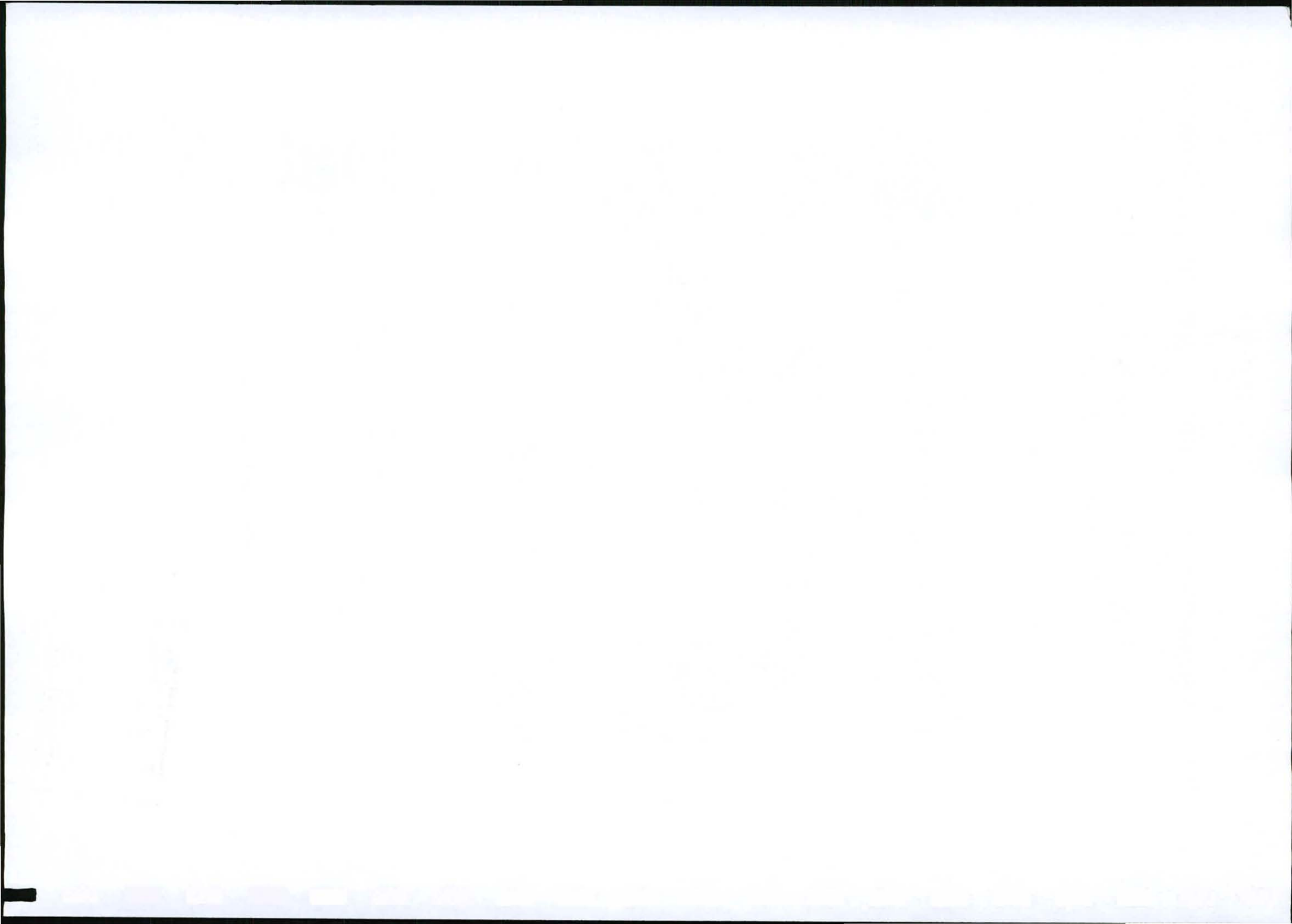
Prepared By:

TERRECO cc

PO Box 19829
TECOMA
5214

Phone: (043) 721 1502
Fax: (043) 721 1535





PROPOSED UPGRADING OF UGIE TOWN STREETS, WARD 2

ENVIRONMENTAL MANAGEMENT PLAN FOR TWO (2) BORROWPITS




Submitted to the Department of Minerals and Energy in compliance with Section 5(4)a of the Minerals and Petroleum Resource Development Act, Act No 28 of 2002.

April 2010

Prepared By

Checked By

Approved By

ORIGINAL	NAME DUNCAN SCOTT	NAME LOUISE JUPP	NAME LOUISE JUPP
DATE Apr 2010	SIGNATURE 	SIGNATURE PP 	SIGNATURE PP 

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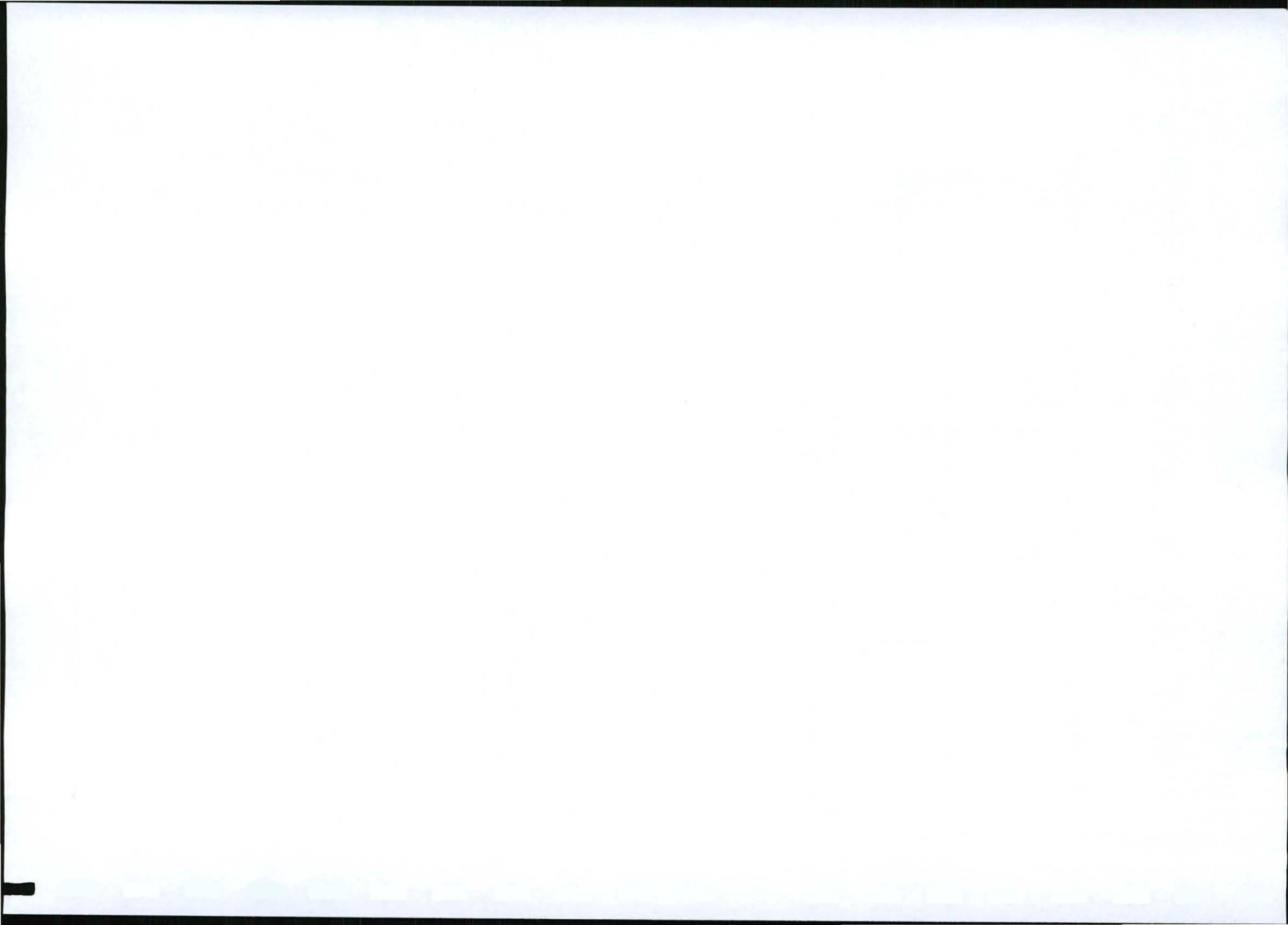


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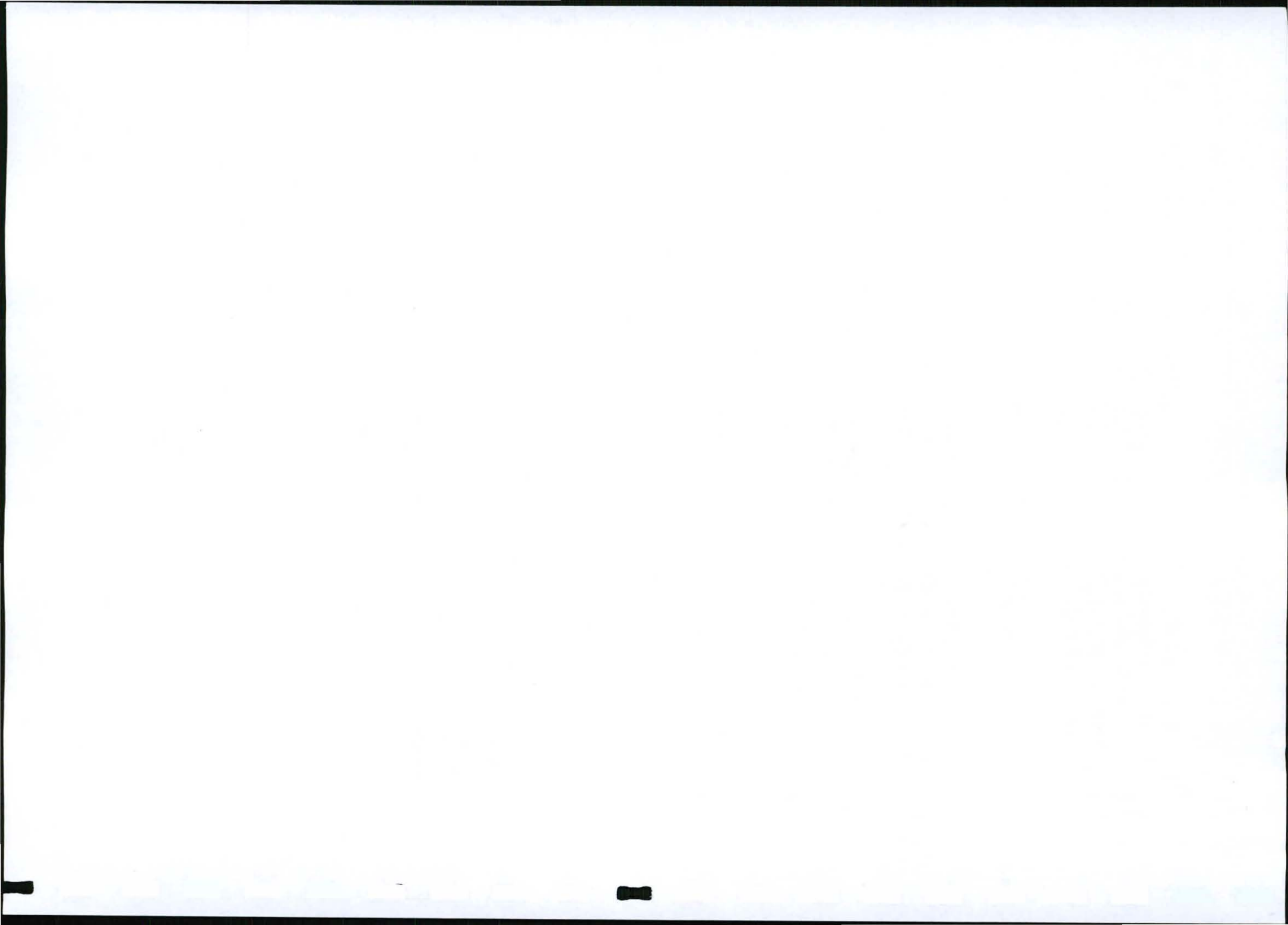
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APPENDIX F:	Letter of Financial Guarantee
APPENDIX G:	Letter of Undertaking
APPENDIX H:	Letter confirming Elundini Municipality project



1 INTRODUCTION

1.1 Overview

The Elundini Local Municipality (ELM) proposes to upgrade a number of gravel roads within the town of Ugie and within selected existing townships in Ugie Ward 2 including JK Bokwe, Ntokozweni, Mandela Park, Land Camp and Ugie Park. Approximately 700m of Van Riebeeck Street will also be upgraded. New stormwater drainage and discharge points will also be provided. The ELM has appointed KV3 Engineers to undertake the design of the proposed upgrades to those roads. Therefore, for the purposes of this project, the ELM is the “applicant” on whose behalf an application is made for the exploitation of two mineral sources.

Terreco Consulting (Geotechnical, Environmental and Waste Management consultants) were appointed by the ELM to assist with their application to the Department of Minerals and Energy (DME) for the mining of two borrowpit sites in the Ugie area.

Due to the nature of the project, which essentially constitutes road maintenance, it was necessary for the ELM to obtain authorisation from the Department of Economic Development and Environmental Affairs (DEDEA) for the proposed project activities. That application has been submitted and the ELM currently awaits the DEDEA's Record of Decision.

This report presents the Environmental Management Plan (EMP) for the two (2) borrowpits which will be mined during the project. The EMP is submitted in support of a mining permit application. Section 27(1) of the Minerals and Petroleum Resources Development Act, Act No 28 of 2002 (MPRDA), indicates that “A Mining Permit may only be issued if – (a) the mineral in question can be mined optimally within a period of two years and (b) the mining area in question does not exceed 1.5ha in extent.” Since it is anticipated that mining of the borrowpits will be completed within two year period and that the mine area will measure less than 1.5ha, an application for a mining permit was deemed to be adequate. Notwithstanding this, a detailed impact assessment has been conducted for each of the proposed sites.

As an organ of state, the ELM – the implementing agent and therefore the applicant – has applied for exemption from undertaking the full application procedure required under the MPRDA. The exemption request (letter) has been attached to this report. Hence the ELM is only required to submit an Environmental Management Plan as specified in Regulation 52, together with the necessary undertakings and guarantees as required by the DME – the relevant authority in this instance.

1.2 Project Details

1.2.1 Applicant

The Client is the provincial Elunidini Local Municipality and is therefore the “Applicant”. Details are provided below:

Elundini Local Municipality
PO Box 1
MACLEAR
5480

Tel: (045) 932 8100
Fax: (045) 932 8132

Contact person: Ms Chuleza Qotoyi

1.2.2 Environmental Consultant

The EMP has been prepared by Terreco Consulting which has gained considerable experience in the completion of impact assessments and formulation of EMPs. Contact details are provided below:

Terreco
P O Box 19829
TECOMA
5214

Tel: (043) 721 1502
Fax: (043) 721 1535
Email: scottd@terreco.co.za

Contact Person: Mr Duncan Scott

1.2.3 Landowner

The land falls within the former Transkei and is therefore State owned land held in trust for the community.

Scale: Approx 1:50 000

Date: March 2010

TERRECO cc

Specialist: Environmental and Waste Management

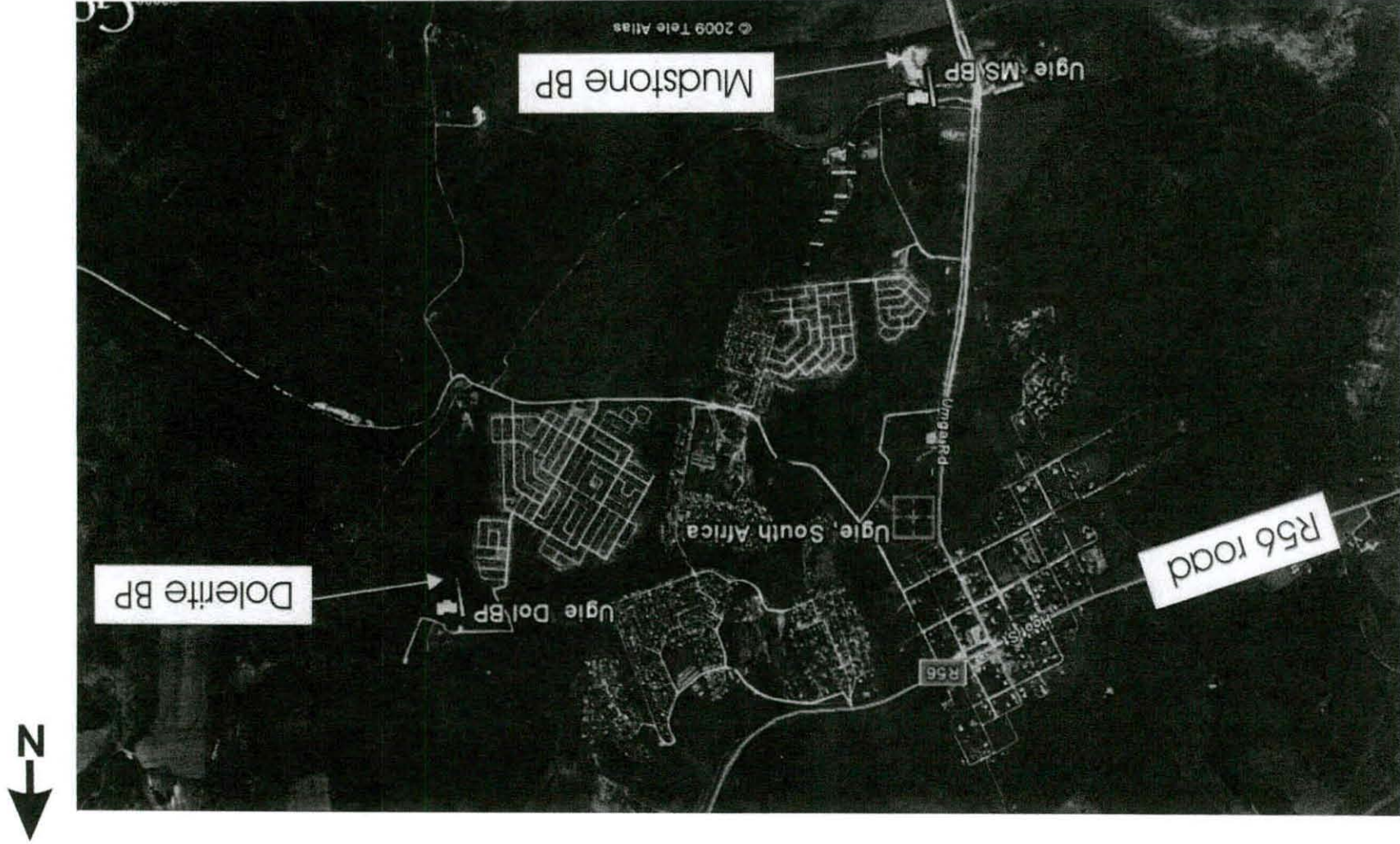


Borrowpit Locality Plan

FIGURE 1.1:

Upgrade of Ugie Town Streets

PROJECT:



1.2.4 Regional Setting

The project streets fall within the town of Ugie which in turn is part of the Elundini Local Municipality and the Ukhahlamba District Municipality. The gravel roads to be upgraded to surfaced standard lie within existing servitudes and are of varying levels of deterioration and/or varying widths with or without stormwater drainage in place. It is understood fenced property boundaries have informally crept onto the existing road reserve in some areas

The borrowpits, named Dolerite Borrowpit (Dol BP) and Mudstone Borrowpit (Mud BP) for the purposes of this report, are accessible directly off existing gravel roads. A short access road will need to be built to the Dol BP. An access road into the Mud BP already exists. The sites are not positioned close to any powerlines and therefore it was not necessary to consult with ESKOM.

1.3 Borrowpit Information

An overview of Dol BP and Mud BP is provided in the borrowpit information summary table provided in Table 1.1 below.

Table 1.1 Borrowpit Summary Table

INFORMATION		MUDSTONE BORROWPIT	DOLERITE BORROWPIT
TYPE OF MATERIAL		Coarse weathered mudstone	Yellow weathered dolerite
QUANTITY TO BE MINED		15 000m ³	15 000m ³
CO-ORDINATES	S	S 31° 13' 14.4"	S 31° 11' 55.7"
	E	E 28° 14' 12.6"	E 28° 15' 39.7"
DISTANCE FROM THE ROAD		+/- 20m	+/- 20m (LHS)
RIVER CATCHMENT		Wildebees River Catchment	Wildebees River Catchment
DISTANCE TO HOUSES		360m to the South	110m to the West
PRESENCE OF SERVITUDES		A non operational railway line to the north of the site. Umga road to the west. None affected by the extension of the mine.	None.

1.4 Approach

The EMP has been undertaken according to the prescribed methodology outlined in the MPRDA. Regulation 52 of the MPRDA: Regulations (Government Notice No. R. 527, 23 April 2004) defines the content of the Environmental Management Plan as follows:

- (a) A description of the environment likely to be affected by the proposed mining operations;
- (b) An assessment of the potential impacts of the proposed mining operations on the environment, socio-economic conditions and cultural heritage, if any;
- (c) A summary of the assessment of the significance of potential impacts, and the proposed mitigation measures and management measures to minimise adverse impacts and benefits;
- (d) Financial provision which must include:
 - i. The determination of the quantum of the financial provision contemplated in regulation 54; and
 - ii. Details of the method providing for the financial provision contemplated in Regulation 53;
- (e) Planned monitoring and performance assessment of the environmental management plan;
- (f) Closure and environmental objectives;
- (g) A record of public participation undertaken and the results thereof; and
- (h) An undertaking from the applicant regarding the execution of the environmental management plan.

A specialist Phase I Cultural Heritage Assessment was undertaken by eThembeni Cultural Heritage on appointment from Terreco. A copy of the report is included in APPENDIX A.

The impact assessments for the borrowpits were conducted according to the requirements of the EIA Regulations published under the National Environmental Management Act, Act No 107 of 1998 (NEMA) with reference to the various guideline documents published in support of the regulations. The detailed approach and methodology employed in the impact assessment is described in greater detail in Section 5.

1.5 Scope of the EMP

This document relates to the construction, operation and closure of the designated borrowpits (Mud BP and Dol BP). The central construction camp with workshops, accommodation, fuel tanks etc, will be positioned in the town of Ugie and for this reason the impacts of those activities have not been covered in the Borrowpit EMP (is covered in the EMP submitted to the DEDEA as part of that application for authorisation). Notwithstanding this, the Environmental Management Plan provided in Section 6 is inclusive of all activities associated with the use of the borrowpits, including vehicle maintenance, storage of fuel, washing of machines etc.

1.6 Structure of Report

The report has been structured to reflect the contents required under Regulation 52 of the MPRDA. The structure of the report is as follows:

SECTION	CONTENT
1: INTRODUCTION	This section provides background to the project and an overview of the proposed works. Details of the applicant as well as the landowner are provided. The project is placed in regional context and a summary of each borrowpit is provided. The approach to the EMP is discussed.
2: PROJECT PROPOSAL AND DESCRIPTION OF MINING OPERATIONS	This section provides the motivation for the use of the borrowpits as well as a detailed description of the proposed mining operations to take place at the borrowpits. The mining activities are divided into pre-construction, construction, operation and closure phases. This section should be reviewed in conjunction with the borrowpit development plans which are included in APPENDIX B.
3: AFFECTED ENVIRONMENT	The pre-mining environment is described in this section. Details of the biophysical, social and cultural conditions on site are provided.
4: PUBLIC PARTICIPATION	The public participation process undertaken for use of the two borrowpits described. A list of interested and affected parties is provided (where applicable). Correspondence with all interested and affected parties (IAPs) is included in APPENDIX C.
5: IMPACT ASSESSMENT	The methodology employed in undertaking the impact assessment is described. Detailed impact matrices and tables are provided and the primary impacts summarised.
6: ENVIRONMENTAL MANAGEMENT PLAN	A detailed environmental management plan for the construction, operation and closure phases of the project is provided in this section.
7: MONITORING PROGRAMME	Details of the monitoring programme including quarterly performance assessments are outlined.
8: DECOMMISSIONING, CLOSURE AND ENVIRONMENTAL OBJECTIVES	Objectives for environmental management and for final closure of the borrowpits are discussed.
9: FINANCIAL PROVISION	The methodology for calculating the financial provision as well as the amount set aside for the financial provision is included in this section.
10: UNDERTAKING	The Applicant's undertaking to comply with the stipulations of the EMP and a confirmation regarding ownership of the borrowpit are included.
APPENDIX A:	Cultural Heritage Assessment Report
APPENDIX B:	Borrowpit Development Plans, Photographs and Title Deeds
APPENDIX C:	Public Consultation
APPENDIX D:	Impact Assessment Tables
APPENDIX E:	Rehabilitation Cost Schedules
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2 PROJECT PROPOSAL

2.1 Overview

It is proposed that two borrowpits be used for the provision of material for the upgrade of selected town streets of Ugie. One of the selected sites is an existing borrowpit while the other is a new "greenfields" site. The borrowpits will be used exclusively for the upgrade of the town streets of Ugie over a period not exceeding two years and will be rehabilitated and closed on completion of the works. Provision has been made in the contract document for the rehabilitation of the borrowpits which will involve shaping, topsoiling and vegetating.

Mining will be undertaken by a suitably qualified contractor who is yet to be appointed by the Applicant, and will be overseen by an engineering management company. The Applicant will retain overall responsibility and accountability for the manner in which the borrowpits are developed, extended and rehabilitated. It is envisaged that mining will commence shortly after the DME's approval, which is expected to be within the third quarter of 2010.

This section provides a detailed description of the mining methods likely to be employed in the exploitation of the borrowpits. Alternative sources and mining methods are discussed in Section 2.9.

2.2 Motivation for the use of the Borrowpits

The borrowpits will provide material for the regravelling of the road within the town of Ugie. The identification of these borrowpits follows a materials investigation undertaken by KV3 Engineers during which a number of alternative sources were identified and investigated. The finally selected sites (Mud BP and Dol BP) were identified as sources with sufficient quantity of material, of a suitable quality, and were recommended for use in the project.

The project will ensure that access along the town streets is maintained and that the access is suitably safe for public vehicles to utilise. It will also facilitate the provision of basic services to local residents living in the villages and other surrounding areas.

2.3 Generic Procedures for Mining and Rehabilitation

General guidelines for the manner in which the borrowpits will be prepared, mined and rehabilitated are outlined below. Specific mine development and rehabilitation for each of the borrowpits is outlined in Section 2.4.

2.3.1 Pre-construction Phase

The pre-construction phase will consist of obtaining the necessary permits and authorisations from the relevant authorities for the use of the borrowpits. The surveys have been completed. Since the borrowpits are located within a grassland environment, no bush clearing was required. While the materials investigation has been completed it is possible that the contractor (yet to be appointed) will embark on further investigations, probably through excavating trial

holes, in order to verify the extent of the material prior to commencing with the construction phase.

2.3.2 Construction Phase

The construction phase will consist of the following activities:

- The borrowpit areas will be fenced with a standard livestock-proof fence. The fences will encompass the total borrowpit areas including topsoil stockpiles. A gate will be erected at the entrance to each of the borrowpits. It will not be necessary to construct an access road to the Mud BP. It will be necessary to construct an access road to the Dol BP.
- Topsoil will be stripped mechanically using a bulldozer. At least 30cm of the A-horizon will be removed in this process. Topsoil will be set aside in stockpiles as indicated in the Mine Development Plans (APPENDIX B) and conserved for use in the final rehabilitation of the borrowpits. Existing topsoil stockpiles from previous mining operations will similarly be protected (where applicable).
- Overburden, where it exists, will be stripped and stored in stockpiles adjacent to the mining area but separate from the topsoil stockpiles.
- Stormwater management measures will be installed before any mining commences at the Dol BP. These measures will consist of the creation of a diversion berm and channel upslope of the mining area to direct stormwater runoff away from the mining face. Energy dissipaters will be installed at the outlets of the diversion berm to prevent erosion. These are not required at the Mud BP as it is placed on a flat area where little runoff will be generated.

The borrowpit floors will be sloped in such a way that stormwater runoff is drained off site and into an energy dissipater (see APPENDIX B).

2.3.3 Operational Phase

The operational phase will consist of the actual extraction of material from the borrowpits. This will be undertaken mechanically using excavators which will load material directly onto haul trucks for removal to the road construction areas. There will be mineral processing on the Mud BP site, such as crushing and screening, and blasting may take place. There will be no mineral processing on the Dol BP site, such as crushing and screening, and no blasting will take place.

Mining of the material will proceed according to the approved development plans in order to achieve the final mining profile.

There will be no infrastructure erected at the borrowpits other than the fence. There will be no materials stored on site and all servicing and maintenance will take place at a central construction camp located in the town of Ugie.

2.3.4 Closure and Rehabilitation

Borrowpit closure will be effected once all the required material has been extracted. Closure will consist of the following activities:

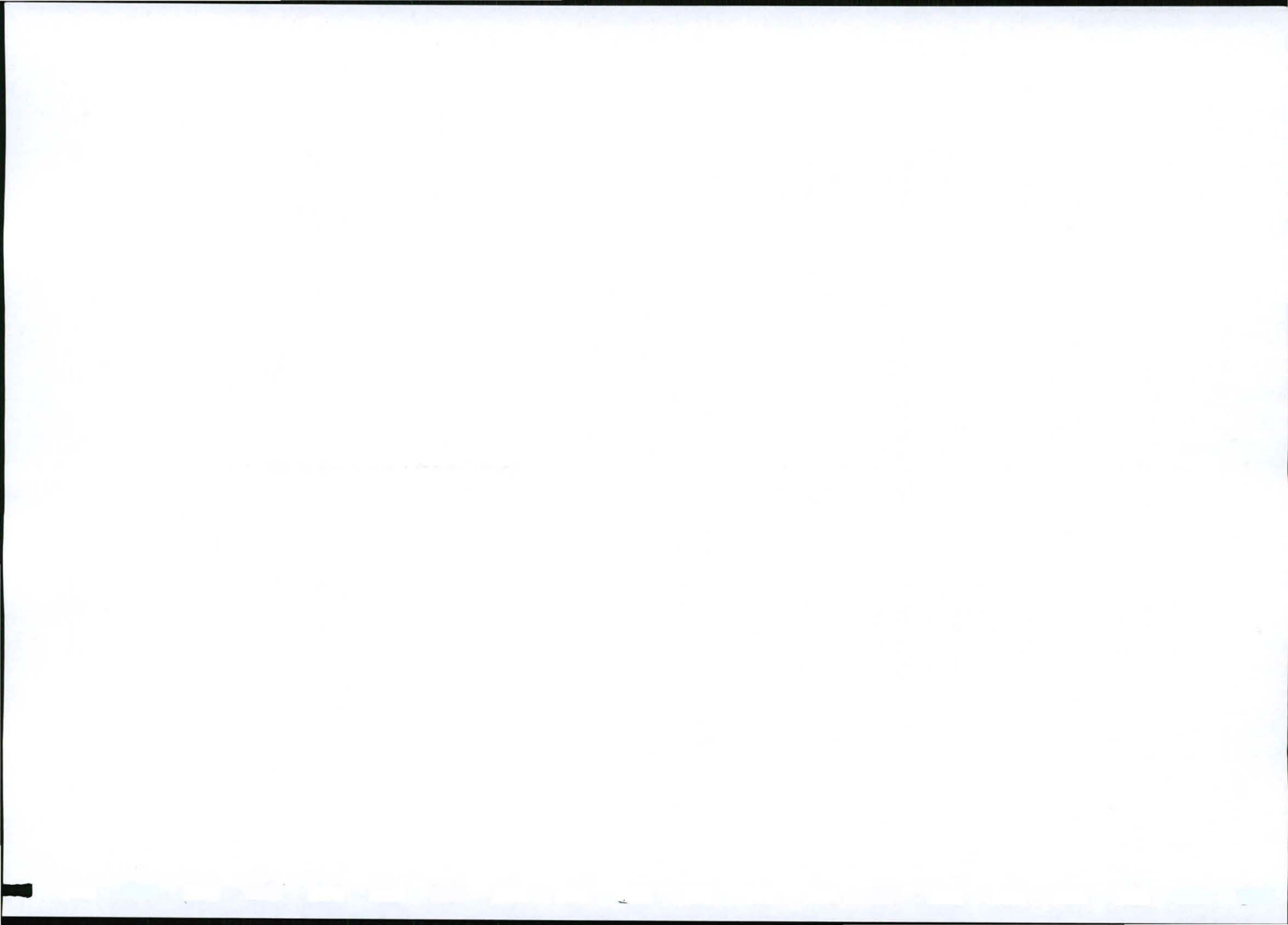
- Final shaping of the borrowpit slopes to resemble the approved closure plans. This will be undertaken mechanically making use of a bulldozer. Borrowpit faces will be sloped to a 1:3 gradient with a gradual fall across the base of the borrowpit to allow for free draining of stormwater. All overburden (if any exists) will be returned to the pit and shaped against the face of each borrowpit. The borrowpits will be shaped in such a manner as to prevent the channelling of stormwater which might result in erosion.
- Topsoil will be spread over the surface of the borrowpits to a depth of between 20 and 30cm. This will be undertaken mechanically using a bulldozer.
- The borrowpit areas will be manually seeded using a suitable seed mix recommended by the landscape contractor. The seed mix will include fast growing annuals (such as *Eragrostis teff*) and other hardy pioneer species, such as *Digitaria eriantha*. The seeds mix will be applied with a fertilizer base, such as 3:2:3.
- The fence will be retained and repaired if necessary to ensure that the borrow areas are protected from grazing by livestock.
- The diversion berm and channel and energy dissipaters to be constructed at the Dol BP will be maintained to protect the rehabilitating surfaces from the erosive effects of stormwater.

2.3.5 Post Closure Phase

- The borrowpits will be inspected after the end of the first growing season for grass regrowth and evidence of erosion. If necessary, the borrowpits, or portions thereof, will be lightly ripped, fertilized and seeded at the start of the next growing season, and erosion rills or channels patched and repaired. Any alien invader plant species, such as *Lantana* and Black Wattle (both of which are prevalent in the area) will be eradicated according to standard procedures.
- Once an 80% vegetation cover has been established a closure application for each borrowpit will be submitted to the Department of Minerals and Energy.

2.4 Borrowpit Specific Mining and Rehabilitation Procedures

Specific procedures for the mining and rehabilitation of the two borrowpits are provided in the borrowpit information sheets included overleaf.



2.5 Surface Infrastructure

Other than the fence, there will be no other infrastructure erected at the Dol BP site. However a crusher is to be erected at the Mud BP site.

2.6 Stormwater Management

Stormwater water management is viewed as a critical component of the environmental management at the borrowpit sites. The general principal behind stormwater management is to divert runoff away from the borrowpits in such a manner as to prevent it causing erosion and to contain and "treat" the "dirty" runoff within the borrowpit areas before releasing it into the environment.

"Dirty" water runoff refers to stormwater runoff which has collected within the borrowpits and accumulated a high sediment load as a result of the exposed soils and underlying weathered rock. Other than a high sediment load, there is unlikely to be any other form of contamination of the runoff.

"Treatment" refers to the containment of water within the confines of the borrowpits in such a manner as to allow for the settlement of sediment and the controlled release of clean water, normally through a dissipation bed.

A dissipation bed may consist of an accumulation of rocks and oversized material at the outlet which serves to slow down the passage of water, allowing it to drop its sediment load and "filter" it through the rock bed. This may be further enhanced through the use of synthetic sheeting such as bitem. The dissipation bed, through arresting the velocity of the runoff, serves furthermore to prevent any down slope erosion.

It is therefore the intention to construct diversion berms upslope of the Dolerite borrowpit to divert stormwater away from it. The diversion berm will be located within the fence line to prevent any outside interference. A typical diversion berm cross section is shown on the development plan. The position of the berms is indicated on the borrowpit development plans included in APPENDIX B.

No stormwater management structures are required at the Mudstone borrowpit due to the naturally flat topography of the site.

The berm will remain in place after borrowpit closure in order to allow for the recovery of the rehabilitated slopes and to protect the downstream environment from sedimentation and erosion which may arise during the rehabilitation period prior to the establishment of adequate grass cover.

2.7 Solid and Hazardous Waste Management Facilities

There will be no solid or hazardous waste generated at the borrowpits during normal operation. All servicing of trucks will take place at the designated workshop in Ugie. It might be necessary

to refuel heavy machinery, such as excavators, on site using a mobile fuel bowser, and emergency field repairs might be required in the event of a breakdown.

The Environmental Management Plan (EMP) makes provision for the containment of hazardous substances during refuelling or repairs, which includes the use of drip trays. The field service truck will be equipped with suitable drip trays, a waste oil drum and an emergency clean-up kit consisting of super absorbent materials (such as Drizit or Hazmat), spades to remove contaminated soil and a drum to convey the soil off site.

A hazardous waste management plan will be developed by the contractor for the entire project. This will include the specifications provided in the EMP, such as secondary containment of hazardous substances. Details are provided in Section 6.

The only semi-permanent staff located at the borrowpits is likely to be the excavator or bulldozer operator. As such, there is unlikely to be any domestic waste generated and there will be no construction waste produced. Portable chemical toilets will be provided at nearby road construction sites where staff concentrations will be higher. If necessary a portable toilet will be placed at both (or either) of the respective borrowpit sites as well.

A solid waste management plan will be developed by the contractor based on the specifications provided in the EMP.

2.8 Health and Safety

In terms of the Occupational Health and Safety Act, the contractor will be required to develop a Health and Safety Plan identifying all potential health and safety hazards and providing a detailed plan and programme for the management and monitoring of these risks. An independent Health and Safety Auditor will be appointed for the duration of the project with the responsibility of site inspections. There will, furthermore, be a designated Health and Safety Officer on site.

Potential health and safety risks which are presented by the construction, operation and closure of the borrowpits include:

- Noise, caused by the operation of heavy machinery, in particular the reverse hooters of trucks, and potential blasting activities (at Mud BP only);
- Dust;
- Injury due to operation of heavy machinery and potential blasting (at Mud BP only); and
- Collapse of unstable faces.

Both the workforce and the surrounding community are at risk of exposure to these hazards. These risks will be minimised, if not mitigated entirely, through the implementation of a sound EMP.

2.9 Alternatives

This section deals with the possible alternatives to the project proposal described in the section above. Alternative sources of road construction material as well as alternative methodologies are discussed.

2.9.1 Alternative Sources

The materials investigation which was undertaken KV3 Engineers identified the potential material sources in the area. This identified that there was no existing weathered dolerite source of sufficient quality in the viable vicinity of the project area. It was determined that the Dol BP and Mud BP were most ideally situated as well as containing an adequate quality material, to provide gravel for the construction activities.

Originally it was decided to attempt to only use existing borrowpits and to avoid the opening of new, greenfields sites. However due to the lack of dolerite sources in the vicinity it has been necessary to establish a new dolerite borrowpit (Dol BP). No other alternative sources within a reasonable distance of the project area (town of Ugie) were identified. There are no commercial sources of road gravel located within an economical distance of the project area.

2.9.2 Alternative Development Methodologies

There are no alternative methodologies to those described in the sections above.

2.9.3 The No-go Alternative

The "no-go" alternative will simply involve not utilizing the proposed borrowpits as a source of road building material for the proposed upgrades to the town streets of Ugie. This will affect the viability of the project as for all intents and purposes, if the borrowpits are not developed, the level of construction works required will not be possible. In terms of achieving the proposed upgrade of the Ugie town streets, the "no-go" alternative cannot be considered.

If the Dol BP and Mud BP are not used then it might be necessary to open alternative new sites in order to provide material for road maintenance. This will have potentially greater environmental impacts and time delays for site establishment and would further delay the progress of the Ugie streets upgrade project and would, in the case of the Mudstone Borrowpit, not be in agreement with the request of the DME to make use of existing borrowpits rather opening new sources.

3 AFFECTED ENVIRONMENT

This section provides a description of the existing biophysical and social environment within the vicinity of the project study area and at the borrowpits. The information presented below is a synthesis of knowledge gained from literature reviews, discussions with various roleplayers and from site investigations. Photographs of the site are presented in APPENDIX B of this report.

3.1 Geology and Soils

The geology of the broader area comprises the Stormberg Group of deposits which are part of the Karoo Supergroup sequence which were deposited around 250 – 182 million years ago. The Stormberg Group predominantly comprises sandstones and mudstones which collectively *'...reflect a gradual change to increasingly more arid conditions – a change sequentially recorded in the sequence of rocks that make up the Stormberg Group, that is, the Molteno [oldest], Elliot and Clarens [youngest] Formations'*.

The Molteno Formation sandstone rocks form the flat-topped hills around Ugie and were originally deposited mainly by large braided rivers during the Triassic Period (251 – 203 million years ago). Elliot Formation deposits, which were subsequently deposited during increasingly drier conditions, crop out in the foothills of the Prentjiesberg mountains to the north west of Ugie. These deposits reflect sedimentation by meandering river systems through seasonal flooding and from salt pans. The Prentjiesberg are capped by sandstones of the Clarens Formation, the youngest rocks in the Stormberg Group. The Clarens Formation deposits *'...attest to desert conditions [as associated] with the development of an extensive sand sea much like the Namib Desert.'*

Karoo dolerite intrusions are a feature of the Karoo Supergroup and occurred extensively around 206 million years ago (Jurassic period). The general area around Ugie contains thin dolerite dykes.

A description of the underlying geology at the Dol and Mud BP is provided in Table 1.1.

3.2 Topography and Drainage

Ugie lies at approximately 1305m above mean sea level. Ugie is located at the base of the foothills of the Southern Drakensburg which extends into the Eastern Cape. The landscape is characterised by undulating to broken topography which gives rise in places to flat-topped mountains. Specifically, the topography of the Project focus area is generally rolling to hilly, with the Wildebees River crossing in a roughly west-east direction across the Project focus area.

In terms of drainage, the Wildebees River forms an important feature in the landscape. The Wildebees River forms part of the Mzimvubu River system and is incorporated within the Mzimvubu to Keiskamma Water Management Area (WMA) 12. The Wildebees River drains into the Tsitsa River which in turn merges with the Inxu, Tina, Laneka and Mzimtlava Rivers to form

the Mzimvubu River. The Mzimvubu River flows into the Indian Ocean at Port St Johns. The total catchment size of the Wildebees River is approximately 200km² with a mean annual runoff of 12 000 000m³: no other detail is available at this stage regarding the ecological status, river health or water quality of the Wildebees. It is noted that much of the upstream land uses are associated with commercial timber production but that the townships have had an impact on the riparian environment through vegetation clearance, pollution, littering and siltation from erosion (see below).

The Wildebees River runs in a roughly west-east orientation through much of the immediate Project area. It is the main water supply for Ugie and water is abstracted from a weir structure below the R56 bridge by a pump station situated on the bank of the river. The water is then fed to the water treatment works via a 70m long pipeline.

A large wetland extending in a south west direction and adjoining the Wildebees River occurs between Ugie Town and Land Camp and Ugie Park. This wetland is listed on the National Wetland Database. However no specific data regarding this site was immediately available. Smaller wetlands are also located on the Wildebees River downstream of the larger wetland. These are sites of potential sensitivity to change from both an ecosystem point of view and from a legal perspective in respect of the National Water Act 36 of 1998

The borrowpits are positioned within the catchment area of the Wildebees River catchment. Drainage for the Wildebees catchment moves in a south easterly direction towards the coast.

There are no drainage lines directly affected by either of the borrowpits.

3.3 Climate

Climatic conditions were obtained from PG Bison. The climate of the northern section of the Eastern Cape is warm temperate and is typical of the high elevation summer rainfall areas of eastern South Africa. Winters are cold and dry with frequent frost and occasional snowfalls, while summers are warm with regular thunder storms bringing most of the high annual rainfall. Mean annual precipitation is strongly influenced by the topography and varies between 600 and 1200mm; mean monthly precipitation is greater than 50mm between October and March and less than 25mm in June and July. Mean annual precipitation for Ugie is 716mm as depicted on the Surface Water Resources of Southern Africa map (1994).

The mean maximum temperature peaks at 25°C between January and February while the minimum temperatures of -5°C are commonly reached at Maclear between June and July.

Wind direction is predominantly NE to E during summer months and W to NW during winter months.

3.4 Vegetation and Wildlife

The vegetation in the general area surrounding the borrowpits lies within the Grassland Biome which incorporates much of the Eastern Cape and extends northwards covering much of

eastern South Africa inland of the coast and savannah biomes. The major vegetation types associated with this biome and found within the study area include the East Griqualand Grassland (Gs12). This vegetation type typically occurs at altitudes of 920 – 1740 m and, within the hilly slopes, comprises 'grassland with patches of bush clumps with *Leucosidea sericea* (only wet sites) or *Diospuros lyciodes*, *Acacia karroo* and *Ziziphus mucronata* in low-lying and very dry sites.' In terms of conservation status, the East Griqualand Grassland is described as Vulnerable and has generally been subject to transformation for cultivation, plantations and urban sprawl.

Other vegetation types in the general area include the Southern Drakensberg Highland Grassland (Gd4) and Drakensberg Foothill Moist Grassland (Gs10) vegetation types which are present to the west and south and east of the immediate study area. The conservation status of both these vegetation types is considered to be 'Least Threatened'.

Natural vegetation is very limited or non-existent within, and immediately adjacent, to the townships. Most of the vegetation present is largely ornamental and/or utilitarian either for security, screening or consumption and transformed and impacted grasslands is used for grazing. Some riparian vegetation is present within the vicinity of the Wildebees River but it is fragmented and transformed by clumps and / or single, isolated invasive alien tree species along sections of the river between the townships. This is not unusual given the existence of formal and informal housing development, illegal dumping, eroding pathways, poor stormwater management and grazing activities.

In terms of wildlife, it is expected the diversity in the proposed project area will be poor on account of the transformed nature of the habitat and the level of human activity in the area. Those species present are likely to be more tolerant of human activities. No mammal species were observed during the site visit. However it is possible that certain species of small antelope exist within forest type areas in the extended environment. Certain mammal species which may occur in the area include various mongoose species, porcupines, moles and hares

There are no designated nature reserves or protected areas within the general area surrounding the focus townships. The Prentjiesberg Nature Reserve lies to the north west of Ugie.

In general this vegetation type is poorly conserved but it is especially heavily overgrazed in the Transkei region of the Eastern Cape and thus highly disturbed. The areas within the proposed mine extensions are covered with disturbed grassland vegetation typical of the area. There are no protected species present at either of the borrowpits.

3.5 Existing Land-use and Tenure

The existing land use within the general project area consists of the town of Ugie as well as rural homesteads and subsistence farming. Crop farming is primarily maize while goats, sheep and cattle are grazed throughout the area. The population is mainly concentrated in the town of Ugie. Landuse practices have resulted in the degradation of the natural environment in places. Indigenous forests have largely been cleared to make way for crops and grazing areas.

Commercial activities consist are dominated by the facilities within the town of Ugie. These are typical of small towns in the local area eg. banks, stores, service stations, funeral parlours.

The study areas surrounding the borrowpit sites are state-owned land falling under the governance of the local tribal and municipal authorities who are responsible for the allocation of homesteads and agricultural land to the community members. The title deeds issued for the land designated for use as borrowpits is included in APPENDIX B.

Public consultation with the nearby residents is described in greater detail in Section 4.

3.6 Local Economic and Social Structure

The local economy of Ugie is based on the commercial enterprises established in the town. Monies earned in the town help to finance local residents as well as persons living in the extended rural environment. Typical of the rural areas of the former Transkei, unemployment and poverty levels are expected to be high.

3.7 Cultural Heritage

A specialist Phase I Cultural Heritage Assessment was undertaken by eThembeni Cultural Heritage on appointment from Terreco. No areas of cultural importance were identified at either of the borrowpits sites, or within close proximity to either site, during that assessment. However the archaeologist did object to the establishment of the Dolerite Borrowpit due to the creation of a scar on the side of the hill within a highly visible location. However this has been discussed previously. The borrowpit has been located in this position due to the lack of dolerite material sources of sufficient quality in the local area.

The archaeologist did not object to the extension of the Mudstone Borrowpit.

A copy of the report is included in APPENDIX A.

3.8 Visual Aspects

The borrowpits are positioned within a rural setting which is generally aesthetically pleasing. The Mud BP is located in close proximity to a road but is not easily visible from that road as it has been developed as a hole with the side walls left intact. It is thus mostly hidden from view from the road. It is an existing borrowpit and therefore currently represents a visual impact in its current form.

The Dol BP is to be established on a hillside overlooking the town of Ugie. The lack of quality dolerite materials in the vicinity of the project area has led to the selection of this area as the proposed dolerite source. This is a new "greenfields" site and is highly visible from surrounding areas and the construction and operation activities will represent a large visual impact. However the engineer has been made aware of this concern and has attempted to develop the site in such a manner as to mostly reduce the visual impact of the site upon completion of the proposed mining activities and rehabilitation measures.

As a general comment, the Mud BP has traditionally been used for road maintenance along the surrounding gravel roads and has never undergone rehabilitation. As such it has been left with steep to vertical exposed faces and piles of topsoil or overburden that were mined previously have been left wherever they were dumped. Measures will be implemented to reduce the impact of this site during this project.

3.9 Risk Assessment

At present the Mud BP site represents a safety risk to the surrounding public and animal life due to the fairly high and steep faces along its edge. During mining the on site use and movement of heavy machinery, and the extension of the mine area, will pose a potential safety risk to the same groups.

At present the Dol BP site does not represent a safety risk to the surrounding public and animal in its undeveloped state. During mining the on site use and movement of heavy machinery, and the creation of the mine area, will pose a potential safety risk to the same groups.

4 PUBLIC PARTICIPATION

4.1 Introduction

Public Participation is an essential and integral part of the EIA process. It is furthermore a requirement of the DME's permit process for borrowpits. The objectives of Integrated Environmental Management, as defined in Section 23 (2) of the National Environmental Management Act, No 107 of 1998, are *inter alia* to "Ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment." The specific objectives of the Public Participation Process (PPP) are discussed below.

- To ensure that the public are informed of the project and provided with the opportunity to register as interested and affected parties (IAPs) in the EIA Process;
- To provide IAPs with the opportunity to raise any concerns they may have with regards to the project proposal, and to ensure that these concerns are recorded and addressed in the Scoping Study;
- To allow IAPs the opportunity to contribute to the EIA process by identifying potential impacts and means by which negative impacts may be mitigated, or the benefits of a project enhanced.

4.2 Methodology

The methodology undertaken in order to achieve the above objectives was as follows:

- Key stakeholders were identified in consultation with the project team.
- One-on-one consultations were held with community members living in close proximity to the borrowpits. The implications of the mining activities were discussed. Signed forms giving consent to the mining activities are included in APPENDIX C.
- A public meeting, in which the proposed construction project was described and discussed, was held in the project.

4.3 Key Stakeholders

Key stakeholders are identified as follows:

- Elundini Local Municipality (Applicant and therefore "Mine Owner")
- Department of Minerals and Energy
- Local Ward Councillors
- Tribal Authority
- Neighbouring residents.

4.4 Key Issues

No houses or other buildings are located within 100m of the Mud BP. Therefore no surrounding residents were interviewed. There is only one house approximately 360m from the site with other houses greater than 500m from the site.

There are however a number of houses downslope and to the west of the Dol BP site. One-on-one interviews were conducted with the residents of the closest houses in that area. There was general support for the development of the borrowpit while the following issues were raised:

1. Children play in the general area and so safety on site is very important (in particular during the construction and operation phases). In response to this concern a full detailed health and safety plan will be implemented during the project and will be monitored by a designated health and safety officer;
2. If rocks are to be stockpiled on site the community was concerned that those rocks may roll downslope and damage their property. Rocks will be stockpiled upslope of the excavation and will not be able to roll downslope towards those houses.
3. There was a concern that water dammed in the excavations may be released in a "flood" should heavy rains fall and the storage capacity be exceeded. The damming of water within the site is not in the interest of the Contractor as they would then not be able to mine effectively. The site will be free draining and stormwater will be released in a controlled manner.

These issues will be carefully considered and addressed in the EMP section of this report (Section 6).

5 IMPACT ASSESSMENT

This section is completed in terms of Regulation 50 of the Minerals and Petroleum Resources Development Regulations and provides an assessment of the nature, extent, duration, probability and significance of the identified impacts and benefits.

The objective of the assessment is to identify and assess all significant impacts that may arise from the undertaking of an activity. The findings of the assessments are used to inform the competent authority in their decision as to whether the activity should be authorised, authorised subject to conditions that will mitigate the impacts to within acceptable levels or should be refused.

5.1 EIA Methodology

5.1.1 Overview

This section presents the methodology employed in the identification, prediction and analysis of impacts. The approach to the impact assessment is based on the current EIA Regulations¹ which came into effect on the 03/07/2006 in fulfilment of Chapter 5 of NEMA, the guideline documents which are published in support of both the former and the current EIA regulations and the Integrated Environmental Management Information Series publication on Impact Significance (DEAT, 2002). The logical and methodical approach described below, while seemingly exhaustive and repetitive, ensures that the assessment is focused and provides the basis for making predictions and value judgements that will ultimately inform the decision of the competent authority.

5.1.2 Scope

The scope of the Impact Assessment includes all activities associated with the proposed development of two borrowpits (Dol BP and Mud BP) for use during the proposed upgrade of the Ugie town streets as described in Section 2. Impacts which may occur during the various phases (pre-construction, construction, operation and maintenance and closure – where relevant) have been identified and assessed.

5.1.3 Impact Identification

An “aspects” based approach has been utilised in the identification of potential impacts. “Environmental Aspects” are the mechanisms by which an activity interacts with the environment. Environmental aspects refer to an element of an activity, product or service which can have a beneficial or adverse impact on the environment. For example, it could involve a discharge, an emission, the consumption or use of a material, or noise. A number of environmental aspects have been determined for the proposed operations. These are presented in Table 5.1.

¹ Government Notice No. R.385, Department of Environmental Affairs and Tourism, 21 April 2006: Regulation in terms of Chapter 5 of the National Environmental Management Act, 1998.

Table 5.1 Environmental Aspects

	Main Category	Sub-Categories	Example
INPUTS	Resource Consumption	Raw Materials Manufactured Products Energy	Diesel
		Water	Water for construction works (dust suppression) Potable water for domestic purposes
OUTPUTS	Releases to Water	Point sources (piped source) Diffuse sources (seepage/run-off)	Stormwater runoff
	Releases to Air	Dust Gasses and fumes	Dust generated from transport (haul roads), stripping, excavating and stockpiling Gasses and fumes generated from exhaust emissions
	Other Releases	Noise Solid waste Spillages Vibrations	Construction noise / Potential blasting (operation of machinery) Solid waste from staff Spillages from maintenance activities Vibrations from mining, hauling etc.
	Land Transformation	Surface disturbance Topographical change	Removal of vegetation Stripping of topsoil Excavation of material Shaping of borrowpits
	Social Aspects	Employment & Training	Staff Subcontractors
		Changes in Landuse / zoning	Creation / Expansion of borrowpits
		Supply of goods	Supply of road building materials to site

Environmental “aspects” (or mechanisms) provide the link between activities and impacts. Significant impacts will only result where there is a significant “aspect”.

Potential impacts associated with the proposed activities have been identified using activity/aspect/impact matrix (Figure 5.1). The matrix illustrates the interactions between the activities, aspects and the affected environment.

The impact and aspect matrix serves to highlight at a glance the likely consequences of an activity. Some of the interactions are non-significant (negligible) and therefore require no further investigation in the EIA process. These include energy and water consumption which will occur during construction and operation. Where appropriate, these have been highlighted in the matrices.

5.1.4 Impact Prediction

The methodology of the Impact Prediction is presented below. The results are presented in the Impact Tables which are included in APPENDIX D.

Nature and significance

Once potential impacts have been identified, further investigation is required to predict the nature and significance of an impact. The nature of the impact is essentially the type of impact which may occur from undertaking an activity. The impacts may be positive or negative and may be categorised as being direct (primary), indirect (secondary) or cumulative impacts.

Where significant environmental aspects are present (as indicated in the matrices), significant impacts may result. The final significance of the impact is a function of probability and consequence. The consequence is determined by considering the severity, spatial extent and duration of the impact. The severity of the impact is determined by qualitative or quantitative criteria as well as by community response. Criteria for the ranking of Severity are presented in Table 5.2.

Table 5.2 Criteria for ranking Severity

RANK		CRITERIA
NEGATIVE	HIGH	<ul style="list-style-type: none"> • Substantial, Measurable deterioration, Death, illness or injury • Recommended Level always exceeded • Widespread complaints from community • Complete loss of land capability • Soil alteration resulting in a high level impact in one of the other environments • Disturbance to areas that are pristine, have conservation value or are an important resource to Humans • Destruction of rare or endangered species • Deterioration of water quality/quantity, resulting in a high negative impact on one of the other environments • Is difficult to manage • May require an alternative course of action. • May affect the viability of the project
	MEDIUM	<ul style="list-style-type: none"> • Moderate, measurable deterioration and discomfort • Recommended level will occasionally be violated • Widespread complaints from community • Partial loss of land capability • Soil alteration resulting in a moderate impact on one of the other environments • Disturbance of areas that have some conservation value or are of some potential use to humans • Complete change in species variety or prevalence • Deterioration of water quality/quantity, resulting in a moderate negative impact on one of the other environments • May be managed • Is low or medium only if managed according to a management programme • Does not affect the viability of the project

	LOW	<ul style="list-style-type: none"> • Minor, deterioration, nuisance or minor irritation. Change not measurable • Recommended level will never be violated • Sporadic community complaints • Minor deterioration in land capability • Disturbance of areas that are degraded, have little value or are unimportant to humans as a resource • Minor changes in species variety or prevalence • Deterioration of water quality/quantity, resulting in a low negative impact on one of the other environments
POSITIVE	LOW ⁺	<ul style="list-style-type: none"> • Minor Improvement in quality • Change not measurable • Sporadic complaints
	MEDIUM ⁺	<ul style="list-style-type: none"> • Moderate improvements • Measurable improvements • Will be within or better than recommended level • No observed reaction from public
	HIGH ⁺	<ul style="list-style-type: none"> • Substantial improvements • Measurable improvements • Will be within or better than recommended level • Favourable publicity

Potential impacts are furthermore assessed according to spatial extent, duration and probability as follows:

Table 5.3 Criteria for ranking Spatial Extent, Duration and Probability

Criteria	Categories	Explanation
Spatial Extent	Site (S)	<i>Immediate area of activity</i>
	Local (L)	<i>Area within 500m of the site.</i>
	Regional (R)	<i>Entire municipality, drainage basin, landscape etc</i>
	National (N)	<i>South Africa</i>
Duration	Short-term (S)	<i>Less than the construction/ operation period</i>
	Medium Term (M)	<i>Construction / operation period</i>
	Long-term (L)	<i>Less than 2 years post construction / operation</i>
	Permanent (P)	<i>Permanent change</i>
Probability	Unlikely (U)	
	Possible (P)	
	Likely (L)	
	Definite (D)	

5.1.5 Mitigation Potential

The significance rating provided in the impact tables is the significance WITH mitigation and WITHOUT mitigation. Mitigation potential describes the ability to manage or mitigate an impact given the necessary resources. Some impacts, by their very nature are extremely difficult to mitigate, while others may be managed to an acceptable level with the implementation of a sound environmental management plan. Mitigation potential is described in Table 5.4.

Table 5.4 Mitigation Potential

Mitigation potential	Description	Example
HIGH:	<ul style="list-style-type: none"> The impact is relatively easy and cheap to manage. Specialized expertise or equipment is generally not required. The nature of the impact is understood and may be mitigated through the implementation of a managed plan, with regular monitoring undertaken to ensure that any negative consequences remain within acceptable limits. The significance of the impact after mitigation is likely to be LOW to Non-Significant. These impacts are normally mitigated by "good housekeeping". 	Noise Dust Soil contamination from accidental spillages and leakages Litter
MEDIUM:	<ul style="list-style-type: none"> Management of this impact requires a higher level of expertise and resources in order to maintain within acceptable levels. The significance of the impact after mitigation is likely to be LOW to MEDIUM depending on the level of management applied. May not be possible to mitigate the impact entirely – may result in a residual impact (e.g. topographical change). 	Visual Impacts Changes to landscape form and functioning Alteration of stream flow patterns Soil Erosion
LOW:	<ul style="list-style-type: none"> Will not be possible to mitigate this impact entirely regardless of the expertise and resources applied. The potential to manage the impact may be beyond the scope of the Project. Management of this impact is not likely to result in a measurable change in the level of significance. 	Change of land use

It should be noted that a LOW mitigation potential does not necessarily imply that the impact is highly significant. An impact with a low significance rating may be extremely difficult to mitigate, such as noise generated by earthmoving machinery during construction, while a highly significant impact may be relatively simple to mitigate with the implementation of the correct management measures.

Concern naturally arises when an impact with a HIGH significance has a LOW Mitigation potential. In some instances this may present a fatal flaw, and motivation for rejecting the development.

The detailed impact assessment is provided in the tables included in APPENDIX D. These tables are informed by the impact matrices and provide a description of the affected environment, the aspect responsible for the impact, the characteristics of the impact (nature, severity, duration, extent and probability), the overall significance rating (with and without mitigation) and reference to the applicable mitigation measures. Please note that in the tables sections 1.1 to 1.14 refer to site setup/construction, sections 2.1 to 2.11 to site operation and sections 3.1 to 3.9 to site closure activities.

The mitigation measures are discussed in detail in Section 6.

A discussion of the impacts which will arise during the various phases of the mining operations is provided below.

5.2 Mudstone Borrowpit (Mud BP)

This is an existing borrowpit. It is situated in a rural area with a few houses in the general vicinity of the site. The closest of the houses is approximately 360m away. It will not be necessary to relocate any houses. Health and safety risks, including dust and noise, will need to be managed appropriately to minimise the effect on the neighbouring residents.

A non operational railway line runs approximately 20m to the north of the site but this will not be affected during the mining process.

The mining area must be clearly demarcated at the outset and a fence erected to contain operations. Any appropriate stormwater management measures identified on site are installed before any clearing and mining takes place in order to minimise the risk of erosion and sedimentation.

Impacts such as erosion from stormwater runoff and loss of topsoil may be minimised to a low level of significance through the implementation of the management measures outlined in the EMP.

5.3 Dolerite Borrowpit (Dol BP)

This is a new "greenfields" site positioned in a rural environment on the outskirts of Ugie with the closest houses approximately 110m distance downslope of the site. It will not be necessary to relocate any houses. Health and safety risks, including dust and noise, will not need to be more carefully managed than at the Mud BP site.

There are no telephone lines or powerlines within 100m of the site.

The mining area must be clearly demarcated at the outset and a fence erected to contain operations. It is important that appropriate stormwater management measures are installed before any clearing and mining takes place in order to minimise the risk of erosion and sedimentation.

Health and safety constraints must be strictly applied and the borrowpit must be mined as per the development plan to ensure the minimal visual impact upon rehabilitation of the site.

Impacts such as the protection prevention of erosion, conservation of topsoil and control of stormwater runoff may be minimised to a low level of significance through the implementation of the management measures outlined in the EMP.

5.4 Benefits

The development of these borrowpits will supply road construction material for the upgrade of the Ugie town streets which has obvious benefits for the local community. Those benefits occur both in the short term from job creation as well as from the provision of improved access within the town of Ugie. This is also likely to reduce wear and tear on local vehicles and will improve road safety along the upgraded routes.

The use of the mudstone borrowpit will allow for the rehabilitation of that site which currently presents a visual impact. The concerns expressed by the environmental consultant in terms of safety hazards presented by the steep faces will essentially be addressed by the rehabilitation of that site.

5.5 Residual Impacts

Residual impacts are those which persevere after the borrowpit has been closed and rehabilitated according to the approved closure plan. Considering that it is the intention to slope the borrowpits to at least a 1:3 slope there should be no safety hazard posed by steep faces or unstable slopes. The borrowpits will be grassed and returned to their former landuse, which is largely grazing of livestock, hence there will be no residual impacts on landuse.

Until such time that an adequate grass cover has become established, there will be a residual visual impact at both of the sites. This will be mitigated on achieving the required grass cover of at least 80%.

6 ENVIRONMENTAL MANAGEMENT PLAN

The mitigation measures which will apply during the Site Establishment, Operation and Rehabilitation phases to be undertaken at the borrowpit sites listed within this report are provided in the following sections. The management procedures are to be applied to activities at both sites unless otherwise stated. An "aspects based" approach has been adopted to the mitigation measures as the impacts may be more effectively controlled through the management of the aspects, eg the impact on surface water quality may be effectively mitigated through the management of surface water runoff, discharge of water from a point source and from effective hazardous waste management.

Overall objectives and specific targets for the management of the various aspects at both borrowpits are provided. Activities which are responsible for the aspect are listed and the likely impact summarised. The responsibility for the implementation of the mitigation measures is indicated and any institutional and training requirements outlined. Finally, requirements for monitoring of mining activities at BP 213/2 and BP 213/4 are provided.

The Mitigation Measures are grouped under the following aspects:

- Energy consumption
- Water consumption
- Releases to Water (point)
- Releases to Water: Diffuse (Stormwater Management)
- Emissions to Air
- Noise Disturbance
- Surface Disturbance (Soil Compaction and Loss)
- Surface Disturbance (Vegetation Degradation and Loss)
- Surface Disturbance (Cultural Heritage)
- Surface Disturbance (Land use and Productivity)
- Surface Disturbance and Changes in Landform and Topography (Aesthetics)
- Changes in landform and Topography (Public Health and Safety)
- Solid Waste Generation and Disposal
- Access Creation and Disruption
- Procurement of Goods and Services
- Employment and Training
- Additional Measures, which include
 - Community Relations
 - Staff Safety and Education
 - Work Stoppages
 - Existing Services and Infrastructure

NOTE: Although the current report deals exclusively with the development and use of two borrowpits, provision has been made in the EMP for all impacts and aspects associated with the mining operations, including the servicing of vehicles, storage of fuel, accommodation of staff etc.

6.1 Energy Consumption

Objectives:	To utilise renewable resources SUSTAINABLY, and non-renewable resources WISELY. To ensure that the project does not impact negatively on the availability of power for other users.
Targets:	To use "clean" sources of power where possible, eg solar power. To minimise the amount of power utilised on site and to guard against the unnecessary wastage of power.
Activities:	All mining activities using diesel.
Impact:	Greenhouses gasses produced from the production of power from fossil fuels. The depletion of non-renewable materials in the generation of power and the processing of diesel.
Mitigation Measures:	Alternative energy sources (such as solar power) to be used where practical. Energy saving measures (eg the use of energy saving globes) to be implemented on site. All vehicles are to be kept in good working order to minimise fuel consumption.
Responsibility:	Site Agent Operators
Permit Requirements:	None
Institutional and Training requirements:	Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP. Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits. Conservation of energy (electricity and diesel) to form part of the environmental awareness training programme.
Monitoring:	Energy conservation will be monitored during the environmental performance assessments.

6.2 Water Consumption	
Objectives:	<p>To utilise renewable resources SUSTAINABLY, and non-renewable resources WISELY.</p> <p>To ensure that the project does not impact negatively on the availability of water for other users, including the environment.</p> <p>To ensure that the project does not impact on the conservation status of the ecosystems and the health and welfare of surrounding water users.</p>
Targets:	<p>Recycle as much of the process water as possible and prevent wastage and / or loss through the proper maintenance of machinery.</p> <p>Ensure that all water which is discharged off site as stormwater meets the DWA standards for water quality.</p>
Activities:	<ul style="list-style-type: none"> • Dust suppression • Seeding
Impact:	The depletion of potable and process water sources to the detriment of other users and the environment.
Mitigation Measure:	<p>Recycling of water must take place where possible.</p> <p>Minimise the use of water on site.</p> <p>Water abstraction from dams, streams, rivers etc is not permitted without obtaining the necessary authorisation from DWA.</p>
Responsibility:	Site Agent
Permit Requirements:	A water abstraction permit will be required from DWA if the contractor wishes to abstract water from any surface source. Obtaining this permit is the contractor's responsibility and should be applied for as soon as the contract is awarded.
Institutional and Training requirements:	<p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p> <p>Water conservation and recycling will form part of the environmental awareness training programme.</p>
Monitoring:	Water consumption is to be monitored by mine staff on an ongoing basis and reported to the EEA. The implementation and efficacy of the water conservation policy and plan will be assessed as part of the biannual performance assessments.

6.3 Releases to Water (Point)	
Objectives:	<p>To ensure that the project does not impact negatively on the ground and surface water quality and therefore the health of other users, and of the environment.</p> <p>To ensure that any polluted water is treated and discharged in accordance with the legislation with negligible risk to the health of other users and the environment.</p> <p>To prevent the loss of soil through erosion caused by point source discharge.</p>
Targets:	<p>All water which is discharged on or off site either as stormwater, wastewater or process water must meet the DWA standards for water quality.</p> <p>The discharge of water from point sources must not result in the pollution or loss of soils through erosion.</p>
Activities:	<ul style="list-style-type: none"> • Office block (ablutions, waste water from kitchens etc) – off borrowpit site. • Maintenance of plant and machinery (washbays) – off borrowpit site. • Batching of cement at the construction camp – off borrowpit site
Impact:	<p>The contamination of soils through discharge of polluted water.</p> <p>The pollution of surface and groundwater sources through the discharge of polluted water.</p>
Mitigation Measure:	<p>Potential point sources of pollution include: ablutions, waste water from kitchens etc, washbays, workshops and cement mixers (construction). All of those, besides the ablutions, will be housed at the main camp site in Ugie and not at either of the borrowpit sites.</p> <p>Onsite ablutions at the site office are to be discharged into the Ugie sewage infrastructure.</p> <p>Temporary work areas (eg during the construction phase) are to be equipped with chemical porta-loos, which should be emptied on a regular basis and the contents disposed of at a registered sewage treatment works.</p> <p>All temporary / portable toilets shall be secured to the ground to prevent them toppling due to wind or any other cause. All toilets are to be maintained in a clean, sanitary condition. The Site Agent shall ensure that no spillage occurs when the toilets are cleaned, or emptied, and that the contents are properly stored and removed from Site. Discharge of waste from toilets into the environment, and burial of waste, is strictly prohibited.</p> <p>Refueling activities should not be conducted where runoff could carry contaminants into drainage pathways (including stormwater drains / trenches and sewers).</p> <p>Washing of vehicles must be kept to a minimum and must only take place in a designated washbay area on an impervious surface which drains into an oil sump.</p> <p>Concrete mixers to be located on an impermeable surface. A lined settlement pond to be established below the plant to contain any contaminated run-off.</p> <p>Cleaning out of concrete mixers and trucks must take place on a properly</p>

	<p>designated site with a sump that can be cleaned out.</p> <p>Washing, whether of the person, or of personal effects, and acts of excretion and urination, are strictly prohibited other than at the facilities provided.</p> <p>All water requiring discharge, including wastewater from kitchen and ablution facilities, should be led into the soakaway system. No wastewater shall be discharged into rivers or streams.</p>
Responsibility:	Site Agent
Permit Requirements:	No permits are required for the discharge of waste water via the soakaway system as the quantities are expected to be relatively low. This will not be required at either of the borrowpit sites.
Institutional and Training requirements:	<p>The prevention of pollution through the discharge of contaminated water will form part of the Environmental Awareness Programme.</p> <p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p>
Monitoring:	Possible pollution of soil or water bodies will be monitored by the EEA during the bi-annual site inspections and reported to the DME on a bi-annual basis as part of the environmental performance assessments. The contractor must monitor for such pollution between the inspections by the EEA.

6.4 Releases to Water: Diffuse (Stormwater Management)	
Objectives:	<p>To ensure that the project does not impact negatively on the ground and surface water quality and therefore the health of other users, and of the environment.</p> <p>To ensure that all contaminated water (eg. sediment laden runoff) is treated and discharged in accordance with the legislation with negligible risk to the health of other users and the environment.</p> <p>To prevent the loss of soil through erosion caused by stormwater runoff.</p>
Targets:	Provide for appropriate stormwater control, protecting exposed areas from stormwater runoff and directing and dissipating stormwater in such a manner as to prevent erosion.
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing • Stripping of topsoil • Creation of stormwater drainage systems • Excavation of material • Stockpiling of topsoil and overburden • Rehabilitation measures.
Impact:	The overland flow of stormwater may result in the erosion and loss of soil, the transformation of the surface through gully and sheet erosion and the contamination of surface water bodies through sediment ingress and pollution with consequent impacts on the aquatic flora and fauna.
Mitigation Measure:	<p>All excess run off water, generated during mining operations, will be released in a controlled manner downslope of each of the borrowpits. If necessary at the Dol BP then a diversion channel will be constructed and that will terminate in an energy dissipater. The dissipaters on site must be monitored to ensure that they remain effective. Once the dissipater becomes 50% full, then it must be emptied and the captured material must be stored within the stockpile area. The energy dissipater must then direct the water flow off site after the sediment load has been removed.</p> <p>A set of diversion berms must be installed above the mining area at the Dol BP to divert clean stormwater runoff away from the mining area. An energy dissipater will be constructed at the lowest point of each berm to ensure that erosion is prevented where the diverted water is released into the environment. All dissipaters must be monitored for effectiveness on a regular basis as discussed above.</p> <p>A diversion berm is not required at the Mud BP due to the relatively topography of the area.</p> <p>The stormwater management systems must be designed for the worst case, i.e., heavy rainfall and runoff events.</p> <p>No rock, silt, cement, grout, petroleum product, timber, vegetation, domestic waste, or any deleterious substance shall be placed or allowed to disperse into the stormwater system or directly into the drainage lines.</p> <p>Halt construction activity on exposed soil during events of high rainfall intensity and runoff.</p> <p>Minimise vegetation cover removal on all the cleared areas - ie only clear those areas where mining and stockpiling is currently taking place.</p>

	<p>Water that has been contaminated with suspended solids, like soils and silt, may be released into natural watercourses or stormwater channels. However, all suspended solids shall be removed from water before it is discharged by settling out these solids in an energy dissipater / settling pond.</p> <p>Soil erosion shall not be tolerated on either of the sites. Uncontrolled erosion will cause siltation and pollution of drainage lines and other downstream areas and result in loss of valuable topsoil. The Site Agent / Contractor should take all reasonable measures to prevent soil erosion and protect areas susceptible to erosion. Erosion prevention measures must be implemented to the satisfaction of the EEA and DME.</p> <p>Areas particularly susceptible to erosion include:</p> <ul style="list-style-type: none"> • areas stripped of topsoil, and • soil stockpiles. <p>Where erosion does occur, the Site Agent shall reinstate such areas to the satisfaction of the DME and the EEA through the construction of contour berms, cut-off drains, or planting of grass sods / ground cover, as may be necessary. Topsoil that has been washed away shall be replaced.</p>
Responsibility:	Site Agent
Permit Requirements:	There are no permit requirements for the control of erosion and stormwater discharge.
Institutional and Training requirements:	<p>There are no specific institutional or training requirements for the control of stormwater.</p> <p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p>
Monitoring:	<p>Areas affected by mining related activities must be monitored regularly for evidence of erosion.</p> <p>Results will be reported in the Environmental Performance Assessment Reports submitted to the DME.</p>

6.5 Emissions to Air	
Objectives:	<p>To reduce dust emissions to levels that are acceptable in terms of the following aspects: nuisance, road hazards, aesthetics and health hazards.</p> <p>To minimise the risk to human health through the minimisation of emissions and the provision of protective equipment.</p>
Targets:	<p>Identify all potential sources of dust.</p> <p>To ensure that dust emissions do not exceed the legal standards and where these standards are exceeded, to take the necessary precautionary measures to protect the health of the exposed persons.</p>
Activities:	<ul style="list-style-type: none"> • Upgrade of access to site • Clearing and grubbing • Stripping of topsoil • Stripping of overburden • Potential blasting (at the Mud BP only) • Creation of stormwater drainage systems • Stockpiling of topsoil and overburden • Excavation and loading of material • Transportation of material off site • Rehabilitation measures.
Impact:	<p>Excessive exposure to dust may impact on human health. Lower levels are primarily of a nuisance value. Dust is regarded as a nuisance when it reduces visibility, soils private property, reduces the palatability of grazing grasses and may retard plant growth. It is also aesthetically displeasing.</p>
Mitigation Measure:	<p>Minimise areas of exposed soil by only clearing those areas where mining or stockpiling is taking place and by revegetating mining and stockpiling areas progressively where possible.</p> <p>Fine material must be kept to a minimum by practicing good housekeeping. All fines should be removed to the spoils area and covered with overburden and vegetated accordingly.</p> <p>Employ dust suppression measures on dry dusty surfaces. This may involve the spraying of water from water carts.</p> <p>Ensure fine materials being stored or transported are covered with tarps or equivalent material.</p> <p>Ensure that the district road accessing the sites is maintained in a good condition with a suitable gravel surface. Heavy trucks may lead to the pulverizing of the gravel and increase the amount of dust produced.</p> <p>Operators exposed to high levels of dust (including cement dust – off borrowpit sites) must be equipped with dust masks. This is a health and safety requirement and must be managed via the mine's Health and Safety Plan.</p> <p>Any blasting that is required (at the Mud BP only) may only be undertaken by a registered and qualified blasting technician. Local police department must be informed of all proposed blasting activities.</p> <p>Ensure all equipment is in good operating order, and fitted with standard air emission control devices.</p>

	Minimise idling of engines at all times.
Responsibility:	Site Agent.
Permit Requirements:	The blasting technician must be appropriately qualified and registered.
Institutional and Training requirements:	<p>The minimisation of dust and gaseous emissions and the use of protective equipment will form part of the health, safety and environmental awareness and training programmes.</p> <p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p>
Monitoring:	Dust will be monitored by the EEA and the Health and Safety Auditor during the bi-annual site inspections.

6.6 Noise Disturbance	
Objectives:	To minimise the risk to human health through the minimisation of noise and the provision of protective equipment.
Targets:	Identify all potential sources of noise. Take the necessary measures to ensure that noise does not exceed the legal standards and where these standards are exceeded, to take the necessary precautionary measures to protect the health of the exposed persons.
Activities:	<ul style="list-style-type: none"> • All mining activities (operation of machinery etc) • Transportation of material.
Impact:	Excessive exposure to high level noise may result in temporary or permanent damage to hearing. Exposure to lower noise levels (eg in surrounding residential areas) may be of nuisance value (irritation).
Mitigation Measures:	<p>No nighttime activities are to take place at the borrowpits until such time as these activities have been proven, through regular monitoring, not to constitute a noise disturbance.</p> <p>All activities with high noise levels should be restricted to daylight hours on weekdays. Working hours on Saturdays should be from 06h00-13h00.</p> <p>Any blasting that is required (at the Mud BP only) may only be undertaken by a registered and qualified blasting technician. Local police department must be informed of all proposed blasting activities</p> <p>All operators exposed to noise in excess of 85dB will be equipped with hearing protection devices.</p> <p>The Site Agent shall take the necessary measures to limit noise levels on site to within legally acceptable limits. The regulations framed under the Machinery and Occupational Safety Act, 1983 (Act No. 6 of 1983) apply.</p> <p>All vehicles to be kept in a serviceable condition and fitted with silencers.</p> <p>Where possible physical barriers are to be placed between noise sources and the community.</p>
Responsibility:	Site Agent
Permit Requirements:	The blasting technician must be appropriately qualified and registered.
Institutional and Training requirements:	<p>The minimisation of noise and the use of protective equipment will form part of the health, safety and environmental awareness and training programmes.</p> <p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p>

Monitoring:	Noise will be monitored by the EEA and the Health and Safety Auditor during the bi-annual site inspections. The site agent and contractor must undertake more regular inspections to ensure that the requirements of the approved EMP are complied with.
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6.7 Surface Disturbance (Soil Compaction and Loss)

Objectives:	To minimise the disturbance or loss of topsoil and subsoil through limiting the footprint of the operations and / or recovering and protecting soil for use in final rehabilitation of the sites.
Targets	<p>To ensure that all activities which might impact negatively on the soils are restricted to the smallest area possible.</p> <p>To ensure that rehabilitation is such that the minimum land with agricultural potential is compromised.</p> <p>To limit soil erosion and consequent degradation of soil and pollution of air and surface water.</p>
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing • Stripping of topsoil
Impact:	<p>Compaction of soil may result in the loss of soil viability (ie ability to sustain vegetation). Compacted soils decrease infiltration and increase runoff which increases the risk of erosion.</p> <p>Soil may be lost through erosion.</p>
Mitigation Measure:	<p>Topsoil should be viewed as a precious commodity on site. Every effort must be made to preserve topsoil from construction areas, to protect it from loss through erosion and to maintain its viability.</p> <p>Topsoil shall be removed from the following areas no longer than 30 days before activities, in each particular area, begin:</p> <ul style="list-style-type: none"> • All areas to be mined / excavated • Areas to be occupied by roads • Areas for the storage of fuels (at construction camp ie. off borrowpit site) • Areas for stockpiling of construction materials (at construction camp ie. off borrowpit site) • Areas for spoiling material. <p>As the mines develop, all existing topsoil and overburden (decomposed rock) must be removed from the designated mining areas for each mining phase. ie. avoid leaving extensive patches of bare earth.</p> <p>During site clearing and establishment activities, topsoil shall be excavated to a depth of 150 mm. Topsoil must be placed within the designated topsoil stockpile areas as indicated in the site development plan (refer to APPENDIX B).</p> <p>Topsoil stockpiles must be no higher than 1.5m and must be protected from compaction.</p> <p>The topsoil stockpiles must be vegetated using a suitable indigenous seed mix which includes fast growth annual species (such as <i>Eragrostis teff</i>) and perennial</p>

	<p>species. Vegetating the topsoil stockpiles will protect them from erosion and maintain their viability (organic content, seedbank etc.).</p> <p>The topsoil stockpiles shall be clearly demarcated with appropriate signage.</p> <p>Topsoil shall not be mixed with any other material (construction rubble, subsoils etc) and erosion of the topsoil stockpiles must be prevented by placing the stockpiles below the stormwater diversion berm where appropriate.</p> <p>Topsoil should under no circumstances be used to create diversion berms or for general erosion control measures.</p> <p>All overburden (decomposed rock) and subsoil must be stockpiled in the designated areas and protected from erosion by placing them downslope of the stormwater diversion berm.</p> <p>The size of required work areas must be restricted to the minimum required for efficient and effective work.</p> <p>The minimum amount of vegetation must be removed from the construction sites.</p> <p>Plan for the worst case, that is, for heavy rainfall and runoff events, or high winds.</p> <p>Care must be taken not to introduce alien plant material into the stockpile areas.</p> <p>All disturbed sites must be revegetated and rehabilitated immediately after construction on each site has been completed so as to limit the exposure of the disturbed areas to wind and water erosion.</p> <p>Topsoil which is placed on slopes steeper than 1:3 must be protected from erosion through the application of "soilsaver" or some other form of biodegradable geomesh.</p> <p>Should any soil become contaminated by pollutants (eg oil spillages), this must be dug up and removed from site for treatment and / or disposal at a licensed facility. No treatment of contaminated soils (e.g. bioremediation) shall be allowed on site.</p>
Responsibility:	Site Agent
Permit Requirements:	No permits required.
Institutional and Training requirements:	<p>The protection and conservation of soil will form part of the health, safety and environmental awareness and training programmes.</p> <p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p>
Monitoring:	Soil conservation and protection will be monitored as part of the bi-annual EEA visits and reported on in the environmental performance assessment reports.

6.8 Surface Disturbance (Vegetation degradation and loss)	
Objectives:	<p>To minimise the impact on the vegetation, taking special consideration of species of high conservation value (rare or protected species – none identified on either site).</p> <p>To protect and preserve as far as possible, the indigenous animal life affected by the construction operations.</p>
Targets:	<p>No loss of biodiversity.</p> <p>The reestablishment of indigenous vegetation following closure and rehabilitation of the sections of the mines.</p> <p>The prevention of the spread of alien invasive plant species.</p>
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing.
Impact:	Loss of vegetation, loss of animal habitat and spread of alien invasive vegetation.
Mitigation Measure:	<p>Natural features, in other words the indigenous flora and fauna within the vicinity of the project works, should be protected and damage or disturbance prevented or minimised, specifically:</p> <p>No plant species outside of the designated mine sites and associated areas may be removed.</p> <p>No mining staff may have access to indigenous vegetation outside of the site areas.</p> <p>The use of indigenous plants as firewood is prohibited.</p> <p>All fauna (including domestic livestock) within, and surrounding the sites, shall be protected. They shall not be caught, poisoned, trapped, snared or killed.</p> <p>The minimum amount of vegetation must be removed. Excessive clearing of the sites must be avoided. Disturbance outside of the immediate construction areas must be avoided.</p> <p>Planning and construction must ensure that alien plants are not introduced to the disturbed areas. This can be accomplished by:</p> <ul style="list-style-type: none"> • Utilising the saved topsoil from the construction areas and regular monitoring during the revegetation phase and immediately after the revegetation phase. • Preventing continuous disturbances of the rehabilitated areas. • Alien invader species must be removed from the sites and destroyed as per the DWA Working for Water specifications for that species. Any regrowth must be controlled in the same manner. • Soil should not be moved from one part of a site to another unnecessarily.

Responsibility:	Site Agent.
Permit Requirements:	No Permit required.
Institutional and Training requirements:	<p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p> <p>The protection and rehabilitation of vegetation cover will form part of the environmental awareness training programme.</p>
Monitoring:	Protection and rehabilitation will be monitored as part of the bi-annual EEA visits and reported on in the environmental performance assessment reports.

6.9 Surface Disturbance (Cultural Heritage)	
Objectives:	To identify, protect and preserve any sites of cultural, religious or archaeological significance.
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing • Stripping of topsoil • Stripping of overburden
Impact:	Although no sites of cultural heritage significance have been identified at either borrowpit site (APPENDIX A), there is always some potential that sites may be uncovered during the site preparation and mining activities. It is necessary therefore to put in place an action plan for this eventuality.
Mitigation Measures:	<p>All activities must be restricted to the smallest area possible. All areas outside of the designated mining areas will be placed out of bounds.</p> <p>Should an archaeological or cultural site be located during site preparation or the proposed mining activities, it should immediately be reported to the South African Heritage Resource Agency. Failure to report a site of archaeological and/or cultural significance is a contravention of the National Heritage Act (Act No 25 of 1999).</p> <p>All construction site staff must be briefed to immediately report any potential sites which are encountered during the project. In the event of finding what appears to be an archaeological site or a cultural and / or historic site or object, work should be terminated until a qualified archaeologist or historian can examine the item or find.</p> <p>Should any sites be discovered, the Site Agent shall take reasonable precautions to prevent any person from removing or damaging any fossils, coins, articles of value or antiquity and structures and other remains of archaeological interest discovered on the sites, immediately upon discovery thereof and before removal. All works within the vicinity of the discovery must cease immediately and the area shall be cordoned off until such time as the SAHRA authorises resumption of the works in writing.</p>

Responsibility:	Site Agent.
Permit Requirements:	No permits are required as no sites have been identified.
Institutional and Training requirements:	<p>The possible uncovering of sites of cultural heritage significance and the actions to be taken in event of this occurring will be covered by the Environmental Awareness Training Course.</p> <p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p>
Monitoring:	The possible discovery of sites of cultural heritage significance will be monitored during the bi-annual ECO visits and reported during the environmental performance assessment reports.

6.10 Surface Disturbance (Landuse and Productivity)	
Objectives:	To minimise the impact on surrounding landuses during construction. To, where possible, return the affected areas to their previous landuse capabilities following completion of construction.
Targets:	Rehabilitation of the mined out areas and stockpiles in order to allow for the resumption of the previous landuse (ie grazing) within a reasonable time frame following completion of the mining operations.
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing • Stripping of topsoil • Stripping of overburden • Stockpiling and spoiling • Mining operations (general)
Impact:	The mining operations will result in a temporary change of landuse. The land will not be available for its current use (grazing) for the duration of the mining operations.
Mitigation Measure:	All activities must be restricted to the smallest area possible. All areas outside of the mining area should be placed out of bounds. Measures outlined in 6.8 (vegetation), above, are to be implemented in order to return the site to the previous landuse on closure.
Responsibility:	Site Agent.
Permit Requirements:	No permits are required.
Institutional and Training requirements:	Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP. Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.
Monitoring:	This impact will be monitored by an independent EEA on completion of the mining operations and rehabilitation programme

6.11 Surface Disturbance and Changes in Landform and Topography (Aesthetics)	
Objectives:	To minimise as far as possible the visual impacts resulting from the borrowpit construction activities at Mud BP and Dol BP and to return the land to its previous condition as far as possible on completion of the mining operations.
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing • Stripping of topsoil • Stripping of overburden • Potential blasting (at Mud BP only) • Stockpiling and spoiling • Mining operations (general)
Impact:	The impact of the mine establishment and operation on the aesthetics of the general landscape surrounding the mining area.
Mitigation Measure:	<p>In addition to the mitigation measures described under Section 6.7, the following will apply:</p> <p>Photographic records to be kept throughout construction, starting prior to any activities getting underway. Fixed point photo sites are to be selected. These photographic site records should be used to ensure that the affected topography and vegetation can be reinstated, where practical, to a state which closely approximates the natural situation.</p> <p>Mining is to take place according to the proposed mine development plans included in APPENDIX B. Mined out areas are to be used as spoil sites thereby facilitating rehabilitation.</p> <p>All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of areas disturbed.</p> <p>The EEA shall approve all stockpiling and spoiling sites and confirm the end-use or rehabilitation plans for these sites.</p> <p>The stockpiles should be located within demarcated specified sites. Material must be stockpiled in such a way as to minimise the spread of materials and the impact on the natural vegetation. The Site Agent should ensure that no materials "creep" into "no-go" areas.</p> <p>The Site Agent shall ensure that, insofar as he has the authority, no person, machinery, equipment or material enters the "no go" areas at any time.</p>
Responsibility:	Site Agent
Permit Requirements:	None
Institutional and Training requirements:	<p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p>
Monitoring:	The visual impact of the mining operations will be assessed as part of the bi-annual ECO site visits and reported on in the environmental performance assessment reports.

6.12 Changes in Landform and Topography (Public Health and Safety)	
Objectives:	To prevent any injury to staff or members of the public which might incur through access to unstable surfaces, high faces etc.
Activities:	<ul style="list-style-type: none"> • Mining activities (general)
Impact:	Injury or death incurred as a result of access to unstable areas and high rock faces.
Mitigation Measure:	<p>A Health and Safety Plan and Programme is to be complied and implemented on site.</p> <p>The mining areas must be placed out of bounds to members of the public and other unauthorised persons.</p> <p>Security must be put in place to prevent unauthorised access to the sites.</p> <p>The entire mining areas are to be fenced.</p> <p>Appropriate warning signage is to be erected around the mining areas.</p>
Responsibility:	Site Agent Health and Safety Officer
Permit Requirements:	None
Institutional and Training requirements:	<p>Appointment of a health and safety officer.</p> <p>All staff is to attend the health and safety training programme.</p>
Monitoring:	Health and Safety to be monitored by an external, independent health and safety professional.

6.13 Solid Waste Generation and Disposal	
Objectives:	To ensure that the establishment and operation activities at the two borrowpits do not have a significant negative impact on the environment through the manner in which solid waste is stored, handled or disposed of.
Targets:	<p>Minimise the quantities of solid waste by reducing, reusing and recycling materials wherever possible.</p> <p>To store, handle and dispose of all solid waste according to sound environmental principles and in accordance with the legal requirements.</p>
Activities:	<ul style="list-style-type: none"> • Mining operations (general)
Impact:	Inappropriate handling and disposal of waste may result in contamination of water sources, soils and general pollution of the surrounding environment.
Mitigation Measure:	<p>No construction or other waste may be disposed of at either site. All waste generated during the construction of the sites must be removed and disposed of at a registered waste disposal site.</p> <p>Adequate litter drums or other containers must be located throughout the construction camp (in Ugie) and at all construction sites (the borrowpits and road construction areas) to ensure that no litter is generated on site. The containers should be fitted with suitable lids and pegged to the ground so that dogs or any other scavengers cannot gain access to the container when the sites are unattended.</p> <p>No burning of refuse is to take place on site.</p> <p>Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to sand, fine vegetation, refuse and paper shall have appropriate cover to prevent them spilling from the vehicle during transit. The Site Agent shall be responsible for any clean-up resulting from the failure of his employees, or suppliers, to properly secure transported materials.</p> <p>No on-site burying or dumping of any waste materials, vegetation, litter or refuse shall occur.</p> <p>All solid waste shall be disposed of off site at least once weekly at an approved landfill site. The Site Agent shall provide the EEA with documentary proof of disposal during the biannual compliance audit site inspection.</p>
Responsibility:	Site Agent
Permit Requirements:	None
Institutional and Training requirements:	<p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p> <p>Solid Waste Management will form part of the environmental awareness training to take place on site.</p>

Monitoring:

Solid waste management to be monitored by the EEA during the bi-annual site visits and to be reported on in the environmental performance assessment reports. The contractor must monitor solid waste management practice on a more regular basis (ie. during the period between the bi-annual inspections).

6.14 Hazardous Waste Generation and Disposal	
Objectives:	To manage the hazardous waste component so as to minimise the potential to cause harm to the human and the natural environment.
Targets:	To have zero spillages of hazardous materials on site.
Activities:	<ul style="list-style-type: none"> • Vehicle and plant repair and maintenance.
Impact:	The pollution of soil, surface water and groundwater as a result of spillages of hazardous substances.
Mitigation Measure:	<p>Hazardous substances used on site will likely include fuel, oil and certain degreasers.</p> <p>The relevant Material Safety Data Sheets (MSDS) shall be available on site. Procedures detailed in the MSDSs shall be followed in the event of an emergency situation.</p> <p>Fuel may be stored at the site camp in Ugie. The fuel storage area shall be located at the workshop, or a fuel storage depot, located within the construction camp. The Site Agent shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut or in bowsers. The tanks / bowsers shall be situated within a concrete bundwall with a concrete base. The volume inside the bund shall be 110% of the total capacity of all the storage tanks / bowsers. The bunded area shall be covered to prevent the collection of rainwater. The Site Agent shall prevent unauthorised access into the fuel storage area.</p> <p>The Site Agent shall ensure that all fuels and chemicals are handled and stored in a manner so to minimise the risk of spills, leaks or structural failures.</p> <p>The Site Agent shall have on site all the necessary materials and equipment to deal with spills of any of the substances stored on site.</p> <p>The Site Agent shall set up a procedure to deal with a spillage or pollution event.</p> <p>Staff shall be appropriately trained to deal with any spills or pollution threat.</p> <p>No smoking shall be allowed within the vicinity of the fuel storage area.</p> <p>The Site Agent shall ensure that there is adequate fire-fighting equipment at the fuel stores.</p> <p>Gas and fuels shall not be stored in the same storage area.</p> <p>Where reasonably practical, plant shall be refuelled at the depot, or at the workshop, as applicable. If it is not reasonably practical, then the surface under the refuelling area shall be protected against pollution.</p> <p>The Site Agent shall ensure that there is always a supply of absorbent material (eg. Zorbit) readily available to absorb / breakdown hydrocarbon spills, and where possible, be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 litres of hydrocarbon liquid spill.</p> <p>Where practical, all maintenance and repair of equipment and vehicles on site shall be performed in the workshop (off the borrowpit sites). If it is necessary to</p>

	<p>do maintenance outside of the workshop area, then drip trays must be used. Only emergency repair and maintenance work is allowed outside of the workshop.</p> <p>The Site Agent shall ensure that there is no contamination of the soil, or vegetation, in the workshop and other plant maintenance facilities, including those areas where emergency plant maintenance has been conducted.</p> <p>The workshop (off the borrowpit sites) shall have a smooth impermeable concrete floor. The floor shall be bunded and sloped towards an oil trap or sump to contain any spillages of substances (e.g. oil).</p> <p>When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants.</p> <p>Drip trays shall also be provided for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles).</p> <p>Drip trays shall be inspected and emptied daily, and serviced when necessary. Drip trays shall be closely monitored during rain events to ensure that they do not overflow.</p> <p>All vehicles and equipment shall be kept in good working order and serviced regularly.</p> <p>Leaking equipment shall be repaired immediately or removed from the site.</p> <p>The washing of equipment shall be restricted to urgent, or preventative maintenance requirements only. All washing shall be undertaken in a wash bay area at the site camp which must be equipped with a suitable impermeable floor and sump / oil trap. The use of detergents for washing shall be restricted to low phosphate and nitrate containing, low sudsing-type, detergents.</p> <p>The appropriate danger / warning signs must be erected at the diesel bowser, mine entrance and workshops.</p> <p>Fuel lubricants, solvents, paints, herbicides and other chemicals must be stored within the contractors camp site in a facility secured with lock and key. Storage should be on a bunded, impervious site (secondary containment).</p> <p>All used oil is to be collected and placed in drums stored on a concrete surface. Used oil must be recycled by a licensed dealer or disposed of at a registered landfill site, where the permit conditions of the landfill allow.</p>
Responsibility:	Site Agent
Permit Requirements:	None
Institutional and Training requirements:	<p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p> <p>Appropriate hazardous waste management will form part of the environmental awareness and training course.</p>

Monitoring:	Solid waste management to be monitored by the EEA during the bi-annual site visits and to be reported on in the environmental performance assessment reports. The Site Agent must under regular compliance monitoring in between the EEA's bi-annual inspections.
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6.15 Access Creation and Disruption	
Objectives:	To minimise the disruption of traffic on public roads.
Activities:	<ul style="list-style-type: none"> • Construction / upgrade of the access / haul road at both borrowpit sites. • Transportation of material off site.
Impact:	The movement of heavy vehicles along the district road accessing the site may result in some disruption to traffic on the road. This is likely to be largely of nuisance value.
Mitigation Measure:	<p>Increased traffic, especially heavy vehicle traffic, has the potential to draw complaints from residents nearby to Dol BP. The Site Agent is expected to address any complaints received.</p> <p>The Site Agent shall comply with all the applicable local, regional and national by-laws with regard to road safety and transport. He shall instruct his drivers and plant operators that vehicles will be expected to comply with all road ordinances, such as speed limits, roadworthiness, load securing / covering.</p> <p>Flagmen and signage must be utilised on site to warn motorists that heavy plant machinery will be entering and exiting the sites.</p> <p>Site vehicles should be permitted access only within the demarcated construction sites or on existing roads, as would be required to complete their specific tasks.</p> <p>Site vehicle traffic should be limited to specific access roads to prevent unnecessary damage to the natural environment.</p>
Responsibility:	Site Agent
Permit Requirements:	None
Institutional and Training requirements:	<p>Appointment of a designated on site staff member who will be responsible for the contractor's conformance with the approved EMP.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct bi-annual site inspections and audits.</p>
Monitoring:	Will be monitored through a public complaints register.

6.16 Procurement of Goods and Services	
Objectives:	To maximise the benefits to the local economy through the procurement of goods and services locally if practical.
Activities:	<ul style="list-style-type: none"> • Mining operations (general)
Benefit:	The local economy within the Study Area and further afield within the surrounding areas of the Elundini Local Municipality stands to benefit through the supply of materials or specialist services.
Measures to enhance benefit:	A targeted procurement policy to be implemented at the mine whereby goods and services should be sourced locally if possible. "Local" meaning the study area, followed by the Elundini Local Municipality and finally by the Eastern Cape Province.
Responsibility:	Site Agent
Permit Requirements:	None
Institutional and Training requirements:	None
Monitoring:	None required.

6.17 Employment and Training	
Objectives:	To maximise the social and economic benefits to the local residents through employment and training.
Activities:	<ul style="list-style-type: none"> • Recruitment of labour • Training
Benefit:	The local community stand to benefit from the provision of jobs and the implementation of a staff training programme.
Measures to enhance benefit:	Staff (both skilled and unskilled) should be sourced from within the Elunidini Local Municipality if possible. A training programme should be put in place to train unskilled labour into skilled positions.
Responsibility:	Site Agent
Permit Requirements:	None Required.
Institutional and Training requirements:	Implementation of a Staff Training Programme.
Monitoring:	Will be monitored via the Social and Labour Plan.

6.18 Additional Mitigation Measures

6.18.1 Community Relations

The Site Agent shall erect and maintain information boards at the start of the road construction site. Such boards shall include contact details for complaints by members of the public.

The Site Agent shall keep a "Complaints Register" on both sites. The Register shall contain all contact details of the person who made the complaint, information regarding the complaint itself, and measures taken to address the complaint.

A **Project Steering Committee** must be set up with the community to assist the Mine Owner / Site Agent with employment issues and liaison with communities.

A **Community Liaison Officer** must be appointed from the local community. The CLO will be responsible for channelling any complaints from the community through to the Site Agent and will participate in resolving these issues.

6.18.2 Staff Safety and Education

All staff shall be given a health and safety induction course before beginning work on either of the sites. Part of the induction course will be to make the staff aware of the potential dangers associated with the mining process and the potential hazards around the mines.

The contractor is required to produce a **Health and Safety Plan** (HSP) as per the requirements of the Occupation Health and Safety Act and Regulations. The HSP must include general community safety in the vicinity of the mines, as well as measures to minimise the nuisance factors, such as dust and noise.

The Site Agent must maintain a suitable First Aid Kit at the site office and will have a list of the emergency service contact numbers readily available.

Telephone numbers of emergency services, including the local fire fighting service and HAZMAT / ZORBIT, shall be posted conspicuously in the office near the telephone.

No unauthorised firearms are permitted on either site.

All operations on the borrowpit sites must be undertaken according to the Mine Health and Safety Act No. 29 of 1996 and ensure the safety, health and welfare of the staff on site.

6.18.3 Work Stoppage

The DME shall have the right to order work to be stopped in the event of significant infringements of the Environmental Specifications. Work will only be allowed to restart once the situation is rectified in compliance with the specifications.

6.18.4 Existing Services and Infrastructure

The Site Agent shall ensure that existing services in the extended vicinity of the project borrowpit sites are not disrupted or damaged.

7 MONITORING OF THE EMP

In order to ensure that the Environmental Management Plan is effectively implemented, it is important that regular external audits of the Environmental Management Plan are conducted.

An External Environmental Auditor (EEA) will be appointed by the Department of Roads and Transport to undertake bi-annual site inspections and to produce a Biannual Performance Assessment document in compliance with DME's requirements. The Department of Roads and Transport shall arrange that these external audits do take place and that a system for addressing any problems identified during these audits, is formulated. The relevant documentation shall be kept and shall be available to the DME and the public.

8 DECOMMISSIONING AND CLOSURE

8.1 Environmental and Mine Closure Objectives

8.1.1 Mine Closure

The **Overall Environmental Objective** for mine closure is as follows:

“To render the mining areas² in a safe and environmentally acceptable condition on completion of the mining, rehabilitation and closure activities.”

Specific **Environmental Goals** include:

- “To return the mining areas, as closely as possible, to their former condition and landuse through the shaping and landscaping of the surfaces and through the reestablishment of indigenous vegetation”.
- “To minimise the residual impacts through ensuring that erosion is controlled, slopes are stable, vegetation cover is established and the area is left in a condition which does not pose a safety hazard to humans, livestock and indigenous fauna”.
- “To minimise the visual impacts of the mines on closure through the avoidance of exposed faces and slopes and the through the reestablishment of the indigenous vegetation”.
- “To obtain the necessary Mine Closure Certificates from the Department of Minerals and Energy”.

8.1.2 Management of Impacts

The objectives and goals for the management of impacts are detailed in Section 6.

8.1.3 Socio-Economic Conditions

The specific objective related to the Socio-Economic Conditions is as follows:

“To contribute to the economic and social development of the study area and the Elundini Local Municipality.”

Specific goals include:

- “To maximise the benefits to the local economy through the provision of jobs and support of local service providers and suppliers wherever possible.”

² The mining areas are defined as everything within the boundaries of the perimeter fences including the haul roads and any other surface which was disturbed as a result of the mining operations.

- “To institute a training programme for all staff members.”

8.2 Responsibilities

The Elundini Local Municipality (ELM) shall be responsible for the complete rehabilitation of each of the sites, including borrowpit slopes, floor, spoil sites, access roads, haul routes etc. Where re-vegetation is not successful, these affected areas will be re-seeded and replanted until such time as a cover in excess of 80% has been achieved.

8.3 Rehabilitation Plan and Programme

The ELM / Site Agent, in conjunction with the EEA, shall develop a comprehensive plan for rehabilitation of each site in its entirety, including the associated workshops, site camps etc. This plan must meet the approval of the DME.

The following points must be taken into account when drawing up the **Rehabilitation Plan and Programme**:

- The Plan should be flexible – where measures are found to be inefficient, the plan shall be modified.
- The ELM shall be responsible for successful rehabilitation and re-vegetation of the sites, for a minimum period of 2 years after mining has ceased.
- The Plan shall include the eradication of young invasive, exotic species that may have become established during the construction period, in impacted areas and in rehabilitated areas.
- The growth of invasive exotic species shall be monitored during the 24 month period following decommissioning / closure.
- The Plan shall include grass seed mixes applicable to summer and winter.
- The Plan shall include suitable fertilisers and application rates.
- Successful re-vegetation means $\geq 80\%$ of the seeded area is covered with trees / grass / groundcover.
- Where there is insufficient topsoil to cover an area to specified depth, the Site Agent shall import suitable topsoil.

8.4 Additional Requirements

Environmental Management associated with the decommissioning of this project will ensure that the following items are addressed at closure and during the maintenance / liability period:

- All cleared sites are rehabilitated with indigenous grass species.
- All visible alien plants are removed from disturbed sites.
- The mines conform to the designed closure specifications, including drainage, slope stability, topsoiling and grass planting.
- All site infrastructure will be removed (from the camp site area in Ugie), where applicable, and those areas will be ripped and then covered with a 30mm thick layer of topsoil. Those areas will then be seeded with a mix of grasses indigenous to the area.
- The borrowpit sites must remain fenced with warning signs erected to caution the general public of the altered state of the environment within those areas. Drainage structures must also be left intact.
- The top edges of the mine will be cut back to an angle of 1:3.
- Overburden (decomposed rock) will be, where possible, placed over any exposed rock. This will be covered with a layer of topsoil no less than 30cm deep.
- The topsoil will be seeded at an appropriate time of the year (spring to early – mid summer). Sufficient grass cover will be maintained on the stockpiles during the operational life spans of the mines until such a time that the waste material is used in the rehabilitation of the mine faces.
- The mine areas will be fenced with stockproof fences to prevent access by livestock until such time that the vegetation has been allowed to recover. No dangerous faces which present a safety threat to communities will be left intact.
- All closure objectives prescribed by the DME must be met before retention monies will be released back to the applicant.
- The requirements detailed in Regulations 56, 57, 60, 61 and 62 pertaining to Site Closure must be fulfilled. They include the following key actions:
 - Identify and assess all residual and latent environmental impacts;
 - Undertake a performance assessment and an environmental risk report for each site; and
 - Compile a **Closure Plan** and apply for a **Closure Certificate** for each site.

9 FINANCIAL PROVISION

The contract makes provision for the profiling and earthworks required for the rehabilitation of the borrowpits as well as the fencing, final landscaping and revegetation.

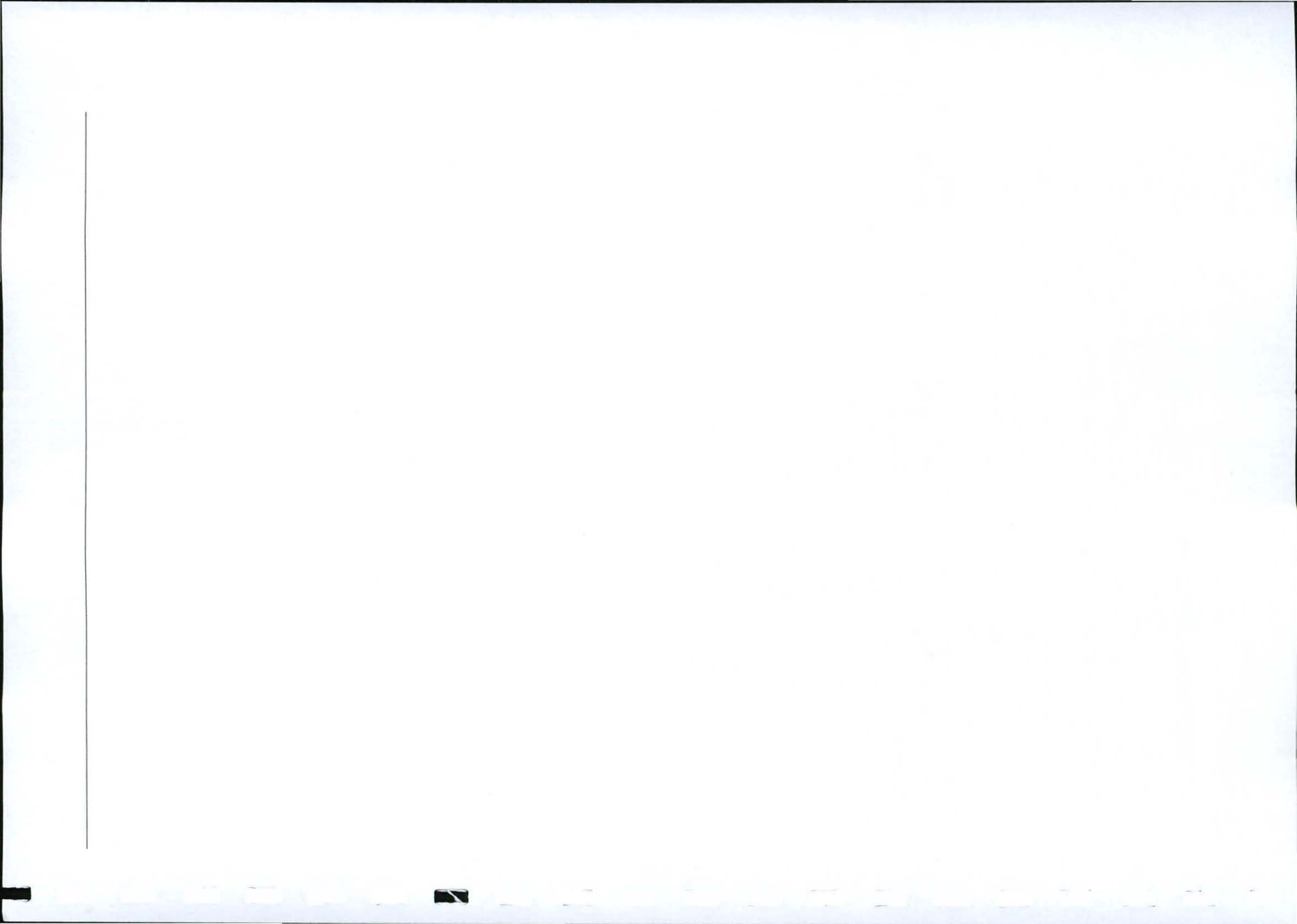
The rehabilitation cost schedule for the borrowpits have been included into APPENDIX E. The calculation assumes that site establishment will be required. A rehabilitation cost of roughly R 85, 000.00 to R 90, 000.00 (including VAT) was determined for each of the borrowpits.

Security for the financial provision will be provided by the Elundini Local Municipality (ELM), who will retain a fixed percentage of the total contract value in retention money until the end of the maintenance period. An amount of R 200, 000.00 will be placed with the DME as a financial guarantee for the rehabilitation of the two borrowpits along to be used during this project. A letter of financial provision confirming this amount is included in APPENDIX F.

10 UNDERTAKING BY THE APPLICANT

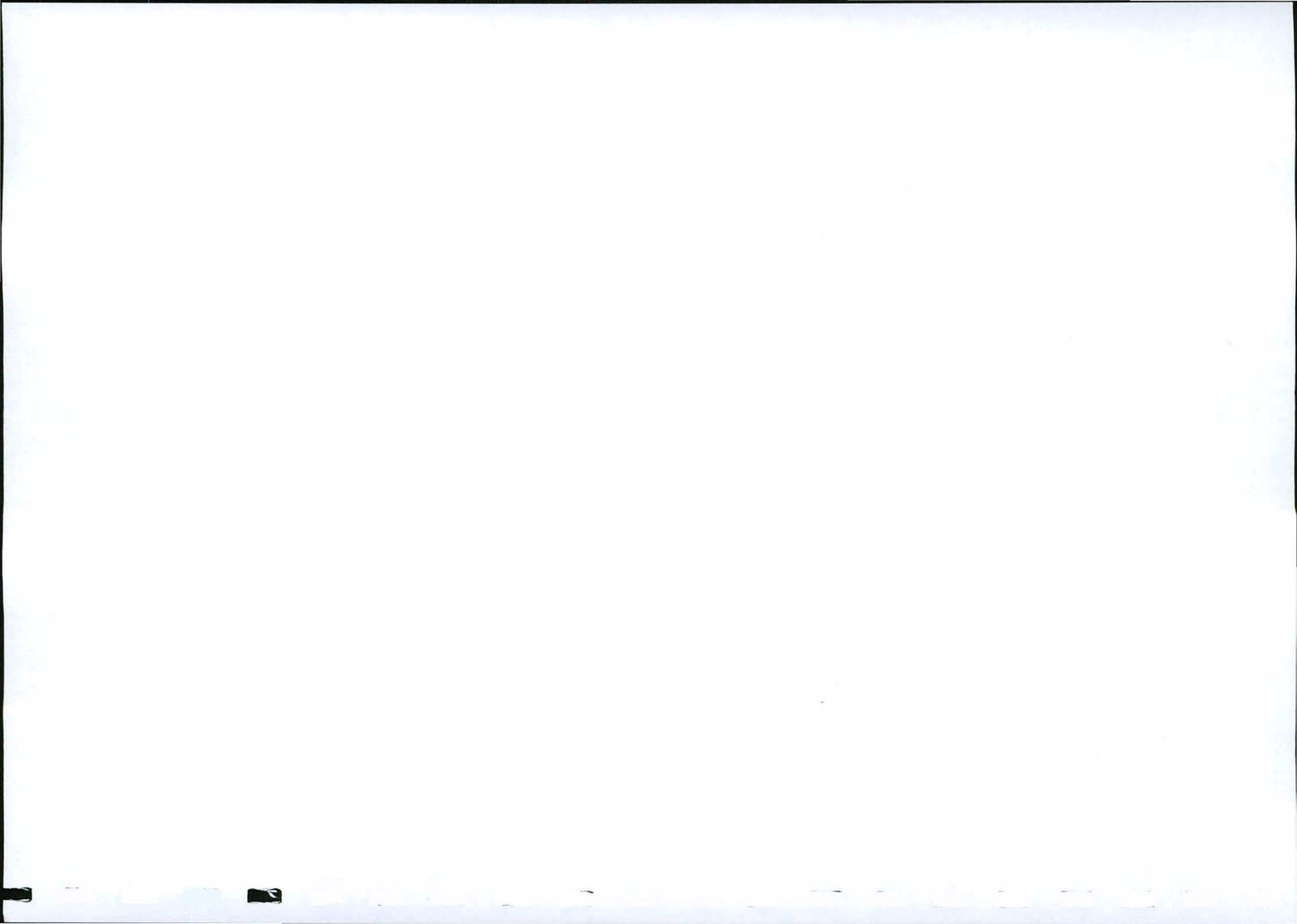
The Client, the Elundini Local Municipality, has undertaken to comply with the requirements of the Environmental Management Plan. A signed copy of the undertaking is included in APPENDIX G.

A letter confirming that this is an ELM project has been included in APPENDIX H.



APPENDIX A

CULTURAL HERITAGE IMPACT ASSESSMENT



HERITAGE IMPACT ASSESSMENT OF
UGIE BORROW PITS,
EASTERN CAPE PROVINCE, SOUTH AFRICA

Prepared for

Terreco cc

Geotechnical, Environmental and Waste Management Services
Box 19829 TECOMA 5214
Telephone Duncan Scott 043 721 1502
scottd@terreco.co.za

Prepared by

eThembeni Cultural Heritage

Box 20057 Ashburton 3213 Pietermaritzburg
Telephone 033 326 1136 / 082 655 9077 / 082 529 3656
Facsimile 086 672 8557 thembeni@iafrica.com

15 March 2010

Management summary

eThembeni Cultural Heritage was appointed by TERRECO to undertake a heritage impact assessment of two borrow pits at Ugie in the Eastern Cape Province, in terms of the National Heritage Resources Act No 25 of 1999. Two eThembeni staff members inspected the area on 24 February 2010, and completed a controlled-exclusive surface survey and a database and literature search.

Observations

The history and visual cohesion of the town of Ugie and its surrounding landscape combine to create a cultural landscape of high scenic quality at the local, regional and provincial levels. It is also sensitive to changes to its visual character wrought by massive infrastructural developments and landscape changes.

The proposed Ugie dolerite borrow pit is located on the side of a prominent hill overlooking the town. The municipal waste site is located on the opposite side of the hill, but is easily screened from the view of residents and travellers by vegetation.

However, the proposed dolerite quarry will create an indelible scar on the landscape that will potentially have a permanent and significant negative effect on the townscape, even if rehabilitated to the standards of the Department of Minerals and Energy. It will be even more visible from the pastoral landscape surrounding the town to the east.

Recommended mitigation measures

We recommend that the proposed Ugie dolerite borrow pit should not be utilised and that material for road construction should be sourced elsewhere.

Further exploitation of the Ugie mudstone borrow pit is acceptable and may proceed with no further heritage mitigation. The site should be rehabilitated immediately following its decommissioning, according to the standards of the Department of Minerals and Energy.

Recommended monitoring

None.

Conclusion

We recommend that the development proceed with the proposed heritage mitigation and have submitted this report to the South African Heritage Resources Agency in fulfilment of the requirements of the National Heritage Resources Act.

If permission is granted for the development to proceed, the client is reminded that the Act requires that a developer cease all work immediately and notify SAHRA should any heritage resources, as defined in the Act, be discovered during the course of development activities.

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1. Introduction

eThembeni Cultural Heritage was appointed by TERRECO to undertake a heritage impact assessment of two borrow pits at Ugie in the Eastern Cape Province, in terms of the National Heritage Resources Act No 25 of 1999 (refer to Appendix A).

South Africa's heritage resources are both rich and widely diverse, encompassing sites from all periods of human history. Resources may be tangible, such as buildings and archaeological artefacts, or intangible, such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical, scientific, social, spiritual, linguistic, economic or technological values; their representivity of a particular time period; their rarity; and their sphere of influence.

The integrity and significance of heritage resources can be jeopardized by natural (e.g. erosion) and human (e.g. development) activities. In the case of human activities, a range of legislation exists to ensure the timeous identification and effective management of heritage resources for present and future generations.

This report represents compliance with a full Heritage Impact Assessment for the proposed development, excluding a palaeontological assessment, which we do not deem necessary given the nature of the project and its location.

2. Terms of reference

A Heritage Impact Assessment must address the following key aspects:

- the identification and mapping of all heritage resources in the area affected;
- an assessment of the significance of such resources in terms of heritage assessment criteria set out in regulations;
- an assessment of the impact development on heritage resources;
- an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- plans for mitigation of any adverse effects during and after completion of the proposed development.

3. Project description

Elundini Municipality are developing proposals for upgrading the gravel road networks within selected existing townships in Ugie Ward 2 including JK Bokwe, Ntokozweni, Mandela Park, Land Camp and Ugie Park (incorporating Takalani). Approximately 800m of Van Riebeek Street will also be upgraded. New storm water drainage and discharge points will also be provided.

The gravel roads to be upgraded to surfaced standard lie within existing servitudes and are of varying levels of deterioration and/or varying widths, with or without storm water drainage in place. It is understood that fenced property boundaries have informally crept onto the existing road reserve in some areas.

The primary objective of this project is to rehabilitate or reconstruct the existing gravel and dirt roads in the selected townships to a suitable low traffic gravel standard and improve the storm water infrastructure. Although every effort has been made to reuse existing storm water infrastructure, in most cases this has not been possible due to its poor state and location.

The upgrading of the streets will be executed in 2 phases: namely Priority 1 roads (± 13 km) and Priority 2 roads (± 11 km). It is intended to construct only the Priority 1 roads at this stage because of budget constraints. The project has been motivated by the communities of these townships, as reflected in public inputs to the recent Integrated Development Plans.

This heritage impact assessment does not apply to the proposed road upgrade, but is limited to the two borrow pits identified as potential sources of material for the upgrade project.

4. Project location

The affected area lies within the jurisdiction of Elundini Local Municipality in the Ukhahlamba District Municipality. Table 1 and Figure 1 provide locations and descriptions of the borrow pits.

Name	Location	Description
Ugie Dolerite Borrow pit	S31 11 55.7 E28 15 39.7	New (greenfield) site located next to the municipal dump site very close to the townlands of Ugie.
Ugie Mudstone Borrow pit	S31 13 14.4 E28 14 12.6	Existing fairly extensively utilised site.

Table 1. Locations and descriptions of the proposed borrow pits near Ugie in the Eastern Cape Province.

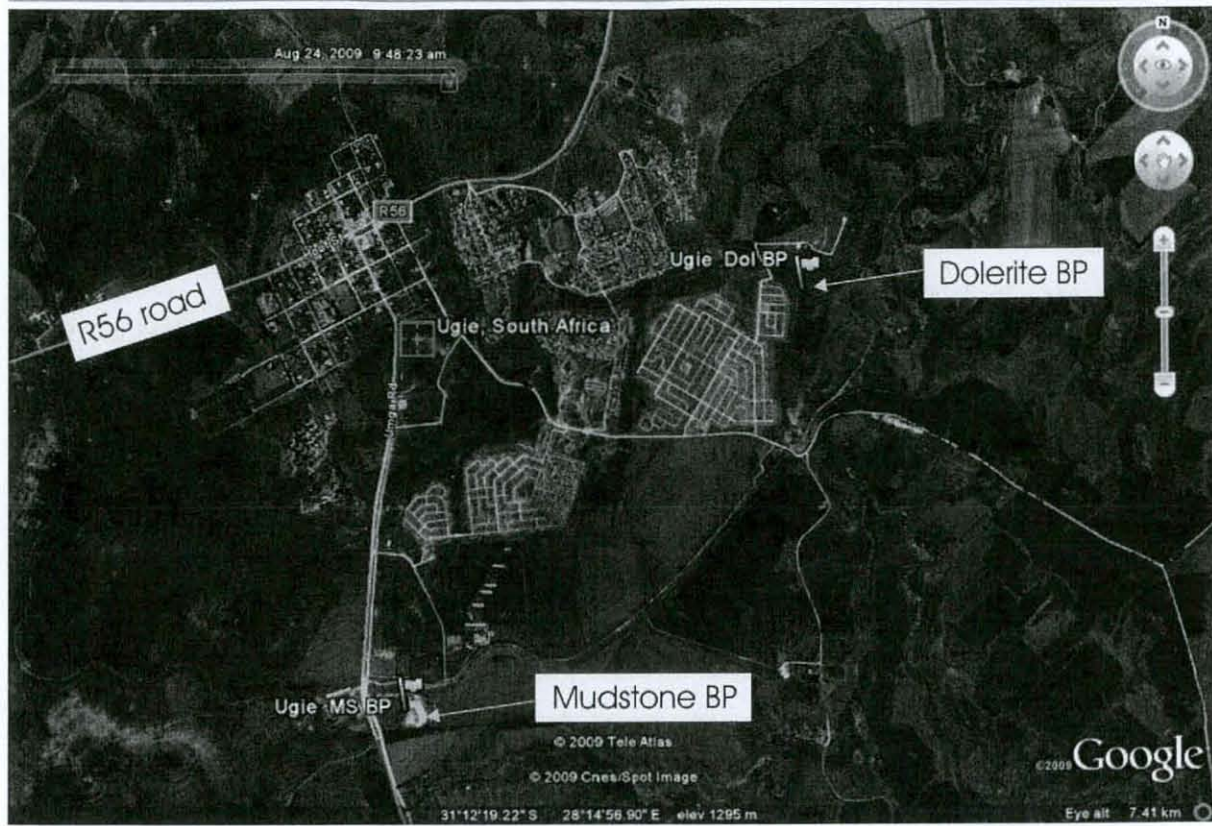


Figure 1. A Google Earth image indicating the locations of the proposed borrow pits relative to Ugie in the Eastern Cape Province.

5. Observations

No development activities associated with the proposed project had begun at the time of our visit, in accordance with heritage legislation. The following table summarises the heritage resources assessed, and our observations.

Heritage resource type	Observation
Living heritage	None were identified within the proposed development areas.
Ecofacts	None were identified within the proposed development areas.
Places, buildings, structures and equipment	None were identified within the proposed development areas.
Places to which oral traditions are attached or which are associated with living heritage	None were identified within the proposed development areas.
Historical settlements and townscapes	See detailed discussion below.
Landscapes and natural features	See detailed discussion below.
Geological sites of scientific or cultural importance	None were identified within the proposed development areas.
Archaeological sites	None were identified within the proposed development areas.
Graves and burial grounds	None were identified within the proposed development areas.
Movable objects excluding any object made by a living person	None were identified within the proposed development areas.
Battlefields	None were identified within the proposed development areas.
Traditional building techniques	None were identified within the proposed development areas.

Table 1. Heritage resources and observations: Ugie borrow pits.

– Historical settlement and townscape / landscape

The Reverend William Murray, member of the Free Church of Scotland, was sent by the London Missionary Society to the then Cape Colony in South Africa to do missionary work amongst the Griquas of Adam Kok III who settled during 1862 in the present Kokstad area. He was also qualified as a medical doctor¹.

The Griquas were persuaded by the Cape Governor Sir George Grey to move from their territory named Griqualand, situated in the area between the towns of Griquatown in the Northern Cape and Philippolis in the Orange Free State. This was done because the leaders of the Griquas always quarrelled amongst themselves, usually troubled the British Government to make peace and from time to time in conflict with the white farmers of the Orange Free State.

¹ <http://www.ugie.co.za/History.html>

During 1862 they moved from Philippolis, preferring to trek through Basuthuland [now Lesotho], because they did not want to cross British territory, to their New Griqualand in the present Kokstad area. Old Griqualand was later on called Griqualand West and New Griqualand, Griqualand East.

Due to a dispute in the Kok family a smaller group broke away from the main group. They crossed the Orange River at Macumacuma near the present town of Sterkspruit and trekked through the present Barkley East district. They crossed the Drakensberg at Mount Enterprise near the present Ugie and settled along the INxu River, which they named the Wildebeest.

A number of them gathered at INxu Drift, now known as Lake's Drift, just north of the present town of Ugie, located on the wagon track between Dordrecht and the new settlement at Kokstad. Ox wagons usually camped out there during the night and had to stay over for a few days if the river was in flood. They usually overhauled their wagons and "trekgoed" for the oxen during the time. The Griquas that settled there helped them for a small fee.

William Murray was born on 15 July 1837 and grew up in the New Deer province in Aberdeenshire in Scotland. His father was a shoemaker and small farmer on the banks of the Ugie River near New Pitslego. Murray, his wife, Ann [née Elliott], and baby daughter, Ann Isabella, left Southampton on a steamer on 27 July 1862. They landed in Port Elizabeth three weeks later on 24 August and proceeded by post coach to Grahamstown. From there they travelled by ox wagon through Fort Beaufort up to Hackney in the Queenstown district. In Katberg they were caught in a snowstorm.

Shortly after they reached Hackney on 9 September 1862 their baby daughter died. The following day Ann Murray also died. Both of them were buried there on the same day and the Reverend Murray decided to remain at Hackney for a while.

Towards the end of February 1863 a deputation of the Griquas left INxu Drift by ox wagon to fetch Murray. The driver of the oxen was Jacob Franks, assisted by Gert du Plooy and Tom Croutz. The wagon leader was April de Wet.

They returned to INxu Drift at the evening of 8 March. Reverend Murray decided to call the place Ugie in remembrance of his homeland. The Scots pronounce Ugie as "Oogie". The word is derived from the word "Oorie" of the Vikings in Iceland, literally meaning to shiver of the cold.

The town of Ugie was founded in 1885 and was known for its large non-denominational orphanage established in 1918 by Father MTR Smit to house children orphaned by the flu epidemic². The Dutch Reformed Church was established in Ugie on 14 February 1903 and comprised the communities of Ugie, Maclear, Tentkop, Mount Fletcher and Gubenxa.

The town is located on a recognised scenic route (the R56) that traverses the foothills of the Drakensberg and has been upgraded extensively to encourage travellers, as an alternative to the N2 national road. Attractions in and around the town include sandstone buildings typical of early Cape European settlement, fly fishing, fossils, Stone Age rock paintings and hiking trails.

² <http://af.wikipedia.org/wiki/Ugie>

The history and visual cohesion of the town of Ugie and its surrounding landscape combine to create a cultural landscape of high scenic quality at the local, regional and provincial levels. It is also sensitive to changes to its visual character wrought by massive infrastructural developments and landscape changes.

The proposed Ugie dolerite borrow pit is located on the side of a prominent hill overlooking the town (refer to Appendix C). The municipal waste site is located on the opposite side of the hill, but is easily screened from the view of residents and travellers by vegetation.

However, the proposed dolerite quarry will create an indelible scar on the landscape that will potentially have a permanent and significant negative effect on the townscape, even if rehabilitated to the standards of the Department of Minerals and Energy. It will be even more visible from the pastoral landscape surrounding the town to the east.

6. Recommended mitigation measures

We recommend that the proposed Ugie dolerite borrow pit should not be utilised and that material for road construction should be sourced elsewhere.

Further exploitation of the Ugie mudstone borrow pit is acceptable and may proceed with no further heritage mitigation. The site should be rehabilitated immediately following its decommissioning, according to the standards of the Department of Minerals and Energy.

7. Recommended monitoring

None.

8. Summary of findings in terms of the National Heritage Resources Act 1999 Section 38(3)

- The identification and mapping of all heritage resources in the area affected
The historical settlement and townscape / landscape of Ugie.
- An assessment of the significance of such resources in terms of the heritage assessment criteria set out in regulations
The cultural landscape has high scenic quality at the local, regional and provincial levels.
- An assessment of the impact of development on such heritage resources
The proposed development could have a permanent and significant negative effect on the townscape.
- An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development
The impact on the cultural landscape will outweigh the potential benefits of the proposed development.
- The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources
The client has undertaken such consultation in terms of statutory requirements and retains the relevant documentation.

- If heritage resources will be adversely affected by the proposed development, the consideration of alternatives
The proposed Ugie dolerite borrow pit should not be utilised and material for road construction should be sourced elsewhere.
- Plans for mitigation of any adverse effects during and after completion of the proposed development
The Ugie mudstone borrow pit should be rehabilitated immediately following its decommissioning, according to the standards of the Department of Minerals and Energy.

9. Conclusion

We recommend that the development proceed with the proposed heritage mitigation and have submitted this report to the South African Heritage Resources Agency in fulfilment of the requirements of the National Heritage Resources Act. According to Section 38(4) of the Act the report shall be considered timeously by the Council which shall, after consultation with the person proposing the development, decide –

- whether or not the development may proceed;
- any limitations or conditions are to be applied to the development;
- what general protections in terms of this Act apply, and what formal protections may be applied to such heritage resources;
- whether compensatory action shall be required in respect of any heritage resources damaged or destroyed as a result of the development; and
- whether the appointment of specialists is required as a condition of approval of the proposal.

Relevant staff members may be contacted at the SAHRA Cape Town head office (Mary Leslie telephone 021 462 4502; mleslie@sahra.org.za).

APPENDIX A**STATUTORY REQUIREMENTS**

Section 38(1) of the National Heritage Resources Act No 25 of 1999 requires a heritage impact assessment in case of:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- the construction of a bridge or similar structure exceeding 50 m in length;
- any development or other activity which will change the character of a site—
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- the re-zoning of a site exceeding 10 000 m² in extent; or
- any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

The Act defines a heritage resource as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes, but is not limited to, the following wide range of places and objects:

- living heritage as defined in the National Heritage Council Act No 11 of 1999 (cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships);
- ecofacts (non-artefactual organic or environmental remains that may reveal aspects of past human activity);
- places, buildings, structures and equipment;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds;
- sites of significance relating to the history of slavery in South Africa;
- movable objects, but excluding any object made by a living person;
- battlefields; and
- traditional building techniques.

Furthermore, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons; and
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.

A 'place' is defined as:

- a site, area or region;
- a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure;
- a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures;
- an open space, including a public square, street or park; and
- in relation to the management of a place, includes the immediate surroundings of a place.

'Structures' means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

'Archaeological' means –

- material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

'Palaeontological' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

'Grave' means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. Amafa aKwaZulu-Natali and / or the South African Heritage Resources Agency will only issue a permit for the alteration of a grave if they are satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned. eThembeni adheres to the following procedures:

- Notification of the impending removals (using appropriate language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;
- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from Amafa aKwaZulu-Natali and / or the South African Heritage Resources Agency;
- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

APPENDIX B**METHODOLOGY**

Two eThembeni staff members inspected the area on 24 February 2010. We completed a controlled-exclusive surface survey, where 'sufficient information exists on an area to make solid and defensible assumptions and judgements about where [heritage resource] sites may and may not be' and 'an inspection of the surface of the ground, wherever this surface is visible, is made, with no substantial attempt to clear brush, turf, deadfall, leaves or other material that may cover the surface and with no attempt to look beneath the surface beyond the inspection of rodent burrows, cut banks and other exposures that are observed by accident' (King 1978³).

We consulted various provincial databases, including historical, archaeological and geological sources and sourced a concise account of South Africa's pre and postcolonial history (available on request). We assessed the value and significance of heritage resources, as defined in the National Heritage Resources Act 1999 and the criteria contained in this Appendix.

Geographic coordinates were obtained with handheld Garmin 60 and nuvi 500 global positioning units. Photographs were taken with a Nikon Coolpix camera and a representative selection is included in Appendix C. A statement of independence and a summary of our ability to undertake this heritage impact assessment are included in Appendix D.

The assumptions and limitations of this heritage impact assessment are as follows:

- We have assumed that the description of the proposed project, provided by the client, is accurate.
- We have assumed that the public consultation process undertaken as part of the Environmental Impact Assessment is sufficient and adequate and does not require repetition as part of the heritage impact assessment.
- Soil surface visibility was low to moderate. Heritage resources might be present below the surface or in areas of dense vegetation and we remind the client that the Act requires that a developer cease all work immediately and notify Amafa should any heritage resources, as defined in the Act, be discovered during the course of development activities.
- No subsurface investigation (including excavations or sampling) were undertaken, since a permit from Amafa aKwaZulu-Natali is required to disturb a heritage resource.
- We are not able to provide a specialist palaeontological assessment, but do not deem such an assessment necessary due to the nature of both the project and the environment.
- A key concept in the management of heritage resources is that of non-renewability: damage to or destruction of most resources, including that caused by bona fide research endeavours, cannot be reversed or undone. Accordingly, management recommendations for heritage resources in the context of development are as conservative as possible.
- Human sciences are necessarily both subjective and objective in nature. We strive to manage heritage resources to the highest standards in accordance with national and

³ King, T. F. 1989. The archaeological survey: methods and uses. Quoted in Canter, L. W. 1996. Environmental impact assessment. Second Edition. New York: McGraw-Hill, Inc.

international best practice, but recognise that our opinions might differ from those of other heritage practitioners.

- We take no responsibility for the misuse of the information contained in this report.

Criteria for assessing the significance and value of heritage resource sites

The following guidelines for determining site significance were developed by the South African Heritage Resources Agency in 2003. We use them in conjunction with tables of our own formulation (see that for the Southern African Iron Age, below) when considering intrinsic site significance and significance relative to development activities, as well as when recommending mitigatory action.

Type of Resource

- Place
- Structure
- Archaeological Site
- Palaeontological Site
- Geological Feature
- Grave

Type of Significance

1. Historical Value

It is important in the community, or pattern of history

- Importance in the evolution of cultural landscapes and settlement patterns
- Importance in exhibiting density, richness or diversity of cultural features illustrating the human occupation and evolution of the nation, Province, region or locality.
- Importance for association with events, developments or cultural phases that have had a significant role in the human occupation and evolution of the nation, Province, region or community.
- Importance as an example for technical, creative, design or artistic excellence, innovation or achievement in a particular period
- It has strong or special association with the life or work of a person, group or organisation of importance in history
- Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, Province, region or community.
- It has significance relating to the history of slavery
- Importance for a direct link to the history of slavery in South Africa.

2. Aesthetic Value

It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group

- Importance to a community for aesthetic characteristics held in high esteem or otherwise valued by the community.
- Importance for its creative, design or artistic excellence, innovation or achievement.
- Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the

identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.

- In the case of an historic precinct, importance for the aesthetic character created by the individual components which collectively form a significant streetscape, townscape or cultural environment.

3. Scientific Value

It has potential to yield information that will contribute to an understanding of natural or cultural heritage

- Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
- Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.
- Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.
- Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.
- It is important in demonstrating a high degree of creative or technical achievement at a particular period.
- Importance for its technical innovation or achievement.

4. Social Value

It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons

- Importance as a place highly valued by a community or cultural group for reasons of social, cultural, religious, spiritual, symbolic, aesthetic or educational associations.
- Importance in contributing to a community's sense of place.

Degrees of Significance

Rarity

It possesses uncommon, rare or endangered aspects of natural or cultural heritage

- Importance for rare, endangered or uncommon structures, landscapes or phenomena.

Representivity

It is important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects

- Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class.
- Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, Province, region or locality.

Sphere of Significance: High, Medium, Low

- International; National; Provincial; Regional; Local

Southern African Iron Age

	Significance		
	- low	- medium	- high
Unique or type site			Yes
Formal protection			Yes
Spatial patterning	?Yes	?Yes	?Yes
Degree of disturbance	75 – 100%	25 – 74%	0 – 24%
Organic remains (list types)	0 – 5 / m ²	6 – 10 / m ²	11 + / m ²
Inorganic remains (list types)	0 – 5 / m ²	6 – 10 / m ²	11 + / m ²
Ancestral graves			Present
Horizontal extent of site	< 100m ²	101 – 1000m ²	1000 + m ²
Depth of deposit	< 20cm	21 – 50cm	51 + cm
Spiritual association			Yes
Oral history association			Yes
➤ Research potential			High
➤ Educational potential			High

The management of cultural landscapes

The Cultural Landscape Foundation⁴ defines cultural landscapes as follows:

A cultural landscape is a geographic area that includes resources and natural resources associated with a historic event, activity, or person. Sometimes cultural landscapes are the result of one person or group of people acting upon the land. Other times they are the result of an idea one person or a group had and then created at that time. Cultural landscapes can

⁴ Though professional techniques for identifying, documenting, and managing cultural landscapes have evolved rapidly in the past 30 years, the results of the professionals' work often fails to reach the general public. Consequently, many of the places in which we live, work, and play often change considerably—sometimes over years and sometimes overnight! The Cultural Landscape Foundation is the only not-for-profit foundation in America dedicated to increasing the public's awareness of the importance and irreplaceable legacy of cultural landscapes. Through education, technical assistance, and outreach, the Cultural Landscape Foundation aims to broaden the support and understanding for cultural landscapes nationwide in hopes of saving our priceless heritage for future generations. The CLF achieves this mission by: (1) heightening the awareness of those who impact cultural landscapes; (2) assisting those groups and organizations who are working to increase the appreciation and recognition of cultural landscapes; and, (3) developing educational tools for young people to better connect them to their cultural landscape environs.

range from thousands of acres of rural lands to a small homestead with a front yard of less than one acre. They include grand estates, farmland, public gardens and parks, college campuses, cemeteries, scenic highways and even industrial sites.

Four general types of Cultural Landscapes, not mutually exclusive, are:

- Historic Sites
- Historic Designed Landscapes
- Historic Vernacular Landscapes
- Ethnographic Landscapes

Cultural Landscapes can:

- Be man-made expressions of visual and spatial relationships.
- Serve as texts and narratives of cultures.
- Be valuable expressions of regional identity.
- Be works of art that are part of our national heritage.
- Exist in relationship to their ecological contexts.

What are cultural landscapes? by Alice E. Ingerson, Institute for Cultural Landscape Studies⁵

Virtually all landscapes have cultural associations, because virtually all landscapes have been affected in some way by human action or perception. Therefore, the Institute for Cultural Landscape Studies does not use the phrase "cultural landscape" to mean a special type of landscape. Instead, we use "cultural landscape" to mean a way of seeing landscapes that emphasizes the interaction between human beings and nature over time. ICLS also works with many other organizations, some of which have contrasting or even conflicting definitions of "cultural landscape":

individual, special, aesthetic, collective, representative, useful, cultural, related to the arts (consciously designed objects), ideas of enduring value related to the everyday beliefs and practices of a group of people, the work of landscape architects or garden designers, scenery portrayed in a painting or photograph, or that is seen as worth painting or photographing, the land that can be seen from a single vantage point (usually larger than a "site", smaller than a "region"), "nearly everything we see when we go outdoors" — Peirce Lewis 1979

The National Park Service and the National Register of Historic Places, as well as organizations that look to these agencies for management models and standards, use the operational definition of "cultural landscape" from the 1996 Secretary of the Interior's . . . Guidelines for the Treatment of Cultural Landscapes:

⁵ From the website of the Institute for Cultural Landscape Studies of the Arnold Arboretum (<http://www.icls.harvard.edu>), © The President and Fellows of Harvard College. The Institute for Cultural Landscape Studies was formed in 1997 to support the emerging community of professionals and volunteers who manage and interpret landscapes with a significant history of human use, particularly in the northeastern United States. These practitioners work with a wide variety of places, from historic gardens and public parks to urban streetscapes, broad agricultural or industrial regions, and conservation or ecological reserves. These landscapes are neither static nor self-contained. Managing them requires active experimentation and continuous learning, to understand how past events and decisions produced today's landscapes, and how today's decisions and events are already producing tomorrow's landscapes. The Institute for Cultural Landscape Studies worked with nonprofit organizations, public agencies, and colleges and universities to capture place-based knowledge about cultural landscapes, and to respond to emerging issues.