



**mineral resources**

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EC 30/5/1/3/3/2/1/0444 EM  
09 June 2010

South African Heritage Resources Agency  
P.O. Box 758  
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5200

Case no: 2175

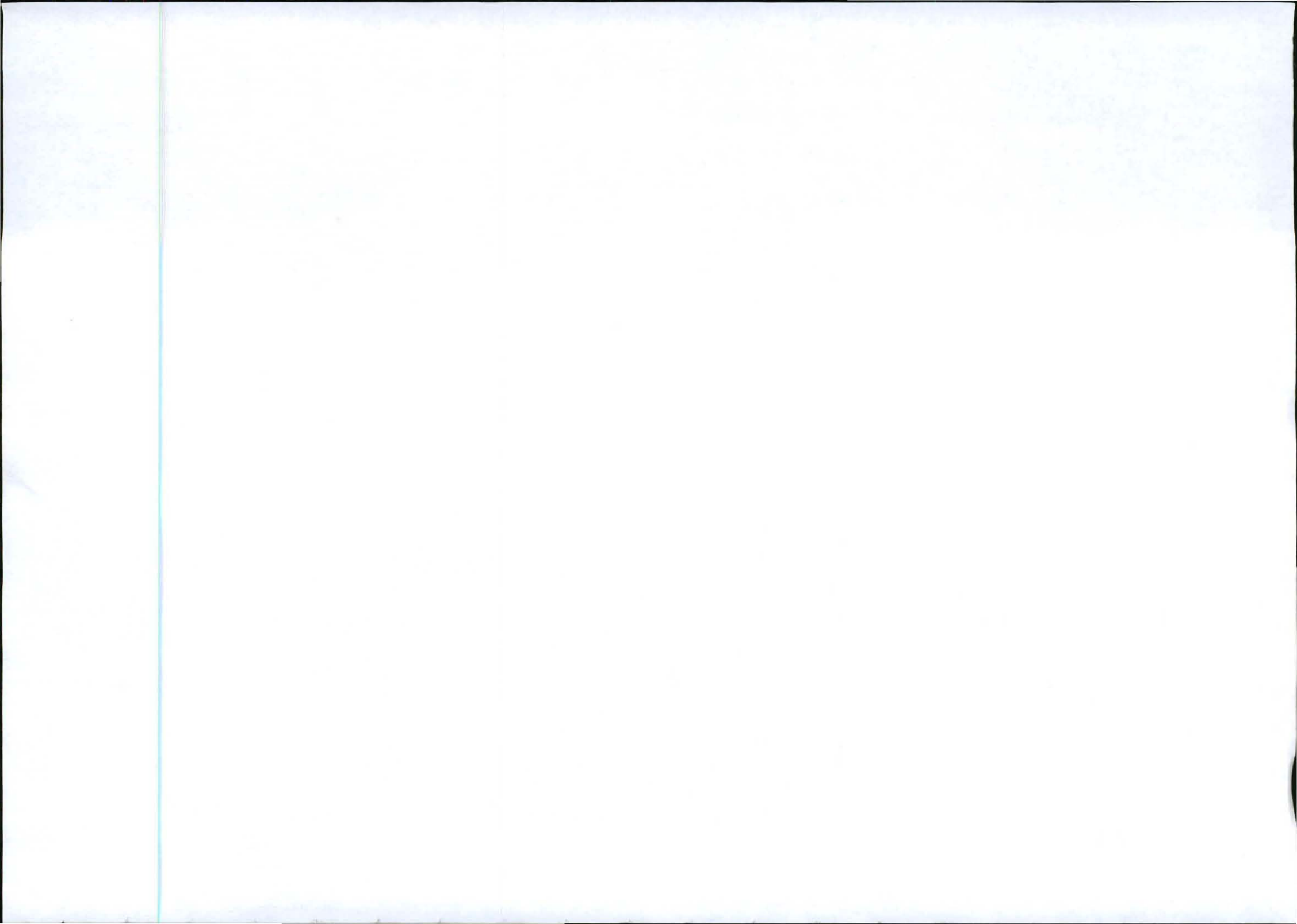
Sir

**CONSULTATION IN TERMS OF SECTION 40 OF THE MPRDA OF 2002:  
ENVIRONMENTAL MANAGEMENT PLAN, MINING PERMIT FOR PROPOSED BORROW  
PIT AND QUARRY FOR THE UPGRADING OF DR 08015 BETWEEN MT.FRERE AND  
THE R 56 MOUNT FLETCHER TO MATATIELE, IN EASTERN CAPE.**

1. Attached herewith, please find a copy of the contact details, a locality map and Mine development plan received from **Department of Roads and Transport**, for your comments.
2. Please forward any written comments or requirements your department may have in this regard, to this office not later than **07 August 2010**. Failure to do so, will lead to the assumption that your department has no objection(s) or comments with regard to the said document.
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(0444)** EM in all future correspondence.
5. Your co-operation is appreciated.

Yours faithfully

  
REGIONAL MANAGER  
EASTERN CAPE



# Environmental Management Programme Report

## Proposed Borrow Pit and Quarry for the Upgrading of District Road 08015 ( $\pm$ Km 57 to $\pm$ Km 79) Between Mount Frere and the R56 (Mount Fletcher to Matatiele)

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

03 JUN 2010

Print Name *S. L. Swartz*

Signature *[Handwritten Signature]*

DEPARTMENT OF MINERALS AND ENERGY

D/2010/06/08/001  
E-2015/1/2/2/0444 mP

Report Prepared for  
**Iliso Consulting**

On Behalf of  
**Department of Roads and Transport**

REGIONAL MANAGER  
MINERALS AND ENERGY  
EASTERN CAPE REGION

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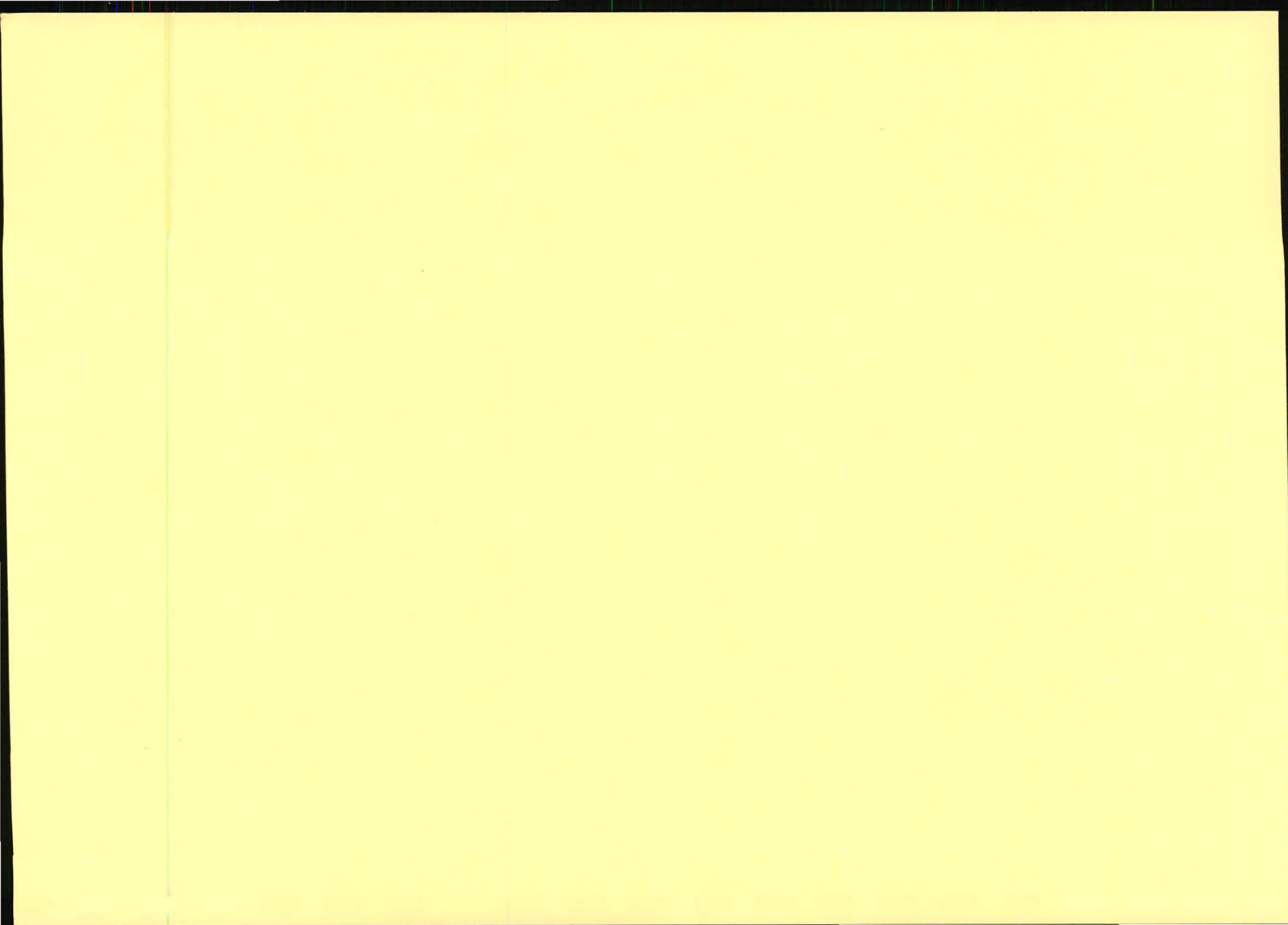
2010-06-08

STREEKBESTUURDER  
MINERALE EN ENERGIE  
OOS-KAAPSTREEK

Report No 407899/3

June 2010

Report prepared by



# Environmental Management Programme Report

## Proposed Borrow Pit and Quarry for the Upgrading of District Road 08015 (±Km 57 to ±Km 79) Between Mount Frere and the R56 (Mount Fletcher to Matatiele)

Report Prepared for  
**Iliso Consulting**  
On Behalf of  
**Department of Roads and Transport**

**SRK Report No 407899/3**

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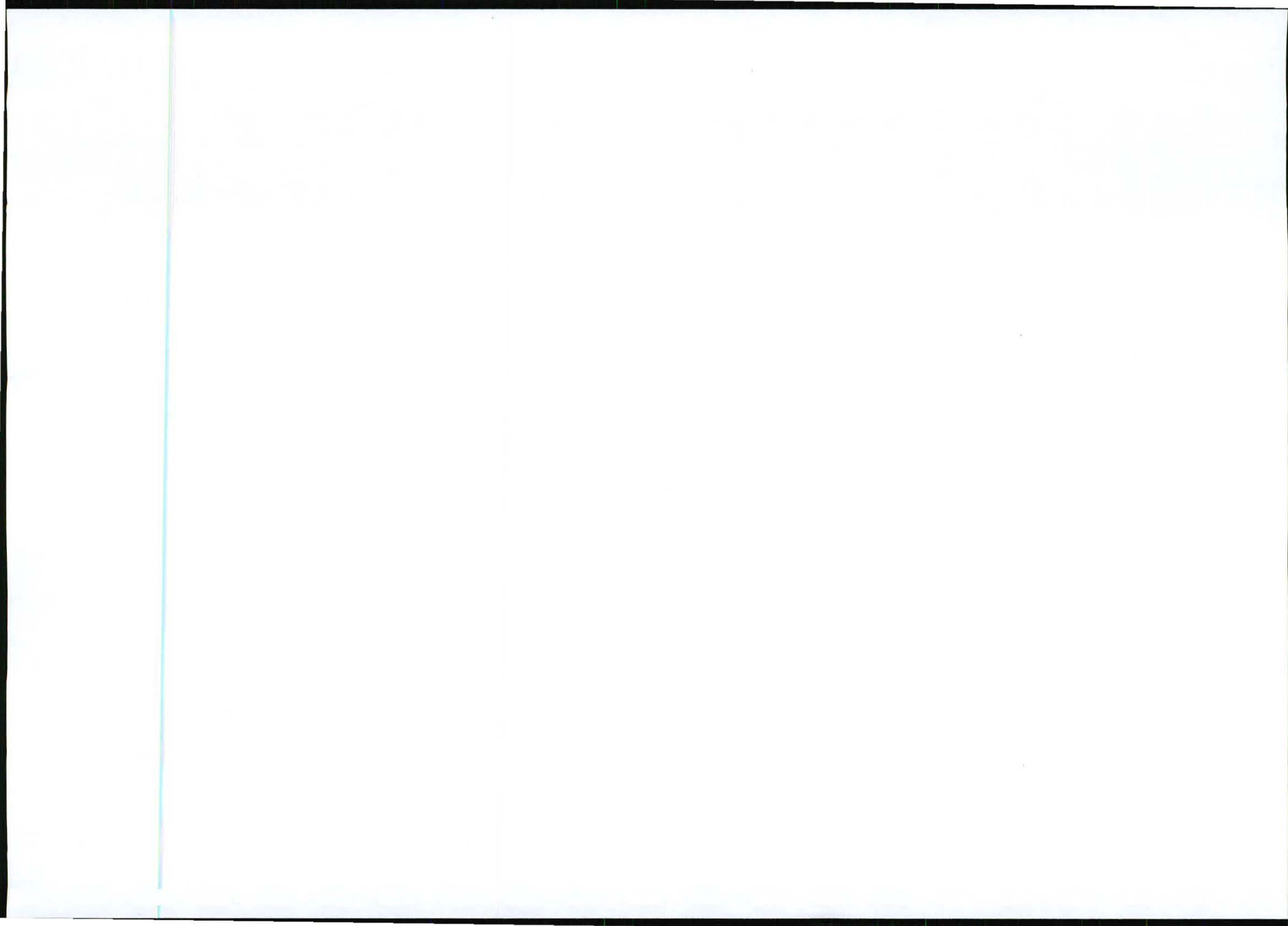


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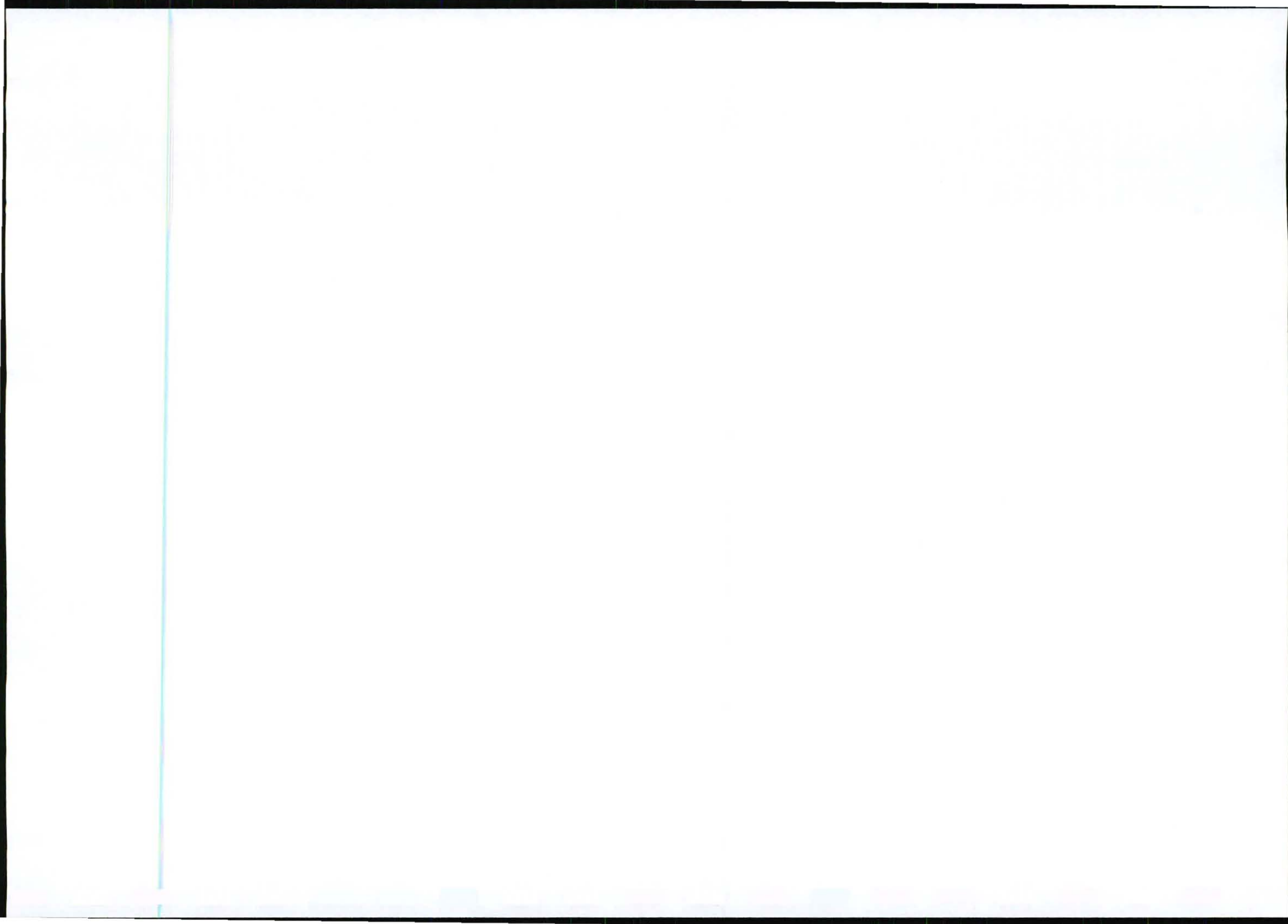


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Principal Environmental Scientist



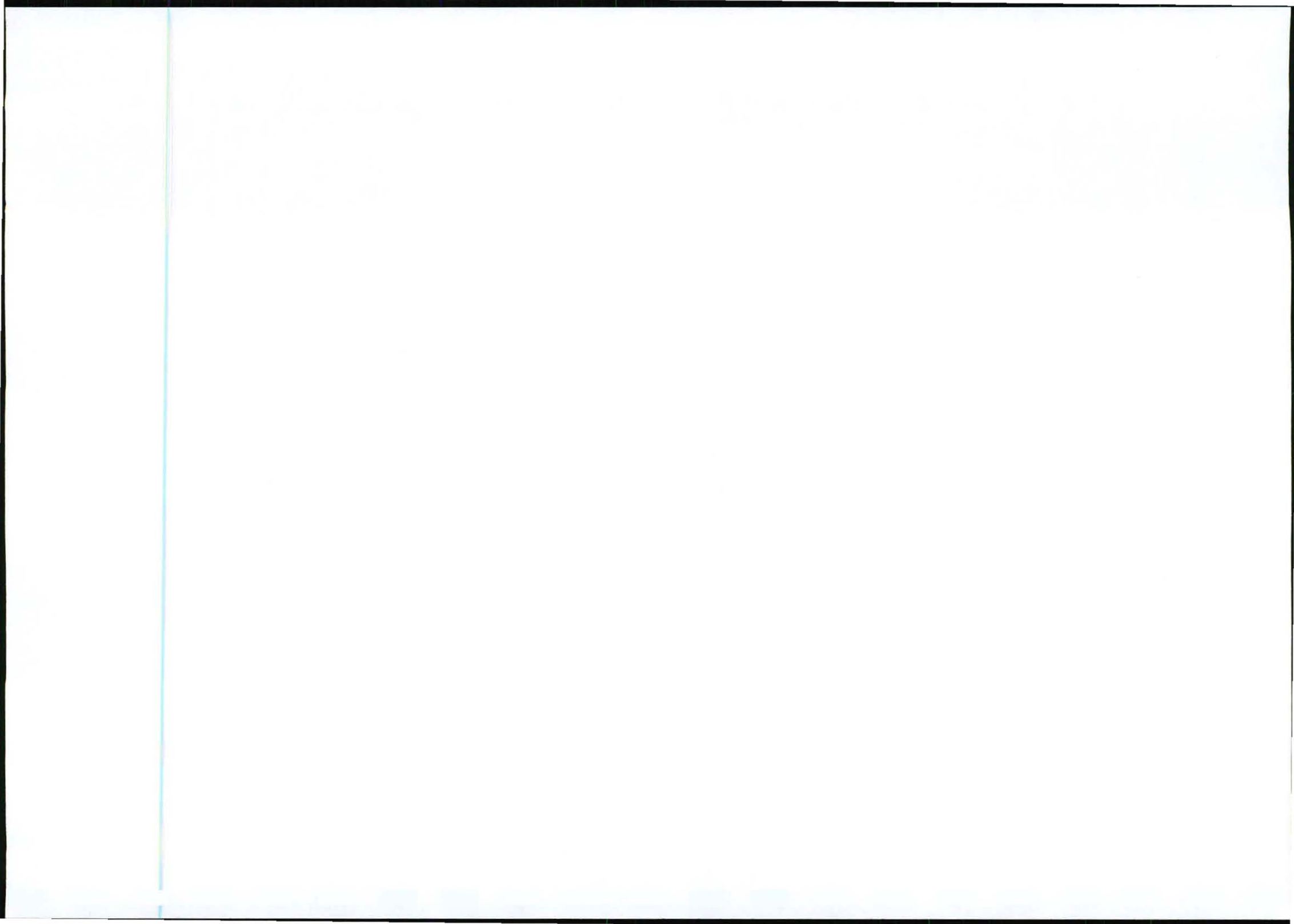
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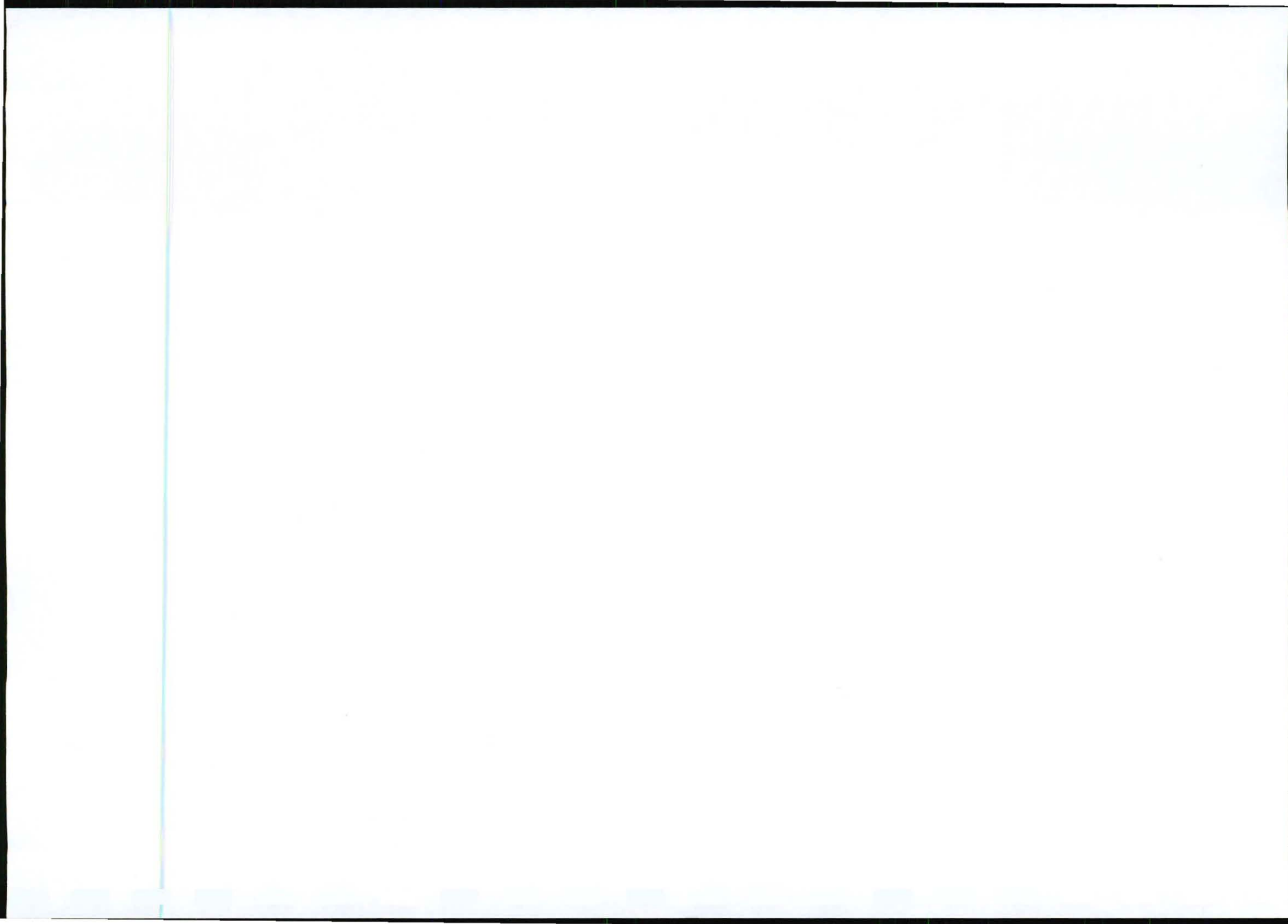
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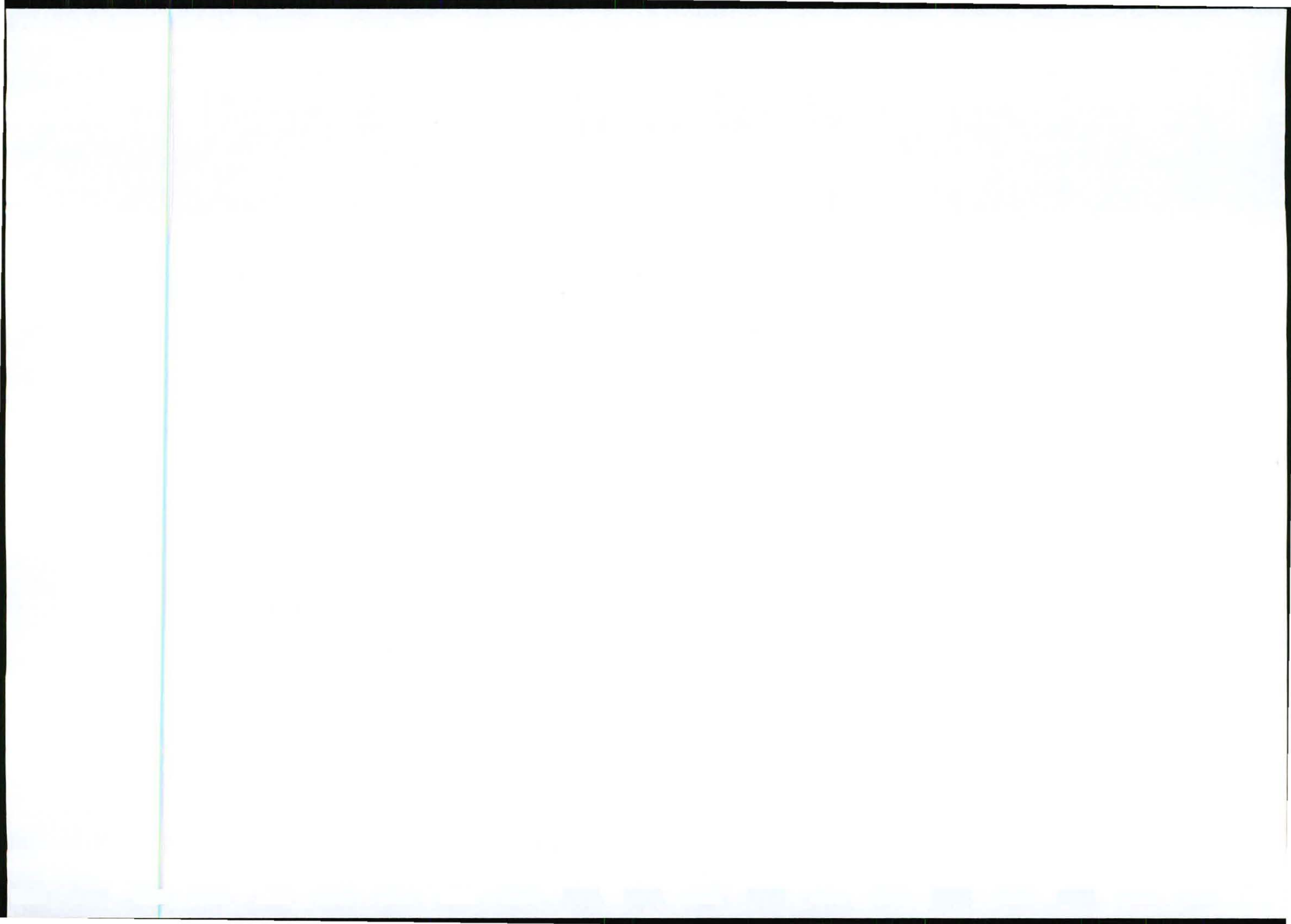


## Glossary

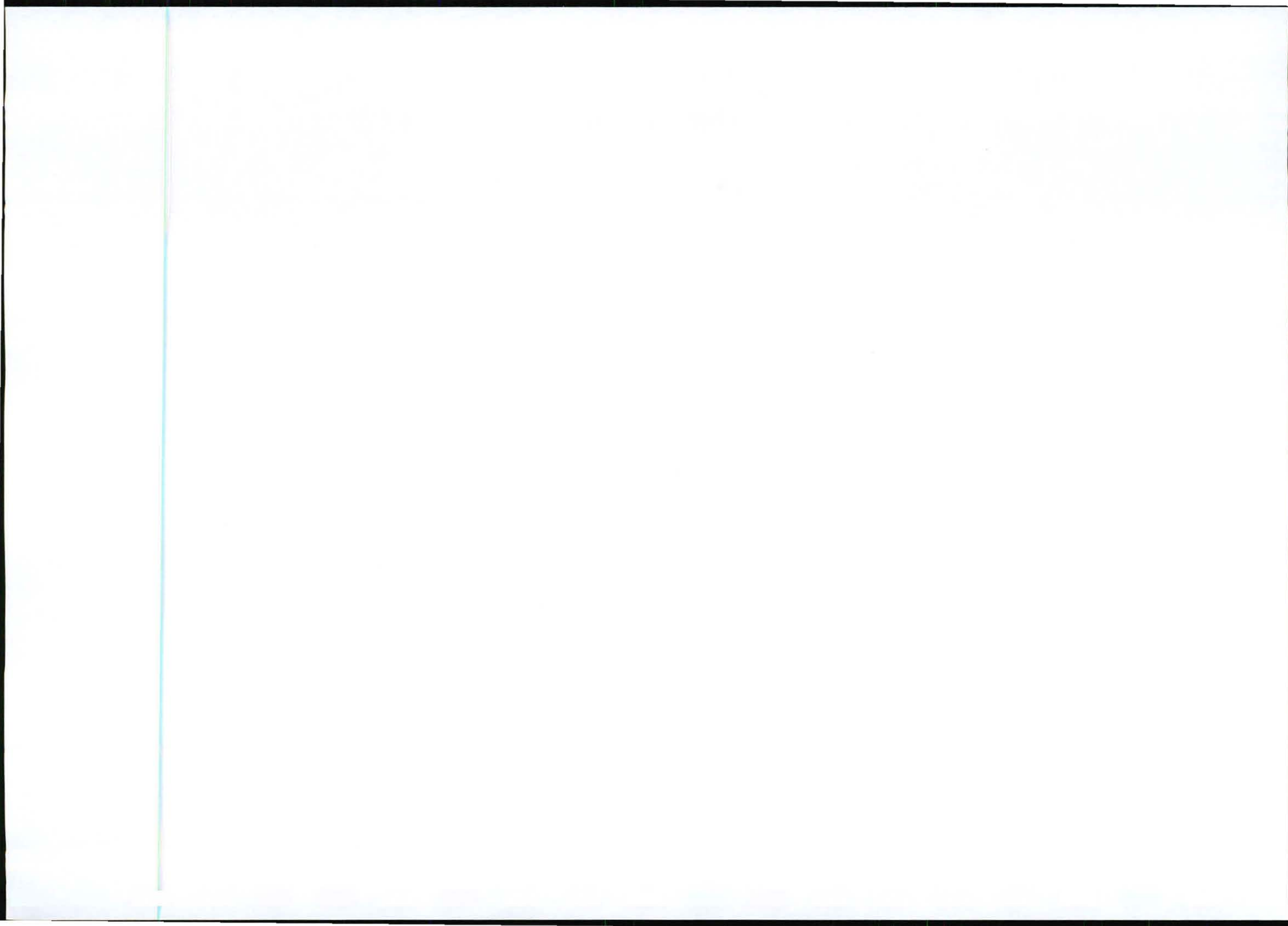
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Impact Assessment (EIA)	A study of the environmental consequences of a proposed course of action.
Scoping	A procedure to consult with stakeholders to determine issues and concerns and for determining the extent of and approach to an EIA, used to focus the EIA
Scoping Report	A written report describing the issues identified to date for inclusion in an EIA
Transformed habitat / land	Land that has been significantly impacted upon by man's activities (such as cultivation, urban development, mining, landscaping, severe overgrazing), and where the original structure, species composition and functioning of ecological processes has been irreversibly altered. Transformed habitats are not capable of being restored to their original states
Degraded habitat / land	Land that has been impacted upon by man's activities (including introduction of invasive alien plants, light-moderate overgrazing, accelerated soil erosion, dumping of waste), but that still retains a degree of its original structure and species composition (although some species loss would have occurred) and where ecological processes still occur (albeit in an altered way). Degraded land is capable of being restored to a near-natural state with appropriate ecological management
Untransformed habitat / land	Land that has not been significantly impacted upon by man's activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and the functioning of ecological processes

## Abbreviations

ASAPA	Association of South African Professional Archaeologists
CBA	Critical Biodiversity Area
CEMP	Planning, Design, Pre-Construction and Construction Environmental Management Plan
CRM	Cultural Resources Management
DEDEA	Department of Economic Development and Environmental Affairs
DEIR	Draft Environmental Impact Report
DME	Department of Minerals and Energy
DRT	Department of Roads and Transport
DSR	Draft Scoping Report
DWAF	Department of Water Affairs and Forestry (former name of the department)
DWEA	Department of Water and Environmental Affairs (National)
EA	Environmental Auditor
ECO	Environmental Control Officer



EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Plan
ER	Environmental Representative
IAP	Interested and Affected Party
IDZ	Industrial Development Zone
IEM	Integrated Environmental Management
ML	Megalitres (1,000,000 litres)
N-DEAT	Department of Environmental Affairs and Tourism (National) (former name of the department)
NEMA	National Environmental Management Act
NMBM	Nelson Mandela Bay Municipality
RoD	Record of Decision
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SRK	SRK Consulting
ToR	Terms of Reference
+ve	Positive
-ve	Negative







## 1 Introduction

SRK Consulting (SRK) has been appointed by the Eastern Cape Department of Roads and Transport (ECDRT) to submit an application for a mining right for the proposed hard rock quarry and a borrow pit located along the DR 08015 between Mount Frere and the R56 (between Mount Fletcher and Matatiele), which is planned to be upgraded and rehabilitated. This EMP is prepared in accordance with the requirements of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) (MPRDA) and the Department of Mineral Resources (DMR).

### 1.1 Applicant Details

Eastern Cape Department of Roads  
and Transport

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5605

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Email: [thembela.peter@dot.ecprov.gov.za](mailto:thembela.peter@dot.ecprov.gov.za)

### 1.2 Environmental Assessment Practitioner Details

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**Directors** AJ Barrett, JR Dixon, DJ Mahlangu, BJ Middleton, MJ Morris, PE Schmidt, PJ Terbrugge

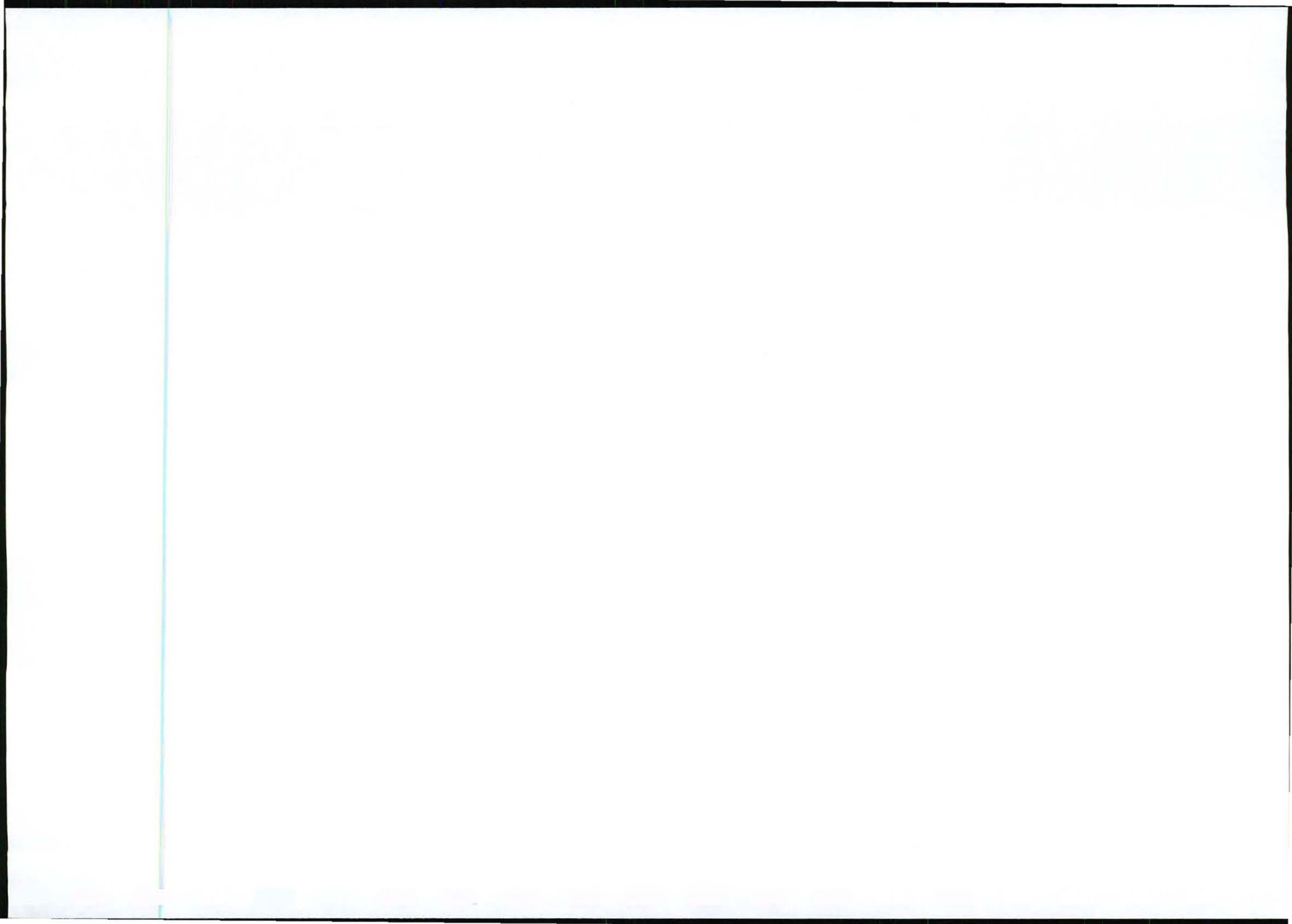
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### 1.3 SRK Profile and Expertise of Relevant Environmental Assessment Practitioners (EAP's)

SRK Consulting (SRK) has been appointed by the Eastern Cape Department of Roads and Transport (ECDRT) as the independent consultants to undertake the Environmental Management Programme (EMP) process required in terms of applicable legislation.

SRK Consulting comprises over 600 professional staff worldwide, offering expertise in a wide range of environmental and engineering disciplines. SRK's Port Elizabeth environmental department has a distinguished track record of managing large environmental and engineering projects and has been practicing in the Eastern Cape since 2001. SRK has rigorous quality assurance standards and is ISO 9001 accredited.

The qualifications and experience of the individual practitioners responsible for this project are detailed in Box 1 below.

**Project Reviewer**

- Rob Gardiner, MSc, MBA, Pr Sci Nat
- Rob Gardiner is the Principal Environmental Scientist and head of SRK's Environmental Department in Port Elizabeth. He has more than 15 years environmental consulting experience covering a broad range of projects, including Environmental Impact Assessments, Environmental Management Systems (EMS), environmental management plans, and environmental auditing. His experience in the development, manufacturing, mining and public sectors has been gained in projects within South Africa, Lesotho, Botswana, Angola and Argentina.

**Project Manager**

- Robyn Thomson, BSc Honours (Environmental Science)
- Robyn Thomson is an Environmental Scientist, with more than 6 years consulting experience covering a broad range of projects, including, Basic Assessments, Environmental Impact Assessments, Environmental Management Plans, Environmental Auditing and GIS.

#### Box 1: Environmental Assessment Practitioner Details

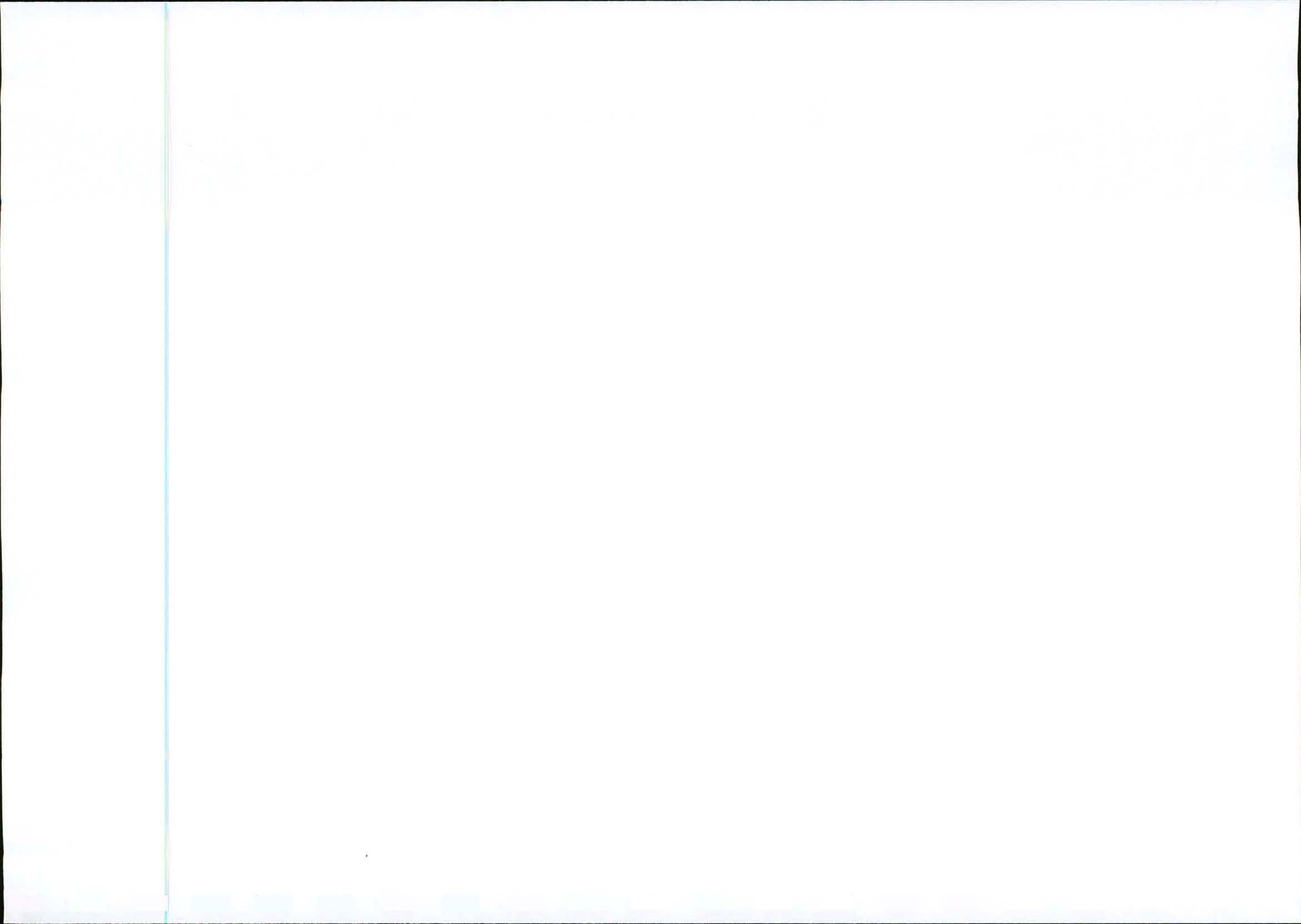
### 1.4 Legal and Administrative Requirements

There are a number of regulatory requirements at local, provincial and national level with which the proposed development will have to conform. A brief summary is provided below of the Acts that are relevant to this study. Some of the key environmental legal requirements include:

- Mineral and Petroleum Resources Development Act 28 of 2002;
- The National Environmental Management Act 107 of 1998; and
- The National Heritage Resources Act 25 of 1999.

Note that other legislative requirements may pertain to the proposed development, but identification and interpretation of these is beyond the brief of this study. As such, the summary provided below is not intended to be definitive or exhaustive, and serves to highlight key environmental legislation and obligations only.

The environmental legislation which is applicable to the authorisation of the proposed project is summarised in this section.



#### **1.4.1 Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA)**

The MPRDA was promulgated to ensure the sustainable development of South Africa's mineral and petroleum resources within a framework of national environmental policy, norms and standards while promoting economic and social development. The objects of the Act are described as follow:

- a) recognise the internationally accepted right of the State to exercise sovereignty over all the mineral and petroleum resources within the Republic;
- b) give effect to the principle of the State's custodianship of the nation's mineral and petroleum resources;
- c) promote equitable access to the nation's mineral and petroleum resources to all the people of South Africa;
- d) substantially and meaningfully expand opportunities for historically disadvantaged persons, including women, to enter the mineral and petroleum industries and to benefit from the exploitation of the nation's mineral and petroleum resources;
- e) promote economic growth and mineral and petroleum resources development in the Republic;
- f) promote employment and advance the social and economic welfare of all South Africans;
- g) provide for security of tenure in respect of prospecting, exploration, mining and production operations;
- h) give effect to section 24 of the Constitution by ensuring that the nation's mineral and petroleum resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development; and
- i) ensure that holders of mining and production rights contribute towards the socio-economic development of the areas in which they are operating.

Section 5(4) states that:

*“(4) No person may prospect for or remove, mine, conduct technical co-operation operations, reconnaissance operations, explore for and produce any mineral or petroleum or commence with any work incidental thereto on any area without—*

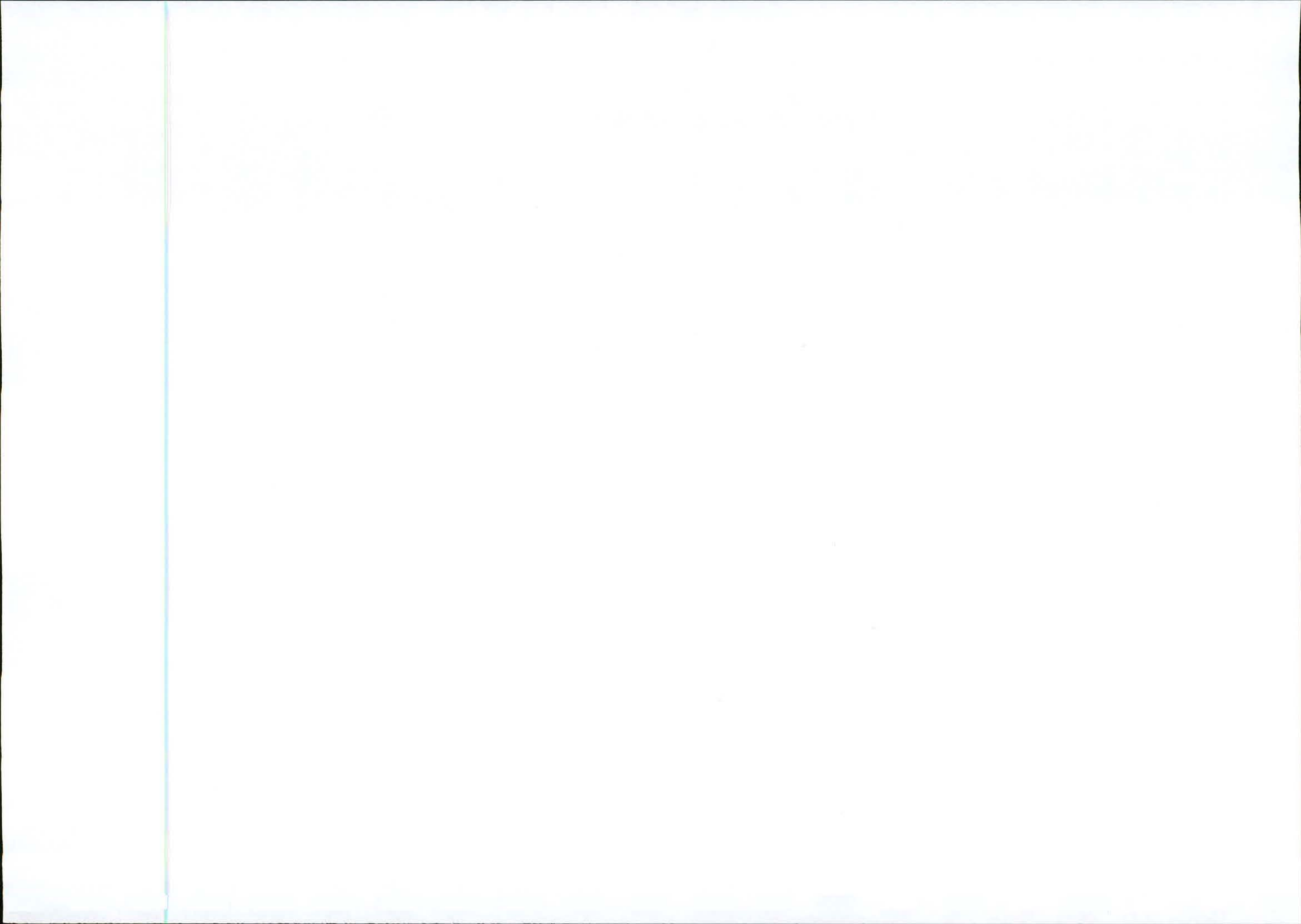
*(a) an approved environmental management programme or approved environmental management plan, as the case may be;*

*(b) a reconnaissance permission, prospecting right, permission to remove, mining right, mining permit, retention permit, technical co-operation permit, reconnaissance permit, exploration right or production right, as the case may be; and*

*(c) notifying and consulting with the land owner or lawful occupier of the land in question.”*

##### ***Legal requirements for this project***

*The Department of Roads and Transport has a responsibility to obtain a mining permit for the relevant project and ensure that the proposed activities conform to the objectives and specifications of the MPRDA. Construction activities should then be conducted according to the EMPR (this report) approved by DMR.*



#### **1.4.2 National Environmental Management Act (Act No. 107 of 1998) (NEMA)**

NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of the State, as well as to provide for matters connected therewith. Section 2 of NEMA establishes a set of principles that apply to the activities of all organs of state that may significantly affect the environment. These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised; and
- Responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its life cycle.

Section 28(1) states that:

*“Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring.”*

If such degradation/pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution; and
- Remedying the effects of the pollution.

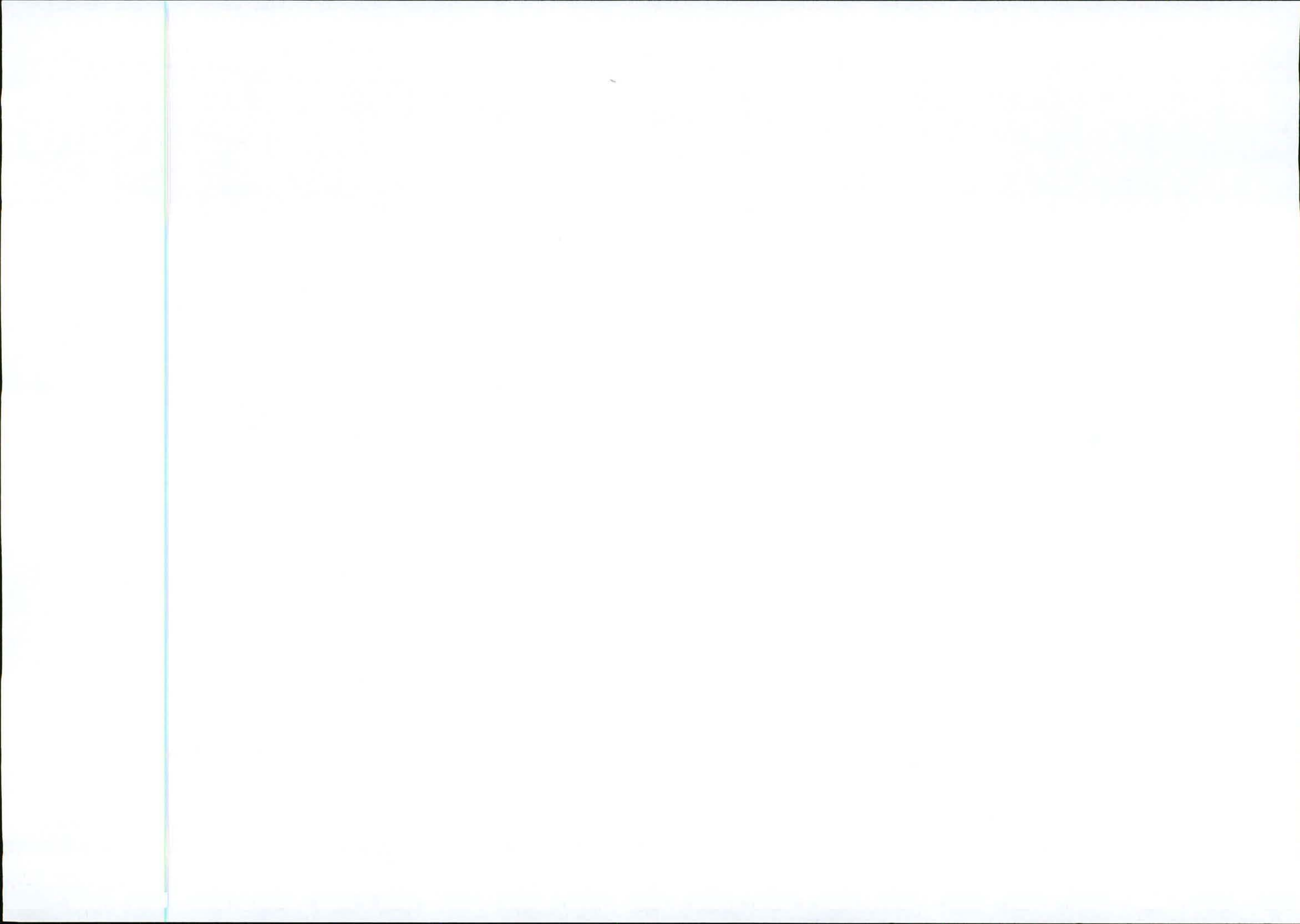
##### ***Legal requirements for this project***

*The Department of Roads and Transport has a responsibility to ensure that the proposed development and construction activities and the EIA process conform to the principles of NEMA. The proponent is obliged to take actions to prevent pollution or degradation of the environment in terms of Section 28 of NEMA.*

#### **1.4.3 National Heritage Resources Act No. 25, 1999**

The protection and management of South Africa’s heritage resources is controlled by the National Heritage Resources Act 25 of 1999. The enforcing authority for this act is the South African Heritage Resources Agency (SAHRA).

In terms of the Act, historically important features such as graves, trees, archaeological artefacts/sites and fossil beds are protected. Similarly, culturally significant symbols, spaces and





landscapes are also afforded protection. In terms of Section 38 of the National Heritage Resources Act, SAHRA can call for a Heritage Impact Assessment (HIA) where certain categories of development are proposed. The Act also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is deemed adequate, a separate HIA is not required.

The Act requires that:

*“...any person who intends to undertake a development categorised as the ... or any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent or involving three or more existing erven or subdivisions thereof must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development...”*

***Legal requirements for this project***

*A phase 1 Heritage Assessment has been undertaken as part of the process.*

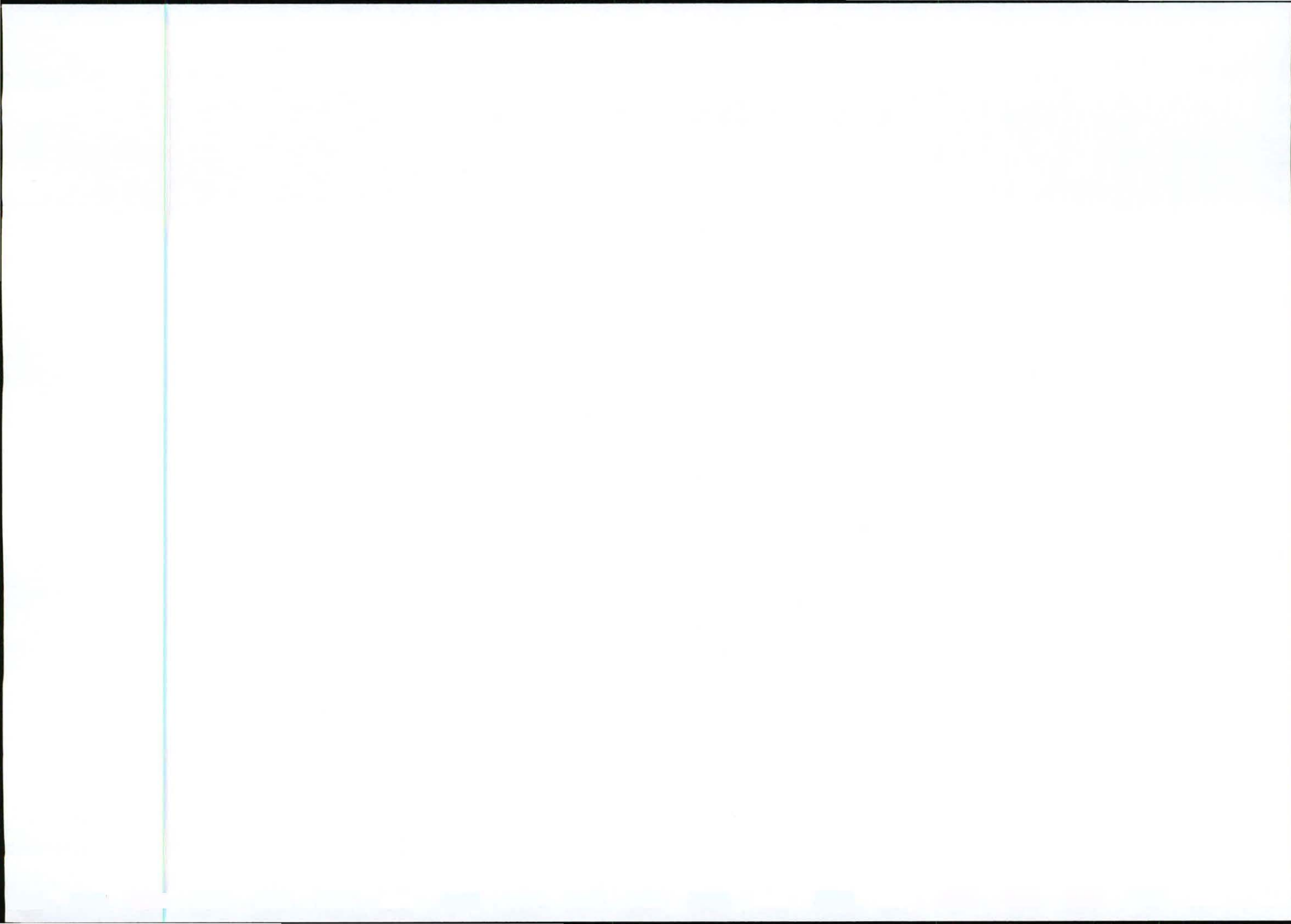
## **1.5 Approach to the Environmental Assessment**

The approach taken in this study is guided by the principles of Integrated Environmental Management (IEM) as described in the IEM guidelines published by the Department of Environmental Affairs and Tourism in 1992. The approach is therefore guided by the principles of transparency which is aimed at encouraging decision-making. The underpinning principles of IEM are:

- Informed decision making;
- Accountability for information on which decisions are made;
- A broad interpretation of the term “environment”;
- Consultation with IAP’s;
- Due consideration of feasible alternatives;
- An attempt to mitigate negative impacts and enhance positive impacts associated with the proposed project;
- An attempt to ensure that the social costs of the development proposals are outweighed by the social benefits;
- Regard for individual rights and obligations;
- Compliance with these principles during all stages of the planning, implementation, and decommissioning of the proposed development or activity; and
- Opportunities for public and specialist input in the decision-making process.

The study has also been guided by the requirements of the EIA regulations set out in terms of the National Environmental Management Act (NEMA). However, Section 38A (1) of the MPRDA states that:

*“The Minister (of Minerals and Energy) is the responsible authority for implementing environmental provisions in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as*



*it relates to prospecting, mining, exploration, production or activities incidental thereto on a prospecting, mining, exploration or production area."*

Therefore this document fulfils the requirements of the MPRDA Regulations No 527 as promulgated in Government Gazette 26275 on 23 April 2004 in which the requirements for mining applications are stipulated. While this report covers the mining right application associated with the proposed borrow pit and hard rock quarry, a separate Basic Assessment Report and Environmental Management Plan has been compiled to apply to the Department of Economic Development and Environmental Affairs for authorisation to upgrade the road in terms of the National Environmental Management Act EIA Regulations.

## **1.6 Contents and Structure of the Report**

This report incorporates all the information required in terms of the DME requirements for Environmental Management Plans, namely:

- A description of the environment likely to be affected by the proposed mining operation;
- An assessment of the potential impacts of the mining operation on the environment, socio-economic conditions and cultural heritage, if any;
- A summary of the assessment of the significance of the potential impacts and the proposed mitigation and management measures to minimise adverse impacts and enhance benefits;
- Proof of financial provision; ;
- Planned monitoring and performance assessment of the environmental management plan;
- Closure and environmental objectives;
- A record of the public participation undertaken and the results thereof; and
- An undertaking by the applicant regarding the execution of the environmental management plan.

This report is divided into seven chapters:

### **Chapter 1 Introduction**

Provides an introduction and background to the proposed project, provides details of the project applicant, summarises the qualifications and experience of the EAPs and outlines the approach to the study. Also, provides a brief summary and interpretation of the relevant legislation.

### **Chapter 2 Description of Activity Proposal**

Describe the various elements of, and the motivation for, the proposed activities.

### **Chapter 3 Nature of the Affected Environment**

Briefly describes the biophysical and socio-economic receiving environments that DME will consider in their assessment of the project.

### **Chapter 4 The Public Participation Process**

Describes Public Participation Process followed.

### **Chapter 5 Assessment of Environmental Impacts**



Describes and rates environmental impacts associated with the proposed project. The associated mitigation measures are listed in Chapter 6. The relevant references are made.

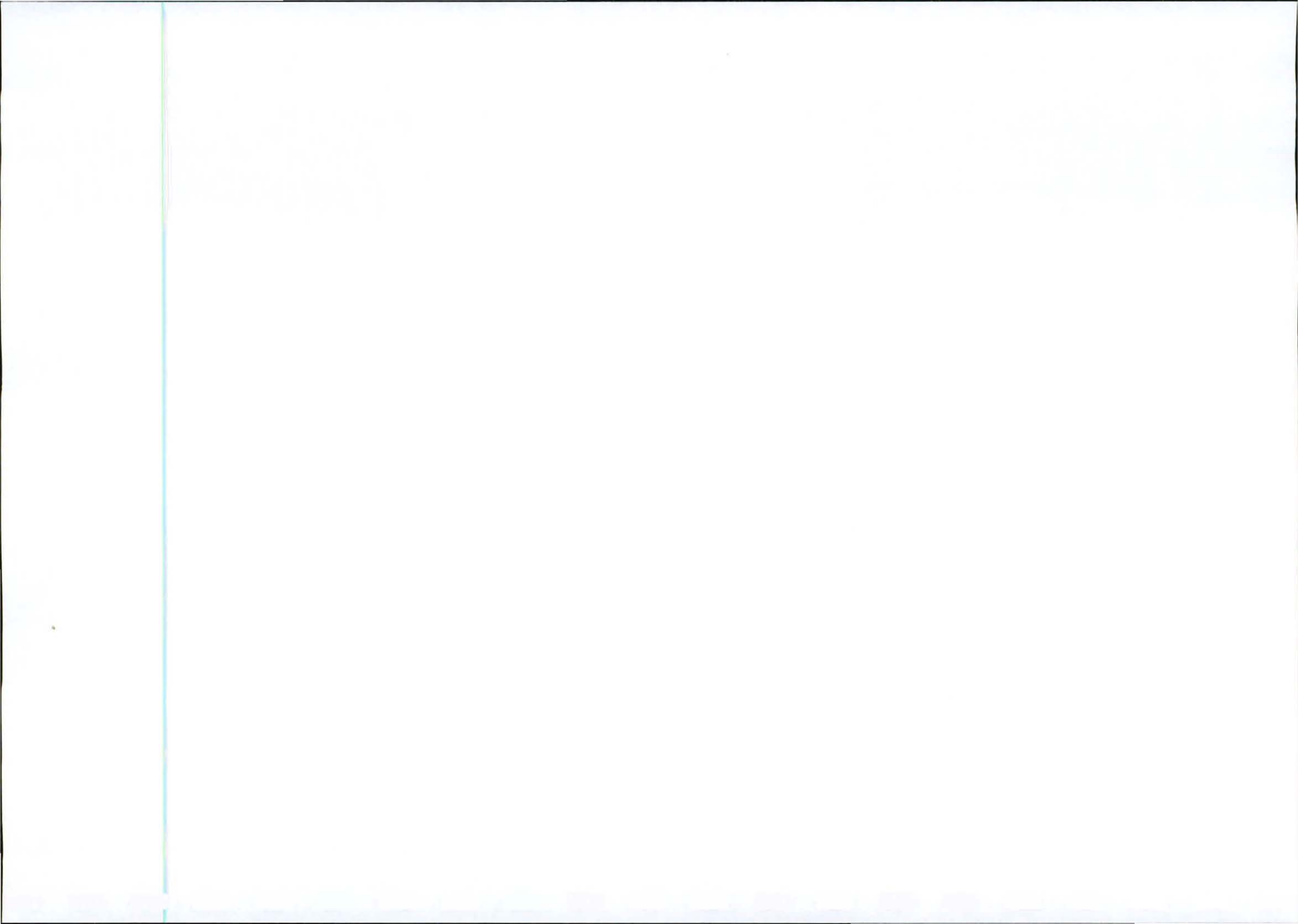
**Chapter 6 Environmental Management Plan**

Stipulates mitigation measures for the identified significant environmental impacts and provides environmental management guidelines that should be implemented in the construction, operation, rehabilitation and closure stages of the proposed borrow pit and quarry.

**Chapter 7 References**

Provides references for documents cited in the EMP Report.





## 2 Description of Activity Proposal

### 2.1 Activity Motivation

The proposed road upgrade forms part of a programme to upgrade the whole of District road 08015 between Mount Frere and the R56 in order to connect the R56 to the N2 route. This section is the third section of the road to be upgraded.

The areas between Mount Frere, Mount Fletcher, and Matatiele are deeply rural and poorly serviced. Roads in the area are primarily gravel and in poor condition, and access (particularly during rainy periods) is poor.

The proposed upgrading of this road forms part of Provincial government's programme to improve infrastructure in the area.

The Locality of the road can be seen in Figure 2-1 below.

### 2.2 Road Design

#### 2.2.1 General

The project includes the upgrading of the existing road from gravel to surface standard. Upgrading will include widening and re-alignment of the existing gravel road. It is proposed that the road be designed to comply with the standards set down in the "Geometric Design Manual" of the Cape Provincial Roads Department. Where applicable, design standards from the following design manuals are to be used as cross-references:

- SATCC: Code of Practice for the Geometric Design of Trunk Roads.
- G2 Geometric Design Manual

The route is characterised by a succession of curves, with very few significant straight sections. The proposed upgrade will include re-alignment of a significant number of horizontal curves to bring them into line with design safety standards.

The rolling, sometimes mountainous, terrain and the existing road (from which the new alignment does not deviate unnecessarily) control vertical re-alignment. Approximately 18% of the road is steeper than the desired minimum gradient. The topography makes the attainment of the desired minimum gradient expensive and it is therefore proposed that the road be designed for typical lower class roads in mountainous areas.

The proposed typical cross section is for:

- 2 x 3.4 m lanes;
- 2 x 1.5 m shoulders;
- Paved/unpaved side drains;
- Guard rails and berms where the fill exceeds 3.0 m in height or the topography dictates that guard rails be provided as a safety measure;
- Fill slopes will be 1:1.5 max;
- Cut slopes will vary between 4:1 and 1:1.5, depending on material conditions;
- Retaining structures and/or benched batters will be provided where the normal batters are impractical; and
- Sub-surface drains will be provided where required.

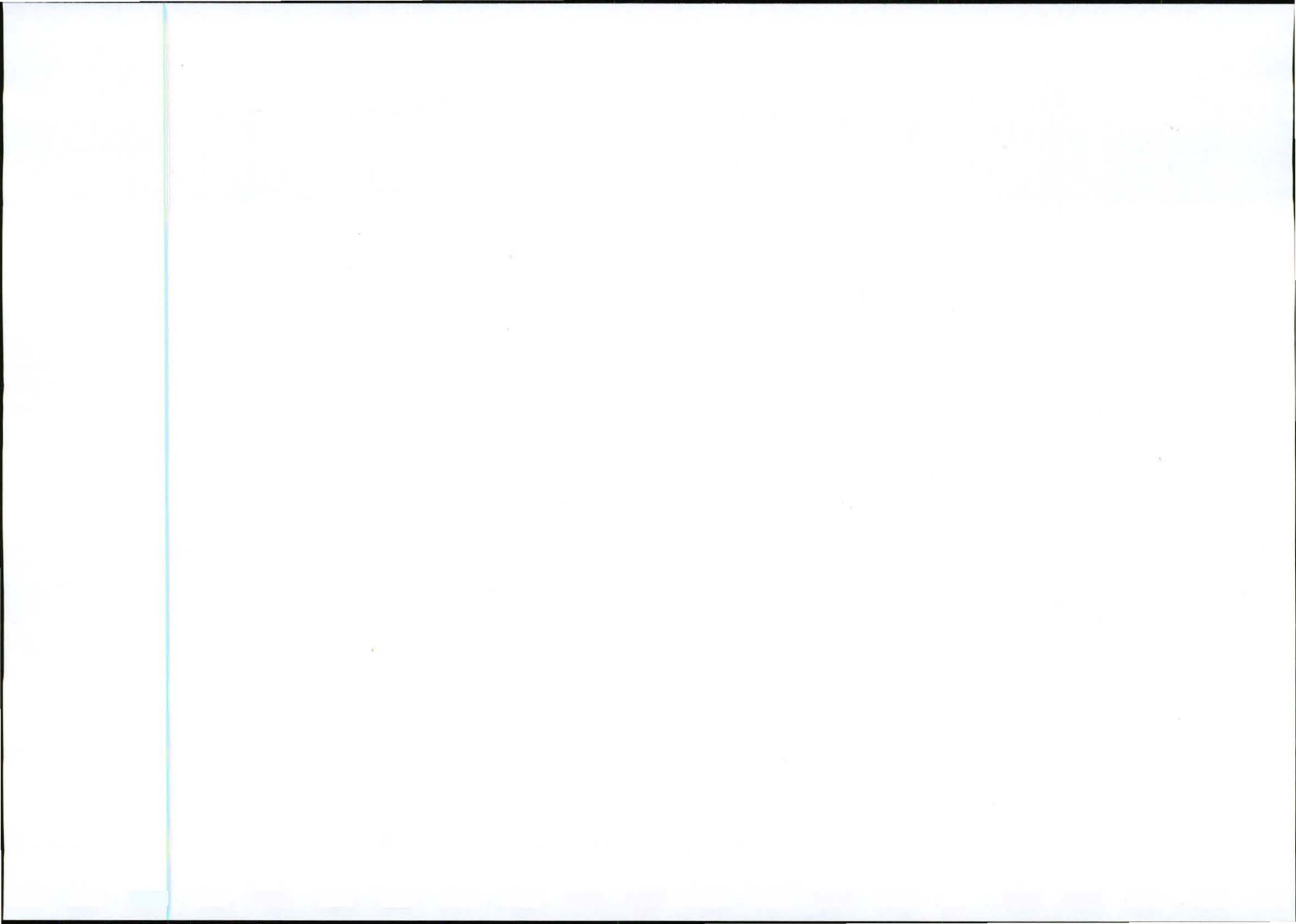
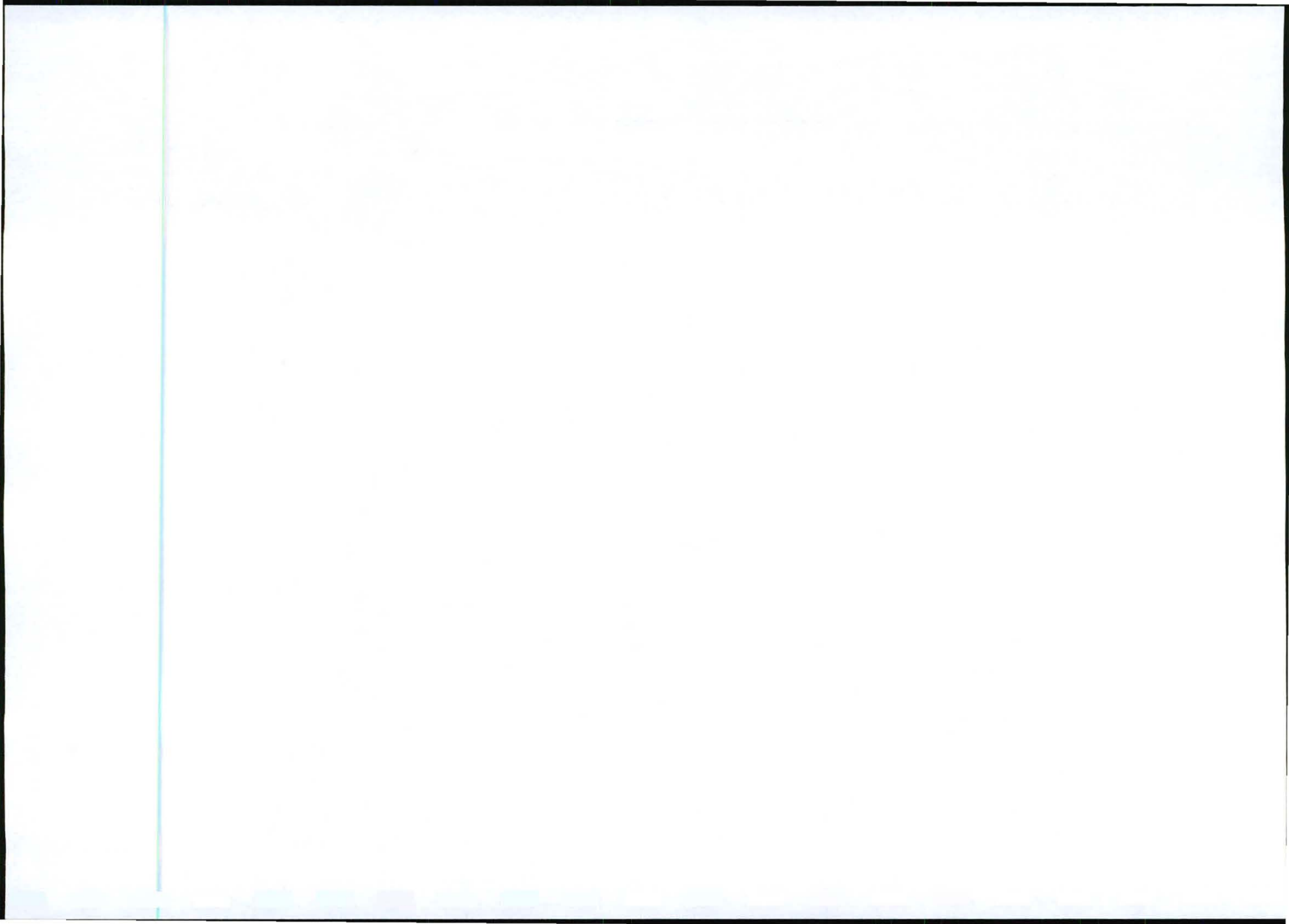






Figure 2-1 Locality of the proposed upgrade of section 3 of DR 08015, also showing the locality of the proposed borrow pit and hard rock quarry



### 2.2.2 Spoil

Due to the nature of the existing route, as well as the steep natural slopes of the ground, the design is based on the principle that there will be more cut than fill. This will have the result that there will be a significant volume of excess cut material to be spoiled. The spoil material is not suitable to be used as subbase material for the road construction, however, it can be used in rehabilitation of eroded areas as well as the proposed borrow pit.

It is proposed that spoiling of material take place in a controlled manner in selected eroded areas along the route. The following principles will be applied:

- Spoil will be done in such a way that it will satisfy the Environmental Management Plan;
- Spoil areas will be indicated and the final finished levels will be as per design drawings; and
- Spoil will be placed in such a manner as to not only arrest the current erosion pattern, but also to make spoil areas available for grazing and/or cultivation.

## 2.3 Source of Material

### 2.3.1 Hard Rock Quarries

Two potential hard rock quarries were identified. The only competent rock in the area is dolerite, which forms extensive dolerite sills in the area. The two main sources of hard rock dolerite considered suitable for use as crushed stone and aggregate were identified at the following locations:

**Table 2-1 Location of Hard Rock Quarries**

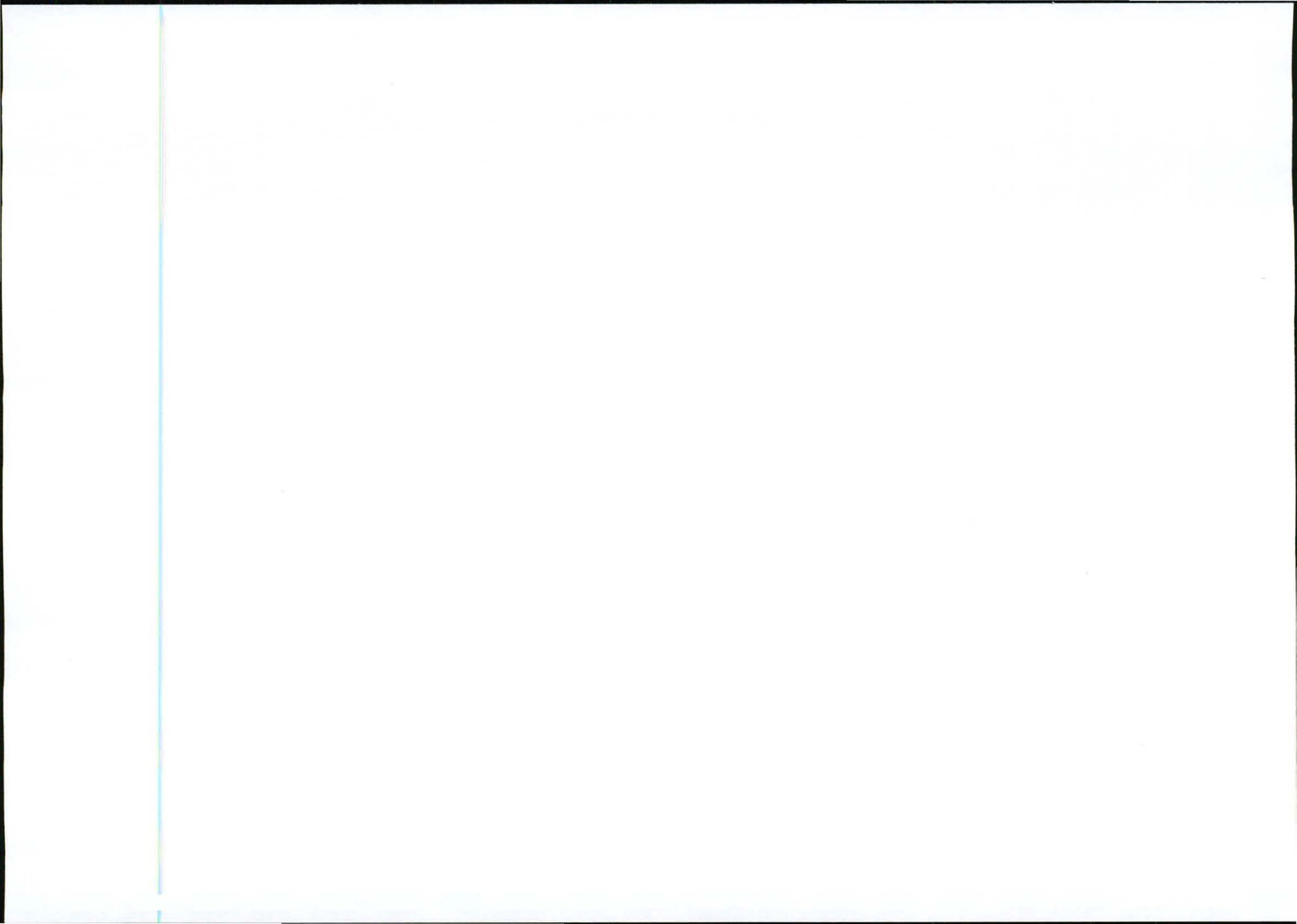
Quarry No.	Original Chainage	Rock Quality Description
No. 1	Approx. km 59	On the top of the plateau: 1 - 2 m of overburden (topsoil and weathered dolerite) overlying competent unweathered medium to widely jointed very hard rock DOLERITE to about 20m. On the down slope, highly weathered dolerite and sandstone was encountered.
No. 2	Approx. km 52	0.4-1.5m of overburden overlying competent, uniform, unweathered, widely jointed, very hard rock DOLERITE to at least 20m.

#### Quarry Site No. 1

Quarry Site No. 1 is located on the side of the extensive prominent circular hill located west of chainages km 59 to km 60. The hill consists of a very thick dolerite sill. The top of the hill is currently used as agricultural land (decomposed dolerite soils). However, on the steeper southwestern side of the mountain dolerite sub-outcrops occur. The potential quarry site is located away from existing fields and villages and the quarry would not be visible from the immediate road. However, due to the prominence of the site a quarry at this location would be visible from a considerable distance and is therefore not favoured.

The hard rock dolerite resource is a near-horizontal sill structure and good quality hard rock dolerite was encountered, virtually from surface down to a depth of 20 m, near the edge of the plateau. Poor quality weathered dolerite and sandstone were encountered approximately 120 m down the slope.

The main advantage of utilising Quarry Site 1 is due to its location. Disadvantages are that there appears to be some risk that the rock may be variably weathered and from an environmental perspective the quarry would be visible from afar (extensive viewshed).



**Quarry Site No. 2**

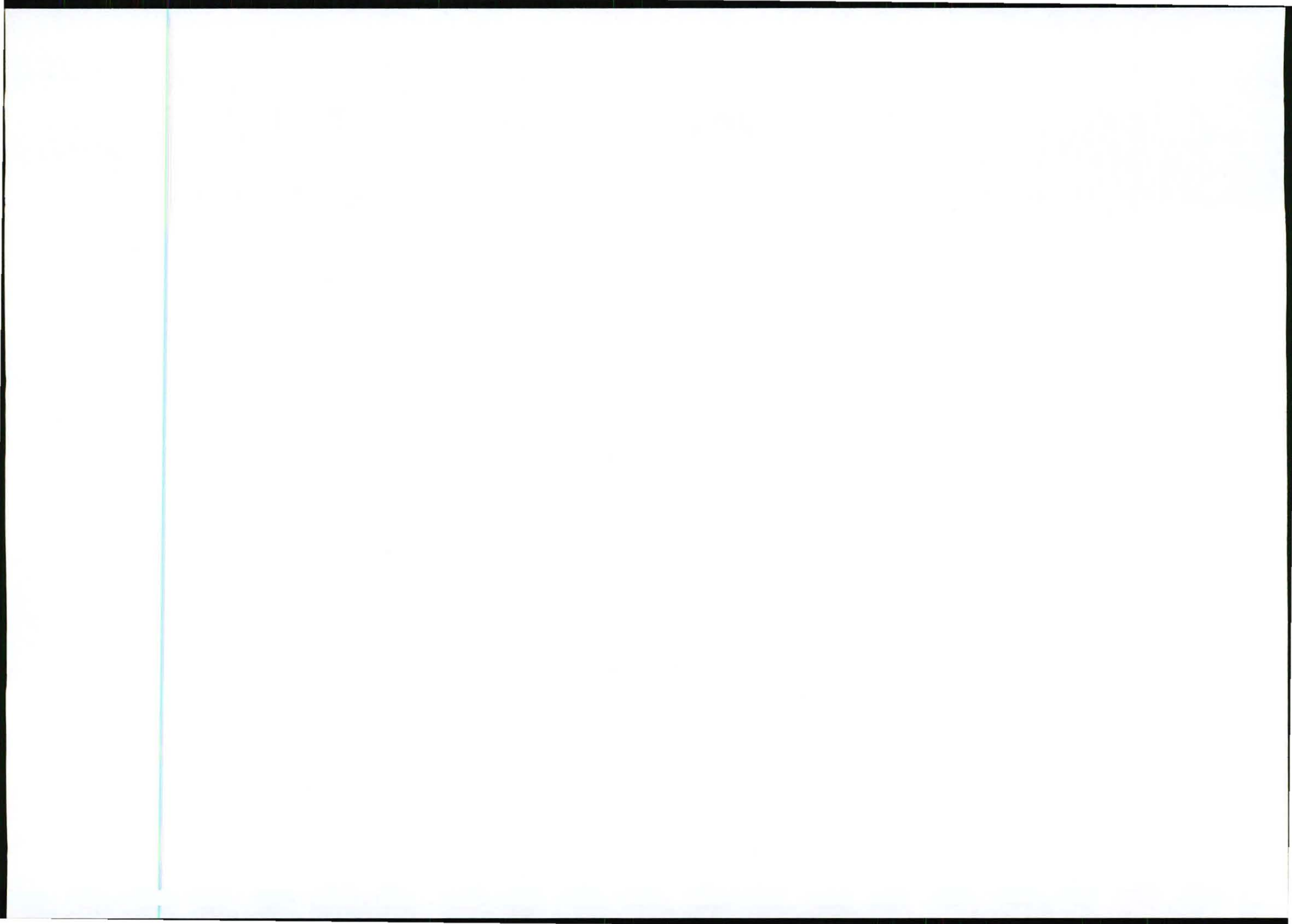
Quarry Site No. 2 is located practically at the start of the road route, that is, at approximately km 52. The quarry is within an extensive hard rock dolerite sill. An existing small track occurs close to the site. Extensive dolerite rock shelves are visible at the surface and the four boreholes drilled confirm the presence of competent unweathered very hard dolerite to at least 20 m below surface. The site is located away from habitation and the adjacent land has to some extent already been utilised as a source of dolerite borrow material (disturbed ground but since re-vegetated).

The quality of the dolerite is considered better than Quarry site No. 1 and it should be suitable for use as aggregate and crushed stone. The resource seems to be very uniform with little overburden. Environmentally the site is considered preferable to Quarry Site No.1 as the quarry would not be visible from the main road and will only be visible over a very small viewshed. Few people live in this area and the land is not suitable for agriculture. The main disadvantage will be the extra haulage distance to the end of the road route.

**It is noted that quarry site no 2 is preferred from an environmental perspective and is therefore the quarry for which a mining permit is being applied for.**

**Table 2-2: Information on proposed Quarry Site (km 52)**

Required Information	Available Information
<b>Information on the site</b>	
Full name of the property on which mining/ prospecting operations will be conducted	Unsurveyed property (Mangoloaneni Area) Chief E.D Jonas
Name of subdivision	Unsurveyed property
Approximate center of mining/prospecting area: Latitude & Longitude	30° 34' 52.80" S 28° 48' 3.65" E
Magisterial District	Matatiele Local Municipality, Alfred Nzo District Municipality
Name of registered owner of property	Communal Land
Details of property owner	Communal Land
Current uses of surrounding areas	Subsistence Farming
Any other, existing land uses that impact on the environment in the proposed mining area	The TR15 contributes to environmental impacts through vehicle emissions and noise
What is the name of the nearest town and specify the distance	Mount Frere, 52 km
<b>Information on the mining activity</b>	
Mineral to be mined	Dolerite
Ultimate depth of the proposed mining operations	20 m
Total area of excavation (ha)	12.3 Ha
Approximate volume of material to be mined	80 000 m <sup>3</sup>
Time period of mining operations to be conducted on this particular site	3 years



### 2.3.2 Borrow Pit

A number of existing and new borrow pits were identified along the road route. However, this application deals only with the new borrow pit No. 3. It is named as such as it takes into account other existing borrow pits along the road.

Borrow pit No. 3 is located at approximately chainage km 66.3. Borrow pit No. 3 consists of an extensive dolerite sill. Exploitation will be possible on either side of a shallow drainage course and either one or two pits can be formed depending on the actual quantity of material required, lateral extension of the borrow pit is also a possibility. It is estimated that borrow pit No. 3 could supply some 153,000 m<sup>3</sup> of residual/weathered dolerite (G6 to G8 material), stabilisation will therefore be required for use as subbase.

No natural source of base course materials was encountered anywhere along the road route and crushed stone will have to be used for this purpose. Suitable crushed stone can be sourced from the proposed hard rock dolerite quarry.

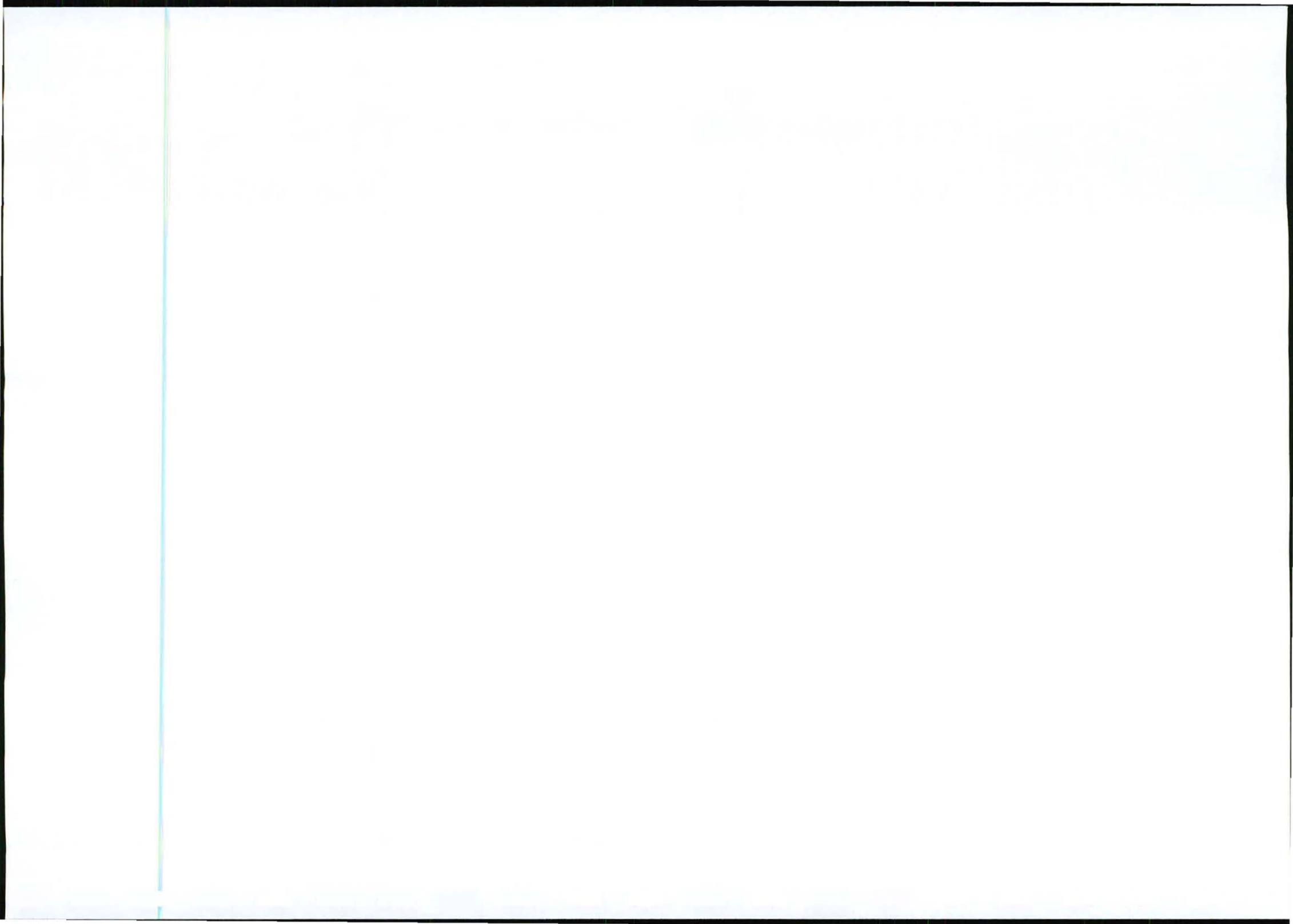
Detailed information for the borrow pit is included in the table below.

**Table 2-3: Information on proposed Borrow Pit 3 (km 66.3)**

Required Information	Available Information
<b>Information on the site</b>	
Full name of the property on which mining/prospecting operations will be conducted	Unsurveyed property (Edulini Area) Chief E.D Jonas
Name of subdivision	Unsurveyed property
Approximate center of mining/prospecting area: Latitude & Longitude	30° 31' 29.02" S 28° 41' 56.73" E
Magisterial District	Matatiele Local Municipality, Alfred Nzo District Municipality
Name of registered owner of property	Communal Land
Details of property owner	Communal Land
Current uses of surrounding areas	Subsistence Farming
Any other, existing land uses that impact on the environment in the proposed mining area	The TR15 contributes to environmental impacts through vehicle emissions and noise
What is the name of the nearest town and specify the distance	Matatiele, 49.3 Km
<b>Information on the mining activity</b>	
Mineral to be mined	Weathered Dolerite
Ultimate depth of the proposed mining operations	2.5 m
Total area of excavation (ha)	10.2 Ha
Approximate volume of material to be mined	153 000 m <sup>3</sup>
Time period of mining operations to be conducted on this particular site	3 Years

### 2.4 Activity Location

The proposed borrow pit and quarry are located in proximity to the road for the proposed upgrade, which extends over approximately 22 km of the existing DR 08015, from approximately 52 km





outside of Mount Frere to the R56 (between Matatiele and Mount Fletcher). The road passes through wards 15, 18, 22 and 23 and is located within the Matatiele Local Municipality which forms part of the Alfred Nzo District Municipality.

The section of the road to be upgraded and the location of the proposed borrow pit and quarry can be seen in Figure 2-1. Mining plans, showing the positions of the listed coordinates are included in Appendix B of this report.

**Table 2-4: Coordinates of the corners of the proposed borrow pits as indicated on the site plans included under Appendix B**

<b>Borrow Pit No 3</b>		
<b>ID POINT</b>	<b>Y-POSITION</b>	<b>X-POSITION</b>
BP1	28976.724	3377934.648
BP2	28659.352	3378203.160
BP3	28926.210	3378363.437
BP4	29007.685	3378285.882
BP5	29130.213	3378082.935
<b>Quarry</b>		
<b>ID POINT</b>	<b>Y-POSITION</b>	<b>X-POSITION</b>
BP1	18696.034	3384344.549
BP2	18632.573	3384415.920
BP3	18589.420	3384647.624
BP4	18851.362	3384817.168
BP5	19023.935	3384677.233
BP6	19065.802	3384620.230

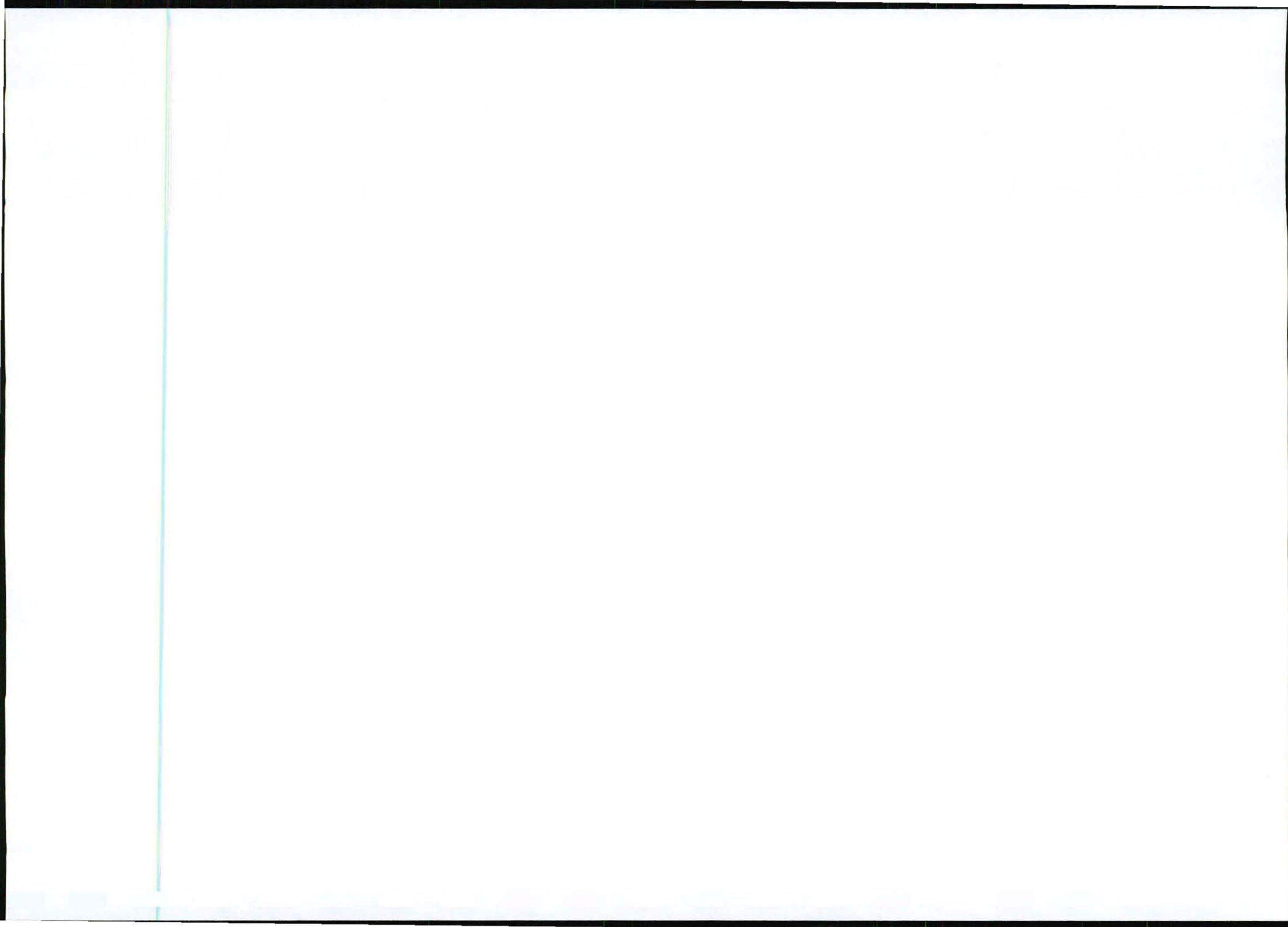
## 2.5 Mining Work Plan / Methods

The following information was provided by the appointed consulting engineer and will form part of the basis of this EMP. As the minerals differ from site to site, mining methods may vary and are therefore described individually where necessary.

### 2.5.1 Borrow Pit No 3:

The material to be mined at borrow pit No. 3 consists of bouldery decomposed dolerite. The material is variable in terms of plasticity. The material with lower plasticity will be selected and preserved for use in the subbase layer. The material will be stabilised by blending with crushed rock from the quarry and adding lime and cement. Fill and selected subgrade will sourced from borrow pit no.3.

The area will be fenced off as shown on the layout plan (Appendix B) and access will be controlled with a gate. Topsoil will be stripped and stockpiled to a maximum height of 1 metre and will be re-used during rehabilitation of the borrow pit. Material will be loaded with an excavator directly to the haulage vehicles.



### 2.5.2 Quarry 2:

The material to be mined consists of hard blue dolerite. Extraction of the rock will be by drilling and blasting and the rock will be crushed and processed with a multi stage crusher to produce the various aggregates required.

The material for the crusher stone base (G2), aggregate for seal work, concrete stone and fine aggregate will be produced.

The entire mining area will be fenced off and access will be strictly controlled with an access gate as shown on the layout plans (Appendix B).

Topsoil will be stripped and stockpiled for future rehabilitation work. The direction of the mine development is given on the layout plan (Appendix B).

## 3 Nature of the Affected Environment (Pre-mining Environment)

### 3.1 Biophysical Environment

Chapter 3 gives a broad overview of the affected biophysical and socio-economic environment.

The section of the road for the proposed upgrade extends over approximately 22 km of the existing DR 08015, from approximately 52 km outside of Mount Frere to the R56 (between Matatiele and Mount Fletcher).

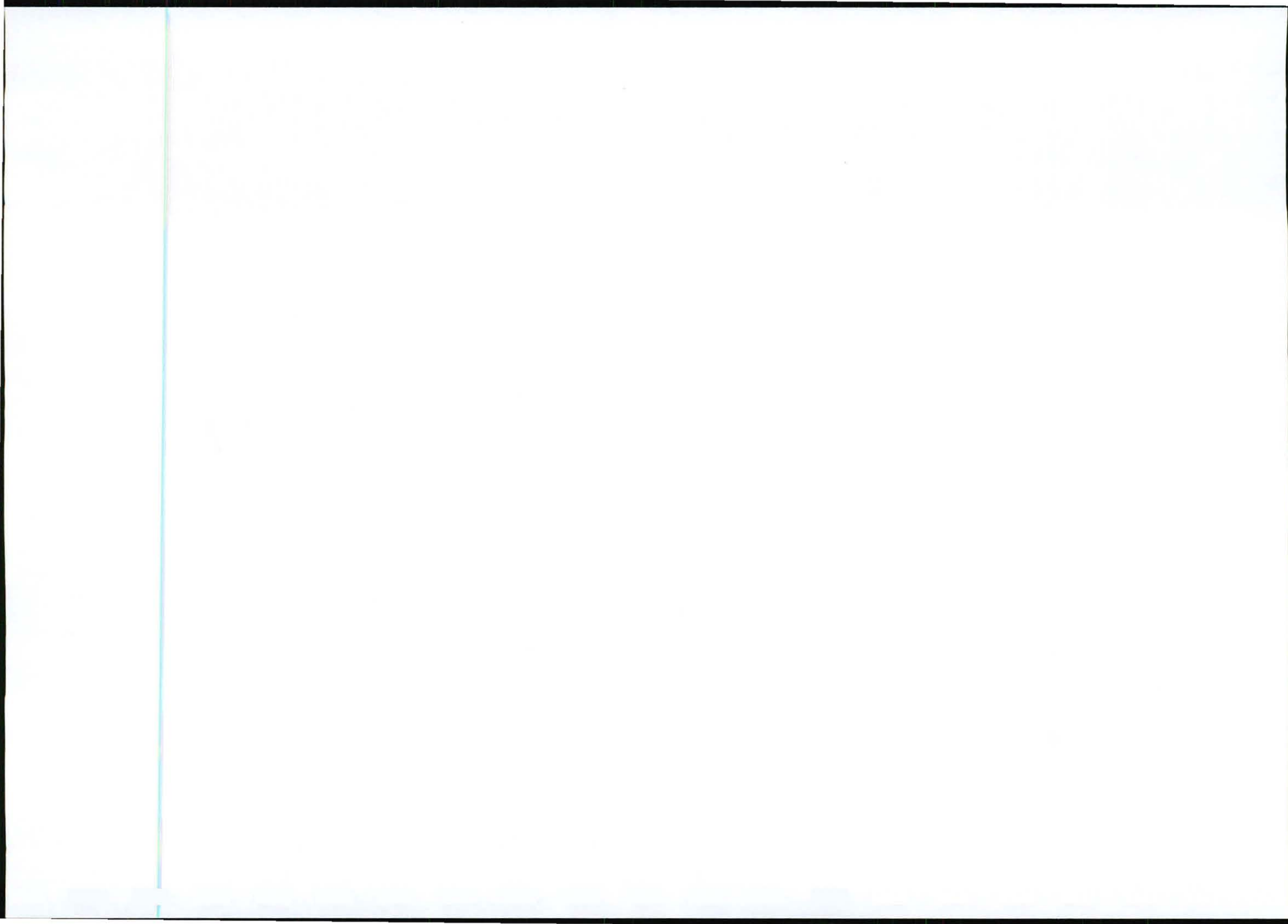
#### 3.1.1 Geology

The section of road and therefore localities of the proposed borrow pit and stone quarry under review traverses sedimentary rocks of the Tarkastad Subgroup, Beaufort Group of the Karoo Sequence. The Tarkastad Group mainly consists of fine-grained sandstone with interbedded reddish brown or purple mudstone. The sedimentary rocks are sub-horizontally bedded, the sandstone tends to be fairly massive but it is invariably interbedded with mudstone layers. The sandstone and mudstone of the Tarkastad Group tend to be relatively weak in terms of rock strength and the materials are considered unsuitable for use as crushed stone or aggregate.

The Karoo sediments have been intruded by dolerite sills and dykes at a number of locations along the road route. Extensive dolerite sills were identified at two main locations along the road route, both of these sites were drilled to determine their suitability for the development of a hard rock quarry.

#### 3.1.2 Climate

The route falls within a sub-humid zone of the Eastern Cape. The climate is classified as wet. The average rainfall recorded at stations in the area is between 800 mm and 1200 mm per annum.



Temperature data was only available for Kokstad and Umtata (SAWS<sup>1</sup>) and is considered sufficiently representative for the purposes of this study.

**Table 3.1: Average climate statistics**

Month	Temperature (° C)				Average Annual Precipitation (mm)		
	Umtata		Kokstad		Amanzamyama	Tshatshenti	Mount Frere
Average Daily Min	Average Daily Max	Average Daily Min	Average Daily Max				
January	16	27	13	26	174	152	135
February	16	27	13	26	163	131	121
March	15	26	11	25	151	120	123
April	12	25	8	22	61	50	46
May	8	23	4	20	31	24	23
June	4	21	0	18	20	14	16
July	4	21	0	18	20	15	19
August	7	22	2	20	26	21	21
September	9	23	6	22	61	50	44
October	11	23	8	23	109	78	78
November	13	25	10	24	140	100	101
December	15	27	12	25	161	118	120
<b>Year</b>					<b>1 117</b>	<b>873</b>	<b>847</b>

### 3.1.3 Topography

The topography along the route is varied and includes gently rolling hills, steep slopes and level sections. An idea of the topography can be obtained from the plates presented in Appendix B. The route generally follows an undulating topography of rolling hills and valleys. The site ranges in altitude from approximately 1200 to 1560 meters above sea level.

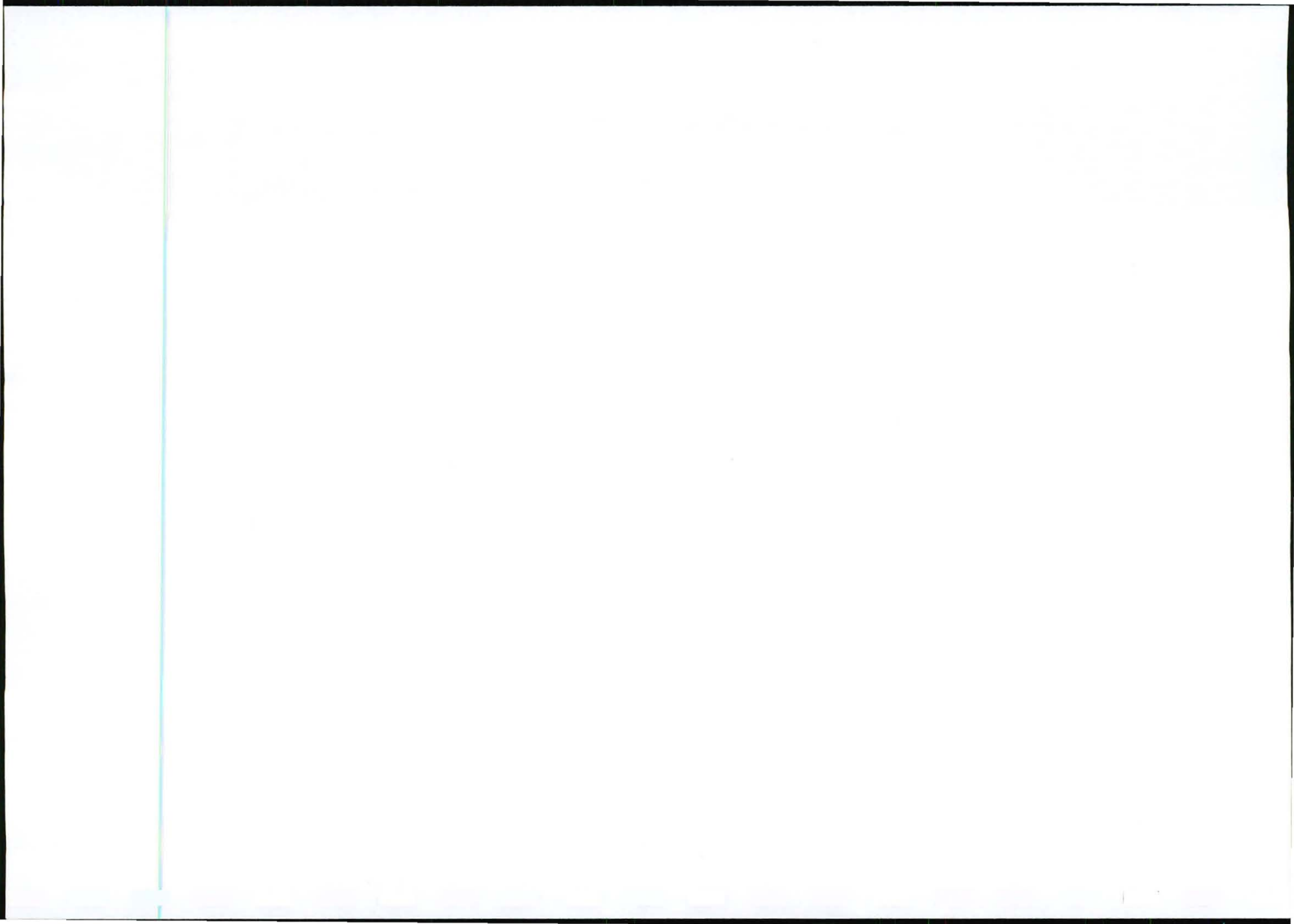
### 3.1.4 Soil

A thin layer of transported soils (generally between 0.5 m –1.0 m thick) covers the residual rocks. Thicker alluvial deposits (up to several metres thick) generally occur within drainage and river courses. The alluvial soils are inferred to be dispersive, as prominent erosion dongas are a feature of drainage courses.

### 3.1.5 Land Use

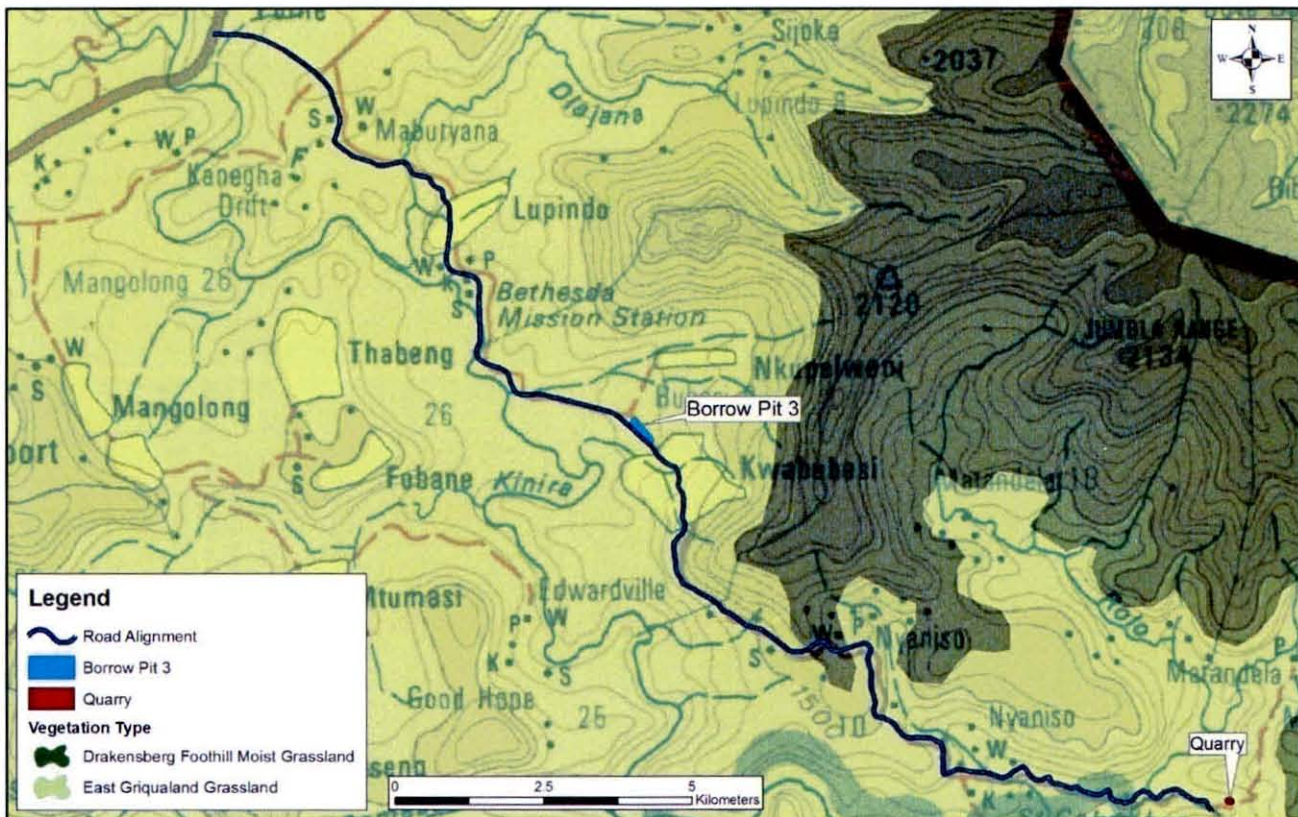
The area is described as rural with land use being primarily subsistence farming (in the form of cultivated fields and communal pastures) and villages. The land at the borrow pit and quarry location is tribal, with a settlement located close by to the borrow pit, but not to the quarry site. Small-scale cultivation occurs at the site of borrow pit 3, while the quarry site is not in close proximity to settlements it may be used for grazing purposes from time to time. No significant commercial or industrial activities could be identified.

<sup>1</sup> Average Climate Statistics for Umtata, Available at <http://www.weathersa.co.za> (Accessed June 2003)



### 3.1.6 Natural Vegetation / Plant Life

The natural vegetation at the sites falls within the Grassland biome. The vegetation type present at the proposed borrow pit as well as the quarry site is East Griqualand Grassland (see Figure 3-1) (Mucina and Rutherford, 2006). While grass species dominate at the various sites, the mountainous areas are also home to Aloe and scrub vegetation. The vegetation at the borrow pit site has been extensively altered due to farming practices, specifically crop cultivation, and is described as altered grassland. The vegetation on the quarry site tends to be less disturbed as it is utilised for grazing purposes.



**Figure 3-1 Vegetation Type**

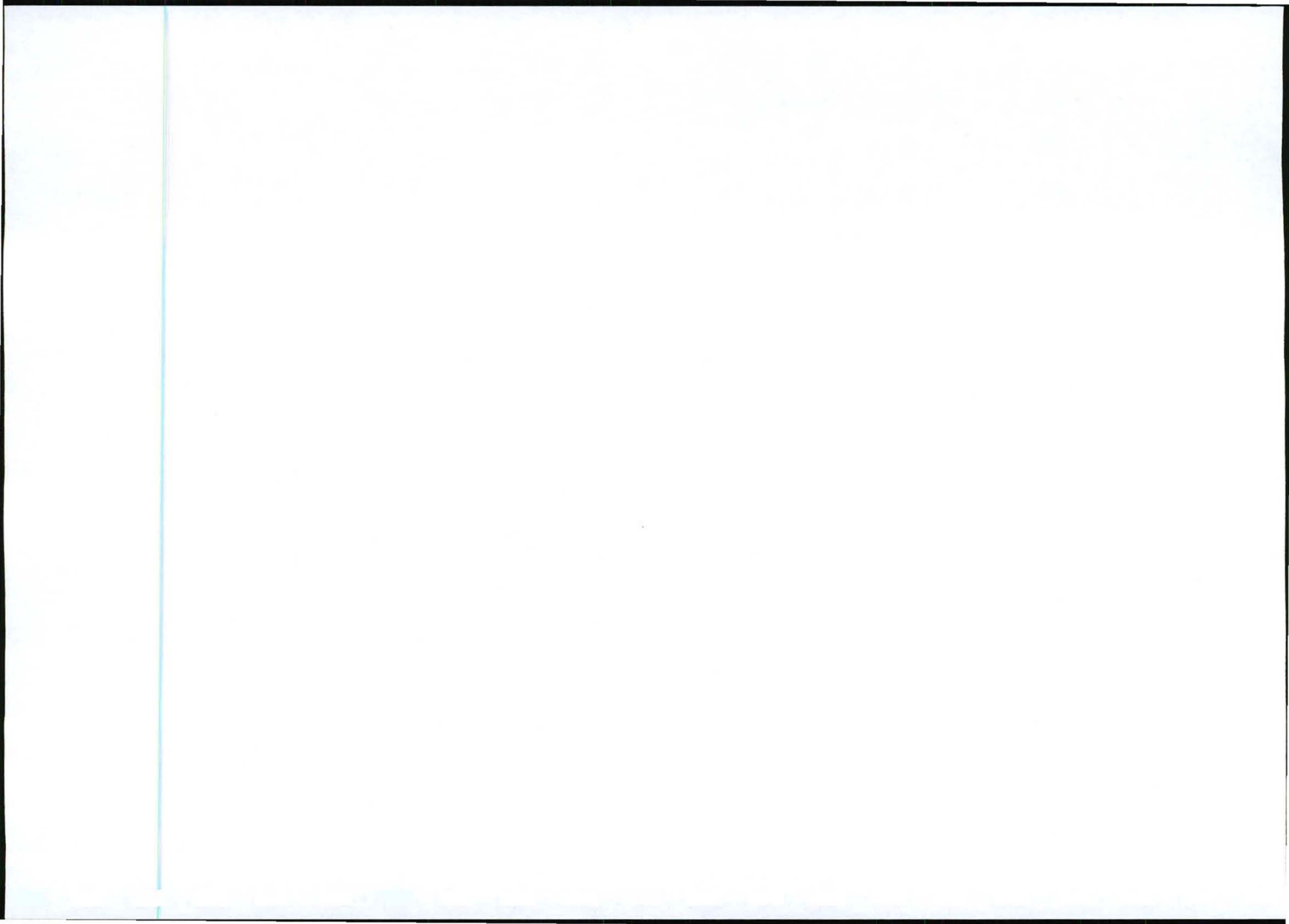
### 3.1.7 Animal Life

No wild animals were observed during the site visits. Due to the human population densities and the transformed nature of the area it is not anticipated that wild animals would be located on or in close proximity to the proposed borrow pit and quarry site.

### 3.1.8 Surface Water

Surface water in the area is dominated by the Kinira River and its tributary the Rolo River. The road runs generally parallel to the Kinira River for most of the section. The quarry is located approximately 1 km from the Kinira River and the borrow pit is approximately 250 m from the Columbus Stream (tributary of the Kinira River). The mining activities are not expected to impact on the Kinira River or its tributaries.

After rehabilitation of the borrow pit and quarry, these areas will probably be a natural accumulation area for runoff from the surrounding areas and become small dams in the long-term. These areas may also be transformed into artificial wetlands if reeds, sedges and other water tolerant grasses are planted.





### **3.1.9 Ground Water**

Natural springs are tapped in the area as (untreated) drinking water. No significant impacts are expected on groundwater as a result of this project.

### **3.1.10 Air Quality**

Air quality in the area is typical of rural areas. The proposed activity will result in short term increases in dust levels (during mining activities). Dust levels during the operational phase of the project life cycle will be reduced (due to the surfacing of the road).

### **3.1.11 Noise**

Noise levels in the area are typical of rural areas and are described as tranquil.

### **3.1.12 Sites of Archaeological and Cultural Interest**

As per the Phase 1 Archaeological Impact Assessment undertaken (see Appendix D) as part of this study, no visible cultural, archaeological or paleontological sites were identified within the proposed site footprints, and no heritage resources that are protected by the National Heritage Resources Act (Act No. 25 of 1999) are known to occur. If any archaeological or paleontological resources are unearthed during vegetation clearing the EMP addresses how these should be handled.

While grave sites were identified in proximity to the proposed road upgrade and to borrow pit 3, it is not anticipated that these will be disturbed by the mining activities. The EMP makes provision for the protection of these features.

### **3.1.13 Sensitive Landscapes**

No sensitive landscapes were identified on the proposed borrow pit and quarry footprints.

### **3.1.14 Visual Aspects**

The environment that will be affected by the proposed road, borrow pit and quarry has an established visual character. This can be referred to as the visual context of the area and forms the basis of the 'visual' expectations of residents and visitors to the area.

The area is described as deeply rural with little or no infrastructure and is largely inhabited by subsistence farmers. The features of the area that contribute to the existing visual character include:

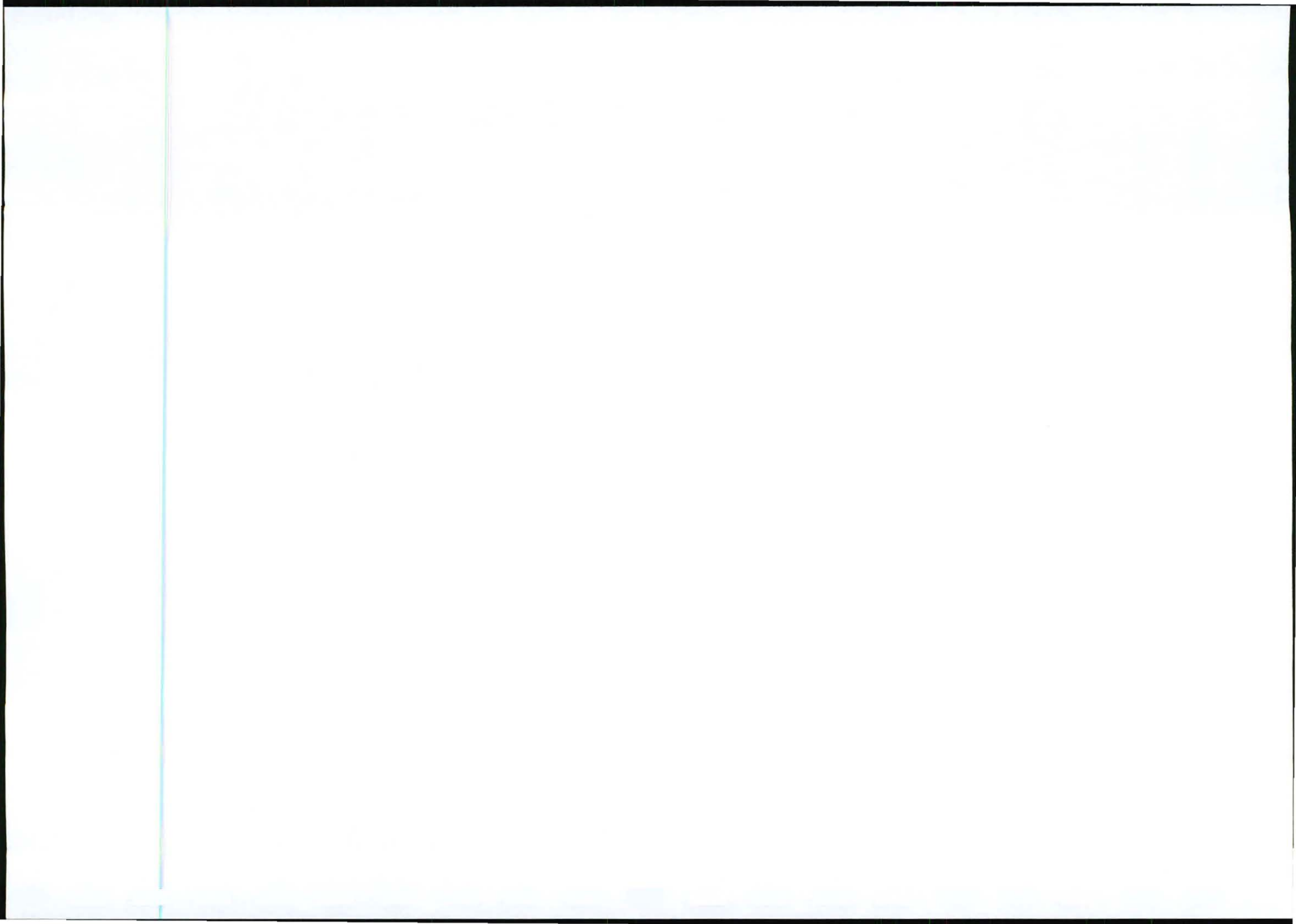
- Rolling hills covered in grassland with occasional clumps of trees (mostly wattle);
- Small rural villages with low structures and no large infrastructure such as power lines or lights;
- Winding gravel roads crossing the landscape, sometimes in an apparently unplanned manner.

It is expected that the visual expectations of residents in the area will be significantly different from that of travellers through the area.

## **3.2 Social and Economic Environment**

### **3.2.1 Regional Socio-Economic Structure**

The area is described as rural and underdeveloped. Economic activity is severely limited and largely restricted to subsistence farming. There is no treated water, and limited electricity infrastructure in the area. There are cellular telephone network towers in the area, however, the reception does not reach all areas of the road. Roads are elementary and water is supplied from natural springs.



### **3.2.2 Interested and Affected Parties**

Residents in the area have shown an interest in the project due to the potential for economic activity, particularly during the construction phase. Also, some of the villages along the route include houses within close proximity of the existing road.

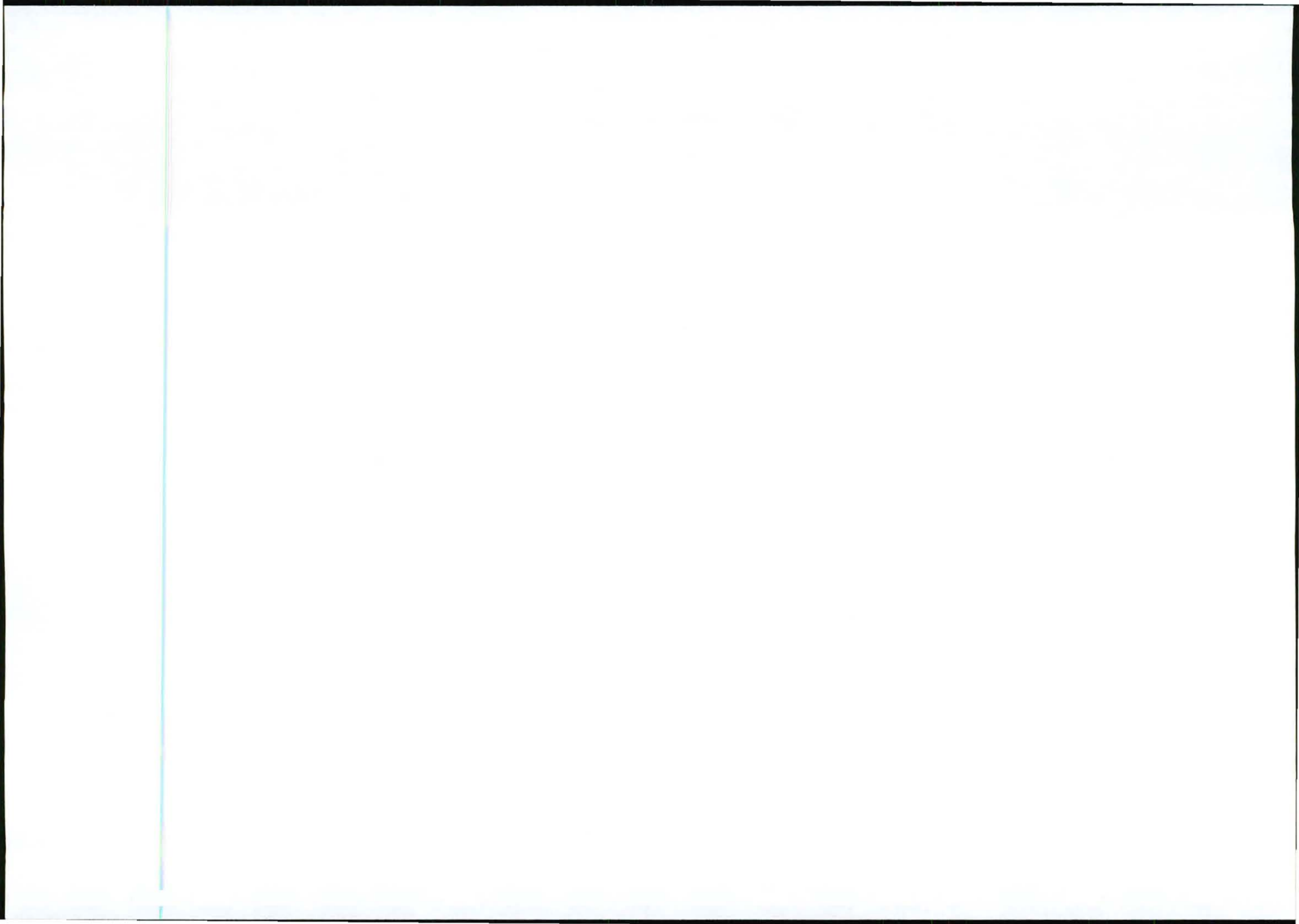
Land is communally owned. Permission for use of borrow pit and quarry has been provided by the Department of Land Affairs and is attached under Appendix E of this application.

### **3.2.3 Social value of the proposed activity**

The proposed borrow pit and quarry are all located along the District Road 08015. This road is proposed to be upgraded to a tarred surface in order to improved connectivity within the Eastern Cape Road network. The proposed borrow pit and quarry will provide the required materials for the construction activities associated with the road.

The proposed activities will improve the condition of the road and therefore improve road safety to all road users as well as to the surrounding local communities. The proposed road upgrade will improve accessibility to the area as well as connectivity between the N2 and the R56.






## 4 Public Participation Process

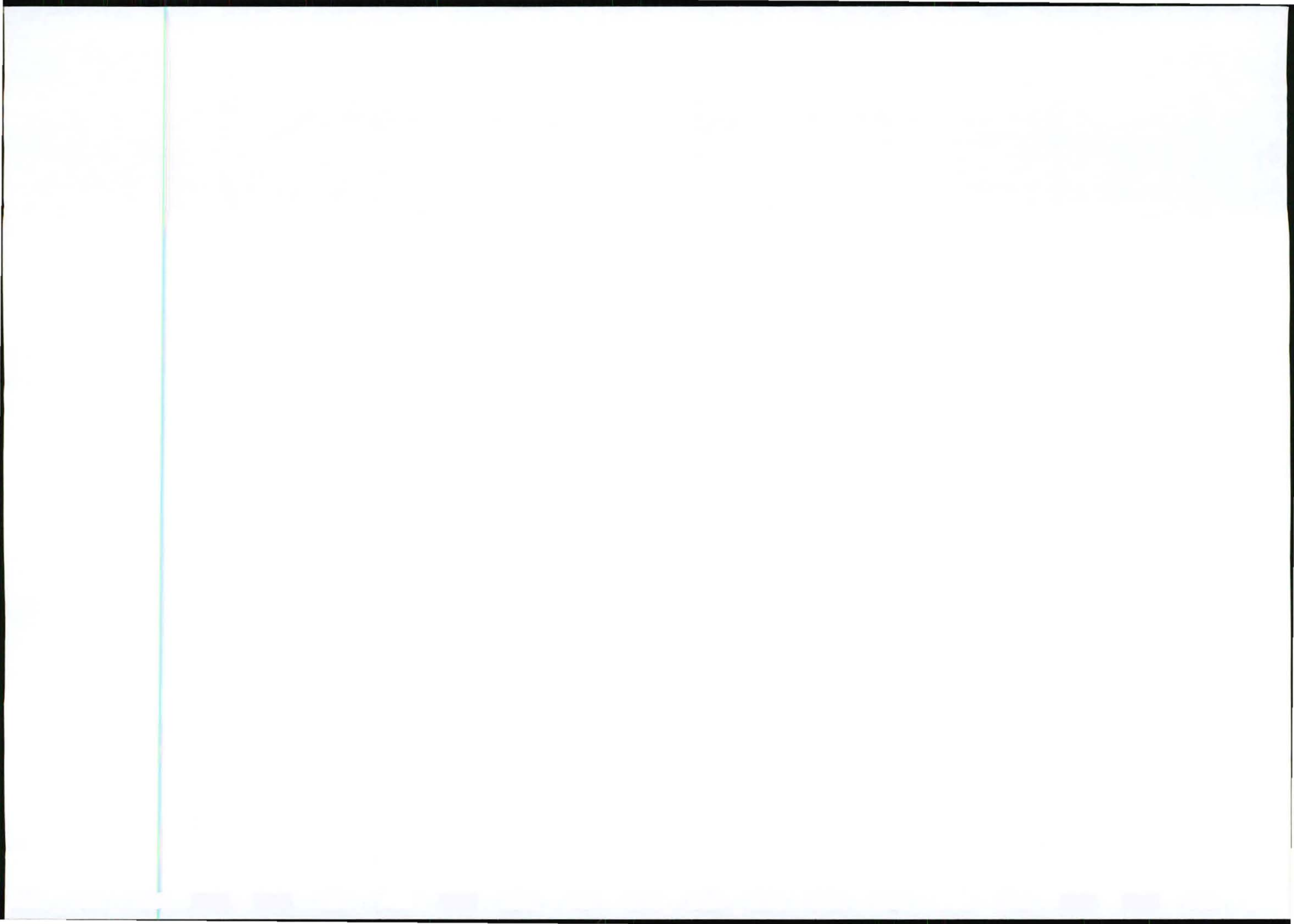
### 4.1 Public Consultation

A public participation process has been carried out as part of the Environmental Basic Assessment process. An advertisement was placed in the media (The Daily Dispatch) and public meetings were held to inform Interested and Affected Parties (IAP's) of the proposed road upgrade and associated mining activities. SRK together with Iliso conducted public meetings on 28 January 2010 to discuss the proposed road upgrade and associated mining activities with the affected communities. The minutes of these meetings are included under Appendix E as proof of community consultation.

### 4.2 Landowner Consultation

The land at the proposed site is tribal land, which is communally owned. The Department of Land Affairs as well as the chief is mandated to protect the interests of the community regarding land issues. SRK together with Iliso conducted public meetings on 28 January 2010 to discuss the proposed road upgrade and associated mining activities with the affected communities. The minutes of these meetings are included under Appendix E as proof of community consultation. Permission has been provided by the Department of Land Affairs for the proposed road upgrade and associated borrow pit and quarry. This letter is included under Appendix E.





## 5 Assessment of Environmental Impacts

### 5.1 Potential Impacts

The identification of potential impacts is based on:

- The legal requirements;
- The nature of the proposed activity; and
- The nature of the receiving environment.

After consideration of these aspects, a Heritage Impact Assessment was conducted in order to investigate the potential Heritage impacts associated with the proposed road and mining activities. The specialist was required to assess the significance of anticipated impacts and to recommend mitigation measures.

The HIA has been attached to this EMPR under Appendix D.

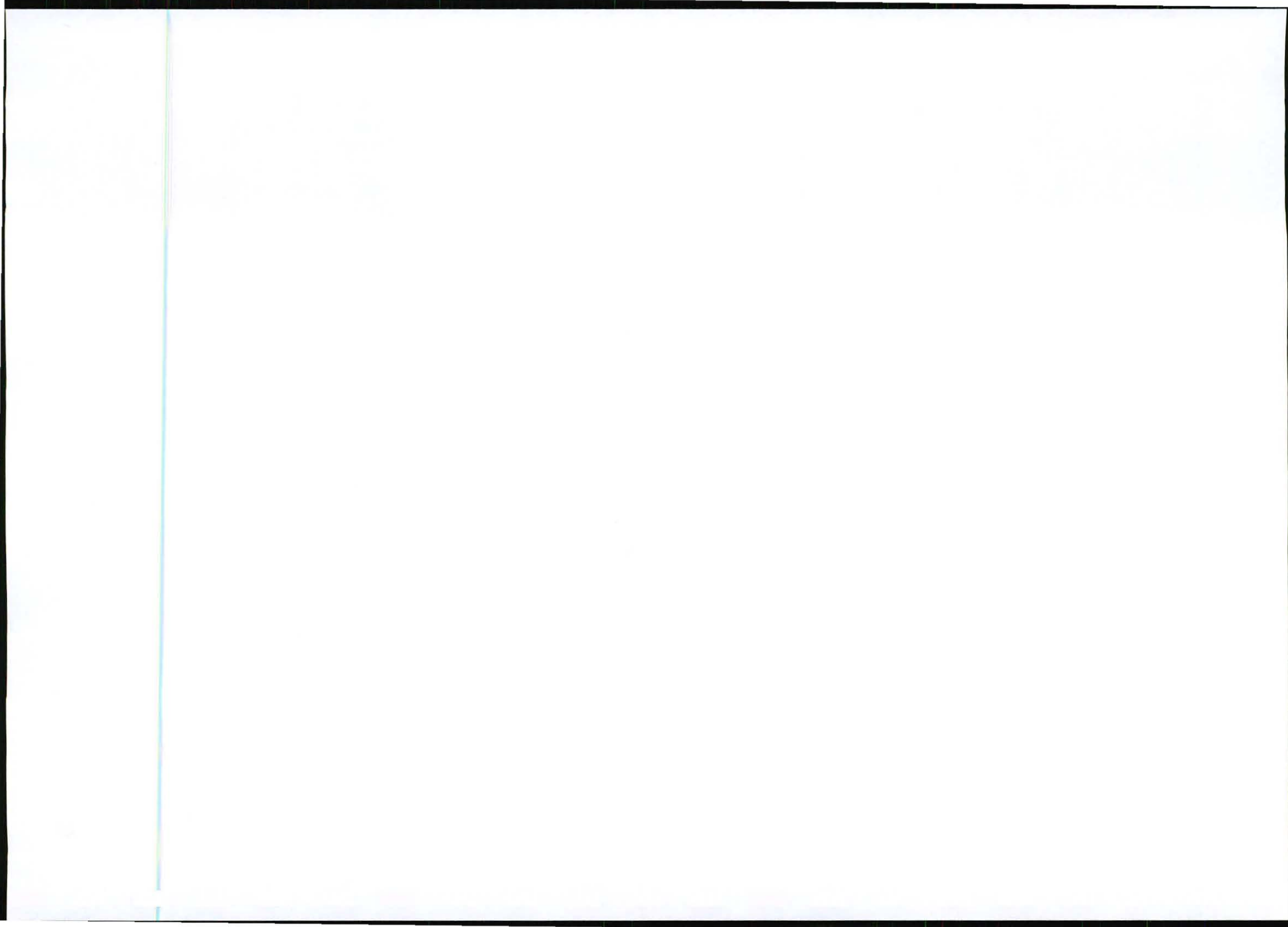
The following potential impacts have been addressed by SRK in consultation with the project team consultants and engineers:

- Nuisance (Dust and Noise) impacts;
- Botanical impacts;
- Visual impacts;
- Socio-economic impacts;
- Storm water and erosion impacts; and
- Waste management impacts.

Table 5-1 summarises the potential impacts of the proposed borrow pit and quarry on the surrounding environment. The status and significance of the relevant impacts are also listed. All measures recommended to mitigate and manage the identified impacts are incorporated into the Environmental Management Plan (EMP) (Chapter 6). The Heritage Impact Assessment findings have been integrated into Table 5-1 and the EMP.

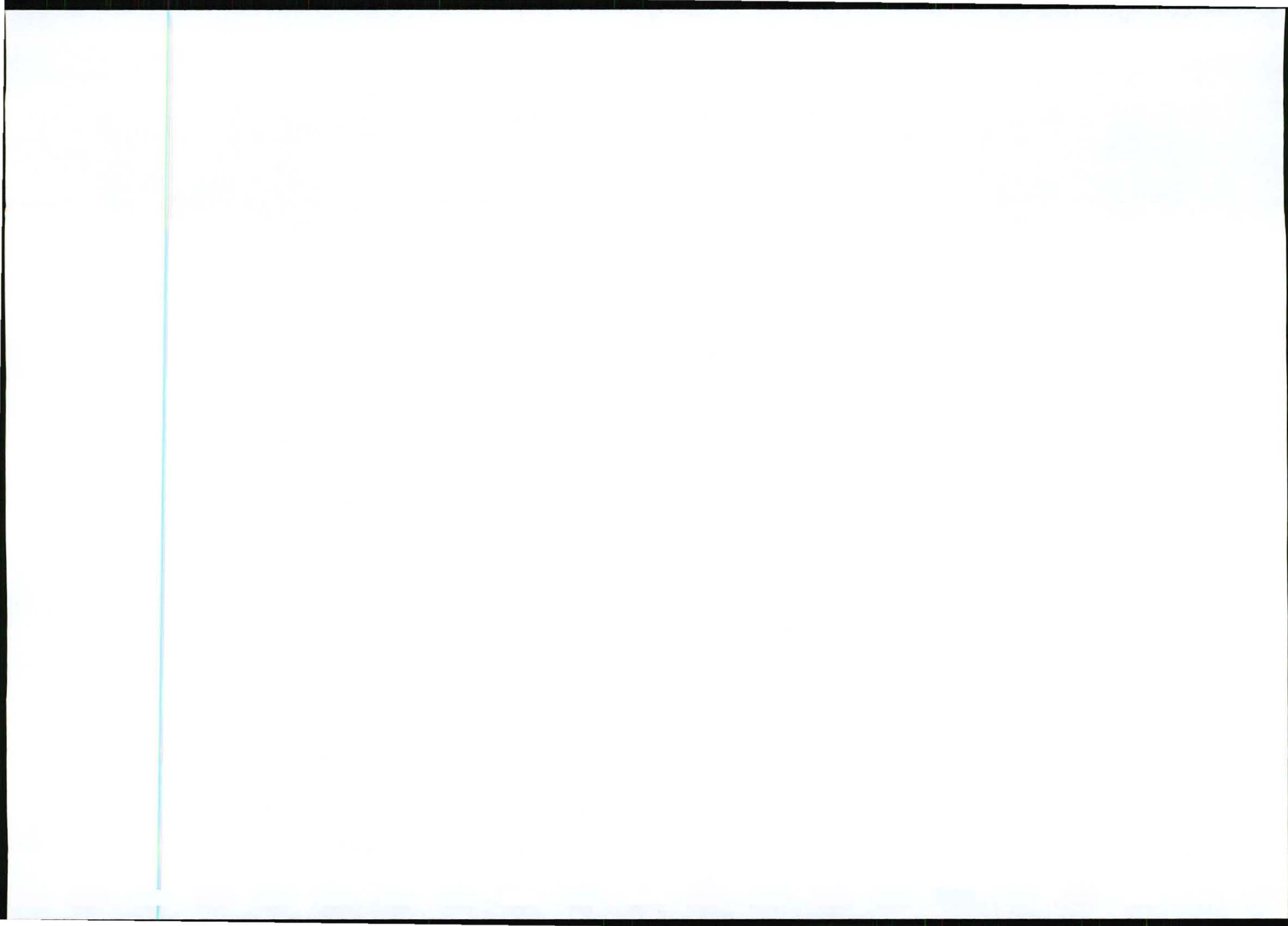
**Table 5-1: Potential impact on the surrounding environment**

Element	Description of Potential Impact	Status	Significance		Reference to Mitigation
			Without Mitigation	With Mitigation	
Topography	Alteration of topography through excavation of borrow pit and quarry and removal of material, and the deposition of material for the proposed road.	-ve	Medium	Low	Sections 6.9.1.2 & 6.9.1.3
Geology	Permanent alteration of geology through the removal of material from the borrow pit and quarry.	-ve	Medium	Low	Section 6.9.1.2
Soils	Potential loss of soil from the borrow pit and quarry due to removal of topsoil and stockpiling for rehabilitation.	-ve	Medium	Very Low	Section 6.9.1.2





Element	Description of Potential Impact	Status	Significance		Reference to Mitigation
			Without Mitigation	With Mitigation	
Vegetation	Small scale loss of endemic vegetation associated with activities (establishment of camp site, removal of overburden, and topsoil stockpiles).	-ve	Low	Very Low	Sections 6.4.2, 6.5.1.2 & 6.9.1.4
Vegetation	Loss of protected flora may occur within borrow pit and quarry sites. However this is unlikely due to the highly disturbed nature of the sites.	-ve	Very Low	Very Low	Sections 6.4.2, 6.5.1.1 & 6.9.1.4
Fauna	Potential small scale loss of fauna, particularly small animals confined to borrow pit and quarry sites, resulting from habitat loss. No endangered or rare species threatened.	-ve	Very Low	Insignificant	Section 6.5.1.2
Surface Water	Potential increased sediment load in runoff water from borrow pit and quarry and road works.	-ve	Very Low	Very Low	Sections 6.6.2 & 6.9.1.5
Groundwater	Impacts on ground water are not expected.	N/A	N/A	N/A	None required
Air quality	Nuisance impact of dust generated from excavating, crushing, stockpiling and road works could potentially occur.	-ve	Low	Very Low	Section 6.5.6
Land capability	No permanent or significant impact on land capability is expected.	-ve	Very Low	Insignificant	None required
Noise	Noise impact will be limited to the construction phase of the project.	-ve	Low	Very Low	Section 6.5.5
Waste management	Pollution by construction and domestic waste as well as waste water could lead to other visual impacts and loss of natural habitat	-ve	Low	Insignificant	Sections 6.5.7, 6.6.3.2, 6.6.4.3 & 6.9.1.6
Heritage	The Heritage Impacts Assessment identified various grave sites in the vicinity of the proposed project.	-ve	High	Very Low	Sections 6.5.3
Visual impact	The borrow pit and the quarry will be visible from some sections of the road, however these impacts can be mitigated.	-ve	Moderate to High	Low to Moderate	Section 6.5.4
Socio-economic structure	The proposed project will have significant benefits to the economy of the region as the road will link the N2 to the R56. This will in turn benefit the local community. The project will also result in job creation during construction of which, 90% will accrue to the local community.	+ve	High	None required	None required



## **6 Environmental Management Plan**

### **6.1 Introduction and scope of the EMP**

This chapter describes how the environmental aspects identified above should be managed and the potential impacts be mitigated in the event of mining authorisation being granted. Although the mitigation measures are written as if the project has been authorised, this approach in no way presupposes that the project will be approved. Rather, the style of writing is aimed at providing a clear picture to the Department of Mineral Resources (DMR), other organs of state, and IAP's, regarding the management of environmental aspects associated with the construction and operational activities of this project.

The preceding chapters in this document form an integral part of this chapter as they provide details regarding the sensitivity of the affected environment, and the findings of the impact assessment. As such, while this Chapter provides a list of environmental specifications aimed at mitigation of the identified impacts, and in a more general sense compliance with environmental and mining legislation, the preceding Chapters are particularly useful for understanding the importance of the measures proposed here.

For easy reference, specific measures for the pre-mining phase are included in sections 6.5.1.1 and 6.5.2. Sections 6.5 to 6.8 describe mitigation measures for the construction phase, while the rehabilitation plan and measures for closure are listed in section 6.9.

It is important to note that the guidelines, operating procedures and rehabilitation/pollution control requirements described in this Chapter will be binding on the holder of the mining permit after approval of the EMP.

### **6.2 Responsibility**

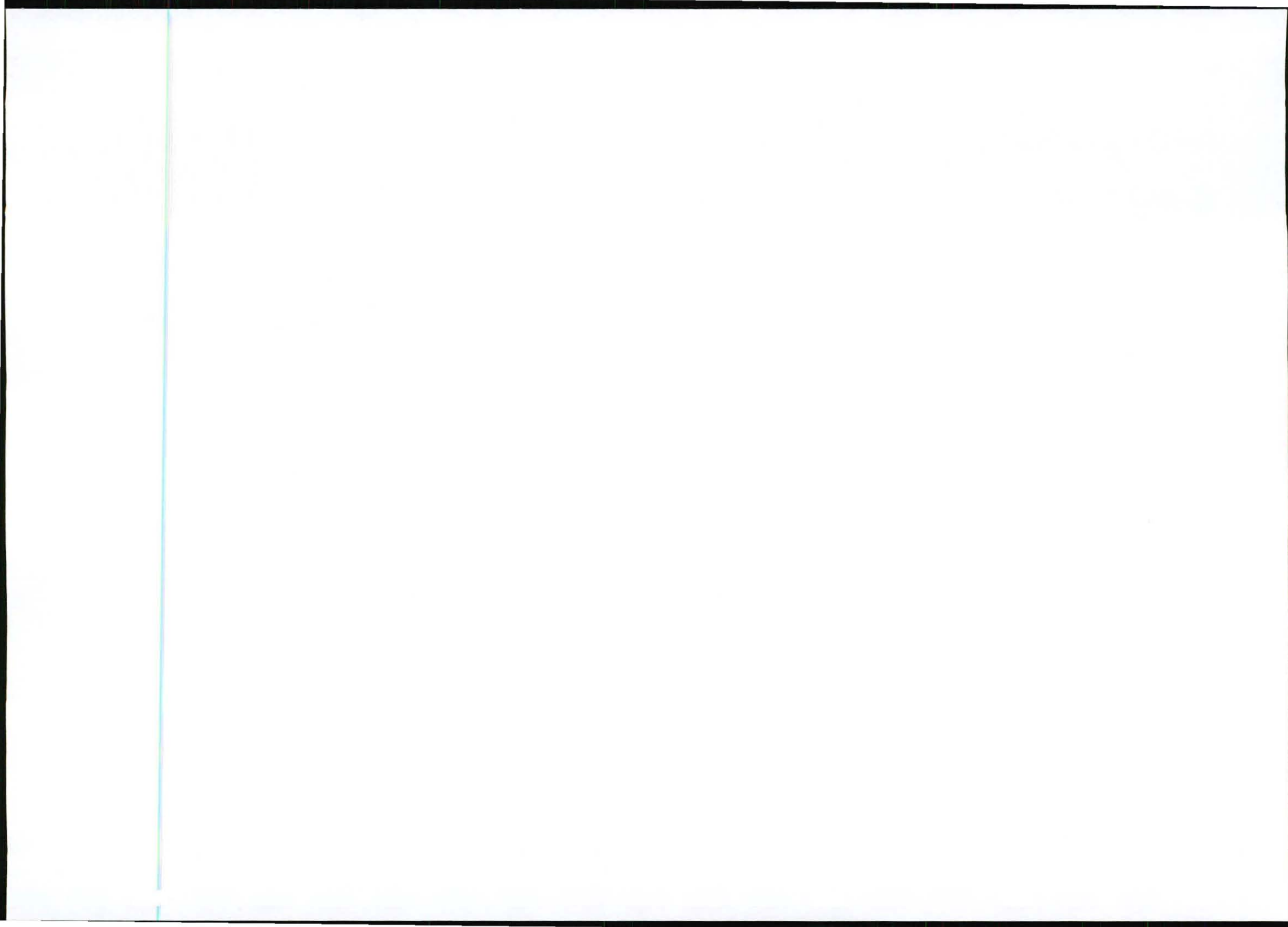
The environment affected by the mining operations shall be rehabilitated by the holder, as far as is practicable, to its natural state or to a predetermined and agreed to standard or land use which conforms with the concept of sustainable development. The affected environment shall be maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof.

It is the responsibility of the holder of the mining permit to ensure that the manager on the site and the employees are capable of complying with all the statutory requirements which must be met in order to mine, which includes the implementation of this EMP.

### **6.3 Environmental Procedures**

#### **6.3.1 Monitoring and Reporting**

- a) Regular monitoring of all the environmental management measures and components shall be carried out by the holder of the mining permit in order to ensure that the provisions of this EMP are adhered to.
- b) Ongoing and regular reporting of the progress of implementation of this programme will be done.



- c) Various points of compliance will be identified with regard to the various impacts that the operations will have on the environment.
- d) Inspections and monitoring shall be carried out on both the implementation of the EMP and the impact on plant and animal life.
- e) Visual inspections on erosion and physical pollution shall be carried out on a regular basis.
- f) Layout plans will be updated on a regular basis and updated copies will be submitted to the Regional Manager on a basis decided by the said Manager.
- g) Any emergency or unforeseen impact will be reported as soon as possible.
- h) An assessment of environmental impacts that were not properly addressed or were unknown when the plan was compiled shall be carried out and added as a corrective action.

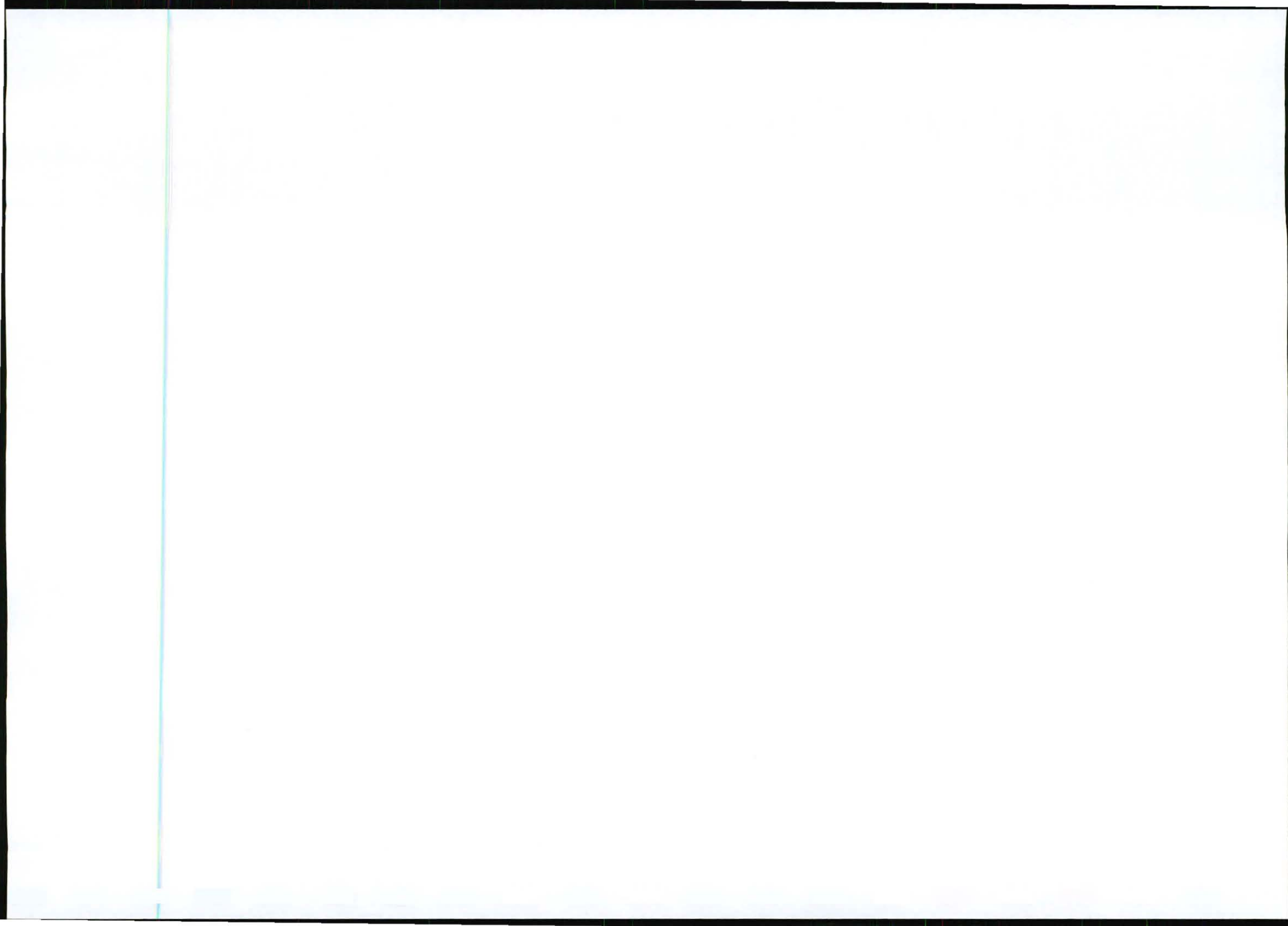
### 6.3.2 Training

The manager on site is responsible for ensuring that the sentiments of the EMP are conveyed to all personnel (including sub-contracted personnel). It is recommended that regular training sessions (including basic environmental awareness training at induction) be conducted to fulfil this purpose. Training registers shall be kept as proof for auditing purposes. The environmental training should, as a minimum, include (but not be limited to) the following:

- a) The importance of conformance with all environmental policies;
- b) The environmental impacts, actual or potential, of the proposed activities;
- c) The environmental benefits of improved personal performance;
- d) Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with this EMP, including associated procedures and emergency preparedness and response requirements;
- e) The potential consequences of departure from specified operating procedures; and
- f) The mitigation measures required to be implemented when carrying out their work activities.

### 6.3.3 Environmental Incidents

- a) The manager on site shall maintain a register of all environmental incidents occurring as a result of the activities associated with the contract. Environmental incidents that shall be recorded include (but are not limited to):
  - Fires;
  - Accidents (e.g. traffic);
  - Spills of hazardous materials, contaminating soil or water resources;
  - Non-compliances with applicable legislation; and
  - Non-compliances with this EMP.
- b) Each environmental incident shall be investigated by the competent person and an environmental incident report shall be forwarded to the holder of the permit. Such incident report shall be presented within five working days of the incident occurring.



- c) Environmental incident reports shall include (as a minimum) a description of the incident, the actions taken to contain any damage to the environment, personnel, or the public, and the actions taken to repair / remediate any such damage.
- d) Prescribe additional measures that may be required to remediate damage resulting from the incident and/or to prevent similar incidents occurring in the future.

## **6.4 General Requirements**

### **6.4.1 Layout Plan**

- a) A copy of the layout plans as provided in Appendix B of this document must be available at the mining site for scrutiny when required. These plans must include details on site locality, site boundaries, layout of the waste management facilities (litter, kitchen refuse, sewage and workshop-derived effluents), access roads and entry points to each site, drainage features and control of stormwater (to reduce the potential for erosion), storage facilities (water, fuel and lubricants, chemicals and other materials, aggregate stockpiles, spoil areas) and intended mitigation measures to reduce potential impacts.
- b) The plan must be updated on a regular basis with regard to the actual progress of the establishment of surface infrastructure, mining operations and rehabilitation (a copy of the updated plan shall be forwarded to the Regional Manager on a regular basis).
- c) A final layout plan must be submitted at closure of the borrow pit and quarry or when operations have ceased.

### **6.4.2 Demarcating the Mining Area**

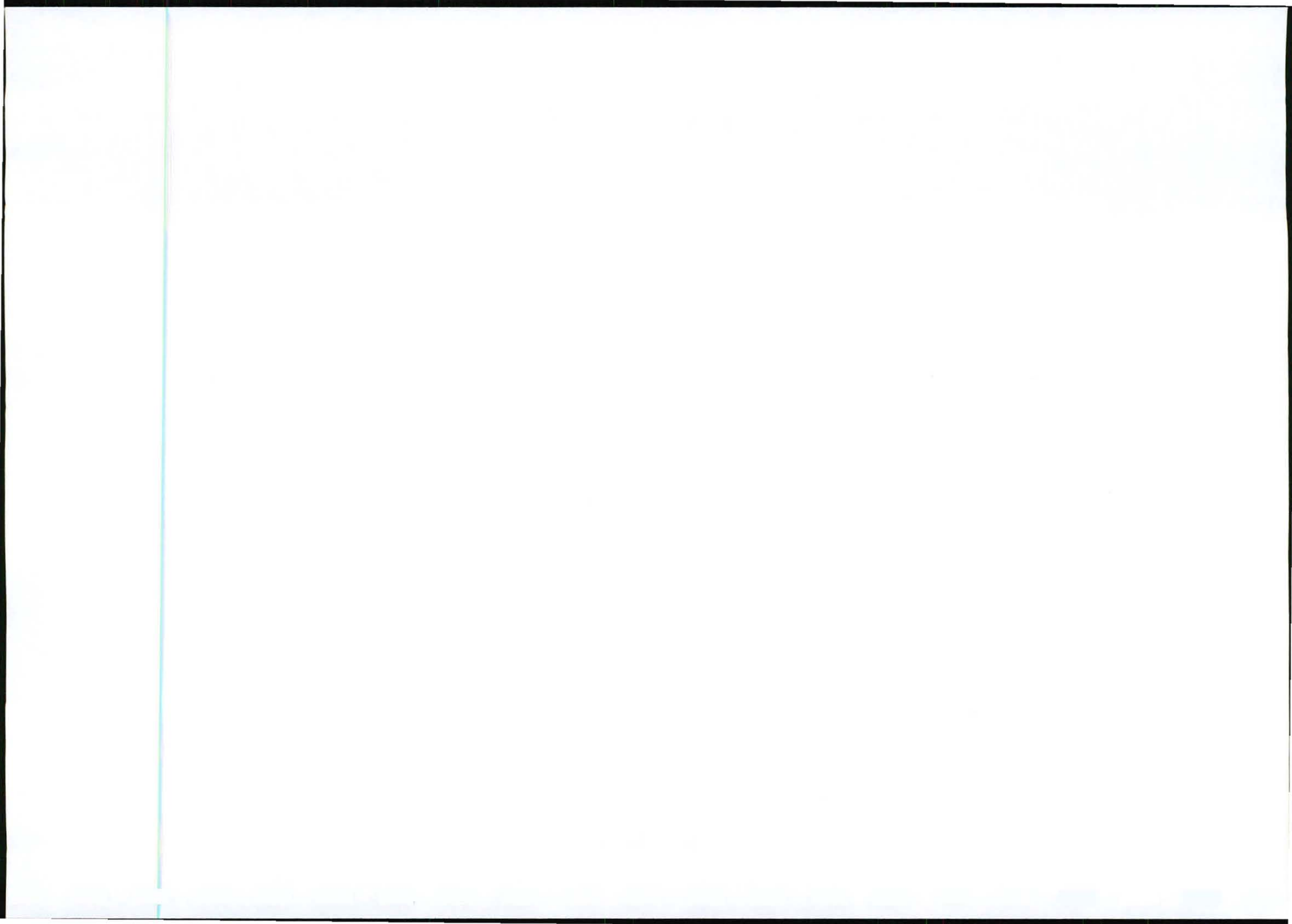
- a) The mining area must be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.
- b) Permanent beacons as indicated on the layout plan or as prescribed by the Regional Manager must be firmly erected and maintained in their correct position throughout the life of the operation.
- c) Mining and resultant operations shall only take place within this demarcated area.
- d) A detailed photographic record of the demarcated areas, prior to any mining activities, shall be taken. These records are to be kept by the Contractor for reference purposes during the rehabilitation of the site.

### **6.4.3 Fencing**

- a) The perimeter of the mining area shall be fenced with stock-proof fencing as indicated on the layout plan (Appendix B).
- b) The access gateway for the proposed new mining area shall be secured with a suitable lock.

### **6.4.4 Signage**

- a) Signage (as per South African Rural Traffic Model (SARTM)) shall be erected on either sides of the intersection of access and the DR 08015.
- b) Caution signs and 40 km/hr signs shall be placed at regulation distance from heavy vehicle crossing signs.





## 6.4.5 Restrictions on Mining

- a) On assessment of the application, the Regional Manager may prohibit the conducting of mining or prospecting operations in vegetated areas or over portions of these areas.
- b) After demarcation of the mining areas, no construction related access shall be allowed before species of special concern have been removed.
- c) In the case of areas that are excluded from mining or prospecting, no operations shall be conducted within 5 m of these areas.

## 6.5 Environmental Requirements

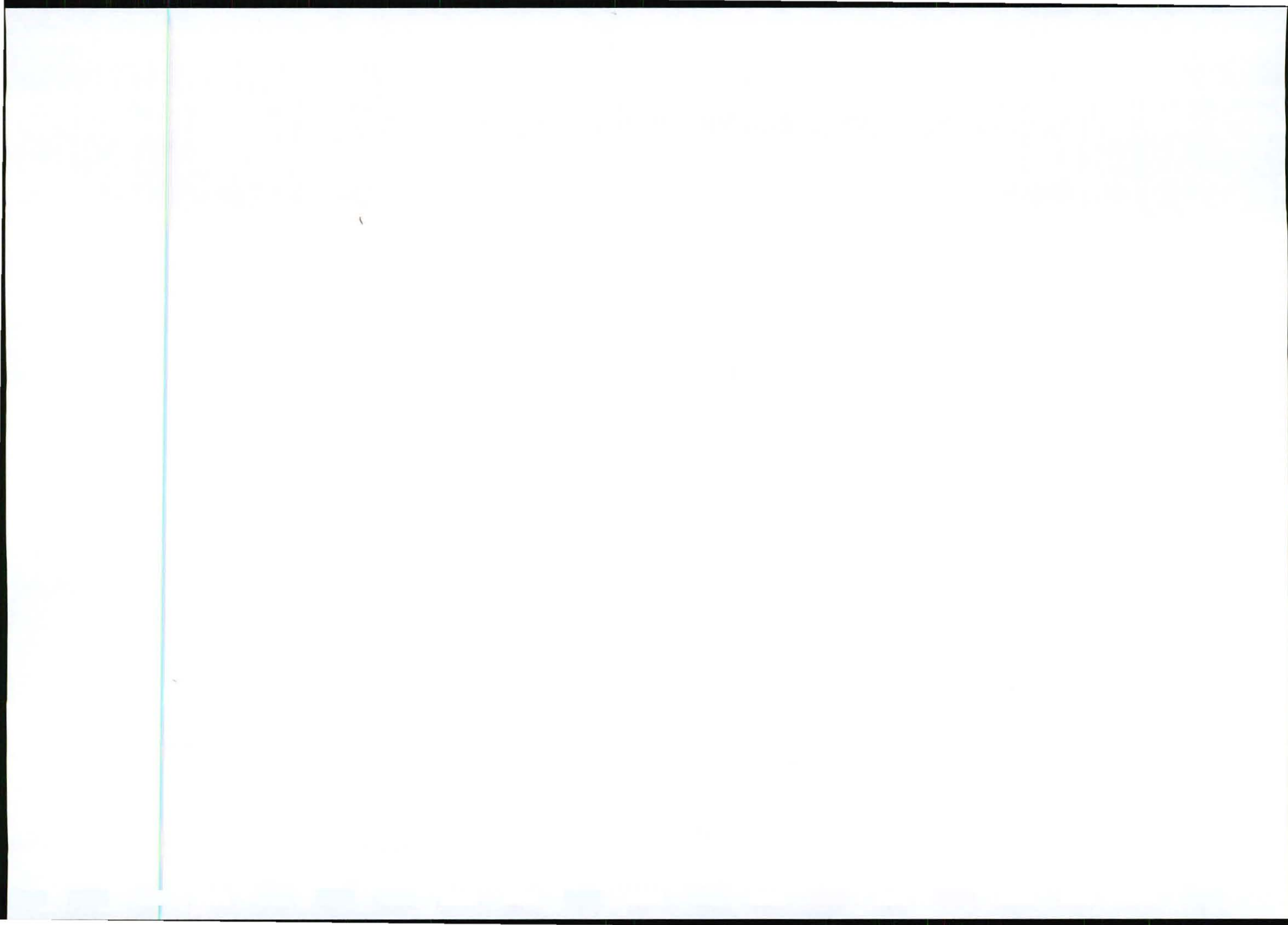
### 6.5.1 Protection of Flora and Fauna

#### 6.5.1.1 Site preparation (pre-mining)

- a) A suitably qualified botanist must survey the entire proposed site for plant species of special concern (SSC) and mark the ground with bio-degradable paint or with pegs for later translocation.
- b) Where necessary, permits for the protected flora must be obtained from the respective departments timeously:  
  
Department of Economic Development and Environmental Affairs (DEDEA) for PNCO permits: Div De Villiers/ Sandiso Mabongo; Private Bag X3513; Kokstad; 4700; Tel: (039) 727 2373; Fax: (039) 727 3282; Email: [div.devilliers@deact.ecape.gov.za](mailto:div.devilliers@deact.ecape.gov.za) or [sandiso.mabongo@deact.ecape.gov.za](mailto:sandiso.mabongo@deact.ecape.gov.za)
- c) The soil around the base of the plants should be loosened using a pick and spade and the plants removed making every effort to keep the root mass intact. These can be placed in sacks for transportation across the site.
- d) The removed plants should either be temporarily stored in a designated relocation area for later use during revegetation and/or permanently planted in adjacent areas having the same soil type as from where they are removed;
- e) Once replanted, plants should be lightly watered once a week for a month and then once every 2 weeks for 2 months thereafter until they have become established, or deemed established as per recommendation of the botanist/engineer (rainfall dependant);
- f) Exotic alien plant species shall be removed and controlled within the areas impacted upon by the activities. Removal of alien plants shall be done according to the Working for Water Guidelines.
- g) Topsoil may only be removed from the site once all the SSC have been removed. Topsoil should be stored in designated storage areas as per the borrow pit and quarry layout plans (Appendix B) and adequately stabilised against wind and water erosion.

#### 6.5.1.2 Specifications for the mining phase

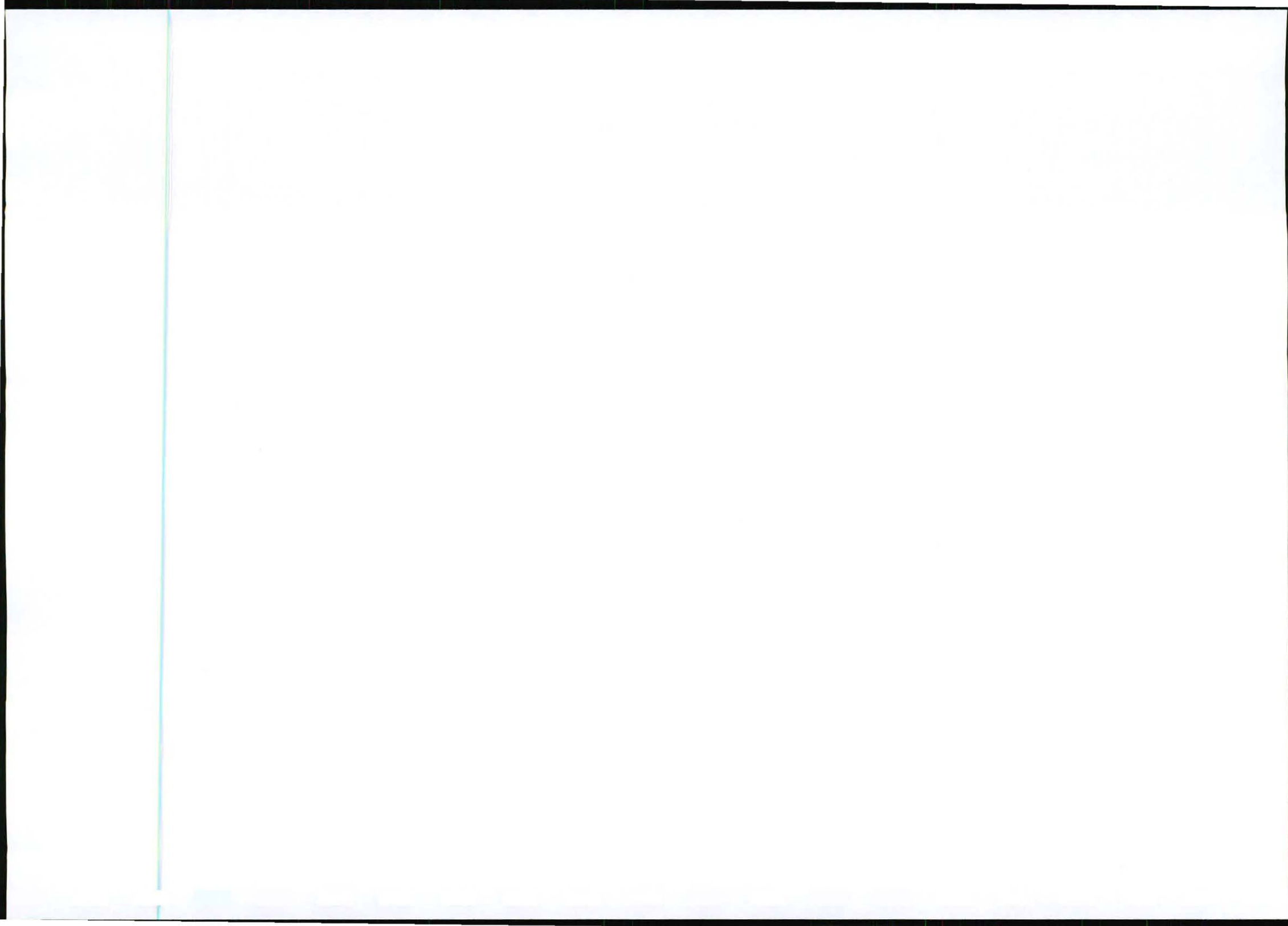
- a) The indigenous vegetation encountered on the site is to be conserved and left intact as far possible.



- b) Clearing should be kept to the minimum and must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once), to enable animal species to move into safe areas and to prevent wind and water erosion of the cleared areas.
- c) Stripped vegetation (excluding exotic invasive species) should also be temporarily stored during mining operation for later use to stabilise slopes.
- d) Fauna disturbed by the mining process on the site shall be carefully and safely removed from site to an equivalent environment.
- e) No animals shall be harmed during the course of mining.
- f) No workers will be allowed to collect any plants or snare any animal. The Contractor shall provide sufficient fuel for cooking and heating as is needed by the site staff.
- g) No domestic animals will be permitted on site.
- h) Only trees and shrubs directly affected by the works, and such others as may be indicated by the Engineer in writing, may be felled or cleared.
- i) Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before rehabilitation of the area.
- j) The Contractor shall be held responsible for the removal of proclaimed weed or alien vegetation within all areas disturbed during mining activities, including (but not limited to) the access roads, construction camps, borrow pit and quarry areas, and temporary storage areas.
- k) The Engineer in consultation with relevant authorities, may at his discretion, order the removal of alien plants when necessary. This includes areas within the confines of the borrow pit and quarry.
- l) Alien plants will be disposed of by temporary storage within a cleared area designated by the Engineer. Seeds from the alien plants will also be collected from the ground surface. All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site. Should brushwood be utilised for soil stabilisation or mulching, it must be seed free.
- m) Rehabilitation of vegetation on the site will be done as described in the Rehabilitation Plan (section 6.9.1).
- n) Fires shall only be allowed in facilities or equipment specially constructed for this purpose. A firebreak shall be cleared and maintained around the perimeter of all camps and office sites.

### **6.5.2 Soil Aspects**

- a) Topsoil shall be removed from all areas where physical disturbance of the surface will occur. Topsoil means that layer of soil covering the earth and which provides a suitable environment for the germination of seeds, allows the penetration of water, and is a source of micro organisms, plant nutrients and in some cases seed.
- b) All available topsoil shall be removed after consultation with the Regional Manager prior to the commencement of any operations.



- c) Topsoil shall be stockpiled only in the areas indicated on the layout plans (Appendix B), even if the topsoil is only partially cleared.
- d) The topsoil removed, shall be stored in a bund wall on the high ground side of the mining and in such a way that it will not cause damming up of water or washaways, or wash/blow away itself. Piles will not exceed a height of two meters, and if left stored for longer than six months, will be upgraded before replacement.
- e) Stockpiles shall be managed so as to maintain the regrowth potential of the topsoil. Should the stockpiles stand for too long (greater than 12 months) it can be considered barren from a seed bank point of view. In this case reseeded may be required. Stockpiles should ideally be stored for no longer than six months.
- f) The topsoil shall be stored so that it can be placed on the exposed subsoil as soon as the mining of the excavation or the relevant section of it has been completed and its slopes have been finished off to the acceptable gradient as part of the rehabilitation process.
- g) The overburden, i.e., that layer of soil immediately beneath the topsoil, will be removed and stored separately from the topsoil.
- h) No chemical pollution shall be allowed to contaminate the soils; any plant equipment found to be attributing to this shall be removed from the site and repaired.
- i) In the event of a petrochemical (diesel, oil, fuels, etc.) spill, the Contractor must take suitable measures to contain the pollution and prevent it from spreading or seepage. Once the spill has been contained, contaminated material (soil, etc.) shall be removed and disposed of at a registered hazardous waste disposal site.

### **6.5.3 Historical and Archaeological Areas**

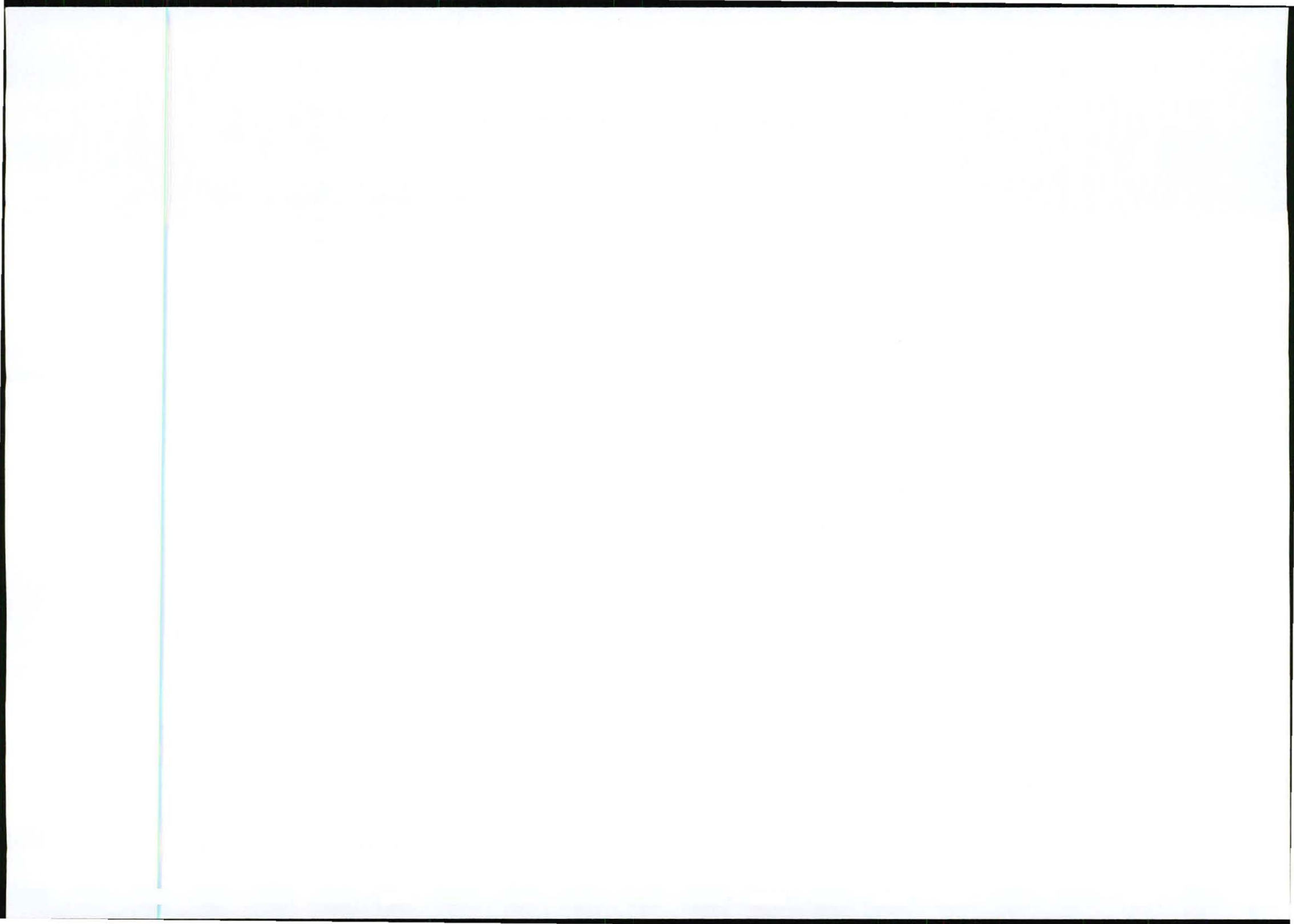
#### **6.5.3.1 Archaeological Sites**

- a) If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately.
- b) The contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the Engineer of such discovery.
- c) SAHRA should to be contacted and will appoint an archaeologist to investigate the site. Work may only resume once clearance is given in writing by the archaeologist.

#### **6.5.3.2 Graves**

The Heritage Impact Assessment identified various graves sites in proximity to the proposed project site. According to the specialist study, there are no visible grave sites within the proposed development footprint. The following measures should be adhered to in respect of these graves.

- a) No earthworks or construction activities should occur within a minimum of ten metres of any grave or burial ground.
- b) All graves and burial grounds should be demarcated appropriately before the start of any construction activities, including a buffer of at least ten metres. Barrier tape and metal posts may be used to define no-go areas and must remain in position for the duration of construction.



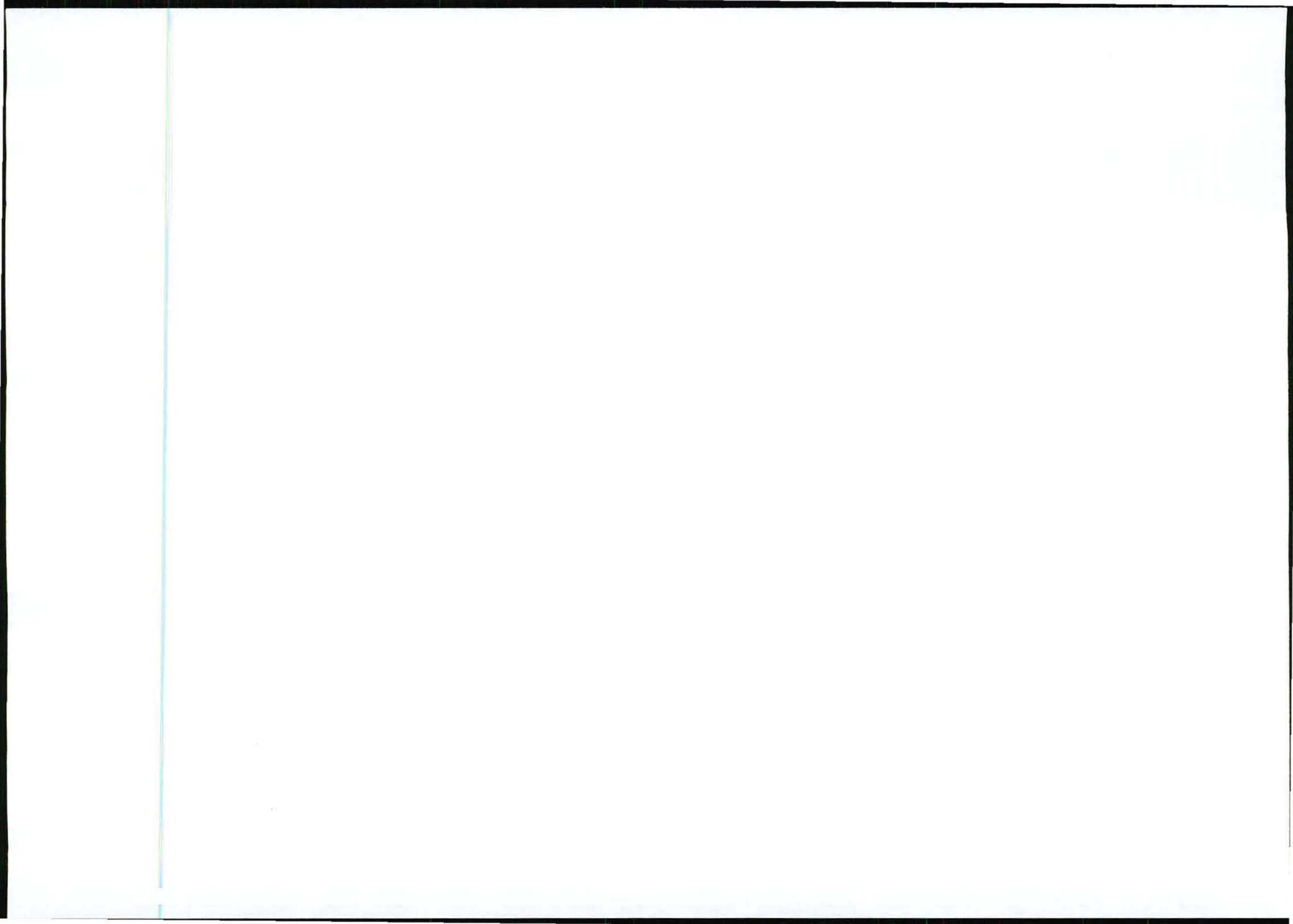
- c) All construction personnel should be informed about the locations of graves and burial grounds and receive instruction concerning appropriate activities in their vicinity.
- d) All actions concerning graves and burial grounds should be agreed to by the appropriate family members and community structures.

If a previously unidentified grave is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the gravesite shall be stopped and the Engineer informed of the discovery. The following will be adhered to in the event of the discovery of graves during mining activities and the management of identified grave sites:

- a) Where it is possible the area where the grave is located should not be disturbed, particularly in instances where exhumation cannot be undertaken or is deemed not permissible by SAHRA.
- b) Where it is necessary to exhume and re-bury graves the contractor will apply for the necessary permissions. (This will include acquisition of permits from SAHRA, national and provincial health departments, community (and next of kin) consultation, and collaboration with a forensic archaeologist if new graves are located during construction or operation).
- c) Site preparation will be delayed until permission for exhumation is granted.
- d) The mine will adhere to the requirements as laid out in the Human Tissues Act (No 65 of 1983) and the National Heritage Resources Act (No 25 of 1999).
- e) Due respect will be given to the customs and beliefs of the affected relatives, and where requested exhumations will be conducted in the presence of the relatives or community representatives.
- f) Exhumations under the Human Tissues Act will be conducted under the supervision of an undertaker or specialist.
- g) Exhumations conducted under the National Heritage Resources Act will be conducted under the supervision of an archaeologist.
- h) Notify SAHRA in the event that additional graves are located during construction and operation and obtain permits for relocation of graves.

#### **6.5.4 Visual Aspects**

- a) On completion of the project, the surface crust shall be broken to obliterate temporary roads or working surfaces. Earth embankments to prevent erosion will be established where appropriate.
- b) The remains of all structures that may have been erected at the borrow pit and quarry shall be demolished and removed on completion of the project.
- c) Care must be taken to ensure that all rehabilitated merges with the immediate environment and any negative visual impacts will be rectified to the satisfaction of the Regional Manager.
- d) Overburden will be placed back into excavation as part of the rehabilitation programme (see section 6.9.1).





### **6.5.5 Noise**

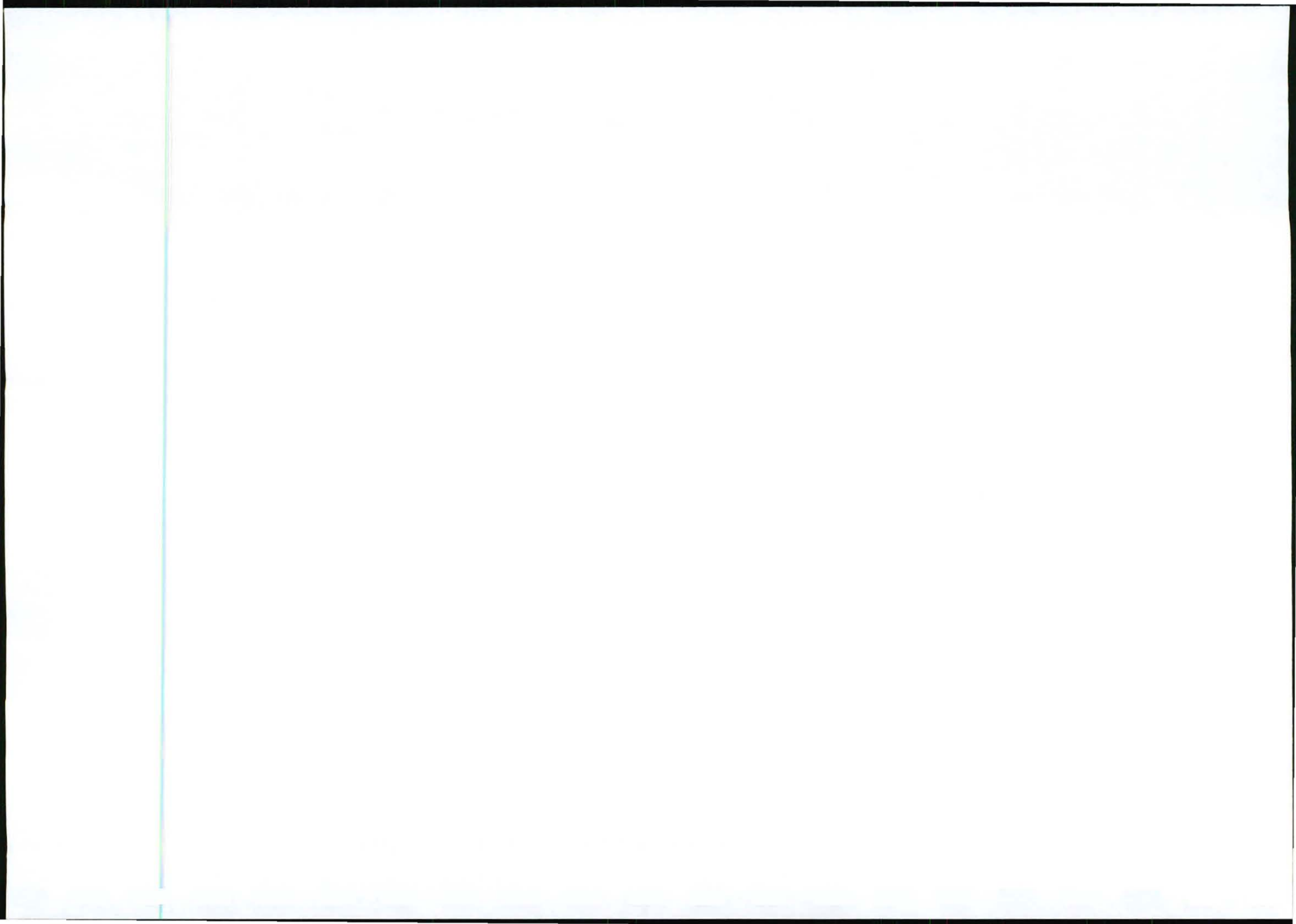
- a) Road construction and blasting activities will be limited to daylight hours. The hours of the activities will be reviewed on receipt of complaints (if any).
- b) Compliance with the appropriate legislation with respect to noise is mandatory.
- c) Regular maintenance of equipment and vehicles will be undertaken.
- d) In the event that activities continue outside the stipulated hours the contractor will communicate such occurrences to potentially affected communities (if any) prior to commencing such activities.
- e) A complaints register should be made available on site, should members of the surrounding communities wish to lodge complaints. In the event of a complaint being recorded the contractor will deal with the complaint appropriately and timeously.

### **6.5.6 Dust**

- a) A dust complaints register will be developed to manage complaints relating to impacts on the communities.
- b) Dust caused by strong winds and/or mining activities on the works shall be controlled by means of water spray vehicles, if required.
- c) No over-watering of the mining area or road surfaces should occur.

### **6.5.7 Waste Management**

- a) A suitable site for spoiling material that is excavated needs to be identified.
- b) Sufficient weather and scavenger- proof bins (with lids, to prevent the escape of litter) shall be provided, and be easily accessible at all points where wastes are generated.
- c) The site shall be kept clean and free of litter and no litter from the site shall be allowed to disperse to surrounding areas.
- d) All personnel shall be instructed to dispose of all waste in the proper manner.
- e) The Contractor shall identify and separate materials that can be reused or recycled to minimise waste e.g. metals, packaging and plastics, and provide separate marked bins for these items.
- f) All construction materials (e.g. bags of cement) must be suitably stored and protected, so that they do not become damaged and unusable.
- g) The Contractor shall be responsible for the regular disposal (at suitable and licensed municipal waste disposal facilities) of all waste generated as a result of the construction. Waste disposal slips shall be kept for auditing purposes.
- h) Construction waste should be removed immediately upon completion of each phase of the project and disposed of at a registered solid waste site.
- i) No dumping within the surrounding area shall be permitted, and no waste may be buried or burned. Where potentially hazardous substances are to be disposed of, a safe disposal slip shall be kept on record as proof of final disposal.



- j) General waste is to be collected either by the Municipality or via a Municipality approved waste transporting contractor. The frequency of collections will be such that waste containment receptacles do not unduly accumulate or overflow.

### **6.5.8 Fires**

- a) Making of fires will only be permitted in facilities or equipment designed to control the spread of fire.
- b) A firebreak shall be cleared and maintained around the perimeter of all camps and office sites, if applicable.
- c) Sufficient fire-fighting equipment shall be maintained and be accessible on sites at all times. In particular, such fire fighting equipment shall be readily on hand in areas where hot work may be required.
- d) In the event that the fire is too large for the on-site personnel to control, the Fire Brigade shall be called to extinguish it.

## **6.6 Infrastructural Requirements**

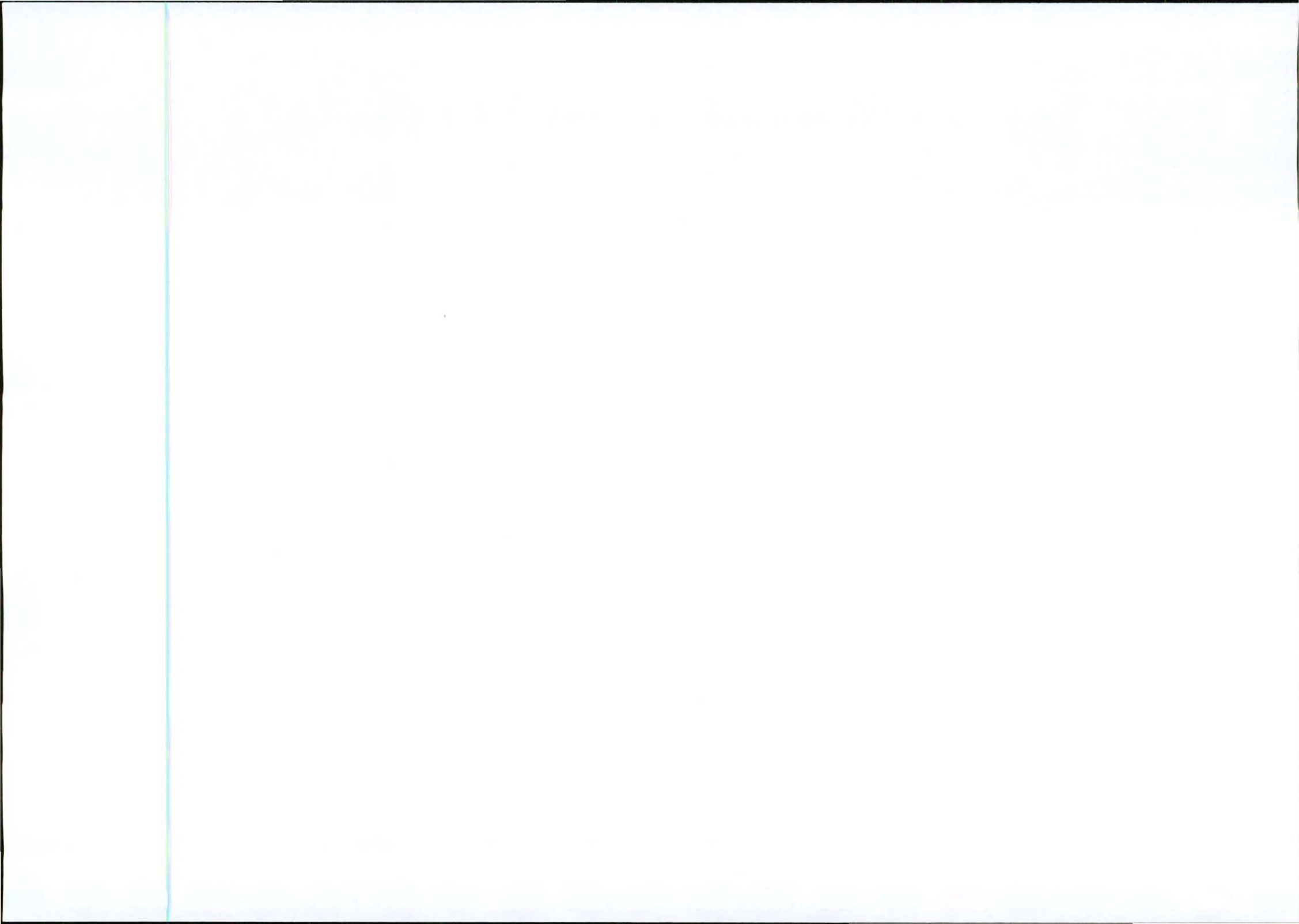
### **6.6.1 Access to Site**

No access roads are planned for the proposed borrow pit and quarry. Access to the sites will be gained from the road (DR 08015) only using the installed gateway as indicated on the layout plans. No mitigation measures are therefore required.

However, the following measures for access roads are included in the event that a road needs to be constructed and is then included in the layout plans at a later stage.

#### **6.6.1.1 Establishing access roads on the site**

- a) The access road to the mining area and the camp/office site must be established in consultation with the tribal leadership and existing roads shall be used as far as practicable.
- b) Should a portion of the access road be newly constructed the following must be adhered to:
  - a. The route shall be selected that a minimum number of bushes or trees are felled and existing fence lines shall be followed as far as possible;
  - b. Water courses and steep gradients shall be avoided as far as is practicable; and
  - c. Adequate drainage and erosion protection in the form of cut-off berms or trenches shall be provided where necessary.
- c) The erection of gates in fence lines and the open or closed status of gates in new and existing positions shall be clarified in consultation with the tribal authority and maintained throughout the operational period.
- d) No other routes will be used by vehicles or personnel for the purpose of gaining access to the site.
- e) Reasonable speeds will be maintained at all times.



#### **6.6.1.2 Maintenance of access roads**

- a) In the case of dual or multiple use of access roads by other users, arrangements for multiple responsibility must be made with the other users. If not, the maintenance of access roads will be the responsibility of the holder of the mining permit.
- b) Newly constructed access roads shall be adequately maintained so as to minimise dust, erosion or undue surface damage.

#### **6.6.1.3 Dust control on the access and haul roads**

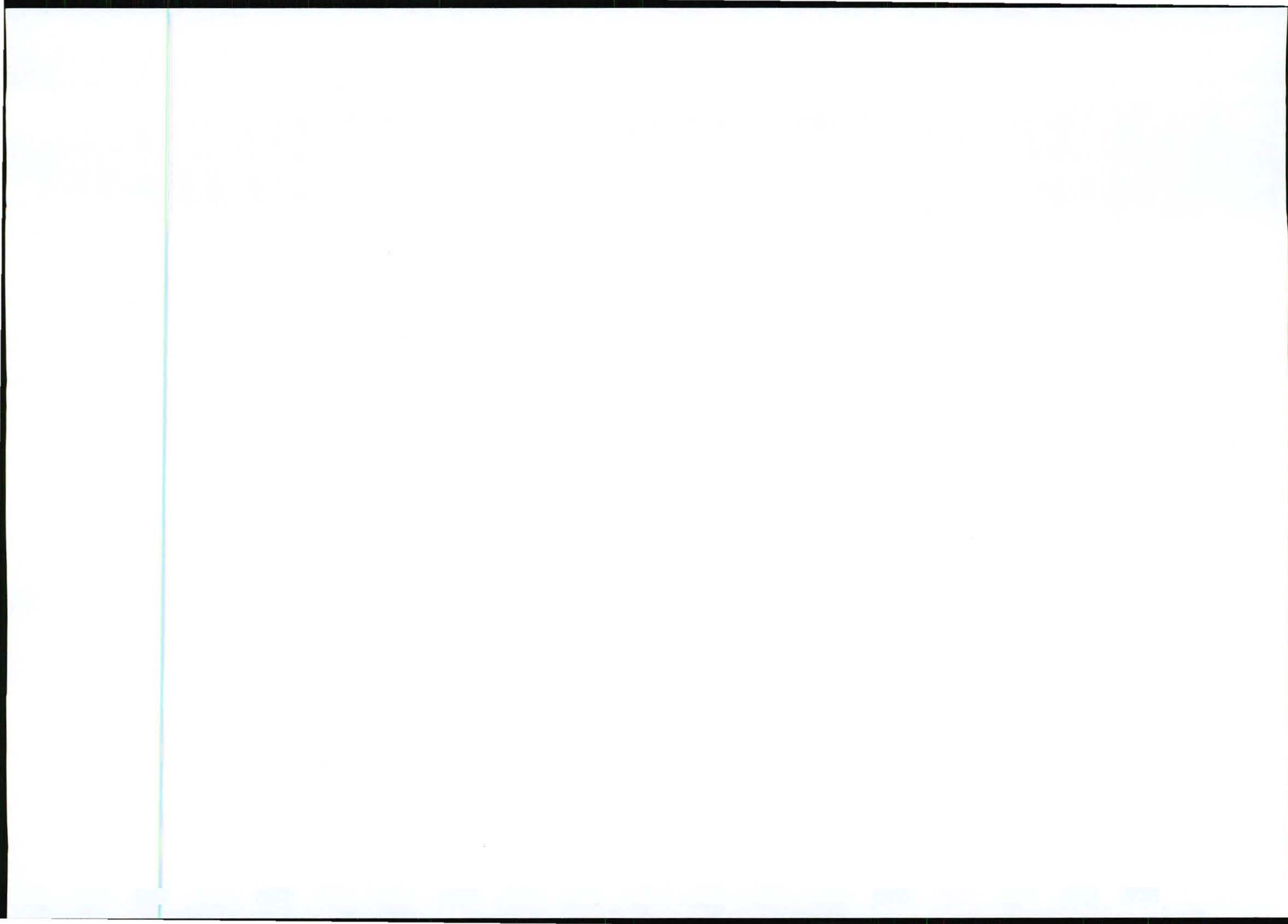
- a) The liberation of dust into the surrounding environment shall be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.

#### **6.6.1.4 Rehabilitation of access roads**

- a) Whenever a mining permit is suspended, cancelled or abandoned or if it lapses and the holder does not wish to renew the permit, any access road or portions thereof, constructed by the holder and which will no longer be required by the landowner, shall be removed and/or rehabilitated to the satisfaction of the Regional Manager.
- b) Any gate or fence erected by the holder which is not required by the landowner, shall be removed and the situation restored to the pre mining situation.
- c) Roads shall be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation must be removed and disposed of in an approved manner prior to rehabilitation.
- d) If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation, be corrected and the area be seeded with a seed mix to the Regional Manager's specification.

### **6.6.2 Stormwater and Erosion Control**

- a) No drainage works are required as surface water is expected to drain in the floor material of the borrow pit and quarry.
- b) Borrow pit and quarry slopes should be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scour (maximum 1:3 gradient).
- c) If necessary, diversion channels should be constructed ahead of the open cuts as well as above emplacement areas and stockpiles to intercept clean run-off and divert it around disturbed areas into the natural drainage system downstream of the borrow pit and quarry.
- d) All existing mined areas will be revegetated to control erosion and sedimentation.
- e) Existing vegetation must be retained as far as possible to minimise erosion problems.
- f) Rehabilitation of borrow pit and quarry shall be planned and completed in such a way that the run off water (if any) will not cause erosion (see section 6.9.1).



- g) Visual inspections shall be done on a regular basis with regard to the stability of water control structures, erosion and siltation (if required).
- h) Groundwater will not be significantly affected by the borrow pit and quarry.

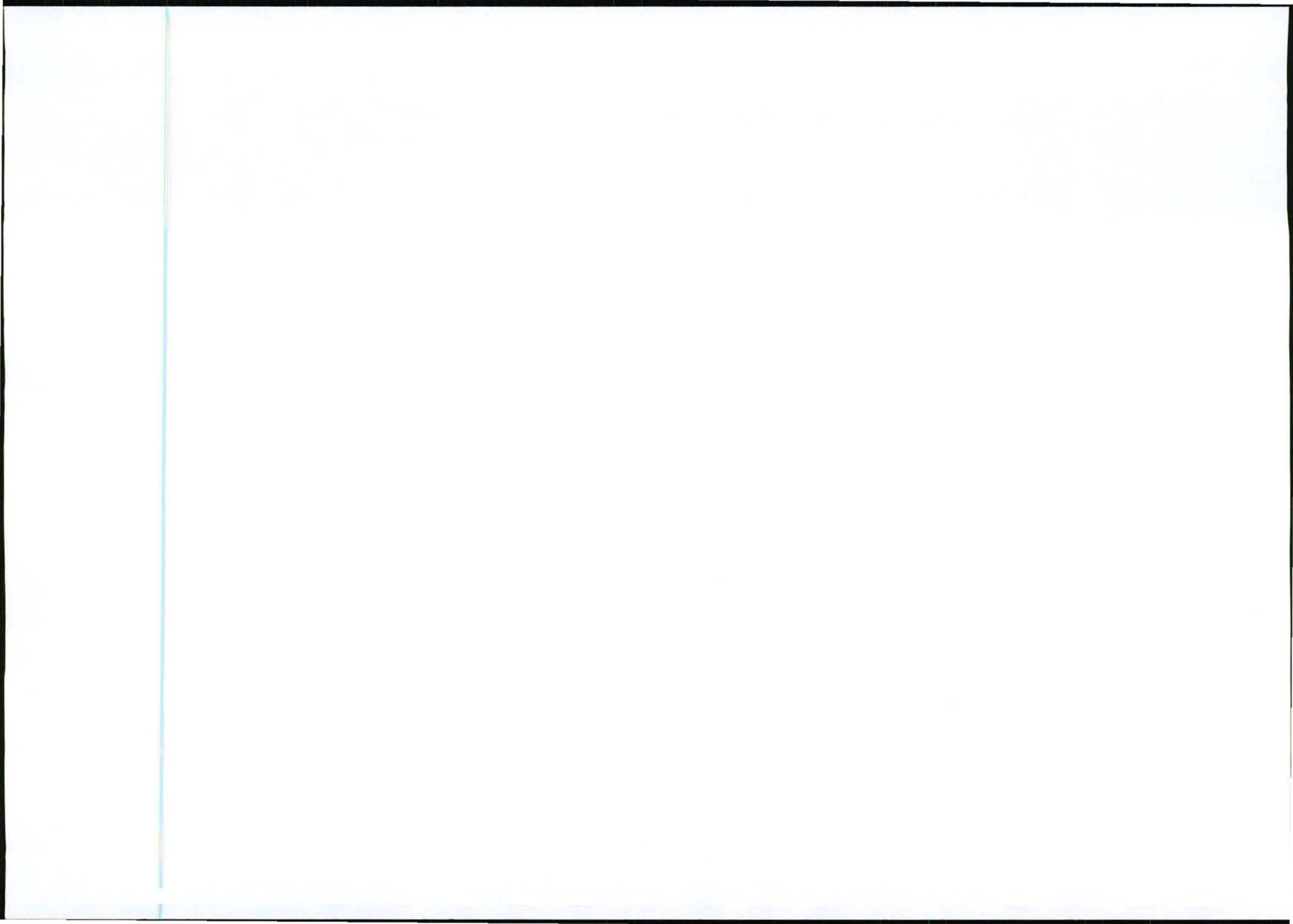
### **6.6.3 Office/Camp Sites**

#### **6.6.3.1 Establishing office/camp sites**

- a) Office and camp sites shall be established, as far as is practicable, outside the flood plain, above the 1 in 50 flood level mark within the boundaries of the mining area.
- b) The area chosen for these purposes shall be the minimum reasonably required and which will involve the least disturbance to vegetation. Topsoil shall be handled as described in Section 6.5.2 above.
- c) No camp or office site shall be located closer than 100 metres from a stream, river, spring, dam or pan.
- d) No trees or shrubs will be felled or damaged for the purpose of obtaining firewood, unless agreed to by the tribal authority.
- e) Fires will only be allowed in facilities or equipment specifically constructed for this purpose. If required by applicable legislation, a fire-break shall be cleared around the perimeter of the camp and office sites.
- f) Lighting and noise disturbance or any other form of disturbance that may have an effect on persons lawfully living in the vicinity shall be kept to a minimum.

#### **6.6.3.2 Toilet facilities, waste water and refuse disposal**

- a) As a minimum requirement, the holder of the mining permit shall, at least, provide pit latrines for employees in such a way that they do not cause water or other pollution and proper hygiene measures shall be established.
- b) Portable toilets shall be provided adjacent to the site entrance indicated on the layout plans (Appendix B) and shall be screened with shade cloth.
- c) The use of existing facilities must take place in consultation with the landowner.
- d) All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole.
- e) Only domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognised facility.
- f) Spills should be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognised facility.
- g) Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., shall be stored in a container at a collecting point and collected on a weekly basis and disposed of at a





recognised disposal facility. Specific precautions shall be taken to prevent refuse from being dumped on or in the vicinity of the camp site.

- h) Biodegradable refuse generated from the office/camp site, processing areas vehicle yard, storage area or any other area shall either be handled as indicated above or be buried in a pit excavated for that purpose and covered with layers of soil, incorporating a final 0,5 meter thick layer of topsoil (where possible). Provision should be made for future subsidence of the covering.

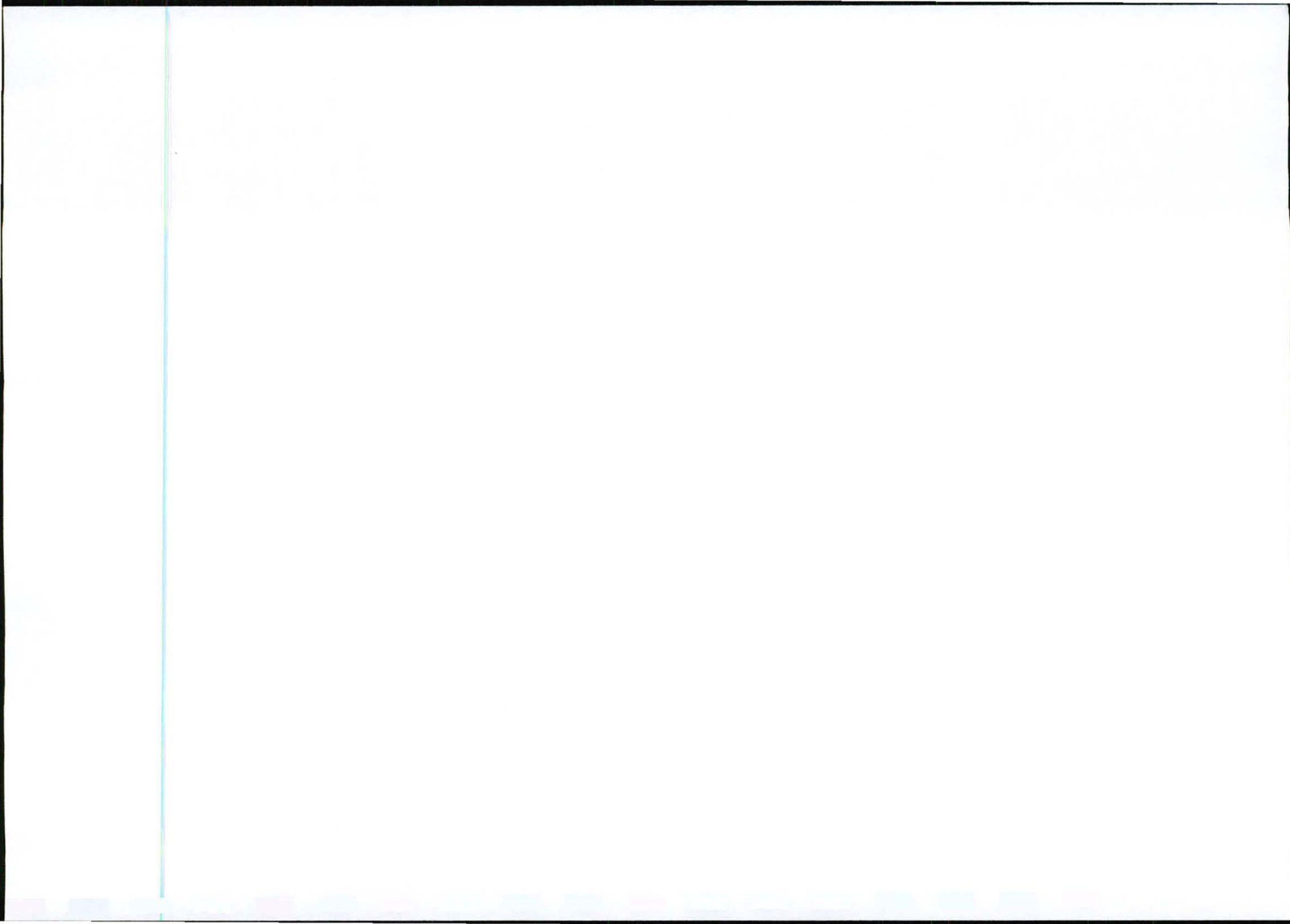
### **6.6.3.3 Rehabilitation of the office/camp site**

- a) On completion of operations, all buildings, structures or objects on the camp/office site shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002). This means that the holder of the permit may not demolish or remove any building, structure, or object which may not be demolished in terms of any other law, which has been identified in writing by the Minister for purposes of this section; or which is to be retained in terms of an agreement between the holder and the landowner, which agreement has been approved by the Minister in writing. The above does not apply to *bona fide* mining equipment which may be removed.
- b) Where office/camp sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
- c) Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface.
- d) Rehabilitation of vegetation on the site will be done as described in the Rehabilitation Plan (section 6.9.1).
- e) If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.
- f) Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the Regional Manager.

## **6.6.4 Vehicle Maintenance Yard and Secured Storage Areas**

### **6.6.4.1 Establishing the vehicle maintenance yard and secured storage areas**

- a) The vehicle maintenance yard and secured storage area will be established as far as is practicable, outside the flood plain, above the 1 in 50 flood level mark within the boundaries of the mining area.
- b) The area chosen for these purposes shall be the minimum reasonably required and involve the least disturbance to tree and plant life. Topsoil shall be handled as described in section 6.5.2 above.
- c) The storage area shall be securely fenced and all hazardous substances and stocks such as diesel, oils, detergents, etc., shall be stored therein. Drip pans, a thin concrete slab or a facility with PVC lining, shall be installed in such storage areas with a view to prevent soil and water pollution.



- d) The location of both the vehicle maintenance yard and the storage areas are to be indicated on the layout plan.
- e) No vehicle may be extensively repaired in any place other than in the maintenance yard.

#### **6.6.4.2 Maintenance of vehicles and equipment**

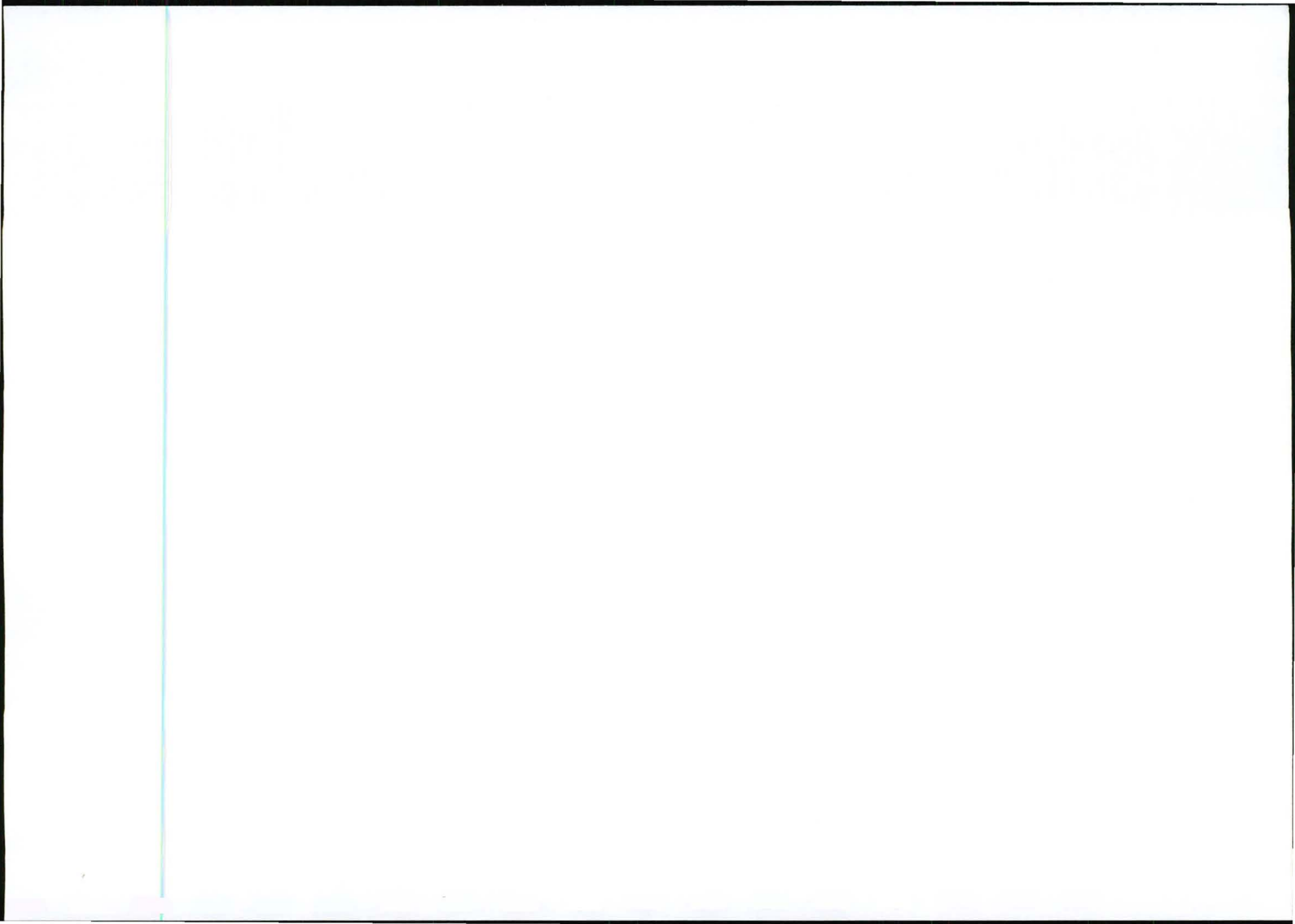
- a) The maintenance of vehicles and equipment used for any purpose during the mining operation will take place only in the maintenance yard area.
- b) Equipment used in the mining process must be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid.
- c) Machinery or equipment used on the mining area must not constitute a pollution hazard in respect of the above substances. The Regional Manager shall order such equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and irreparable.

#### **6.6.4.3 Waste disposal**

- a) Suitable covered receptacles shall be available at all times and conveniently placed for the disposal of waste.
- b) All used oils, grease or hydraulic fluids shall be placed therein and these receptacles will be removed from the site on a regular basis for disposal at a registered or licensed disposal facility.
- c) All spills should be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognised facility.

#### **6.6.4.4 Rehabilitation of vehicle maintenance yard and secured storages areas**

- a) On completion of mining operations, the above areas shall be cleared of any contaminated soil, which must be dumped as referred to in section above (Waste disposal).
- b) All buildings, structures or objects on the vehicle maintenance yard and secured storage areas shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002.
- c) The surface shall then be ripped or ploughed to a depth of at least 300 mm and the topsoil previously stored adjacent to the site, shall be spread evenly to its original depth over the whole area. The area shall then be fertilised if necessary (based on a soil analysis).
- d) Rehabilitation of vegetation on the site will be done as described in the Rehabilitation Plan (section 6.9.1).
- e) If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a seed mix to his or her specification.



## 6.7 Excavations

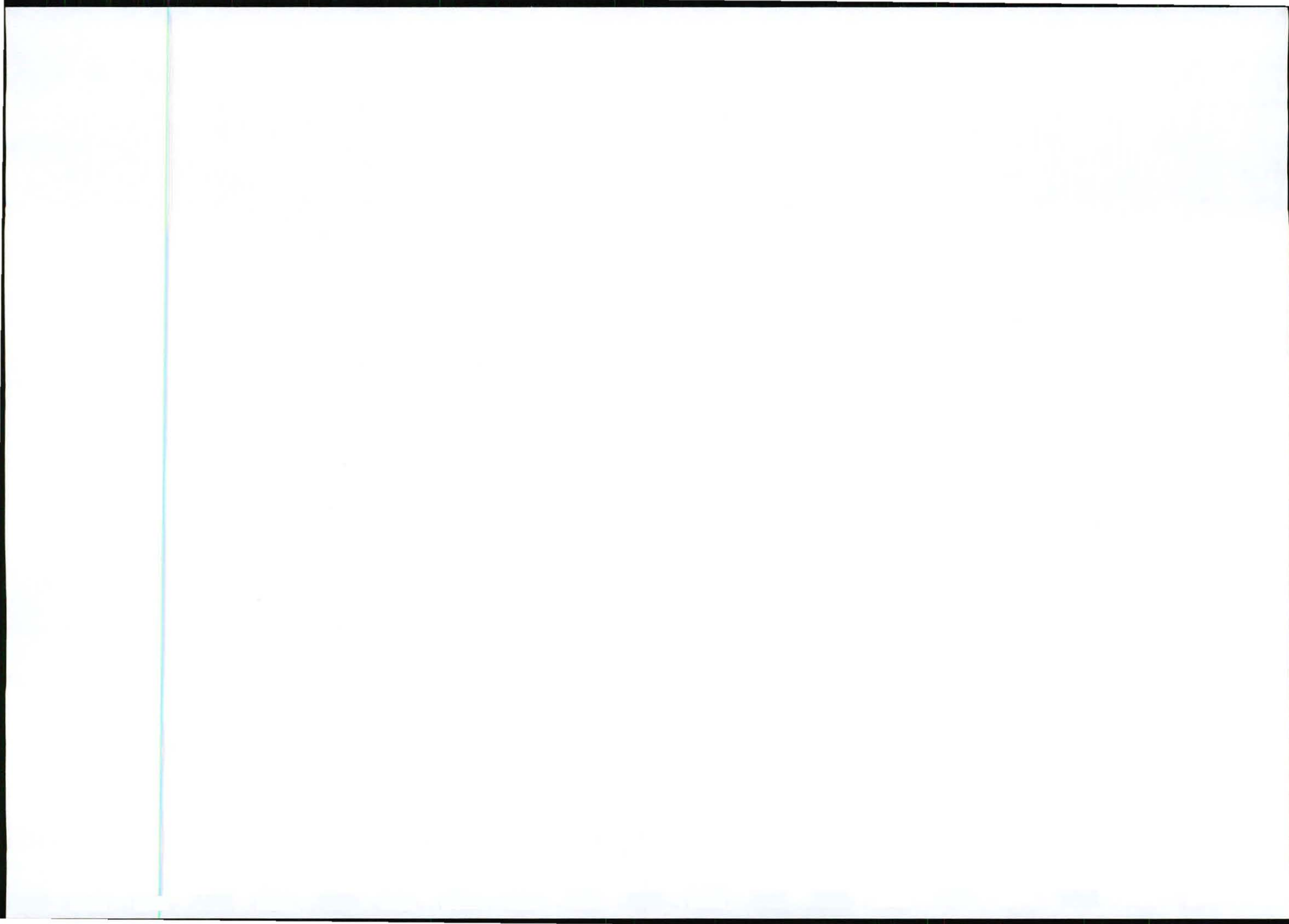
### 6.7.1 Establishing the Excavation Areas

Excavations shall be done as described in section 2.5 of this document. Whenever excavation of the borrow pit and quarry is undertaken, the following operating procedures shall be adhered to:

- a) It is suggested that mining commence at the access and then advance rapidly therefrom.
- b) Excavations shall take place only within the approved demarcated mining area.
- c) Temporary batter boards are to be erected as required as mining proceeds to indicate the sideways and downward limit of mining.
- d) Topsoil shall, in all cases be handled as described in section 6.5.2 above.
- e) Overburden rocks and coarse material shall be placed concurrently in the excavations or stored adjacent to the excavation, if practicable, to be used as backfill material once the gravel has been excavated.
- f) Each successive mined area shall be bound by temporary 1v:2h slopes along its edge with unmined ground, and a final permanent slope of 1V:3H along its edge of ground not to be mined.
- g) The elevation of the floor of the mine shall not exceed three meters below the existing road elevation.
- h) Trenches shall be backfilled immediately if no fill can be located (not likely).
- i) Excavations shall not be used for the dumping of wastes.

### 6.7.2 Rehabilitation of Excavation Areas

- a) Rocks and coarse material removed from the excavation must be dumped into the excavation.
- b) Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations.
- c) Once excavations have been refilled with overburden, rocks and coarse natural materials and profiled with acceptable contours and erosion control measures, the topsoil previously stored shall be returned to its original depth over the area.
- d) The area shall be fertilised if necessary to allow vegetation to establish rapidly. Rehabilitation of vegetation on the site will be done as described in the Rehabilitation Plan (section 6.9.1).
- e) If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation, be corrected and the area be seeded with a vegetation seed mix to his or her specification.
- f) Final rehabilitation shall comply with the requirements mentioned in the Rehabilitation Plan (section 6.9.1).



## **6.8 Labour and Affected Parties**

### **6.8.1 Labourers on site**

- a) Suitable accommodation and security must be provided by the contractors for their workers during construction.
- b) The contractor in conjunction with the client shall develop policies and procedures with regard to employee accommodation.
- c) The contractor will implement management commitments with respect to noise, dust, safety and blasting. Furthermore the contractor shall ensure that their staff are trained regarding the Safety Health and Environmental (SHE) procedures to be followed on site. Penalty clauses for transgressions shall also be considered in this regard.
- d) The contractor shall ensure that the standard safety measures as stipulated in the Mine, Health and Safety Act are complied with.
- e) All employees and contractors shall be briefed about appropriate road safety measures. Penalties and disciplinary actions will be imposed on employees and contractors for non compliance with safety, environmental and social measures.

### **6.8.2 Other affected Parties**

- a) Any complaints, if they arise, will be timeously dealt with. This will require the joint formulation of compliance contracts and grievance procedures and project-specific communication mechanisms (for example keeping of a complaints register).
- b) Inadvertent access to dangerous construction areas shall be prevented. Such areas will be strictly controlled using fencing, warning signs and access control.

### **6.8.3 Prevention of social disruptions**

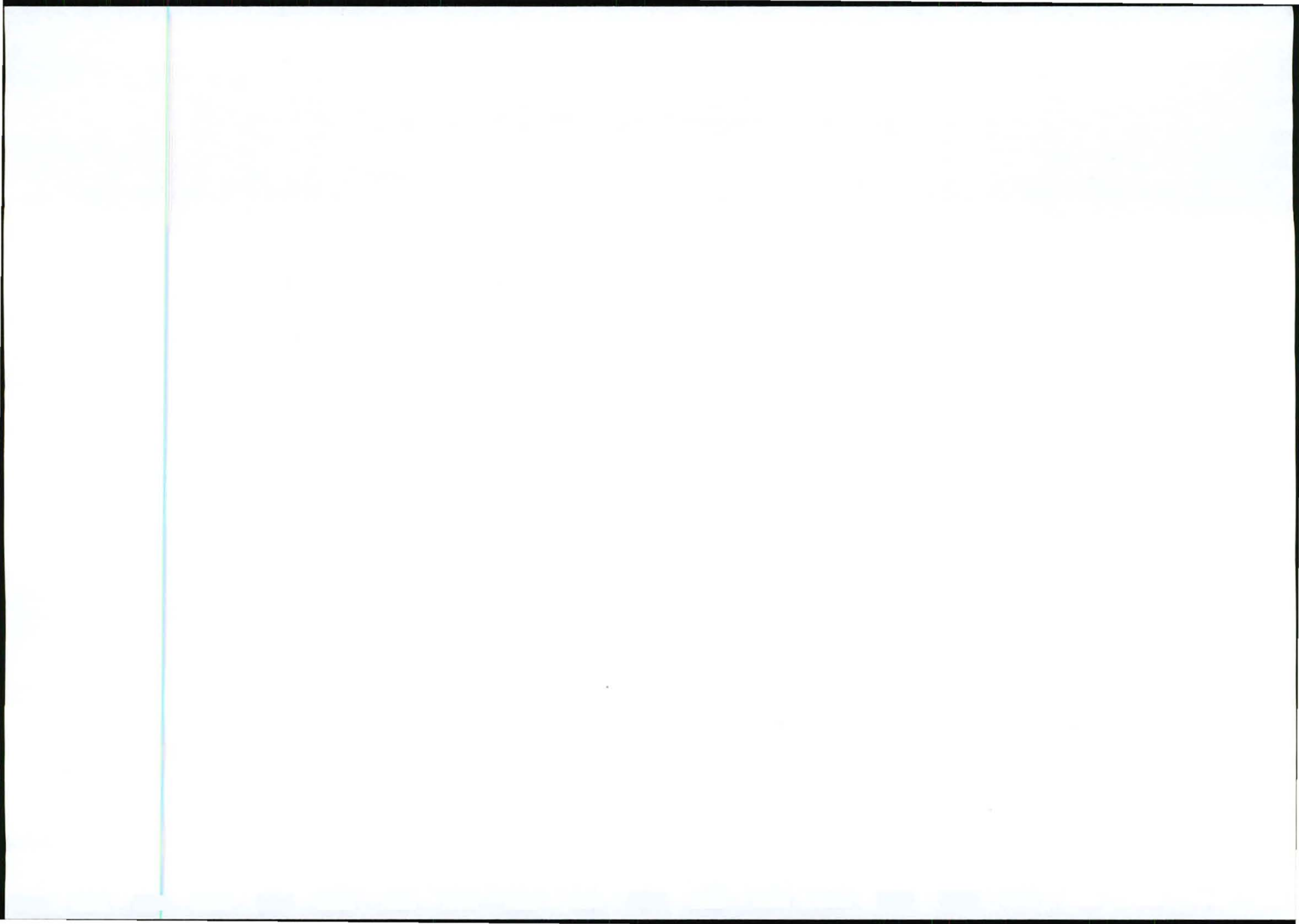
- a) Wherever “outsiders” are accommodated in construction camps, the Contractor shall implement strict access control measures with only authorised personnel allowed at the camp site;
- b) Workers may only be housed in surrounding villages if the relevant authorities in the villages are satisfied with this arrangement.

## **6.9 Rehabilitation and Closure**

### **6.9.1 Rehabilitation Plan**

#### **6.9.1.1 General requirements**

- a) Rehabilitation will be restricted to new excavation areas, however should additional funding be available, the existing disturbed areas will also be rehabilitated.
- b) The objective of rehabilitation will be to restore the borrow pit and quarry to their present condition or their pre-determined end use.
- c) Rehabilitation shall commence as soon as the advancing face and sufficient working/loading area moves away from an area that has been mined out to the proposed limit of mining.





- d) Final rehabilitation will take place on completion of the borrow process and shall continue for six months after completion of the project or until a certificate of closure is issued by the Department of Mineral Resources, whichever is the longer.

#### **6.9.1.2 Surplus material and topsoil**

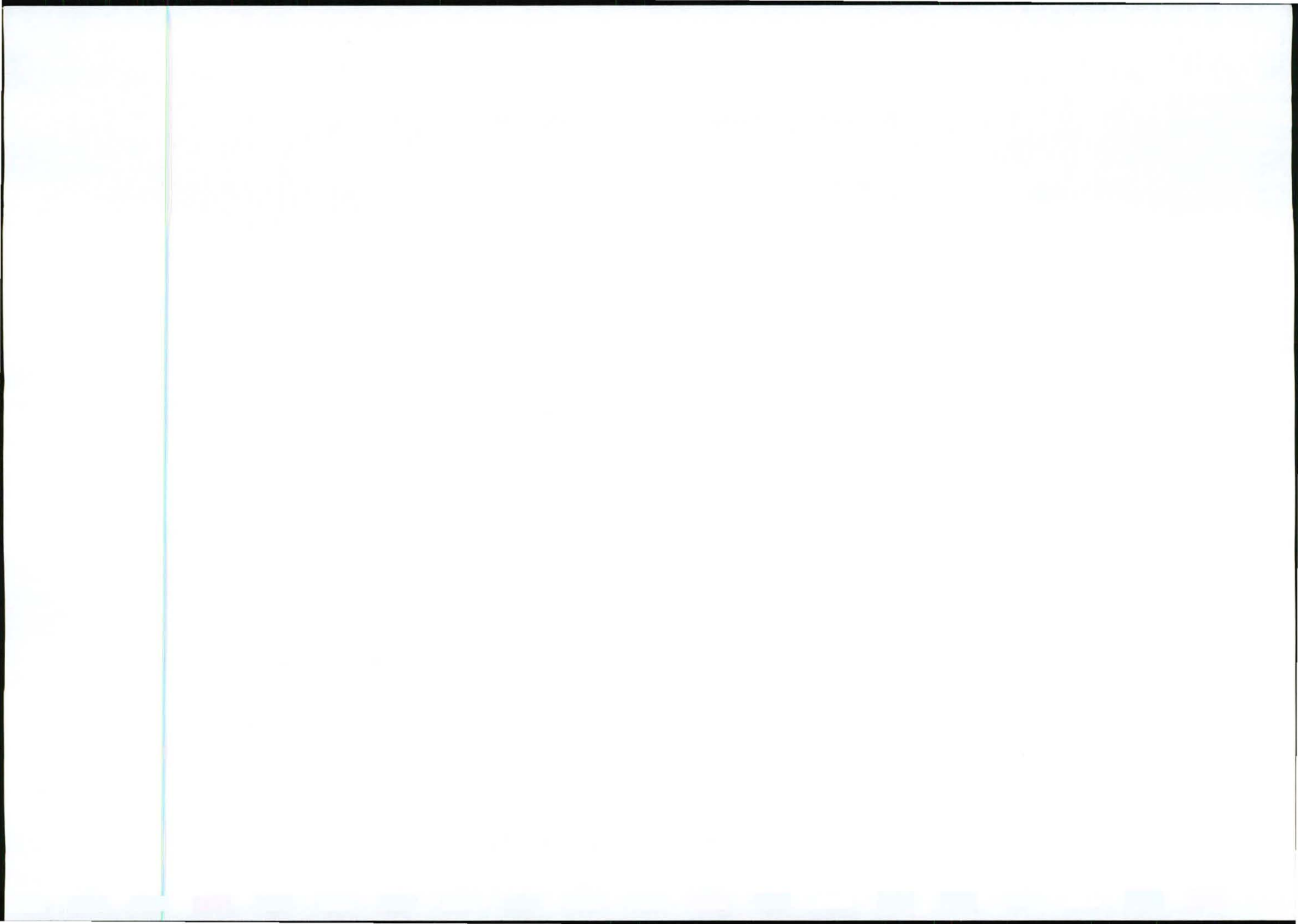
- a) On completion of borrowing, all surplus material in and around the excavations, including any stockpiled gravel or oversized rocks, but excluding topsoil, shall be returned and the sides of the pits shall be graded at 1V:3H slopes.
- b) Stockpiled gravel will be left inside the pits for use on future projects.
- c) The topsoil stockpiled prior to mining shall be spread evenly over designated areas of the borrow pit, to a thickness of not less than 75 mm.
- d) Topsoil from adjacent road clearing can also be used to supplement topsoil from mining area where topsoil is deemed to be inadequate by the engineer.
- e) The topsoil must be keyed into the re-profiled surfaces to ensure that they are not eroded or washed away.
- f) The top-soiled surface shall also be left fairly rough to enhance seedling establishment, reduce water run-off and increase infiltration.

#### **6.9.1.3 Landscaping**

- a) All slopes shall be finished to produce a smooth rounded concave/convex surface.
- b) Slopes shall be smoothed over.
- c) The floor of the borrow pit shall be made gently undulating in keeping with the landscape surrounding the excavation.
- d) The rehabilitated land will merge with the immediate environment, and any negative visual impact will be rectified to the satisfaction of the Regional Manager.

#### **6.9.1.4 Revegetation**

- a) Revegetation will be focussed more on the slopes than the level areas.
- b) Straw shall be used to stabilise slopes using natural seed-free, dried fibres of hay, chaff or tall grass clippings (from the surrounding environment) of various lengths between 50 mm and 400 mm, applied evenly by hand at a rate of one bale per 20 m<sup>2</sup> over the area.
- c) Straw shall be mixed into the upper 100 mm layer of soil by hand.
- d) Alternatively, sorted brushwood (i.e. without alien material) can be overlain on slopes in conjunction with a biodegradable netting/matting (made from jute, sisal, coir or similar material) or a geofabric, geogrid or nylon fabric as deemed necessary by the engineer.
- e) No seeding of replaced topsoil should be required, unless topsoil has been stored for a period longer than 12 months. Once replaced, the topsoil will be left to revegetate naturally unless the process does not occur unaided or if significant topsoil erosion occurs.
- f) The prepared surfaces should be irrigated regularly for the initial 30 day period and monitored for natural re-growth. If necessary, planting or seeding shall be undertaken if



natural vegetation did not begin to establish after 30 - 60 days (specialist guidance shall be sought to determine the exact requirements).

- g) Should the initial approach be deemed insufficient, the problem areas should be seeded with suitable grass species to provide an initial ground cover and stabilize the soil surface. *Themeda triandra* is a species that can work in this regard and can either be collected on site (using a mower or by hand) or purchased from a relevant local seed supplier.
- h) The area is by nature grassland, therefore trees are not recommended to be used for rehabilitation.
- i) No alien species shall be planted at any time in this area.

#### **6.9.1.5 Drainage works/erosion protection**

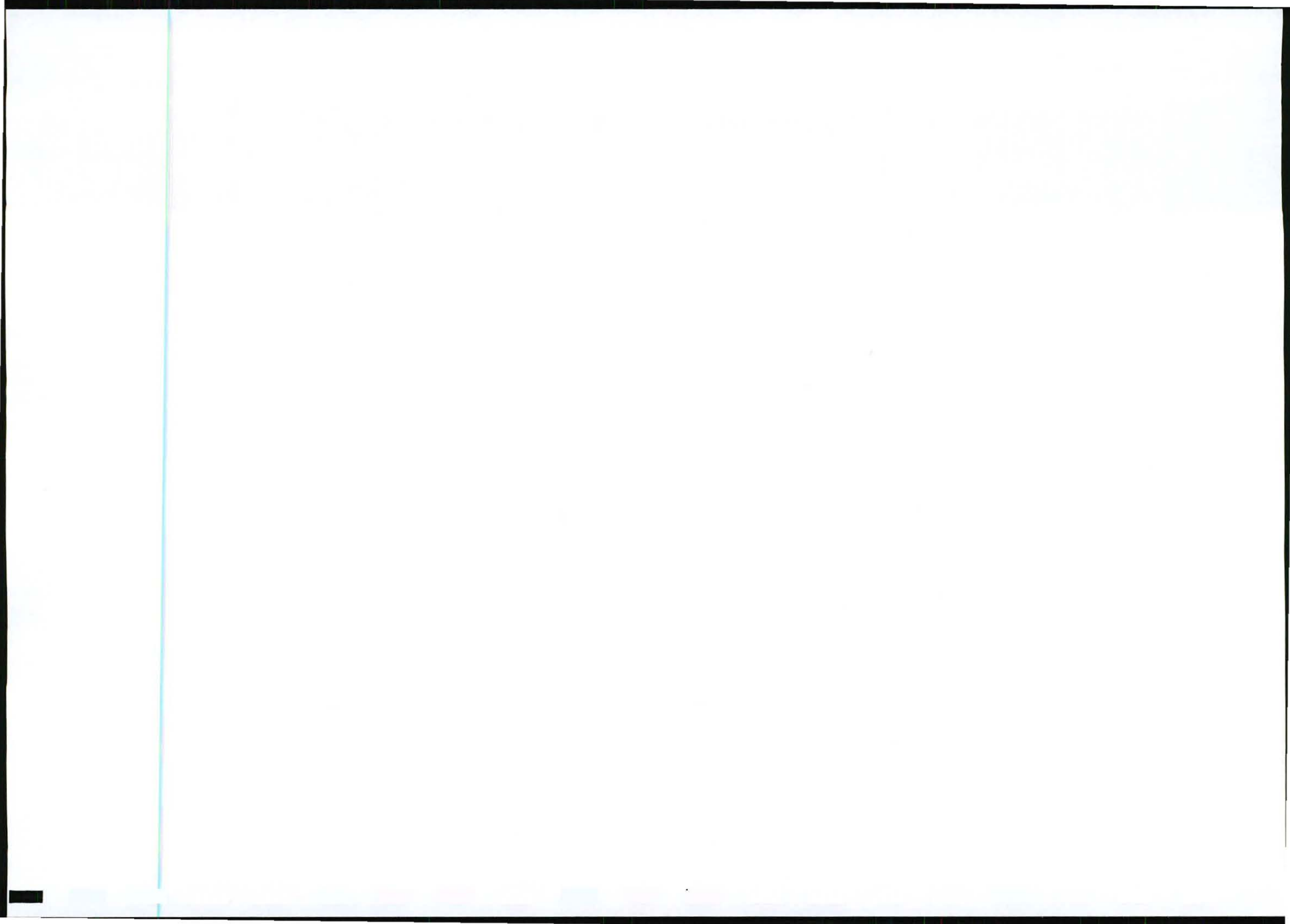
- a) Areas where mining is completed shall be rehabilitated immediately to reduce the opportunity for erosion.
- b) Areas to be disturbed in future mining operations will be kept as small as possible (i.e. conducting the mining operations in phases), thereby limiting the scale of erosion.
- c) The final surface level shall be free draining and necessary measures will be taken to prevent erosion until such time that the vegetation is sufficiently established.
- d) Runnels, erosion channels or wash-aways developing after rehabilitation shall be backfilled and consolidated and the areas restored to a proper stable condition.
- e) Brush packing can be used in erosion runnels or at drainage outlets.
- f) Central borrow pit areas are likely to become water traps in the long-term and the rehabilitation procedure should aim to complement this - i.e. the use of locally occurring water tolerant grasses, sedges and reeds would be recommended.

#### **6.9.1.6 General site clean-up**

- a) All infrastructure, equipment, plant, fencing, temporary services and foreign materials shall be removed from the site (according to section 44 of the MPRDA)
- b) Waste material of any description, including receptacles, scrap, rubble and tyres will be removed entirely from the mining area and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on the site.
- c) Internal access tracks, not required by the landowner, shall be obliterated by breaking the surface crust and scarifying the area to a depth of 250 mm, whichever is the shallower, and then be covered with stockpiled topsoil.
- d) The borrow pit and quarry will be kept in a neat and tidy condition at all times.

#### **6.9.1.7 Additional measures**

- a) No construction equipment, vehicles or unauthorised personnel shall be allowed onto areas that have been finished off.
- b) Only persons or equipment required for the preparation of areas, application of fertiliser and spreading of top material shall be allowed to operate on these areas.



- c) Permanent, stock-proof fencing shall be erected/reinstated adjacent to farm land and alongside the road.
- d) The access gate shall remain locked and a key shall be provided to the farmer for future use.

### **6.9.2 End Use**


After rehabilitation of the borrow pit and quarry, these areas will probably be natural accumulation areas for runoff from the surrounding areas and become small dams in the long-term. These areas may also be transformed into artificial wetlands if reeds, sedges and other water tolerant grasses are planted.

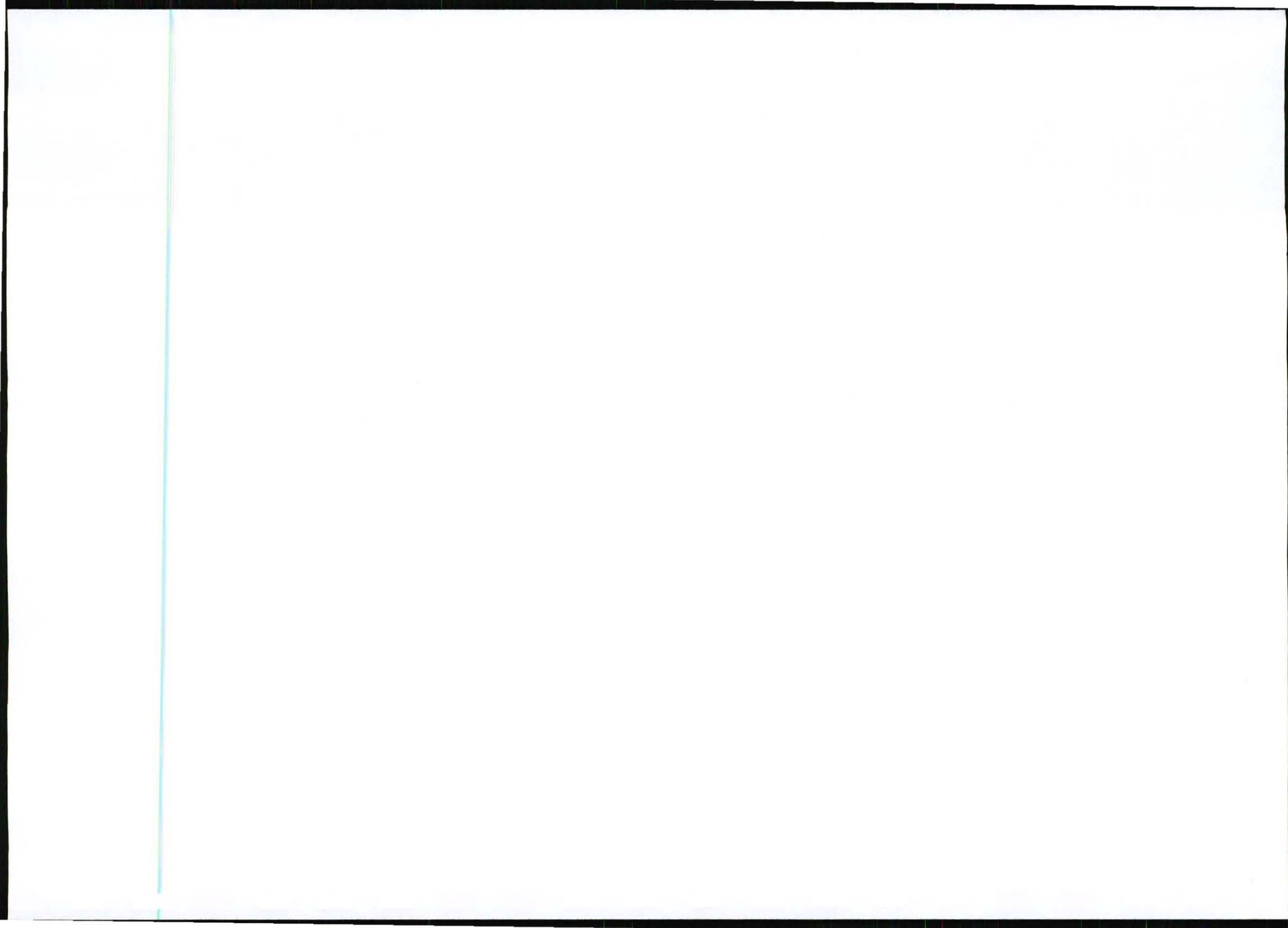
### **6.9.3 Closure**

When the holder of the mining permit intends closing down the mining operations, an environmental risk report shall accompany the application for closure.

## **6.10 Safety and Security**

It is noted that this EMP is not a Health & Safety Plan. It is the Contractor's responsibility to ensure that a Health & Safety Plan, as per the requirements of the Occupational Health & Safety Act, is prepared prior to any physical work occurring on the site. Safety in terms of labourers on site is discussed in section 6.8. In general, the Contractor shall maintain the borrow pit and quarry such that they do not become a danger to persons or livestock. The Contractor shall at all times observe proper and adequate safety precautions on the site and shall be deemed to be responsible for security of the mining site.



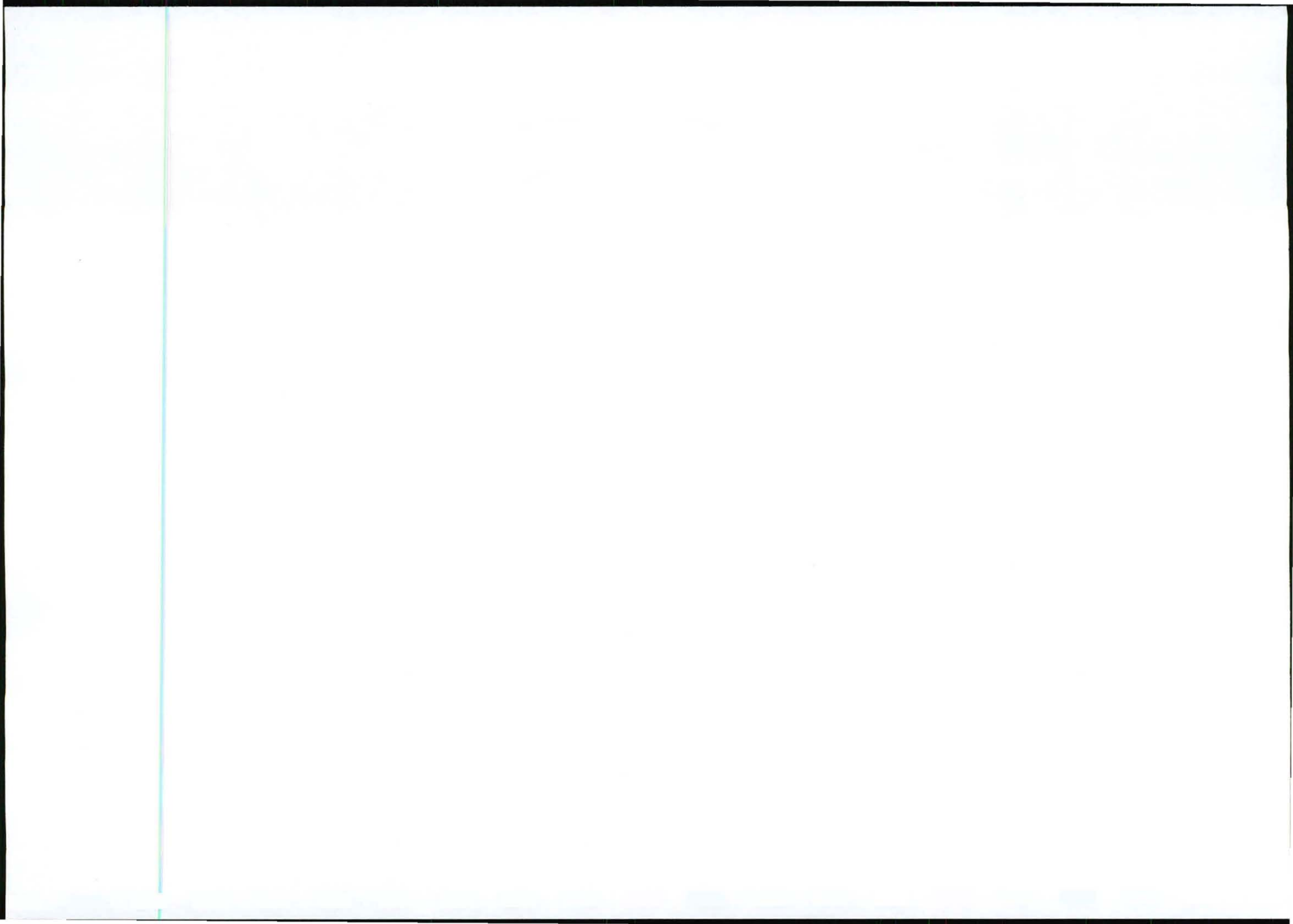


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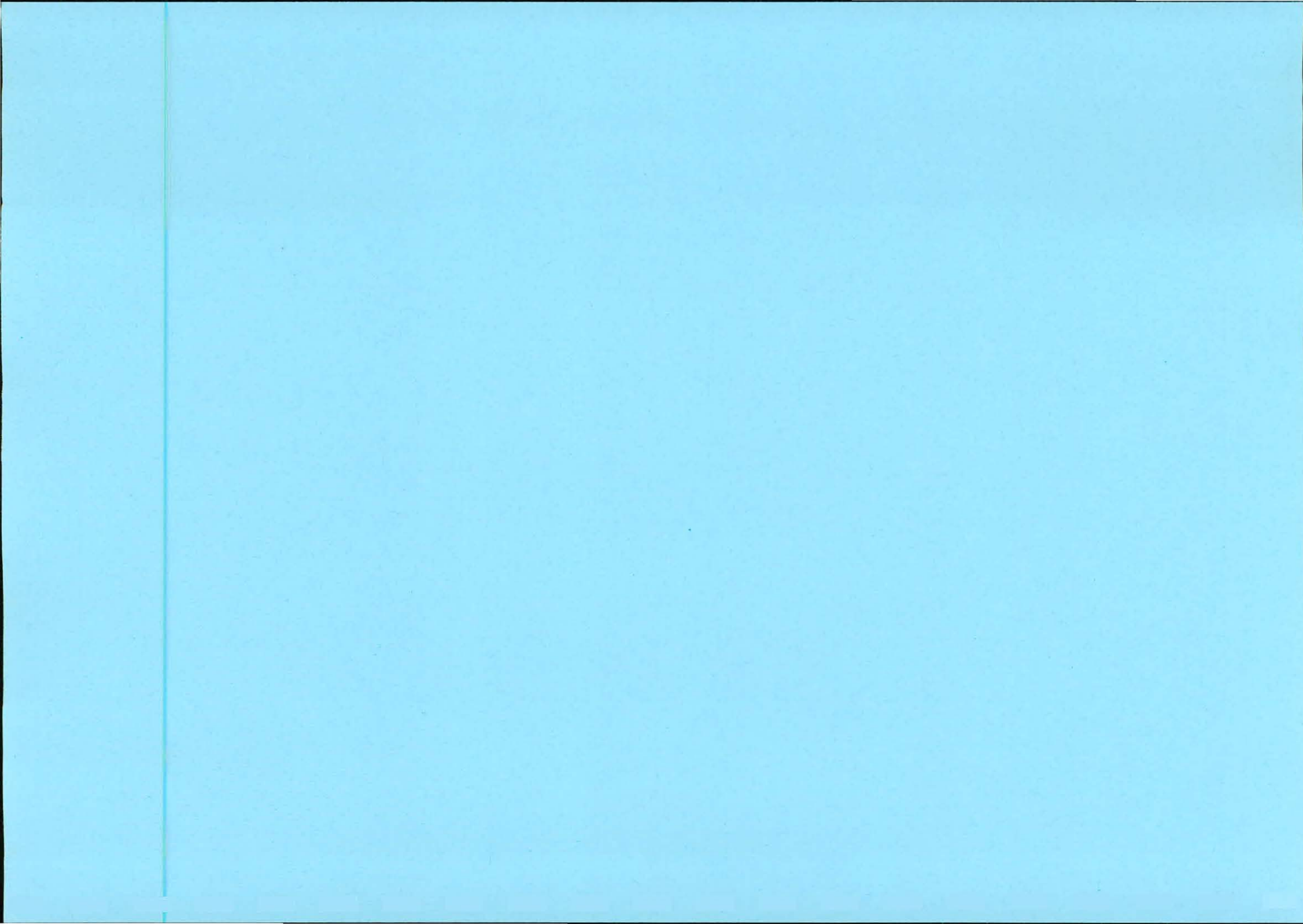


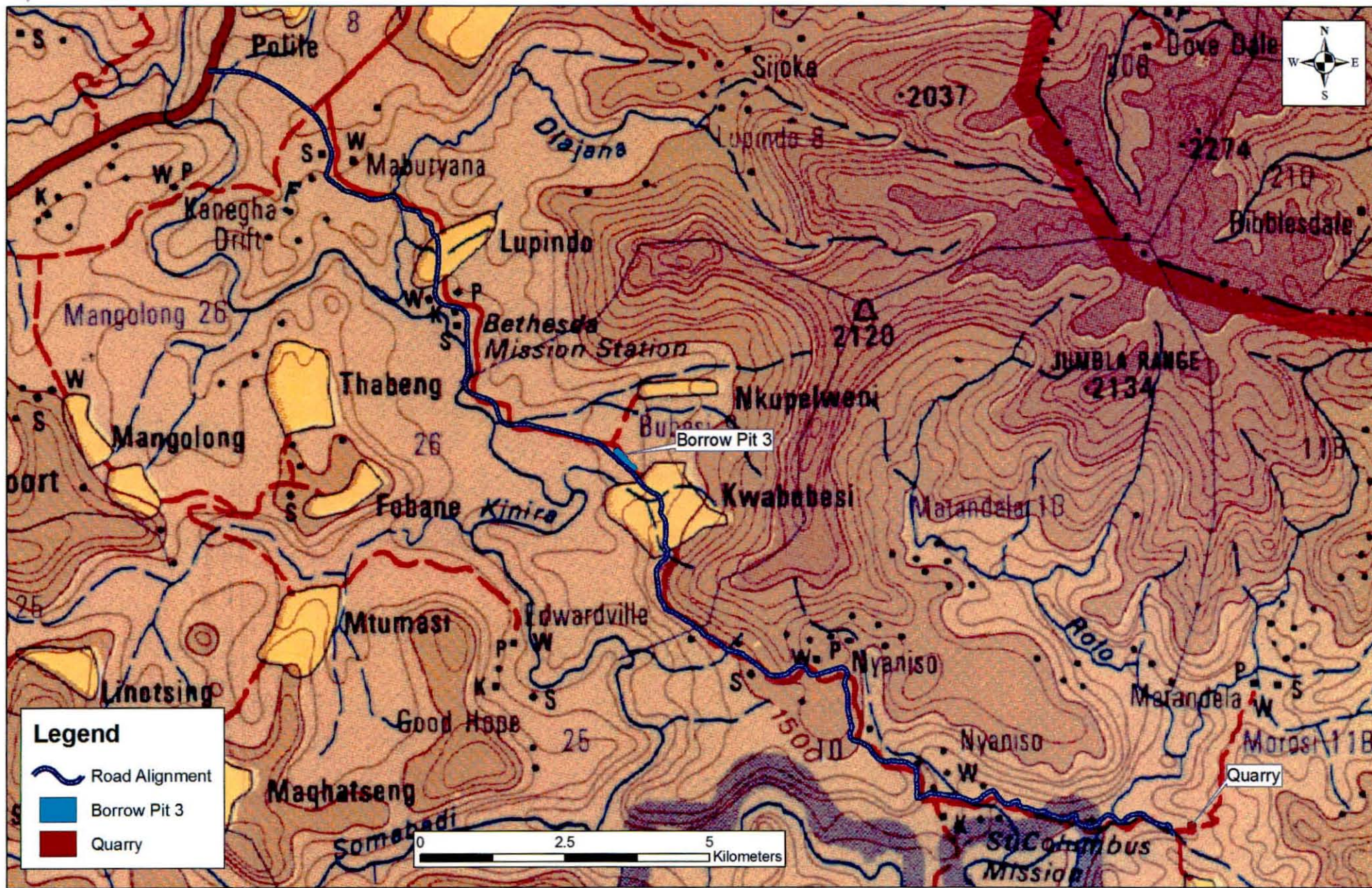




# Appendices

## Appendix A – Site locality

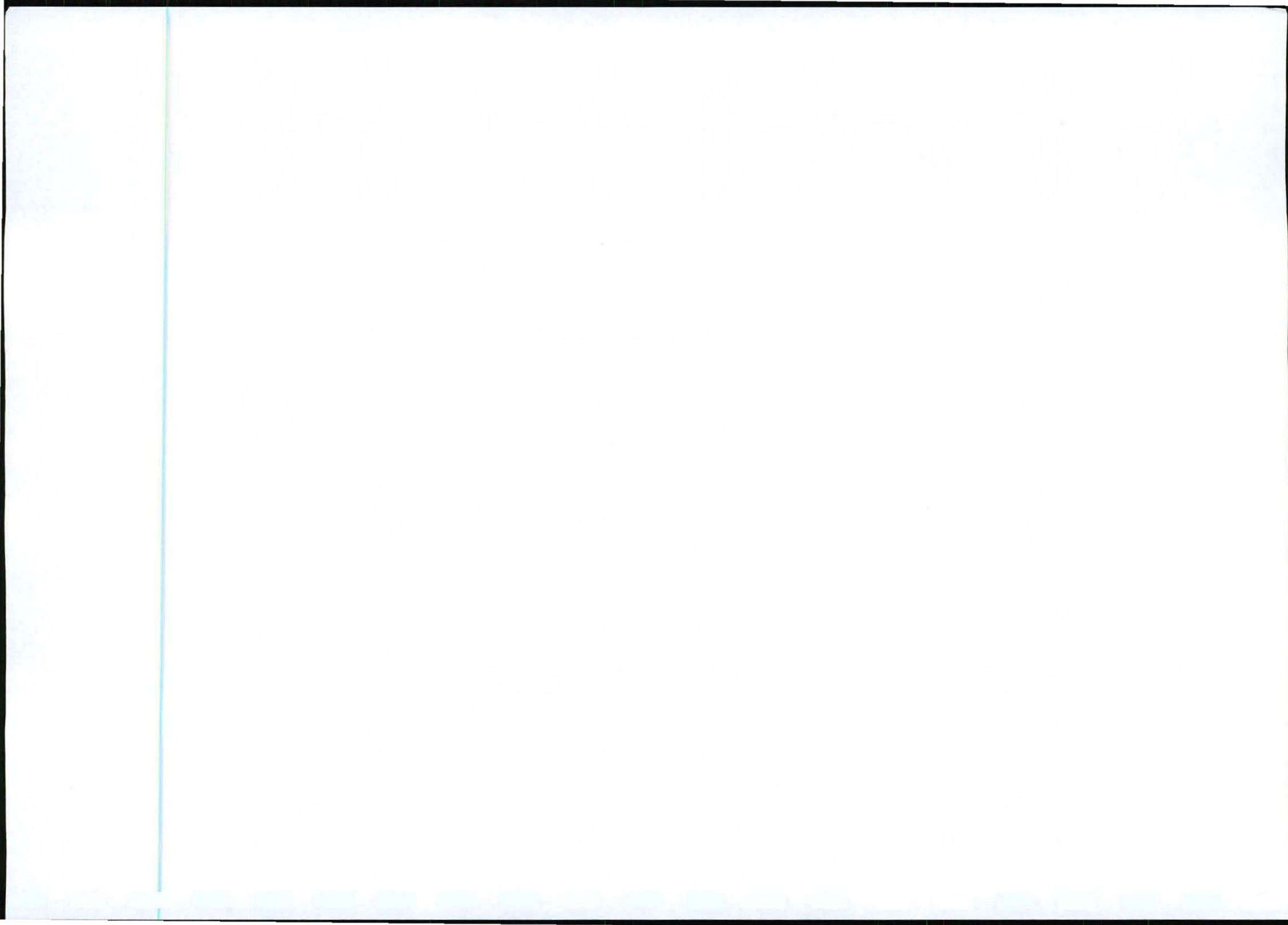




Project No	Datum:
407899	HH1994
	Projection:
	TM
	Central Meridian/Zone:
	29

**DISTRICT ROAD 08015 UPGRADE**  
LOCALITY

Date	Scale
31/05/2010	1:60,000
Compiled by:	Fig No:
THOR	004
Revision: B	Date: 31/05/2010



## Appendix B – Borrow Pit and Quarry Layouts