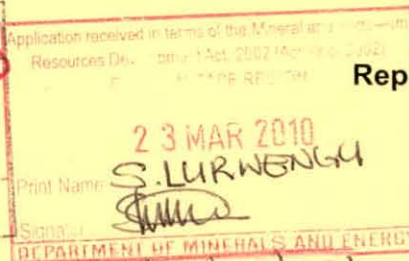


# Final Environmental Management Plan

## Proposed Borrow Pits for the Upgrading of the National Route 2 Section 11, Coega to Colchester

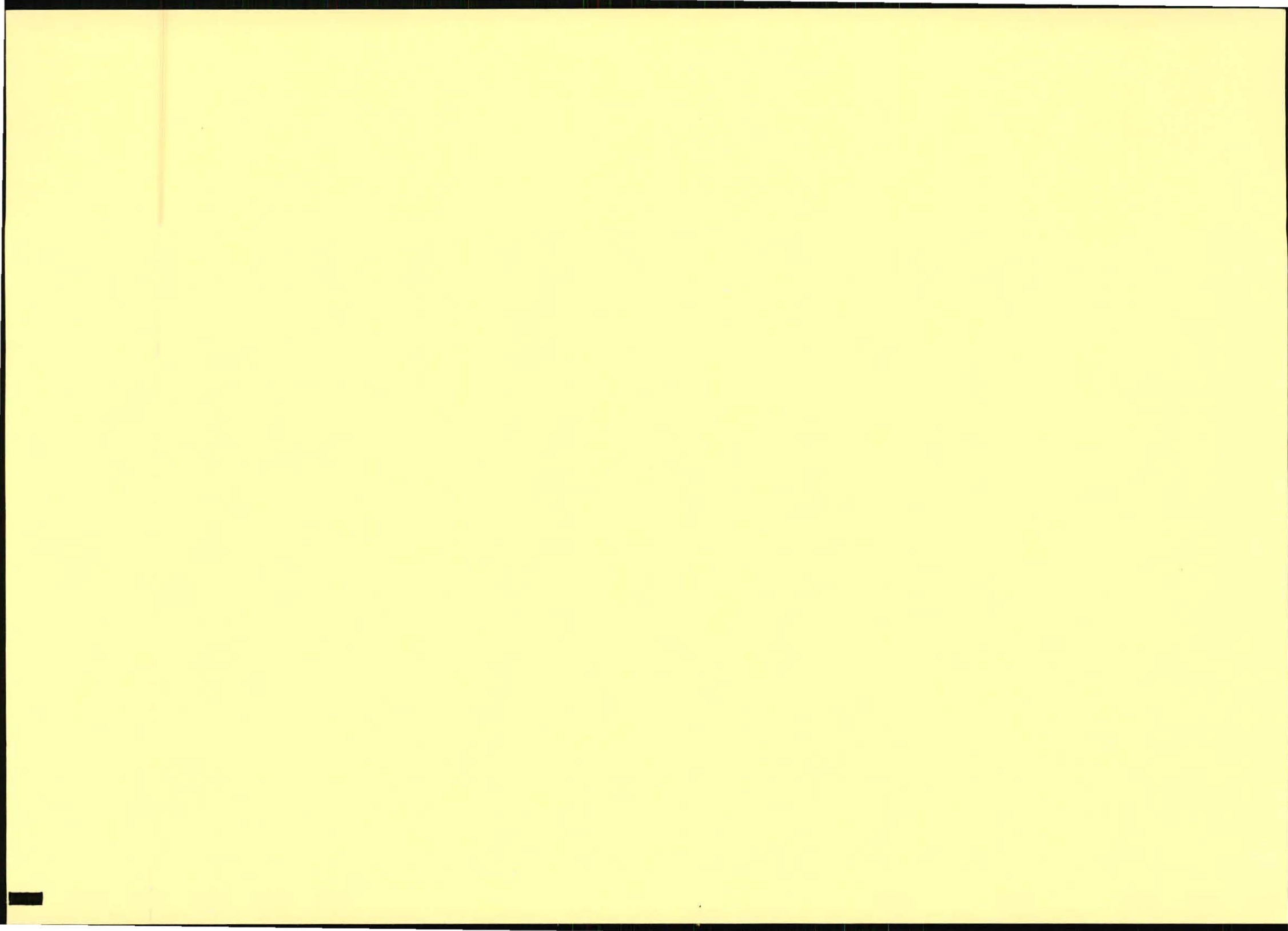
Report prepared for  
**South African National Roads Agency Limited (SANRAL)**



Report No 405303/4

March 2010

D/2010/03/23/001  
E/2010/03/23/0430 MP  
Report prepared by



# Final Environmental Management Plan

## Proposed Borrow Pits for the Upgrading of the National Route 2 Section 11, Coega to Colchester

South African National Roads Agency Limited  
(SANRAL)

SRK Report Number 405303/5

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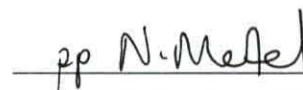
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K Nel

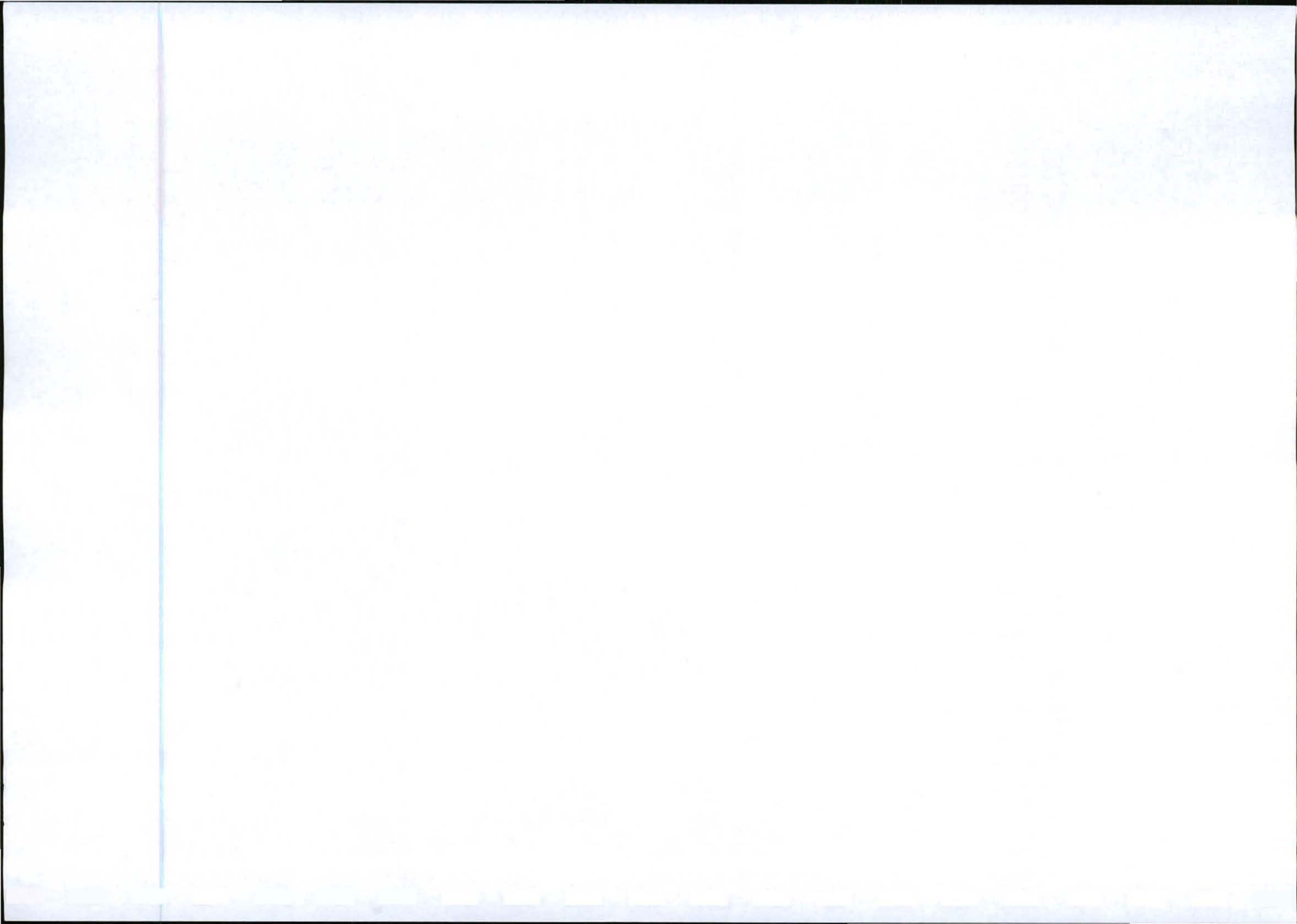
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Reviewed by:



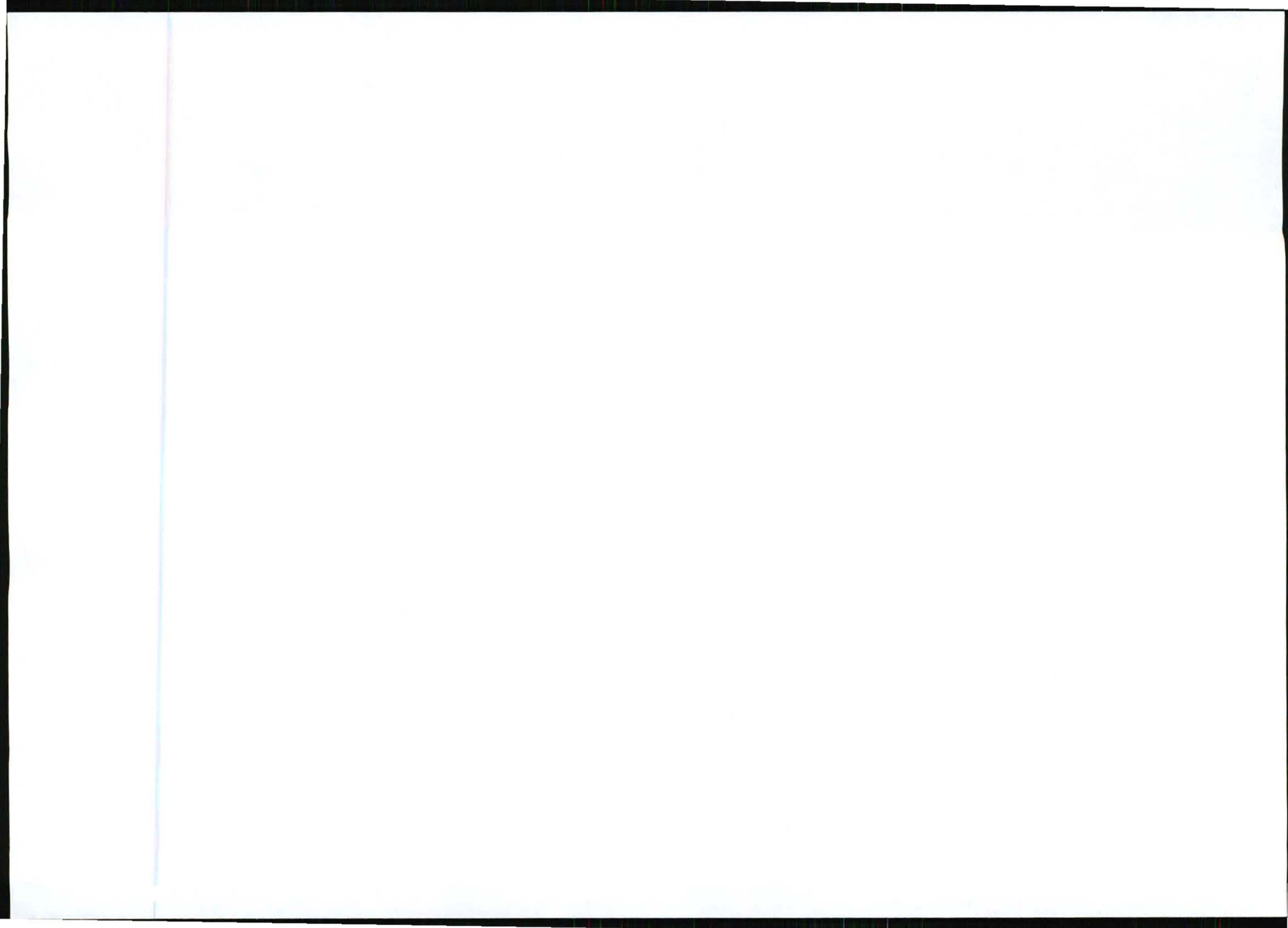
R Gardiner (Pr Sci Nat)

Principal Scientist



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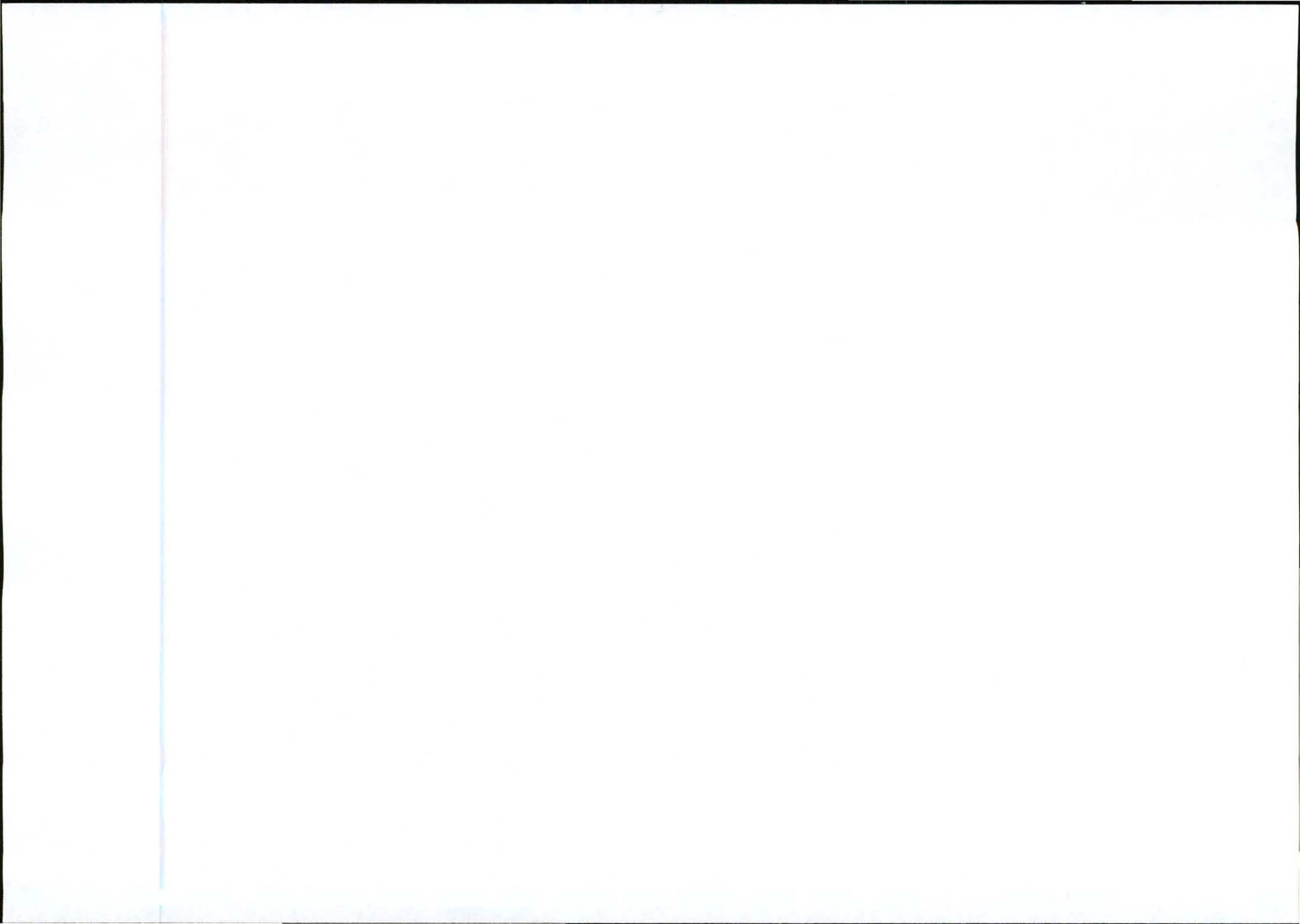
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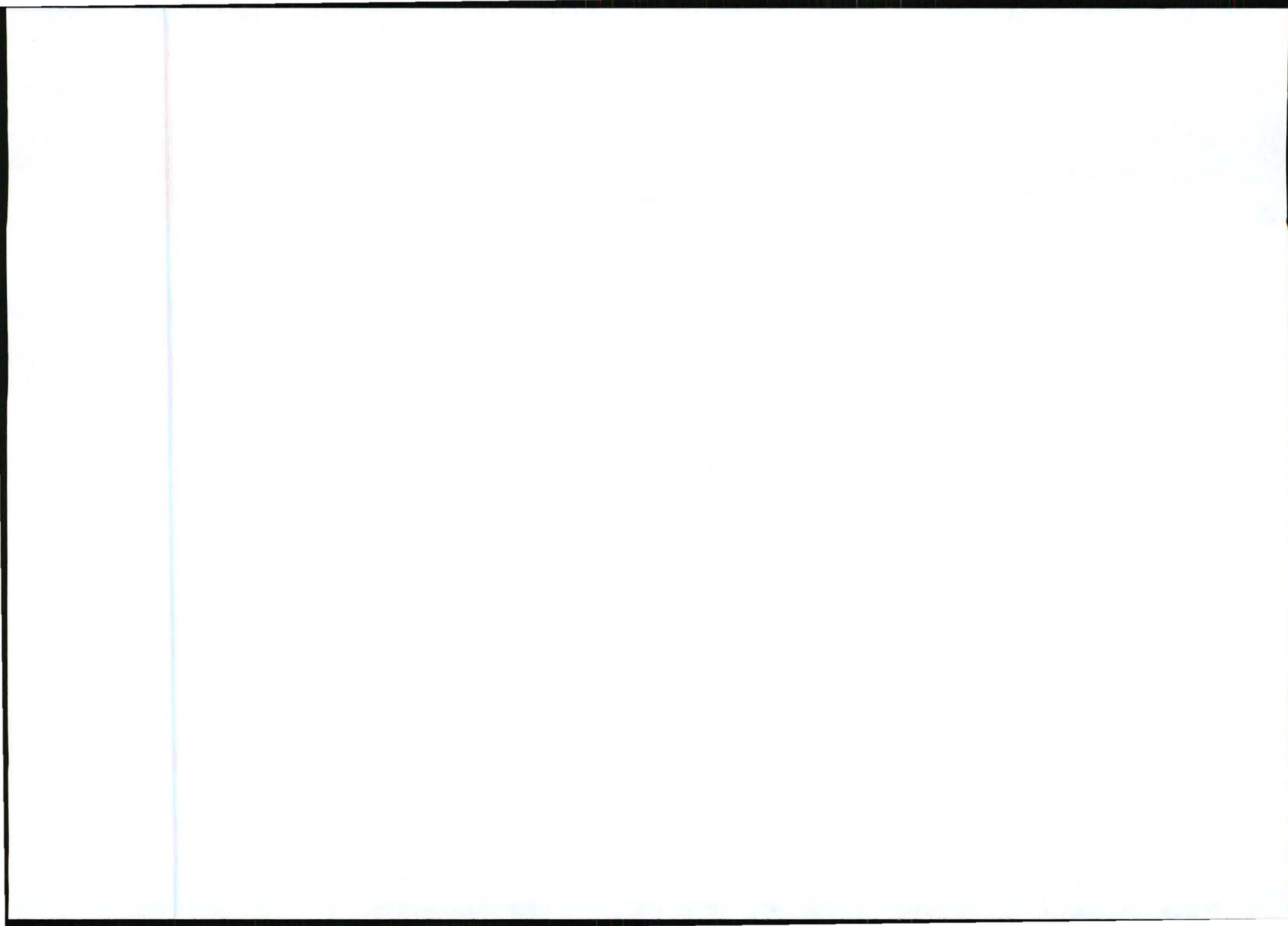
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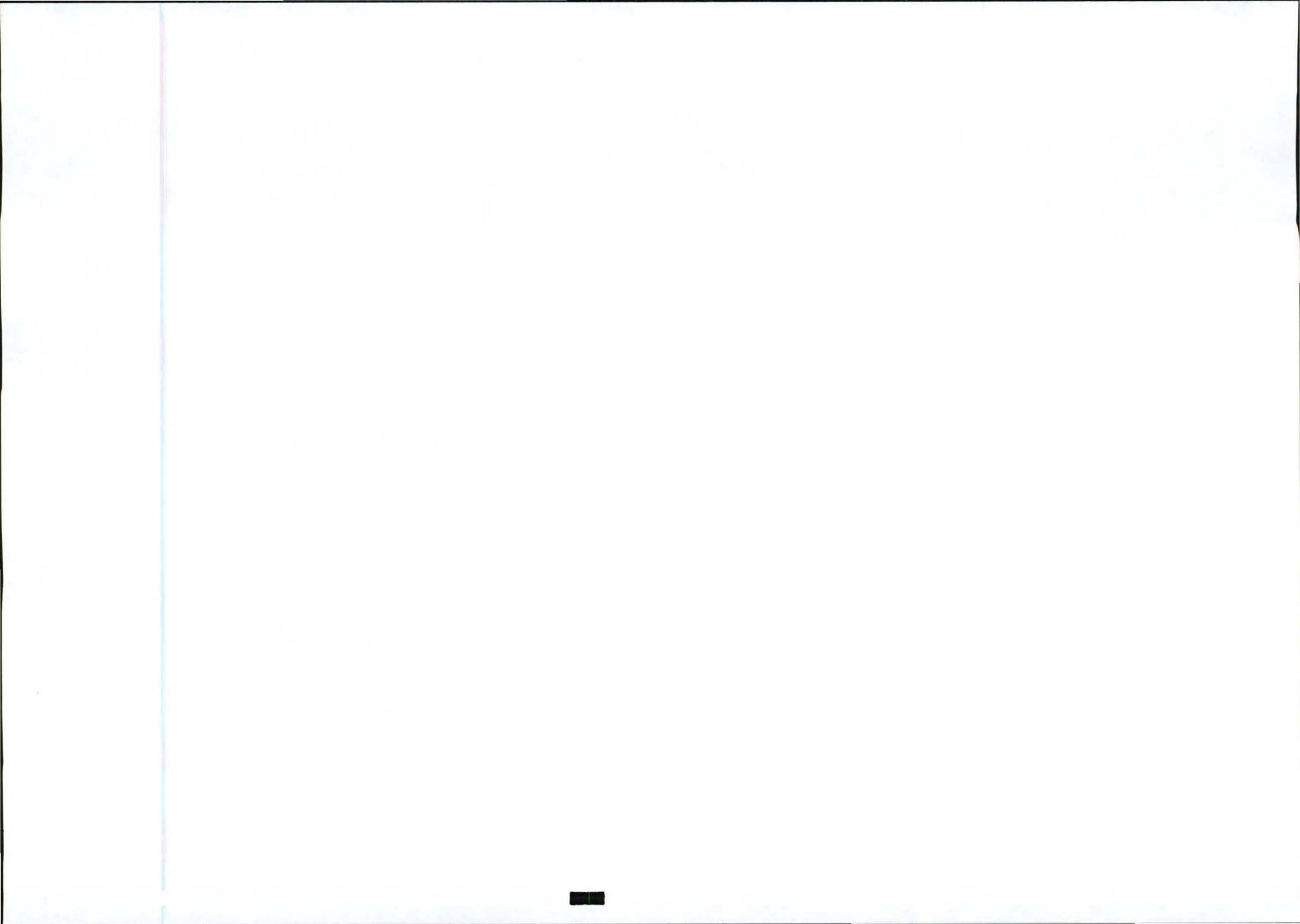


## Glossary

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
BP	Borrow Pit
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
DME	Department of Minerals and Energy
DRT	Department of Roads and Transport
DWAF	Department of Water Affairs and Forestry (former name of the department)
DEA	Department of 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
masl	meters above sea level
ML	Megalitres (1,000,000 litres)
MPRDA	Mineral and Petroleum Resources Development Act
N-DEA	Department of Environmental Affairs (National)
NEMA	National Environmental Management Act
NMBM	Nelson Mandela Bay Municipality
RoD	Record of Decision
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited
SARTM	South African Rural Traffic Model
SDF	Spatial Development Framework
SRK	SRK Consulting
ToR	Terms of Reference
+ve	Positive
-ve	Negative





## 1 Introduction

The South African National Roads Agency Limited (SANRAL) identified a need to rehabilitation the National Route 2 Section 11 (N2/11) from the Eastern boundary of the Coega Industrial Development Zone (IDZ) to the Colchester intersection and to upgrade this section to include a new carriageway to the south of the existing road (see Figure 2-1 for an illustration of the proposed activities). Therefore, SANRAL appointed a project team to conduct the relevant tasks. SRK Consulting was appointed as the independent consultants to assess the environmental impacts and requirements in terms of the National Environmental Management Act (Act 107 of 1998)(NEMA) and the Mineral and Petroleum Resources Development Act (Act 28 of 2002)(MPRDA), and to submit a Basic Assessment application to the National Department of Environmental Affairs as well as to submit an application for a mining right (this document) for the proposed four borrow pits located along this route to the Department of Minerals and Energy (DME). This EMP is prepared in accordance with the requirements of the MPRDA and DME.

### 1.1 Applicant Details

South African National Roads Agency Limited (SANRAL)	Contact person: Mr Renaldo Lorio
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CESA

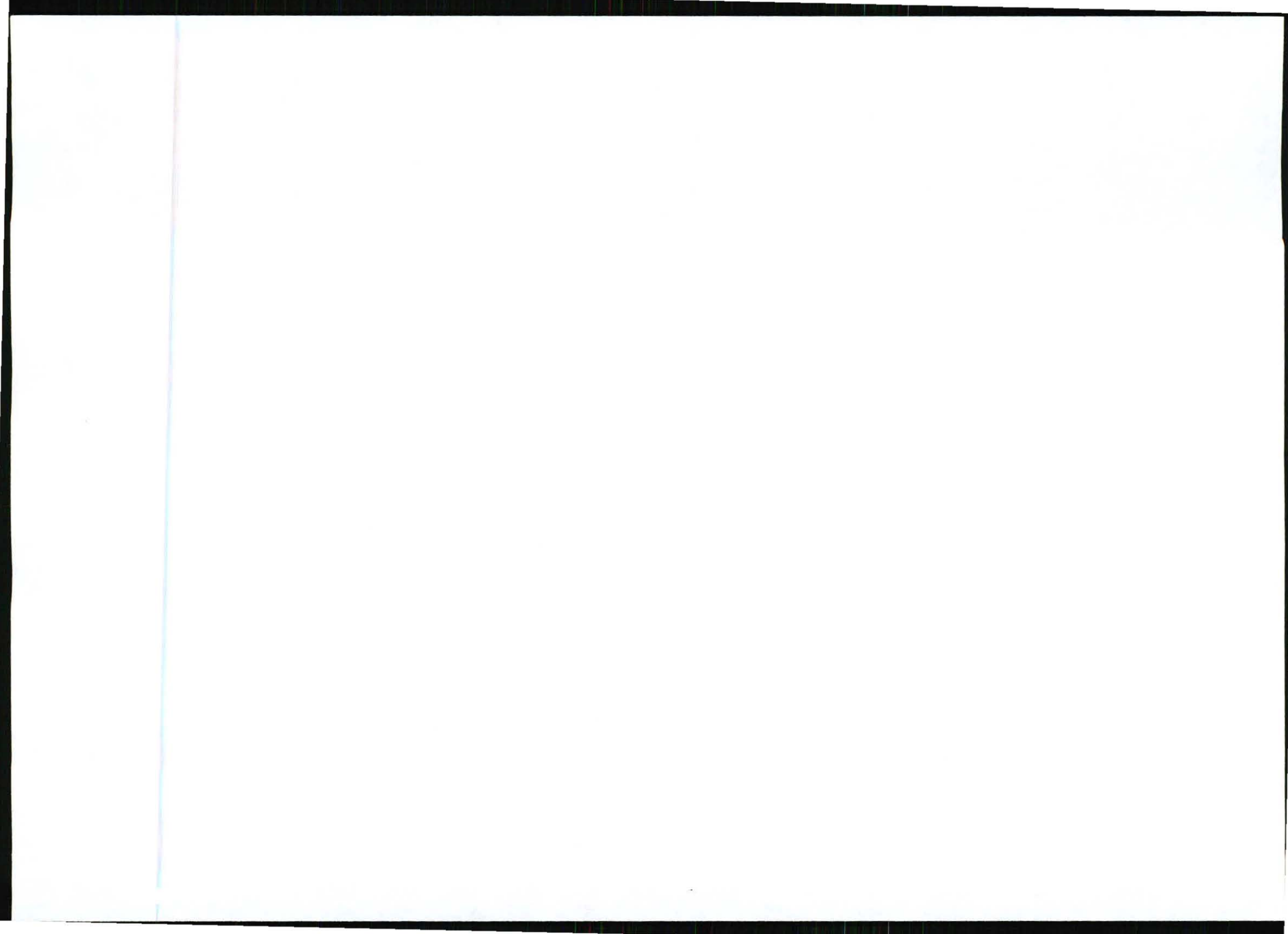


<b>Partners</b>	AN Birtles, JCJ Boshoff, MJ Braune, JM Brown, CD Dalglish, JR Dixon, DM Duthie, R Gardiner, T Hart, GC Howell, WC Joughin, PR Labrum, DJ Mahlangu, RW McNeill, HAC Meintjes, BJ Middleton, MJ Morris, GP Murray, WA Naismith, GP Nel, VS Reddy, PN Rosewarne, PE Schmidt, PJ Shepherd, VM Simposya, AA Smithen, PJ Terbrugge, KM Uderstadt, DJ Venter, HG Waldeck, ML Wertz, A Wood
<b>Directors</b>	AJ Barrett, JR Dixon, DJ Mahlangu, BJ Middleton, MJ Morris, PE Schmidt, PJ Terbrugge
<b>Associates</b>	AH Bracken, BM Engelsman, DJD Gibson, SA McDonald, M Ristic, JJ Slabbert, CF Steyn, D Visser, MD Wanless
<b>Consultants</b>	AC Burger, BSc (Hons); IS Cameron-Clarke, PrSci Nat, MSc; JAC Cowan, PrSci Nat, BSc (Hons), JH de Beer, PrSci Nat, MSc; GA Jones, PrEng, PhD; TR Stacey, PrEng, DSc; OKH Steffen, PrEng, PhD; RJ Stuart, PrTech Eng, GDE; DW Warwick, PrSci Nat, BSc (Hons)

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

SRK Consulting (SRK) has been appointed by SANRAL as the independent consultants to undertake the Environmental Management Plan (EMP) process required in terms of the applicable legislation as described below.

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 Manager

- Rob Gardiner is an associate at SRK Consulting and the Head of SRK Consulting's Environmental Department in Port Elizabeth. He has over 13 years environmental consulting experience covering a broad range of projects, including Environmental Impact Assessments (EIA), Environmental Management Systems (EMS), environmental management plans (EMP), 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 Co-ordinator

- Karissa Nel, MSc. Karissa is an Environmental Scientist and a member of SRK's Environmental Department in Port Elizabeth. She has experience and expertise in Environmental Impact Assessments (EIAs), Environmental Management Plans (EMPs) and Environmental Control Officer (ECO) work, as well as report writing. Her training is in zoology, microbiology, aquatic research and environmental management.

#### Box 1: Environmental Assessment Practitioner Details

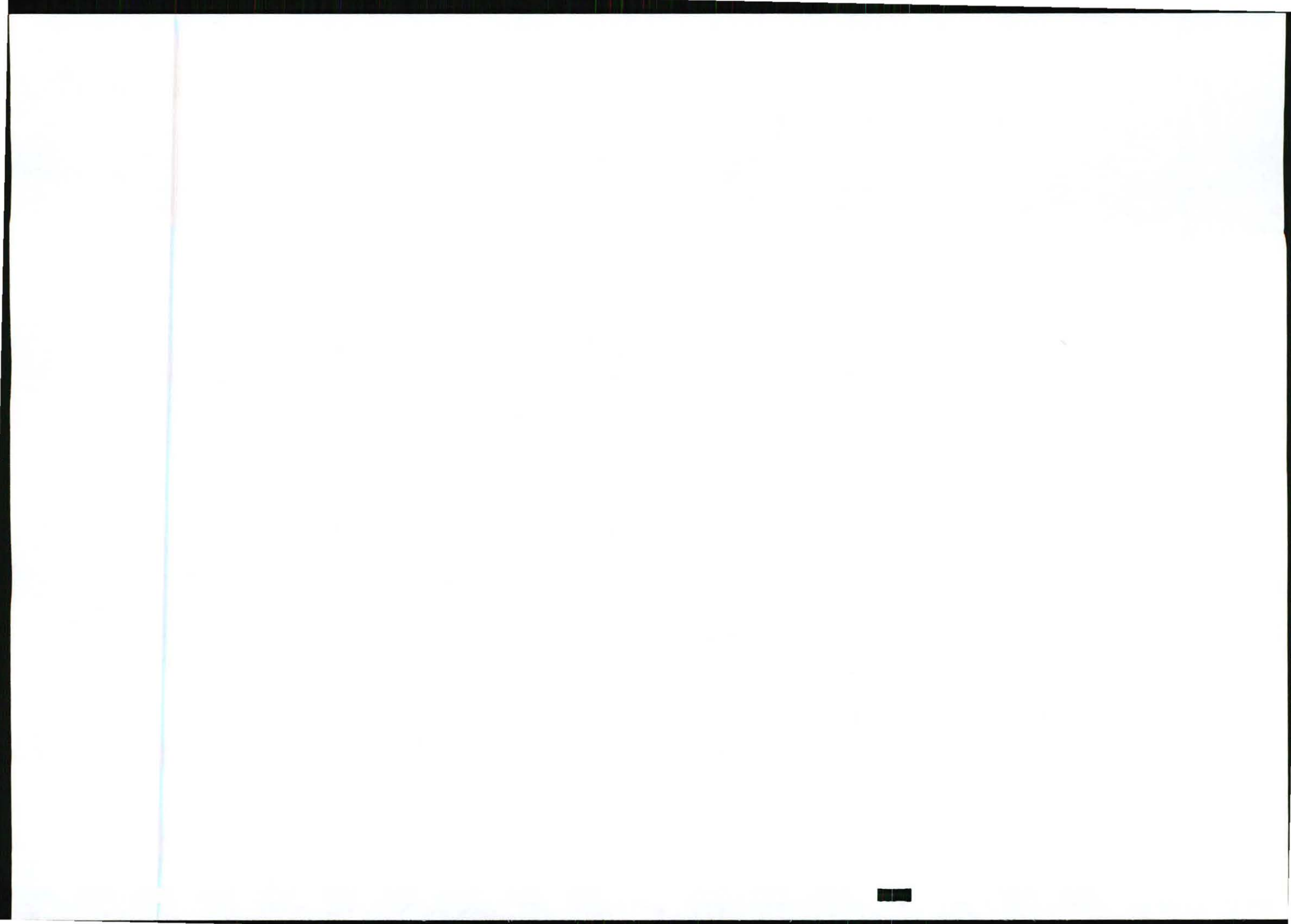
### 1.4 Legal and Administrative Requirements

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—*

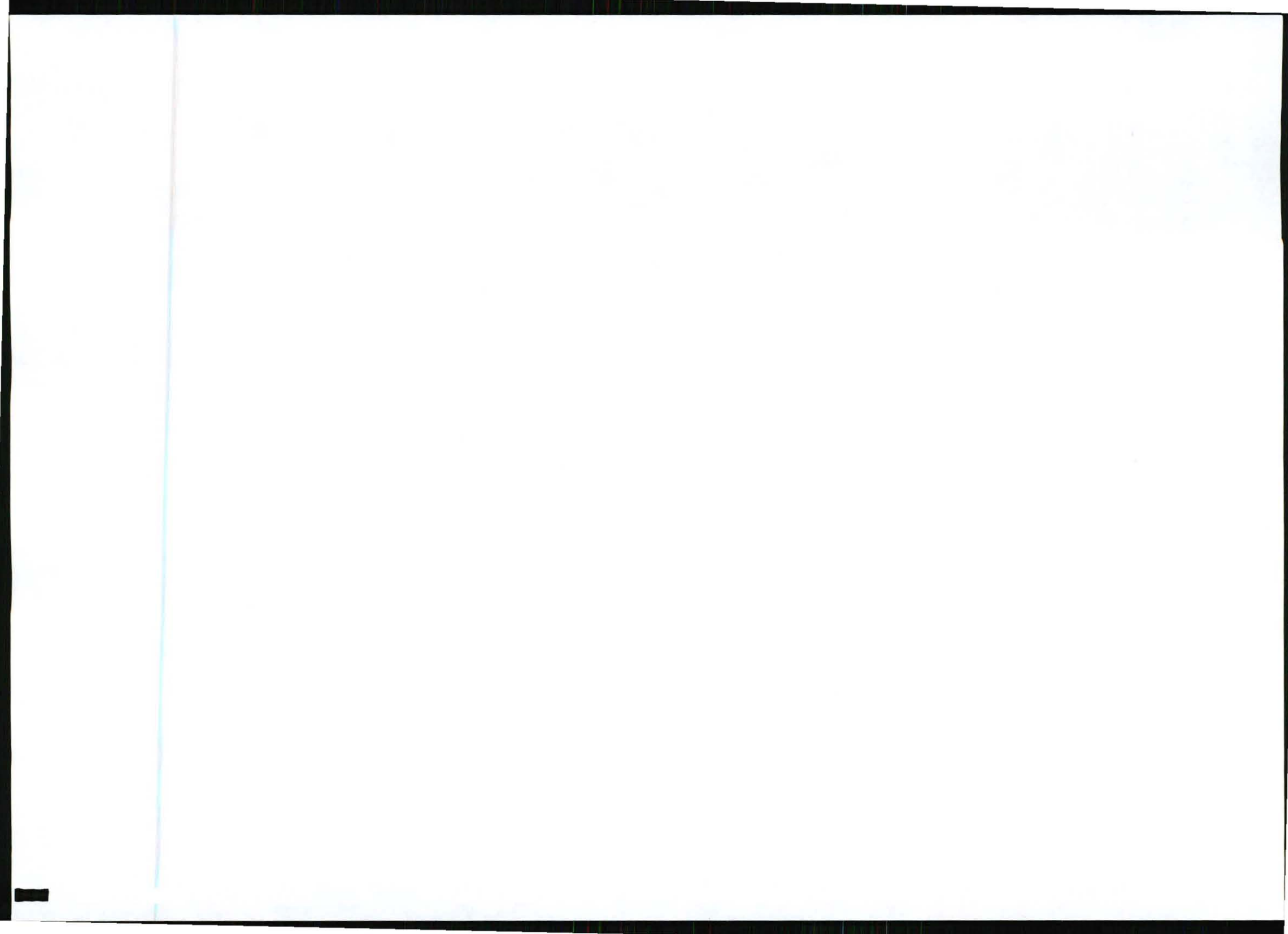
*(a) an approved environmental management programme or approved environmental management plan, as the case may be;*

*(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**

*SANRAL 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 EMP approved by DME.*



### 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
- Remediating the effects of the pollution.

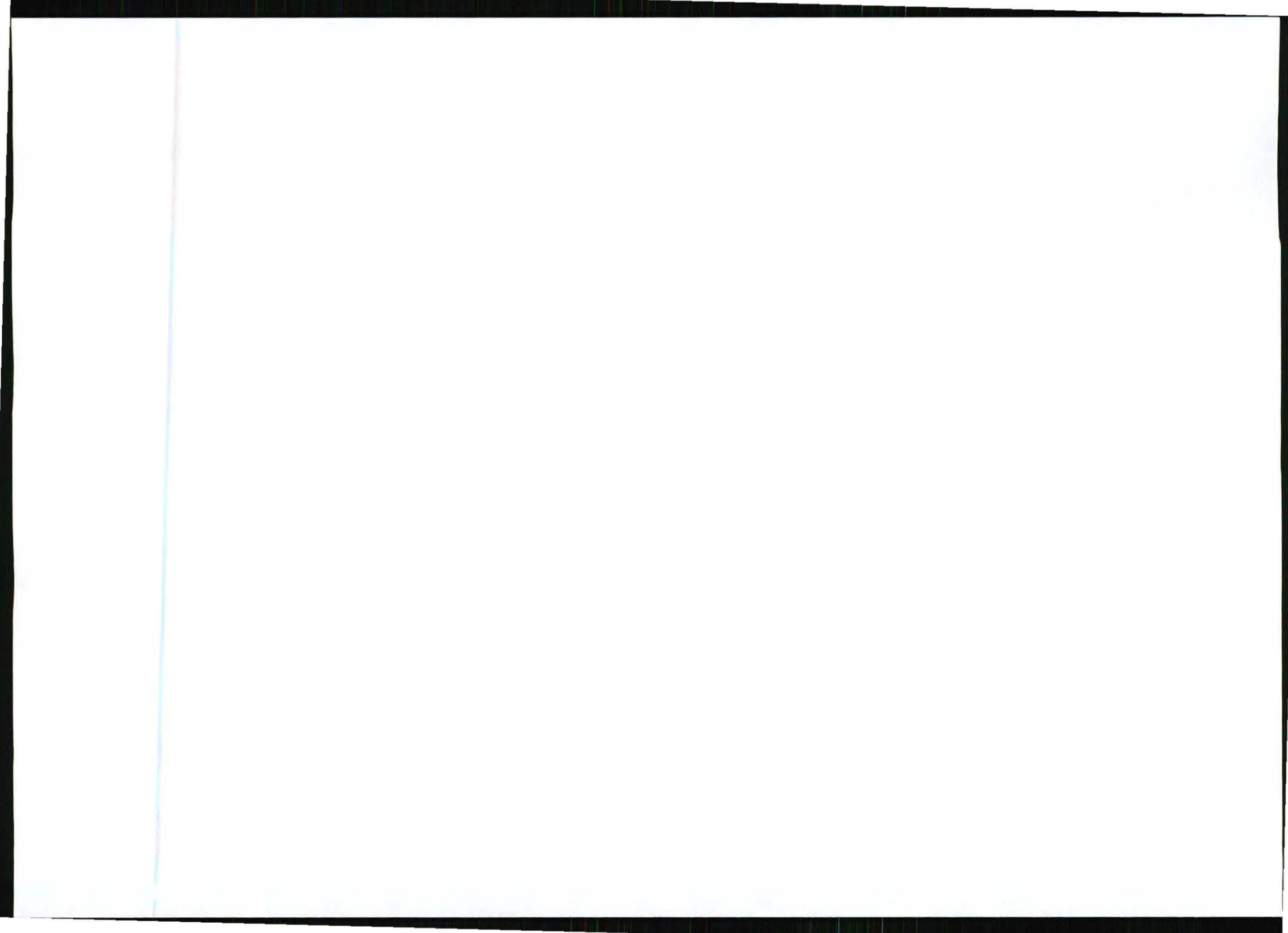
#### *Legal requirements for this project*

*SANRAL 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**

*The Department of Minerals and Energy (DME) requires that a phase 1 archaeological specialist study has been undertaken as part of the EMP. A specialist Heritage/Archaeological Assessment has been undertaken and is included in Appendix E.*

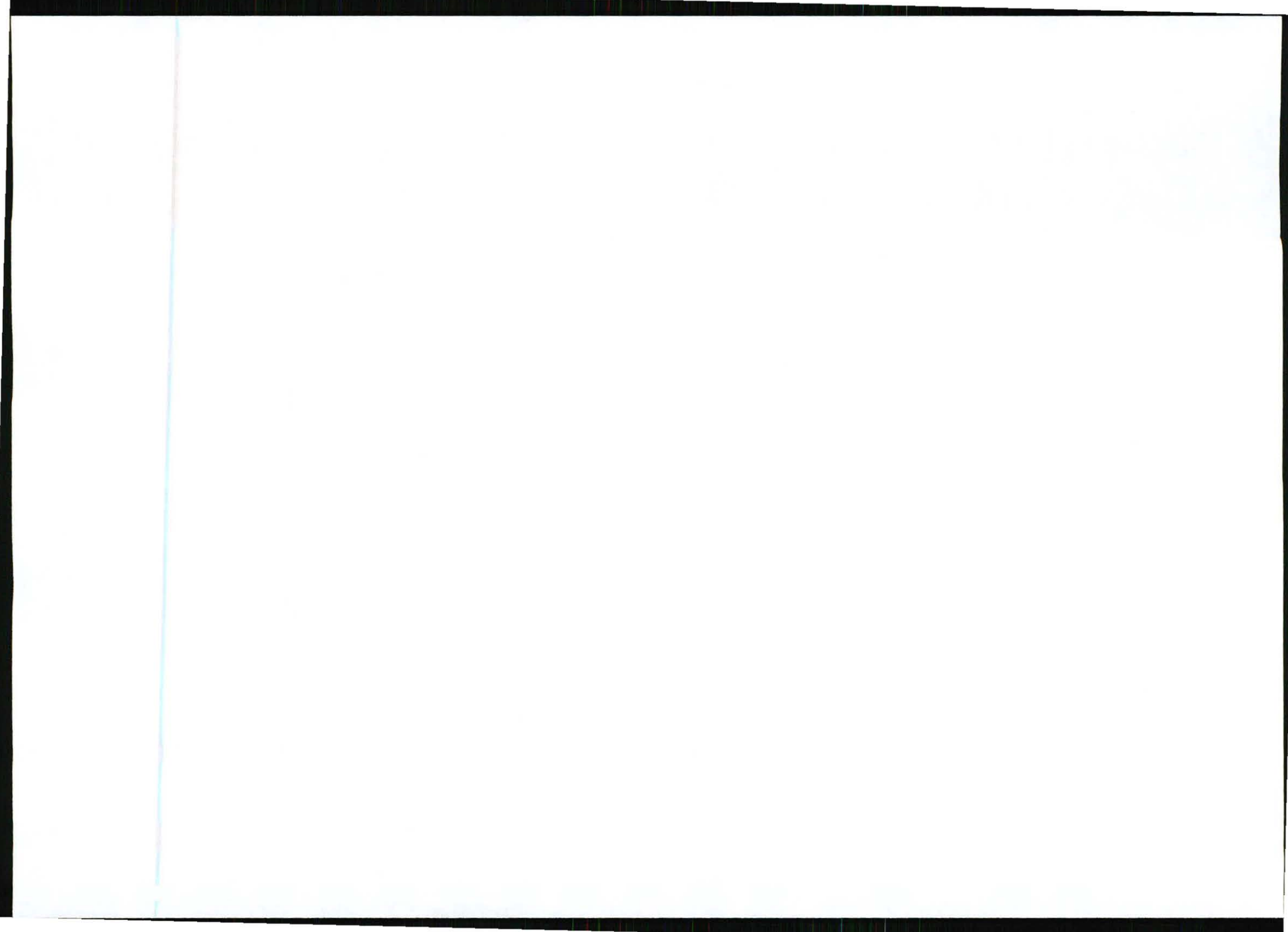
## **1.5 Approach to the Environmental Assessment**

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, the assessment and document have mainly been guided by the MPRDA Regulations No 527 as promulgated in Government Gazette 26275 on 23 April 2004 in which the requirements for mining applications are stipulated.

## 1.6 Contents and Structure of the Report

This report incorporates all the information required in terms of the DME regulations 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 measures 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.

The range of specialist studies undertaken during the process were informed by the issues identified in the scoping phase. The specialist studies and specialists used are listed in Table 1-1. Results from those studies have been incorporated into the EMP, particularly into the description of the affected environment (Chapter 3), impact assessment (Chapter 5) and mitigation and management measures (Chapter 6).

**Table 1-1: Specialist Studies Undertaken**

Specialist Study	Specialist
Ecological Impact Assessment	Jamie Pote
Heritage Assessment	Johan Binneman (Albany Museum)
Aquatic Assessment	Anton Bok Aquatic Consultants

This report is divided into seven chapters:

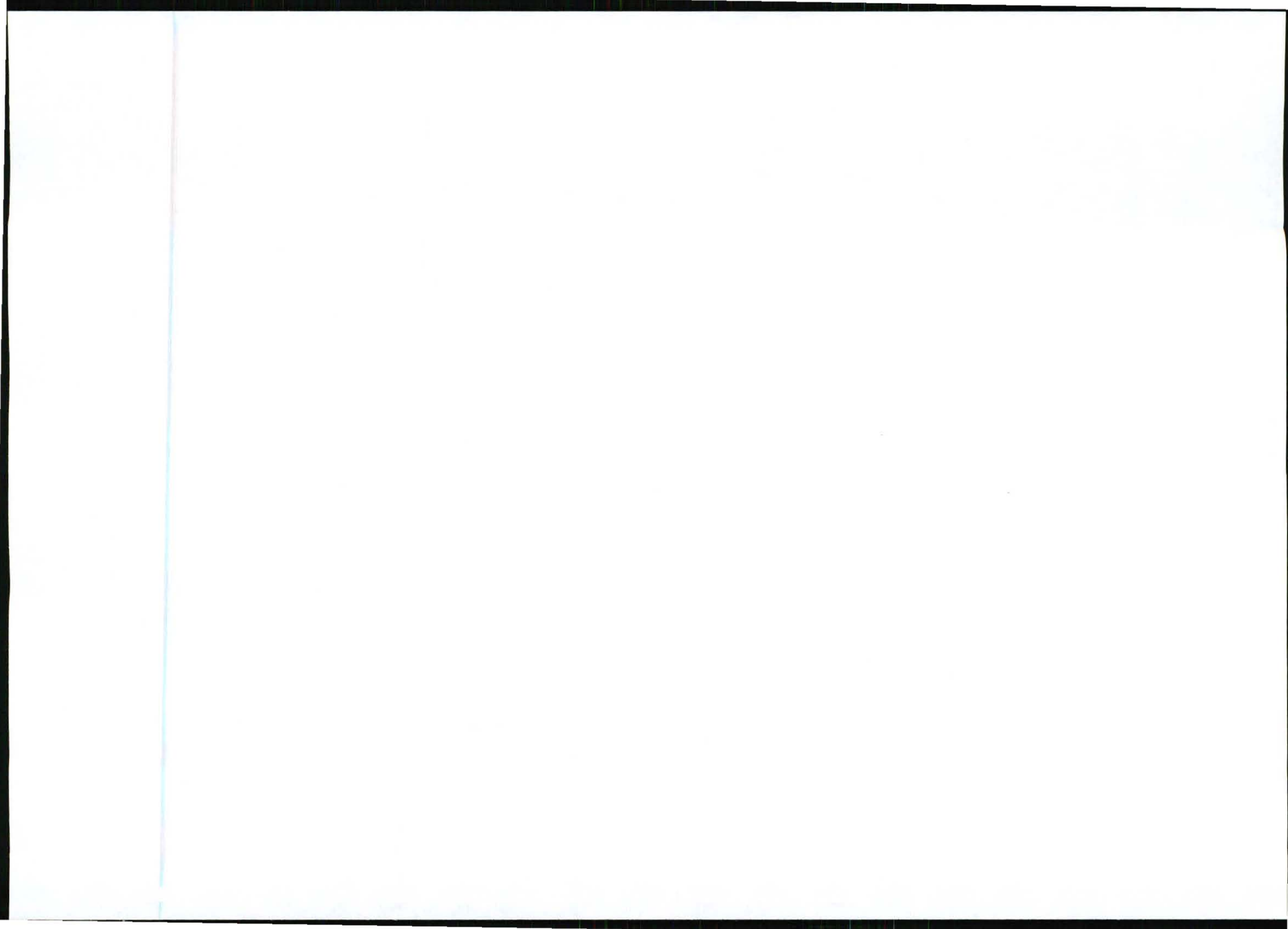
### **Chapter 1 Introduction**

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.

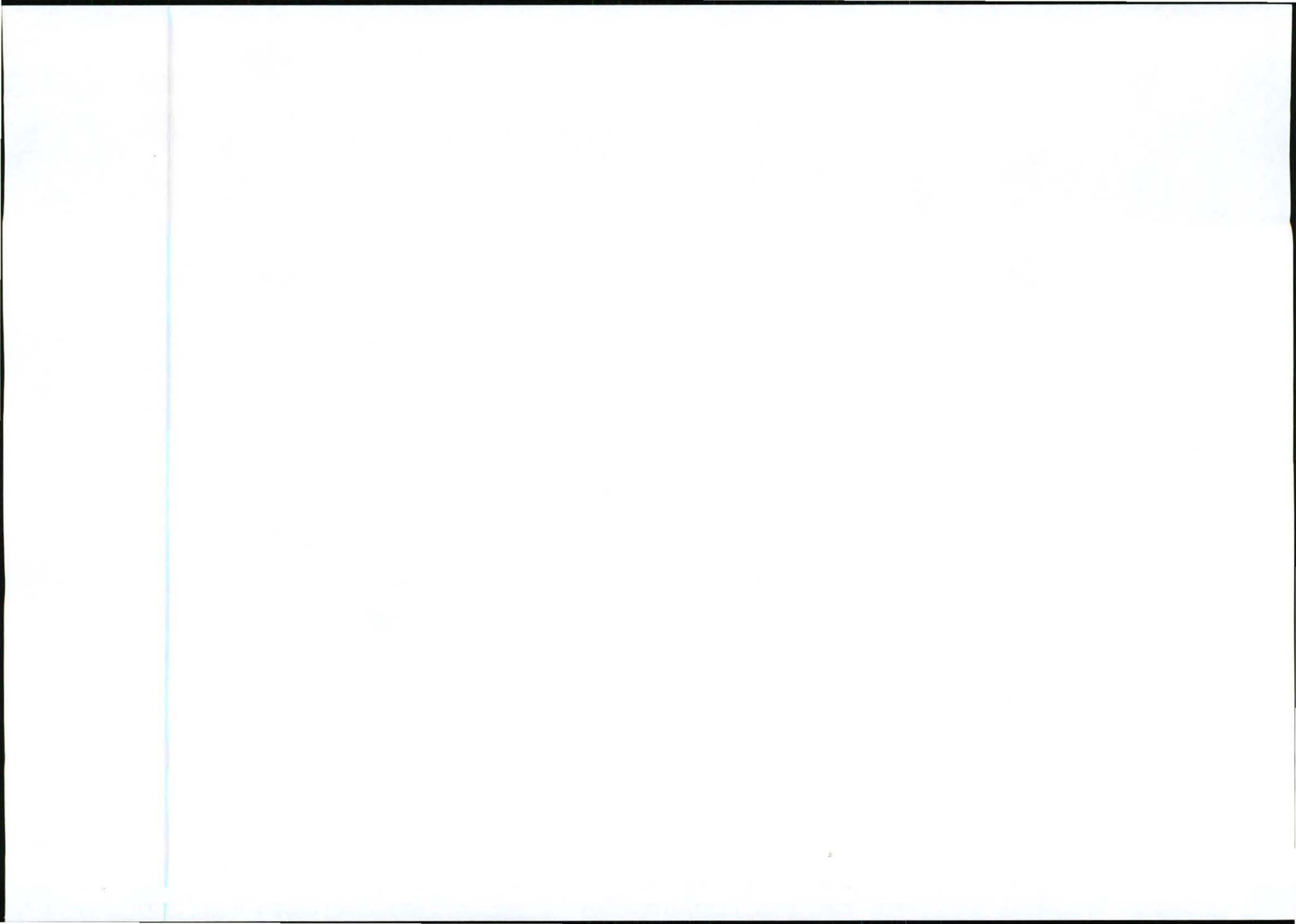
**Chapter 6 Mitigation and Management of Identified Impacts**

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 pits.

**Chapter 7 References**

Provides references for documents cited in the EMP Report.





## 2 Description of Activity Proposal

### 2.1 Activity Motivation

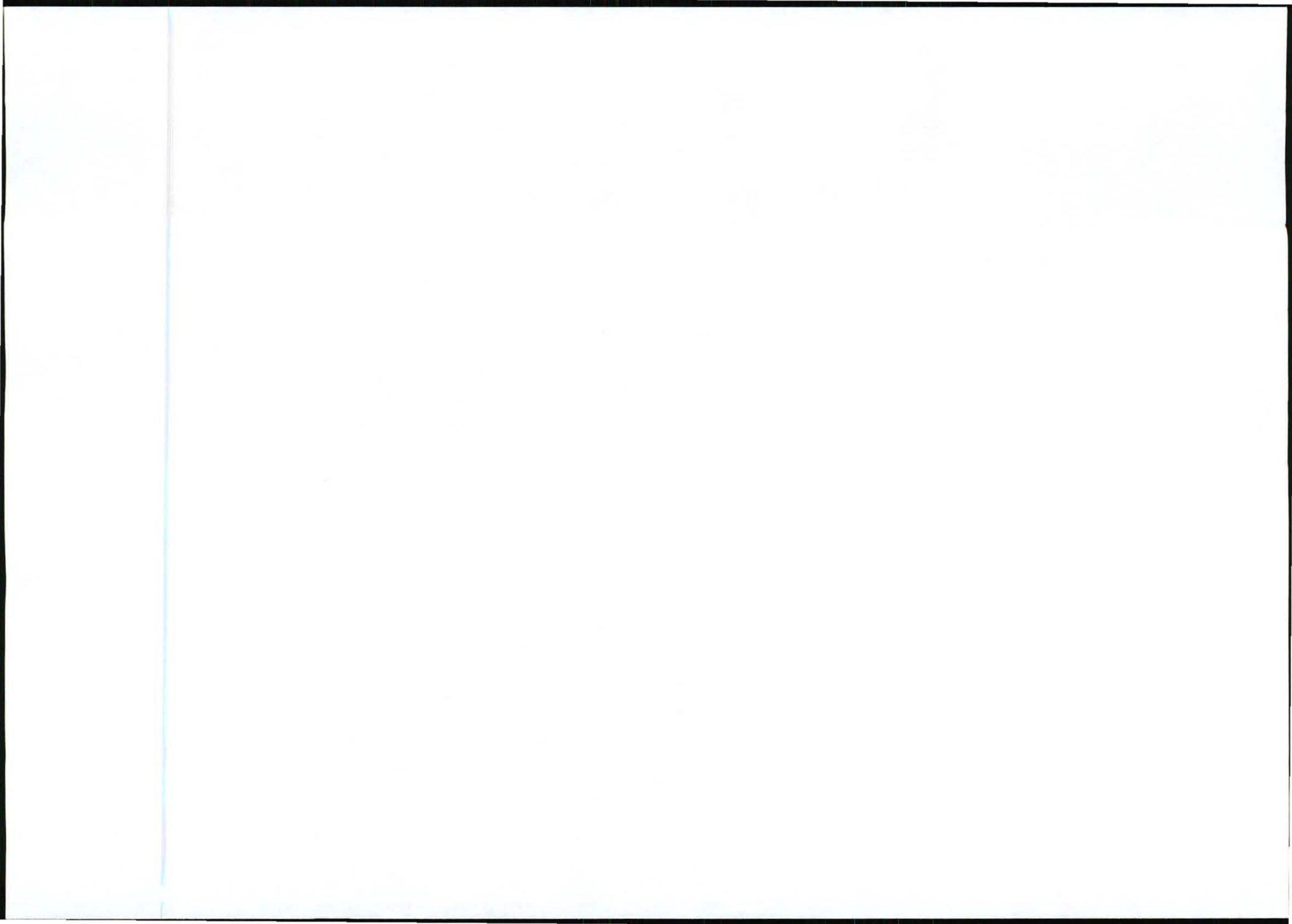
The South African National Roads Agency Limited (SANRAL) identified a need to rehabilitation the National Route 2 Section 11 (N2/11) from the Eastern boundary of the Coega Industrial Development Zone (IDZ) to the Colchester intersection and to upgrade this section to include a new carriageway to the south of the existing road (see Figure 2-1 for an illustration of the proposed activities).

The proposed activities will improve the condition of the road and therefore improve safety to road users and the surrounding local communities of Colchester and Cannonville.

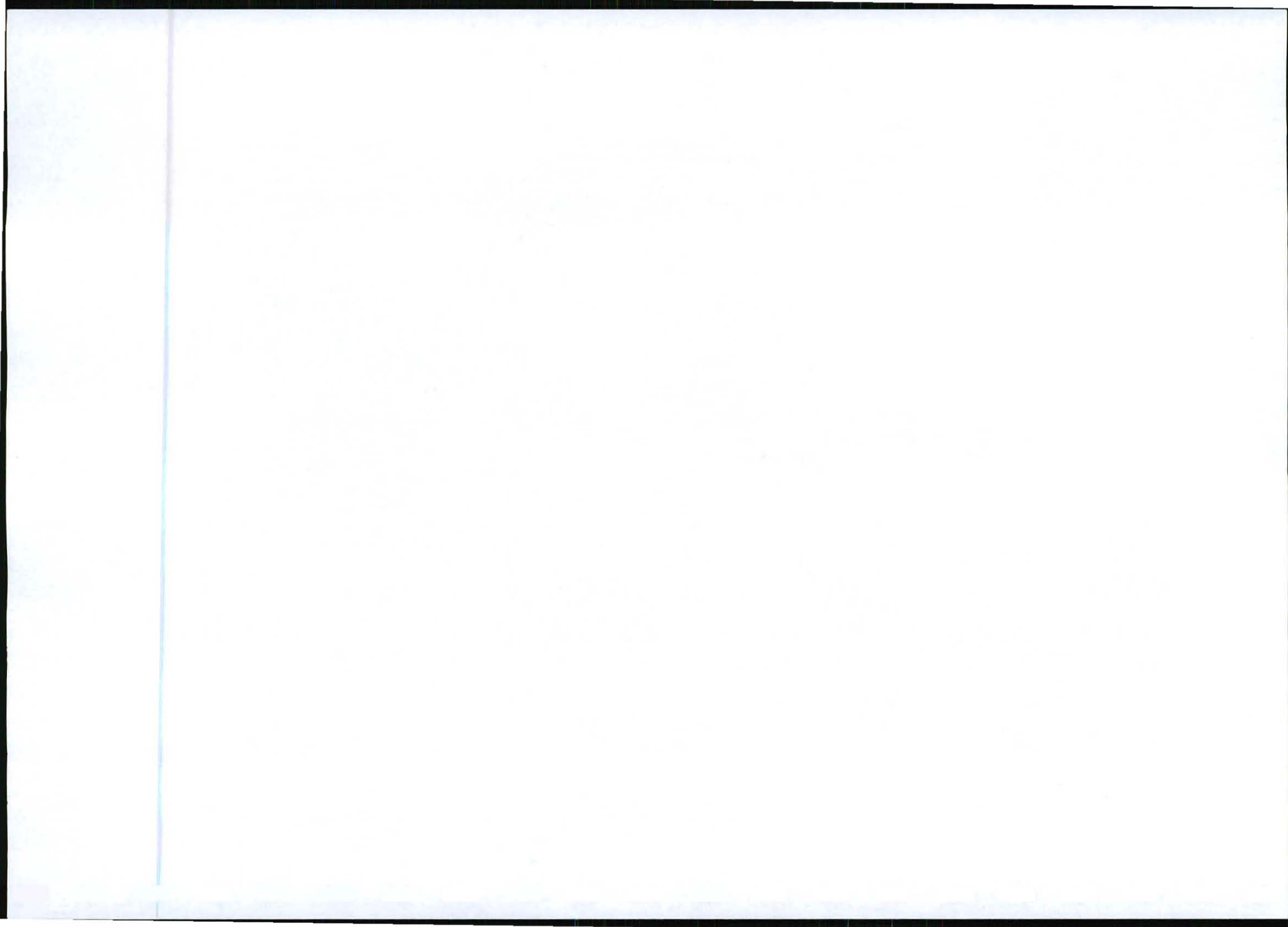
There have been various requests from the Cannonville community to improve the safety of the Cannonville intersection and reduce the speed of vehicles travelling on the N2 through Colchester. Also, although side road traffic volumes are currently relatively low, volumes are likely to increase due to possible future township development to the north of the N2 and further development at Coega. Therefore, it was decided to construct a large traffic circle at the Cannonville intersection. This will accommodate additional side road traffic, reduce traffic speed and improve safety to road users and pedestrians.

A traffic impact assessment that was conducted showed a growth rate for all vehicles over the period 1990 to 2009 of 2.5%. The growth rate for heavy vehicles was 3.8% over the same period. An increase in traffic on the N2/11 indicates that the road should be upgraded to a dual carriageway facility to accommodate the increase in overall and heavy vehicles on this road. The Sundays Estuary bridge will be constructed as part of the second carriageway to the south of the existing bridge over the estuary.

The proposed four borrow pits are all located along this section of the N2 (Figure 2-2) and will provide the required materials for the mentioned activities on the road. Material that becomes available during construction in the road reserve and in road cuttings will firstly be used. Therefore only the required additional material will be obtained from the borrow pits.









## 2.2 Activity Description

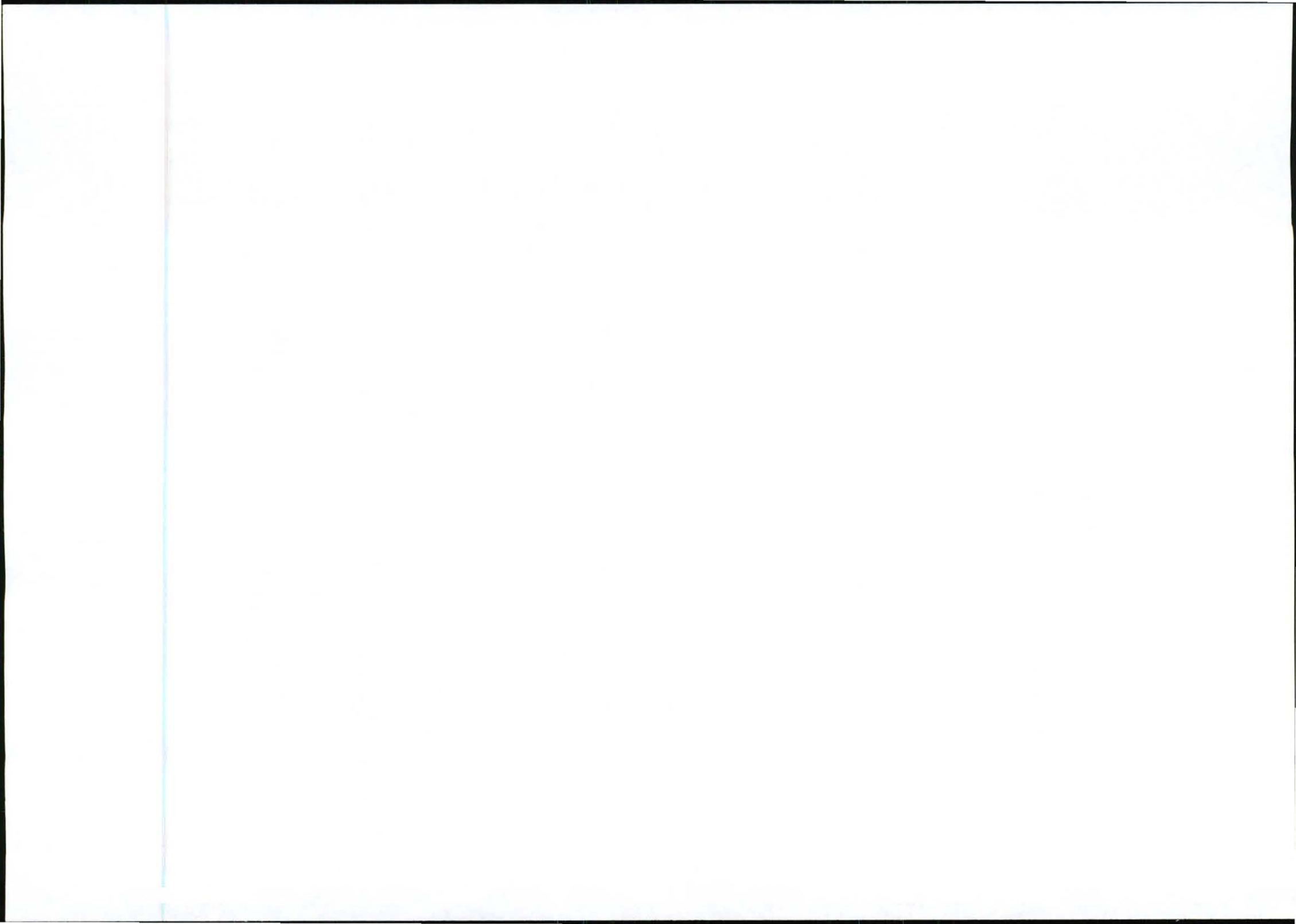
The proposed activities entail four borrow pits along the National Route 2 Section 11 (see Figure 2-2 for the locality plan). Detailed information on each borrow pit is included in Table 2-1 to Table 2-4.

**Table 2-1: Information on proposed Borrow Pit 1 (km 58.4)**

Required Information	Available Information
<b>Information on the site</b>	
Full name of the property on which mining operations will be conducted	Farm Mellville No. 308
Name of subdivision	N/A
Co-ordinates of mining area: Latitude & Longitude	See Table 2-5
Magisterial District	Port Elizabeth
Name of registered owner of property	Pretoria Portland Cement Company Ltd.
Details of property owner	Mr Paul Maré P.O. Box 787416 Sandton 2146 Tel: 011-386 9057 Fax: 011-386 9053 Email: <a href="mailto:pmare@ppc.co.za">pmare@ppc.co.za</a>
Current uses of the property and surrounding areas	Agricultural (grazing) The area is already proposed for mining as mining rights for this property has previously been obtained by PPC for limestone (12/1996).
Any other, existing land uses that impact on the environment in the proposed mining area	The N2 freeway located to the north of the borrow pit site contributes to environmental impacts through vehicle emissions and noise
What is the name of the nearest town and specify the distance	Colchester – 10 km
<b>Information on the mining activity</b>	
Mineral to be mined	Bouldery Gravelly Silty Sand (GM)
Ultimate depth of the proposed mining operations	57.00 masl
Total area of mining activities (ha)	Max. 6.030 ha
Approximate volume of material to be mined	267,790 m <sup>3</sup>
Time period of mining operations to be conducted on this particular site	2 years construction contract & 1 year rehabilitation

**Table 2-2: Information on proposed Borrow Pit 2 (km 59.4)**

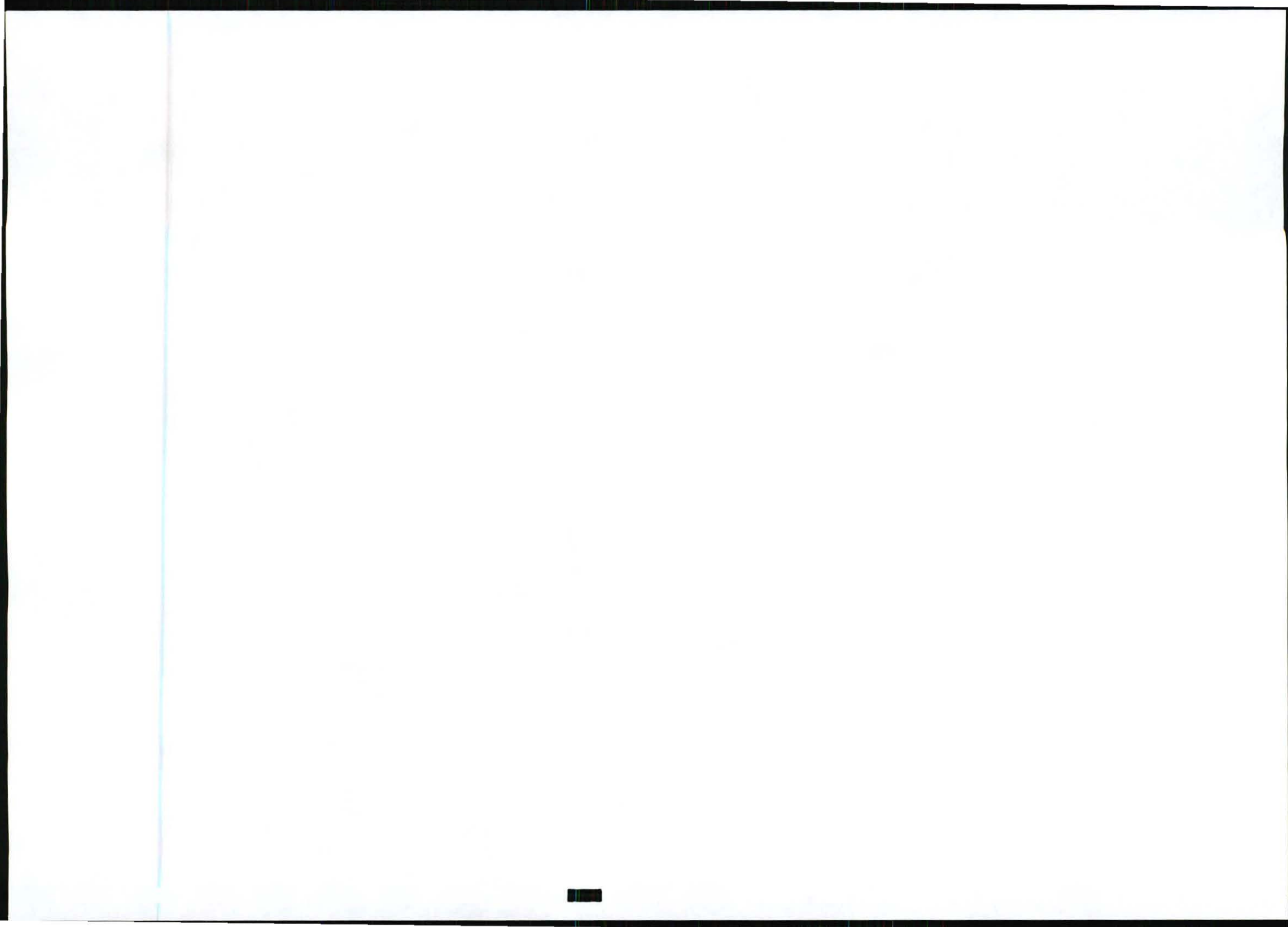
Required Information	Available Information
<b>Information on the site</b>	
Full name of the property on which mining operations will be conducted	Farm Mellville No. 308
Name of subdivision	N/A
Co-ordinates of mining area: Latitude & Longitude	See Table 2-5



Magisterial District	Port Elizabeth
Name of registered owner of property	Pretoria Portland Cement Company Ltd.
Details of property owner	Mr Paul Maré P.O. Box 787416 Sandton 2146 Tel: 011-386 9057 Fax: 011-386 9053 Email: <a href="mailto:pmare@ppc.co.za">pmare@ppc.co.za</a>
Current uses of the property and surrounding areas	Agricultural (grazing) The area is already proposed for mining as mining rights for this property has previously been obtained by PPC for limestone (12/1996).
Any other, existing land uses that impact on the environment in the proposed mining area	The N2 freeway located to the north of the borrow pit site contributes to environmental impacts through vehicle emissions and noise
What is the name of the nearest town and specify the distance	Colchester – 9 km
<b>Information on the mining activity</b>	
Mineral to be mined	Bouldery Gravelly Silty Sand (GM)
Ultimate depth of the proposed mining operations	46.05 masl
Total area of mining activities (ha)	Max. 9.144 ha
Approximate volume of material to be mined	259,879 m <sup>3</sup>
Time period of mining operations to be conducted on this particular site	2 years construction contract & 1 year rehabilitation

**Table 2-3: Information on proposed Borrow Pit 3 (km 62.4)**

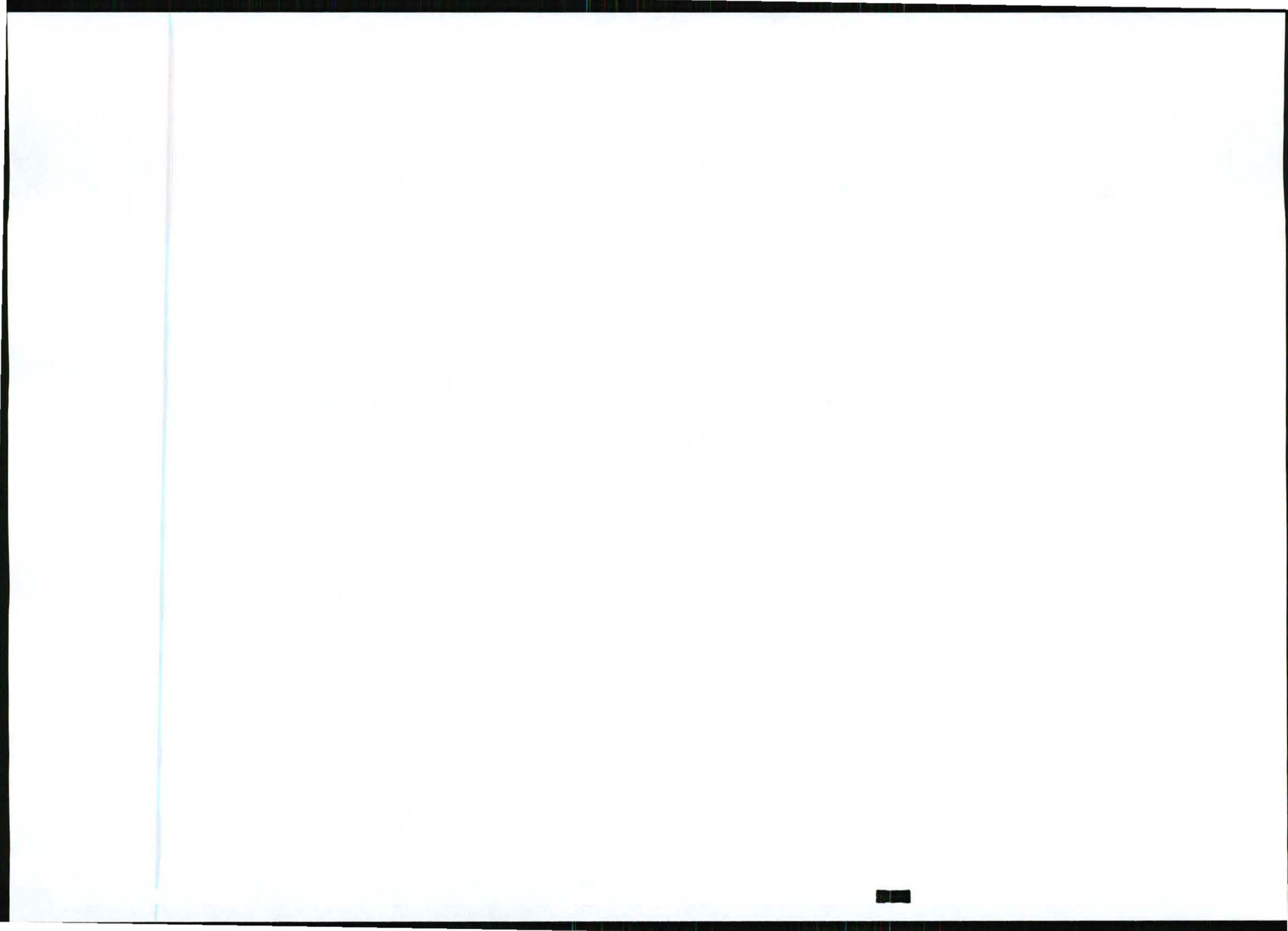
Required Information	Available Information
<b>Information on the site</b>	
Full name of the property on which mining operations will be conducted	Farm The Downs No. 308
Name of subdivision	Subdivision 1
Co-ordinates of mining area: Latitude & Longitude	See Table 2-5
Magisterial District	Port Elizabeth
Name of registered owner of property	Pretoria Portland Cement Company Ltd.
Details of property owner	Mr Paul Maré P.O. Box 787416 Sandton 2146 Tel: 011-386 9057 Fax: 011-386 9053 Email: <a href="mailto:pmare@ppc.co.za">pmare@ppc.co.za</a>
Current uses of the property and surrounding areas	Agricultural (grazing) The area is already proposed for mining as mining rights for this property has previously been obtained by PPC for limestone (12/1996).
Any other, existing land uses that impact on the	The N2 freeway located to the north of the borrow pit site



environment in the proposed mining area	contributes to environmental impacts through vehicle emissions and noise
What is the name of the nearest town and specify the distance	Colchester – 6 km
<b>Information on the mining activity</b>	
Mineral to be mined	Sand (SP) originating from wind blown dunes
Ultimate depth of the proposed mining operations	11.95 masl
Total area of mining activities (ha)	Max. 4.595 ha
Approximate volume of material to be mined	162,934 m <sup>3</sup>
Time period of mining operations to be conducted on this particular site	2 years construction contract & 1 year rehabilitation

**Table 2-4: Information on proposed Borrow Pit 4 (km 63.6)**

Required Information	Available Information
<b>Information on the site</b>	
Full name of the property on which mining operations will be conducted	Farm The Downs No. 308
Name of subdivision	Subdivision 1
Co-ordinates of mining area: Latitude & Longitude	See Table 2-5
Magisterial District	Port Elizabeth
Name of registered owner of property	Pretoria Portland Cement Company Ltd.
Details of property owner	Mr Paul Maré P.O. Box 787416 Sandton 2146 Tel: 011-386 9057 Fax: 011-386 9053 Email: <a href="mailto:pmare@ppc.co.za">pmare@ppc.co.za</a>
Current uses of the property and surrounding areas	Agricultural (grazing) The area is already proposed for mining as mining rights for this property has previously been obtained by PPC for limestone (12/1996).
Any other, existing land uses that impact on the environment in the proposed mining area	The N2 freeway located to the north of the borrow pit site contributes to environmental impacts through vehicle emissions and noise
What is the name of the nearest town and specify the distance	Colchester 5 km
<b>Information on the mining activity</b>	
Mineral to be mined	Sand (SP) originating from wind blown dunes
Ultimate depth of the proposed mining operations	8.20 masl
Total area of mining activities (ha)	Max. 10.478 ha
Approximate volume of material to be mined	445,498 m <sup>3</sup>
Time period of mining operations to be conducted	2 years construction contract & 1 year rehabilitation

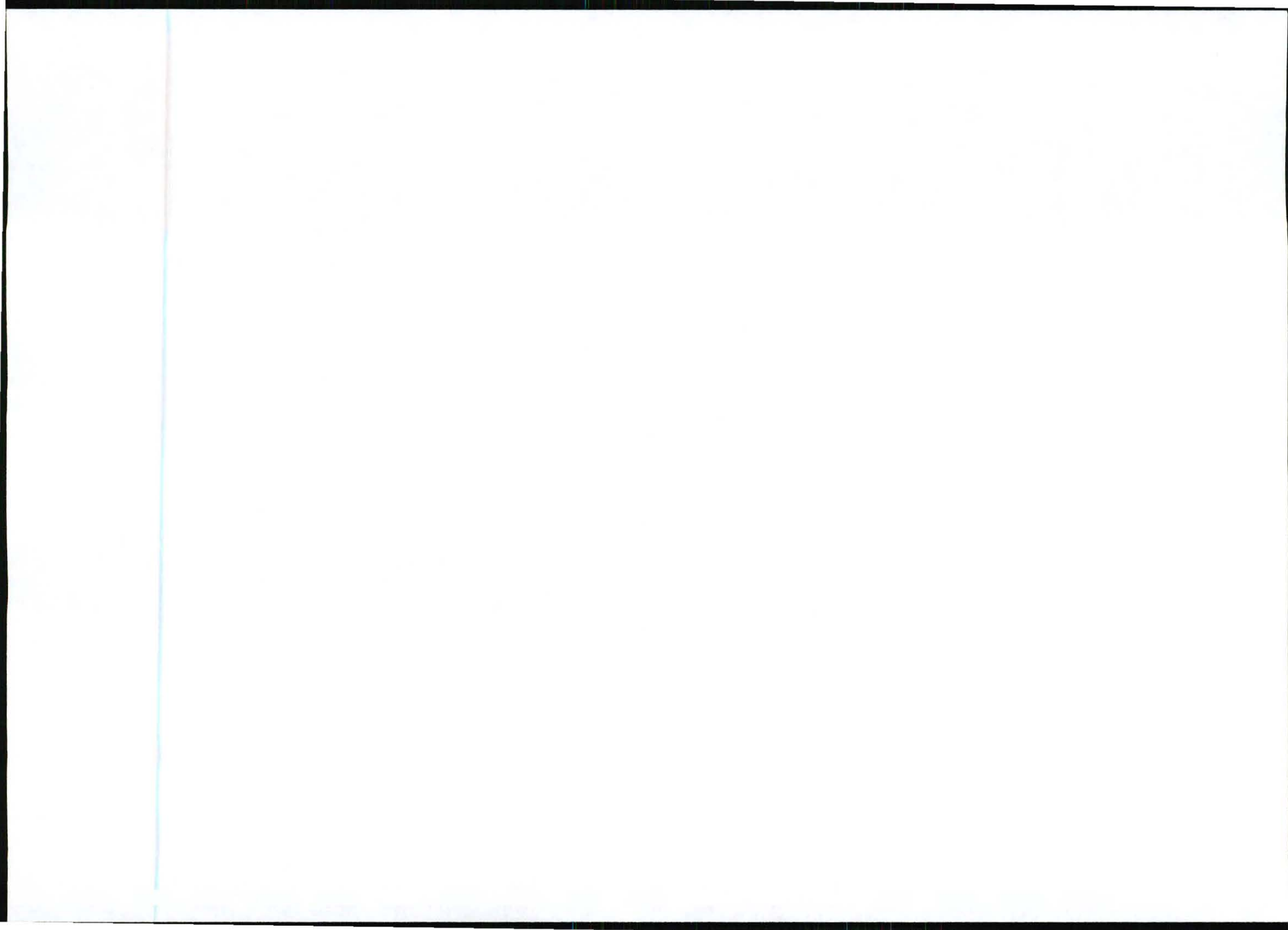


### 2.3 Activity Location

The proposed four borrow pits are all located along the National Route 2 Section 11, which will be upgraded to include an additional lane to the south of the existing road. The section of the road to be upgraded and the location of the proposed four borrow pits can be seen in Figure 2-2. The coordinates of the four corners of the areas within which the proposed borrow pits will be made are listed in Table 2-5. Mining plans, showing the positions of the listed coordinates are included in Appendix B of this report.

**Table 2-5: Coordinates of the four corners of the proposed borrow pits**

Borrow Pit	Coordinates	
	Y(m)	X(m)
<b>BP 1</b>		
A	-68327.40	+3735008.84
B	-68443.57	+3735101.48
C	-68800.00	+3734960.68
D	-68800.00	+3734807.49
<b>BP 2</b>		
A	-69151.06	+3734658.04
B	-69262.95	+3734734.07
C	-69835.88	+3734536.40
D	-69843.97	+3734363.83
<b>BP 3</b>		
A	-71667.60	+3733304.70
B	-71752.74	+3733400.00
C	-72042.03	+3733200.00
D	-71957.45	+3733097.33
<b>BP 4</b>		
A	-72541.80	+3732678.20
B	-72651.30	+3732831.02
C	-73113.15	+3732511.70
D	-72970.09	+3732371.34





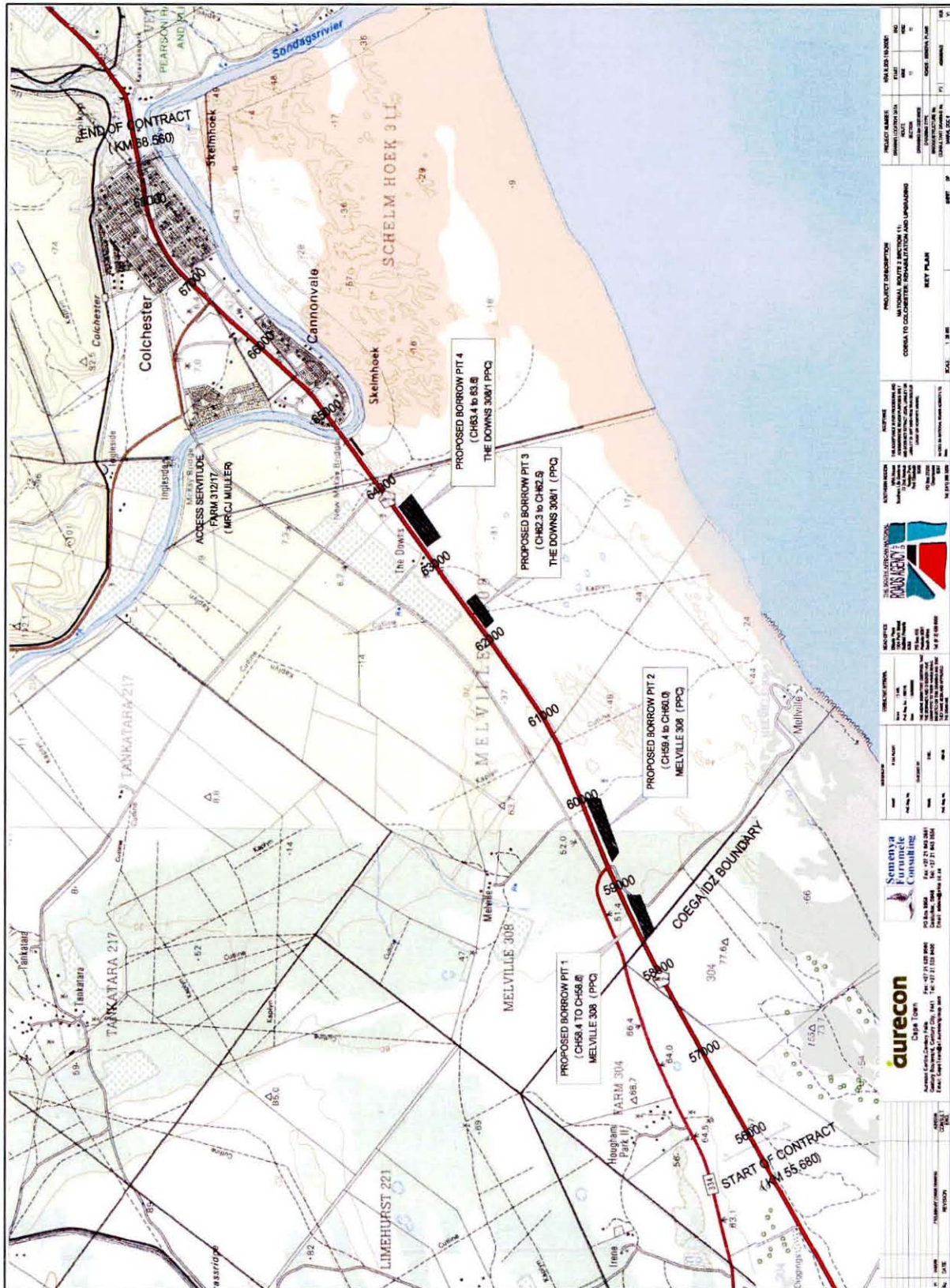
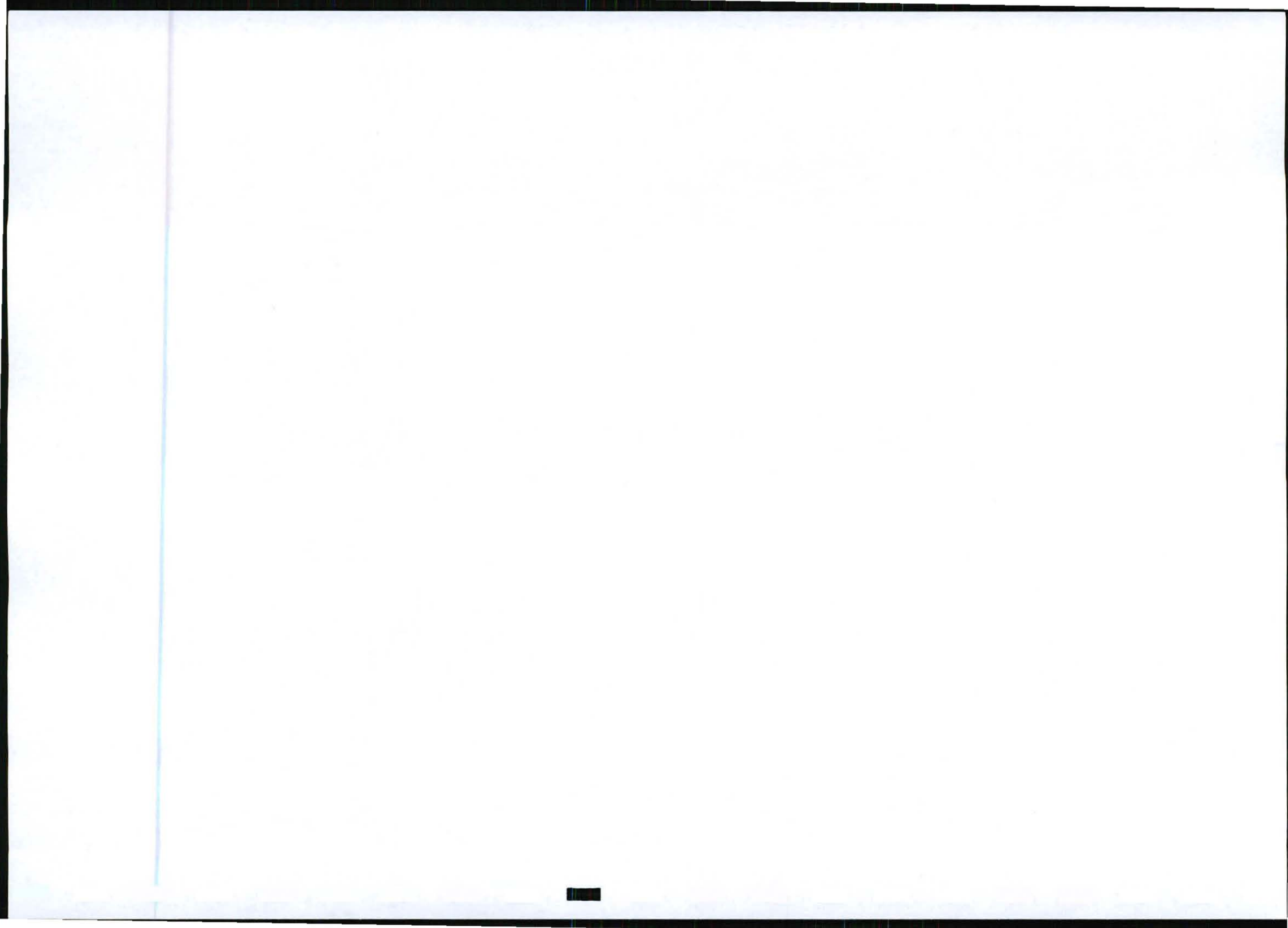


Figure 2-2: Location of the proposed borrow pits (1 to 4)

## 2.4 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 vary and are therefore described individually where necessary.



### 2.4.1 Borrow Pits 1 and 2

The material to be mined at these two borrow pits is partially to completely calcretised, generally bouldery gravelly silty sand. It may be utilised partly as sub-base and partly as selected sub-grade and/or fill. It occurs at these sites with no limitation. It is beneath a layer of topsoil that is about 100 mm thick.

Approximately 30% of the material available at this site consist of hard quartzitic boulders, cobbles and coarse gravel that could be crushed to form sub-base. The remaining 70% material is suitable as selected subgrade.

The boundaries of the mining areas will be demarcated using stone beacons on corners as indicated on the layout plans. The perimeter of the mining area will also be fenced with temporary stock-proof fencing as indicated on the layout plan (Appendix B).

The material will be mined utilising a dozer with a ripper (if necessary to excavate through hard-pan calcrete) and either a front end loader or a tracked excavator to load loose or loosened material. Mining will take place by advancing the face away from the existing face towards the proposed limit of mining, in order to mix the materials from the upper portion with those from the lower portion of the face. The extent of mining will be determined by the volume of material required at that time. The approximate volume of material in each proposed borrow pit area is given in Table 2-1 and Table 2-2 respectively for borrow pits 1 and 2.

Temporary batter board will be erected as required as mining proceeds to indicate the sideways and downward limits of mining.

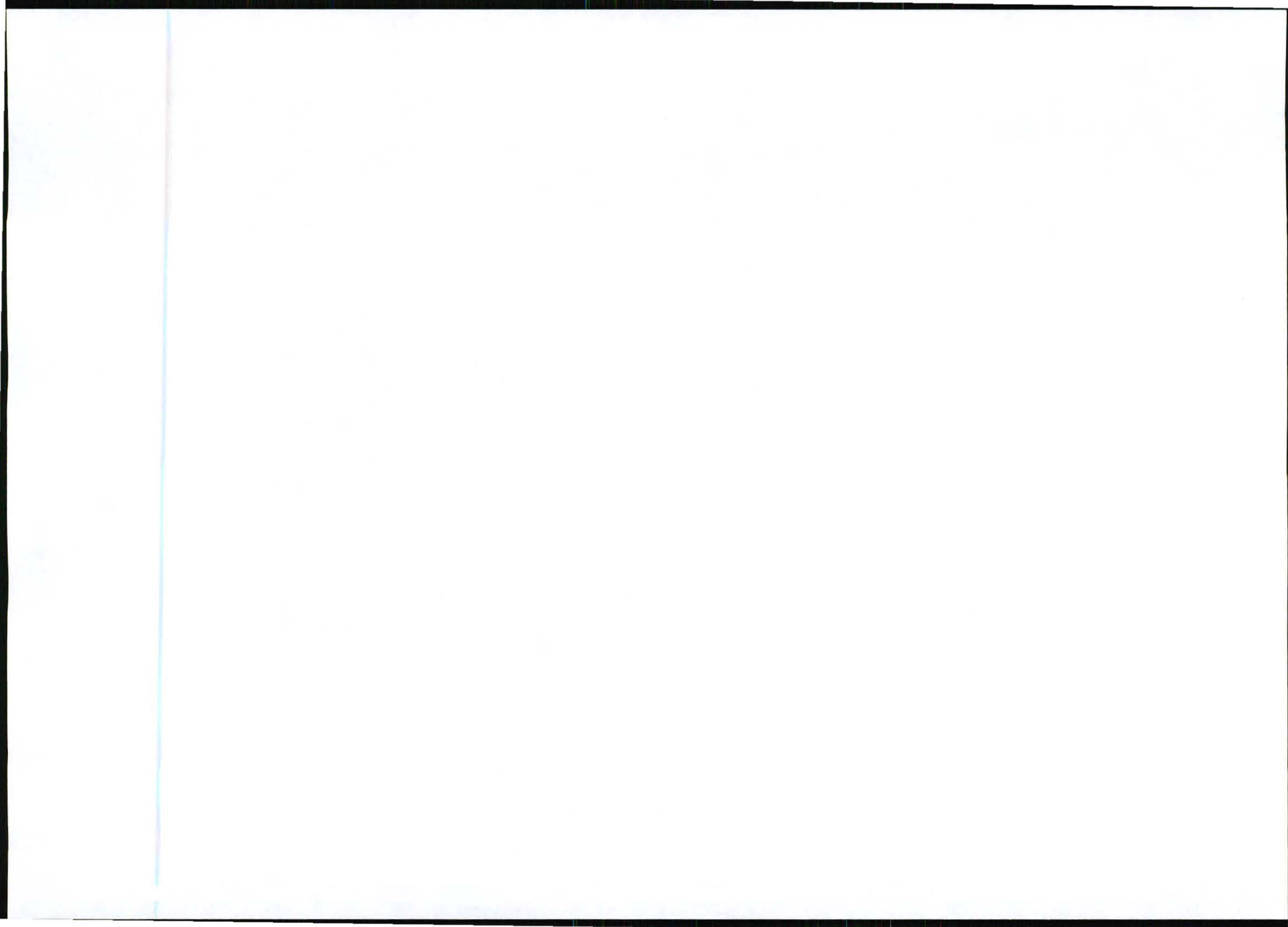
### 2.4.2 Borrow pits 3 and 4:

The material to be mined at these two borrow pits is sand (derived from wind-blown, Aeolian, dunes), which occurs at these sites with no limitation. It is beneath a layer of topsoil that is about 100 mm thick.

The boundaries of the mining areas will be demarcated using stone beacons on corners as indicated on the layout plans. The perimeter of the mining area will also be fenced with temporary stock-proof fencing as indicated on the layout plan (Appendix B).

The material will be mined utilising a dozer and either a front end loader or a tracked excavator to loosen material. Mining will take place by advancing the face away from the existing face towards the proposed limit of mining, in order to mix the materials from the upper portion with those from the lower portion of the face. The extent of mining will be determined by the volume of material required at that time. The approximate volume of fill material in each proposed mining area are given in Table 2-3 and Table 2-4 respectively for borrow pit 3 and 4.

Temporary batter board will be erected as required as mining proceeds to indicate the sideways and downward limits of mining.



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

### 3.1 Biophysical Environment

#### 3.1.1 Topography

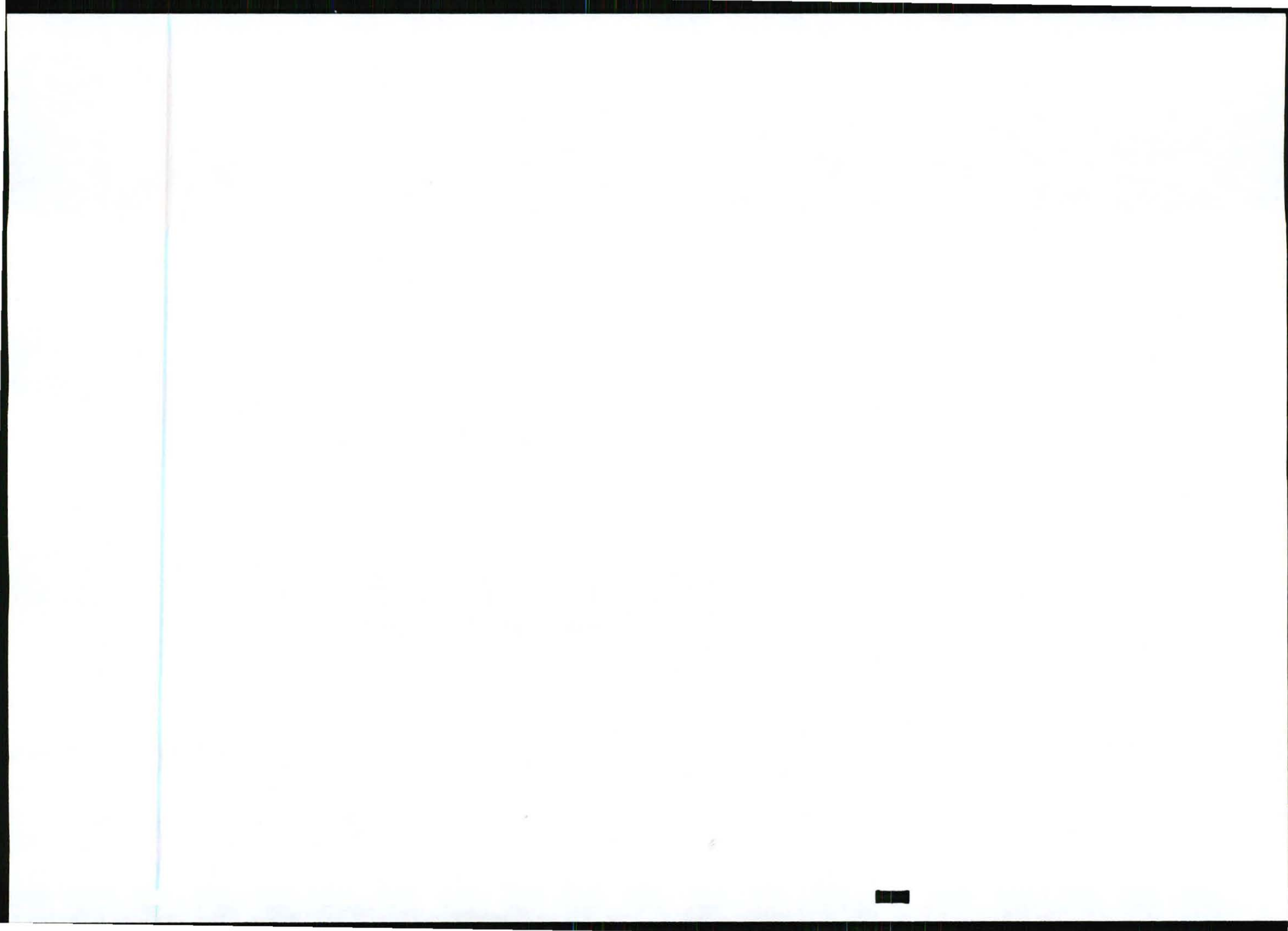
The surrounding area is generally flat with some undulating dunes specifically at borrow pit sites 3 and 4. Borrow pits 1 and 2 are situated on calcrete outcrops which have a higher elevation than the surrounding environment. In these areas a small berm between the road and the borrow pit will be left to mask borrow pit scars in the long-term. Borrow pit 3 also has a small vegetated dune along the boundary between the road and the pit which could be retained/replaced as a visual buffer.

#### 3.1.2 Geology and Soils

This area around Borrow Pit 1 is underlain by alluvial gravel and sand of the Bluewater Bay Formation (see Figure 3-1), which are younger than the high-level terrace deposits of the Grahamstown Formation, and occurs at various levels in the area and are mainly of two types, namely older gravels which cannot be directly linked to existing drainage systems, and fluvial deposits which represent former flood plains of major rivers in the area. In this area, between the Sundays and Swartkops Rivers, a thin layer of a few meters and less, of reddish stained gravel overlies the Alexandria Formation and has in the past been mistakenly regarded as *in situ* weathered conglomerate of the latter units (Toerien & Hill, 1989).

Borrow pits 2 and 3 are underlain by Intermediate and Low-Level Fluvial Terrace Deposits (see Figure 3-1). This area consist of well-developed fluvial terraces, which to some extent reflect changing sea levels in the Quaternary and characterise the valleys of major drainage systems such as the Sundays River in this case. The terraces are covered by gravel and soil, which may be cemented by lime and occasionally by silica and iron oxide, and sometimes carry a calcrete cover (Toerien & Hill, 1989).

Borrow Pit 4 is situated on the Nanaga Formation (see Figure 3-1). This formation, with a maximum thickness of 250 m, overlies the Alexandria Formation and other rocks north and east of the Sundays River. It consists of semi-consolidated to consolidated aeolian sand or dune rock, which is calcareous due to the presence of numerous shell fragments. It is profusely cross-bedded in places and shows signs of local weathering and redistribution. A cover of sandy surface limestone is also widespread (Toerien & Hill, 1989).



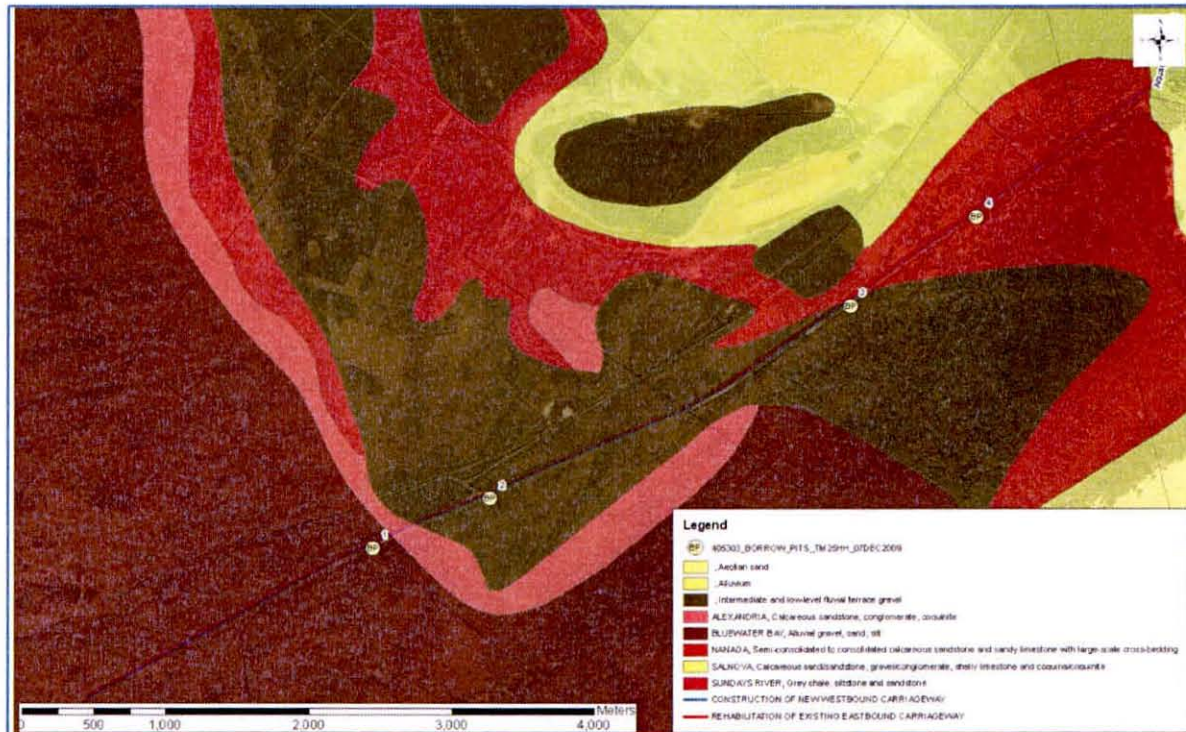


Figure 3-1: Geology at each borrow pit site

### 3.1.3 Hydrology

The National Route N2 stretches over the Sundays Estuary which is situated approximately one kilometre northeast of Borrow Pit 4. The estuary is clearly visible on the borrow pits locality plan (see Figure 2-2). None of the proposed borrow pit sites are situated close to the estuary and are therefore not expected to have any significant impact on this system (see Table 5-1).

Also, no groundwater resources should will not be affected by the borrow pits.

After rehabilitation of the borrow pits, 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.

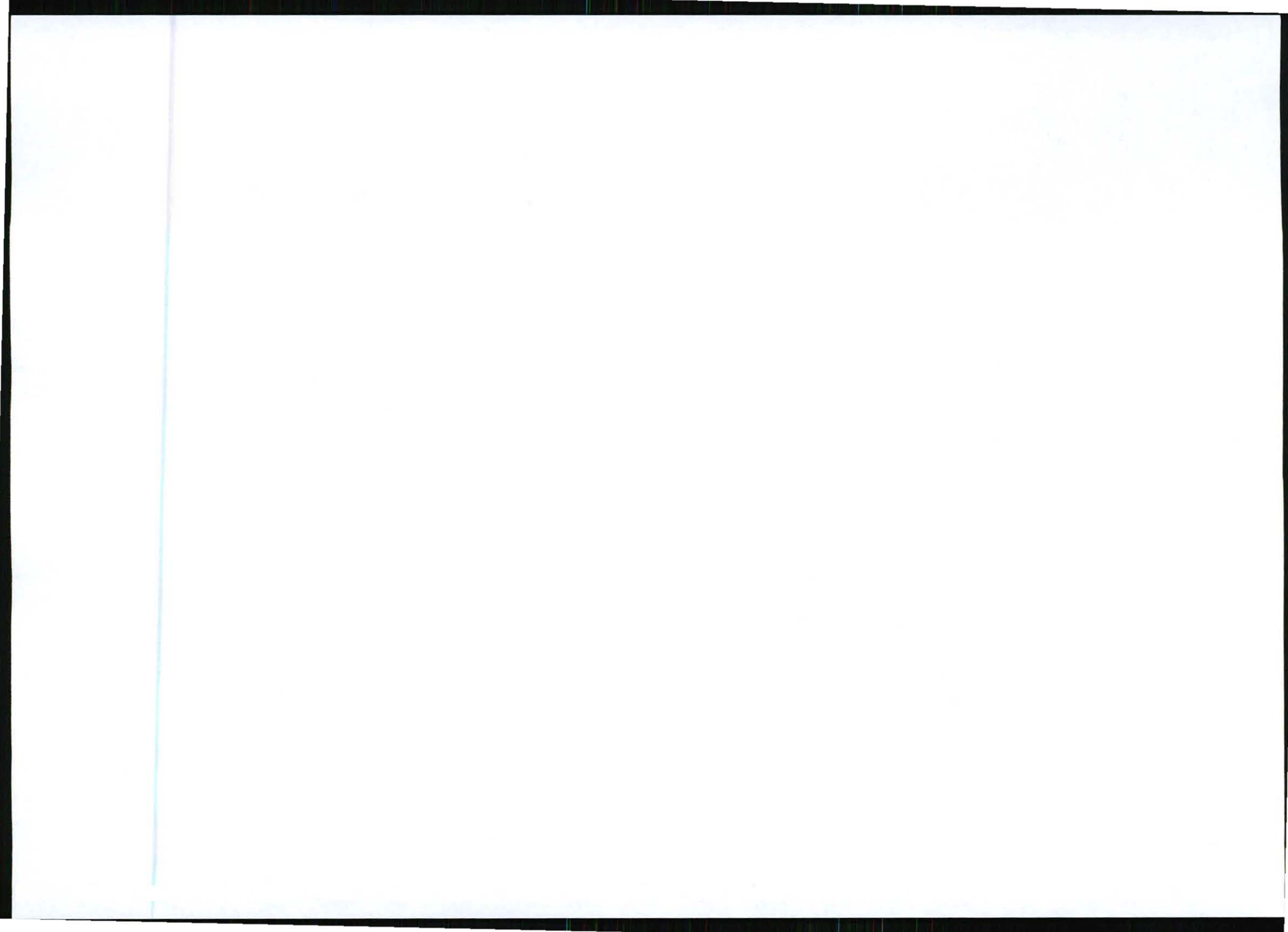
### 3.1.4 Land Use

The relevant sites have a low-value agricultural use as they are informally used for livestock grazing (e.g. cattle). The predominant land use in the adjacent areas is the same as on the proposed sites. A small borrow pit was previously constructed at the proposed site for borrow pit 1, but has been closed.

It is further important to note that the area is already proposed for mining as mining rights for the relevant properties have previously been obtained by PPC for limestone (Mining license No. 12/1996). New mining rights are now applied for for bouldery gravelly silty sand (GM) and sand originating from wind blown dunes (SP) for Borrow Pits 1 and 2 and Borrow Pits 3 and 4 respectively.

### 3.1.5 Ecology

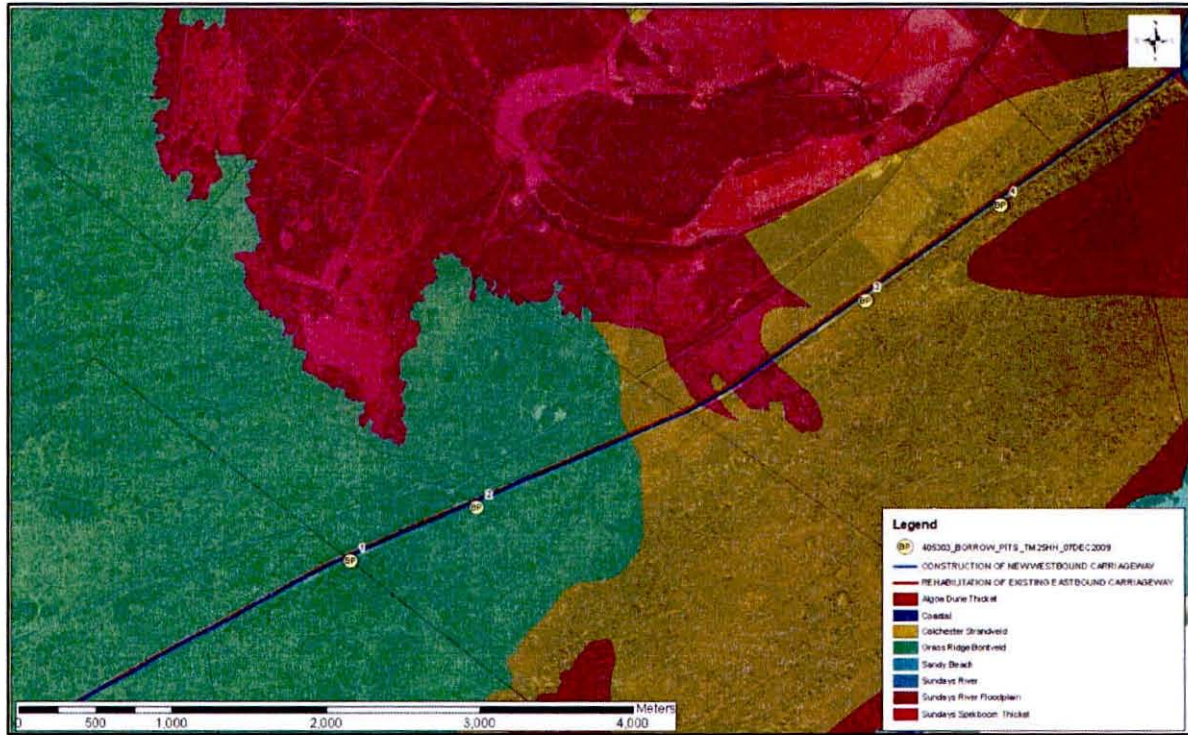
The natural vegetation at the four sites falls within the Subtropical Thicket biome. The vegetation type present at borrow pits 1 and 2 is Grass Ridge Bontveld (see Figure 3-2) which is usually present on the Alexandria formation. In these areas, small clumps of Sundays Valley Thicket occur in a matrix of veld that consists of a combination of species that are characteristic of grassland





(*Eustachys paspaloides*, *Themeda triandra*), succulent karoo (*Pteronia incana*) and fynbos (*Acmadenia obtusata*, *Euryops ericifolius*). Many highly localized endemics are present.

At borrow pits 3 and 4, Colchester Strandveld occurs (see Figure 3-2). Colchester Strandveld is usually present on aeolianite/calcareous sandstone or sand. This vegetation type is characterised by Thicket clumps, which are typical of Algoa Dune Thicket, within a matrix shrubland dominated by honey-thorn (*Lycium cinereum*) with an abundance of grass, e.g. quick grass (*Cynodon dactylon*) (SRK Consulting, 2009).

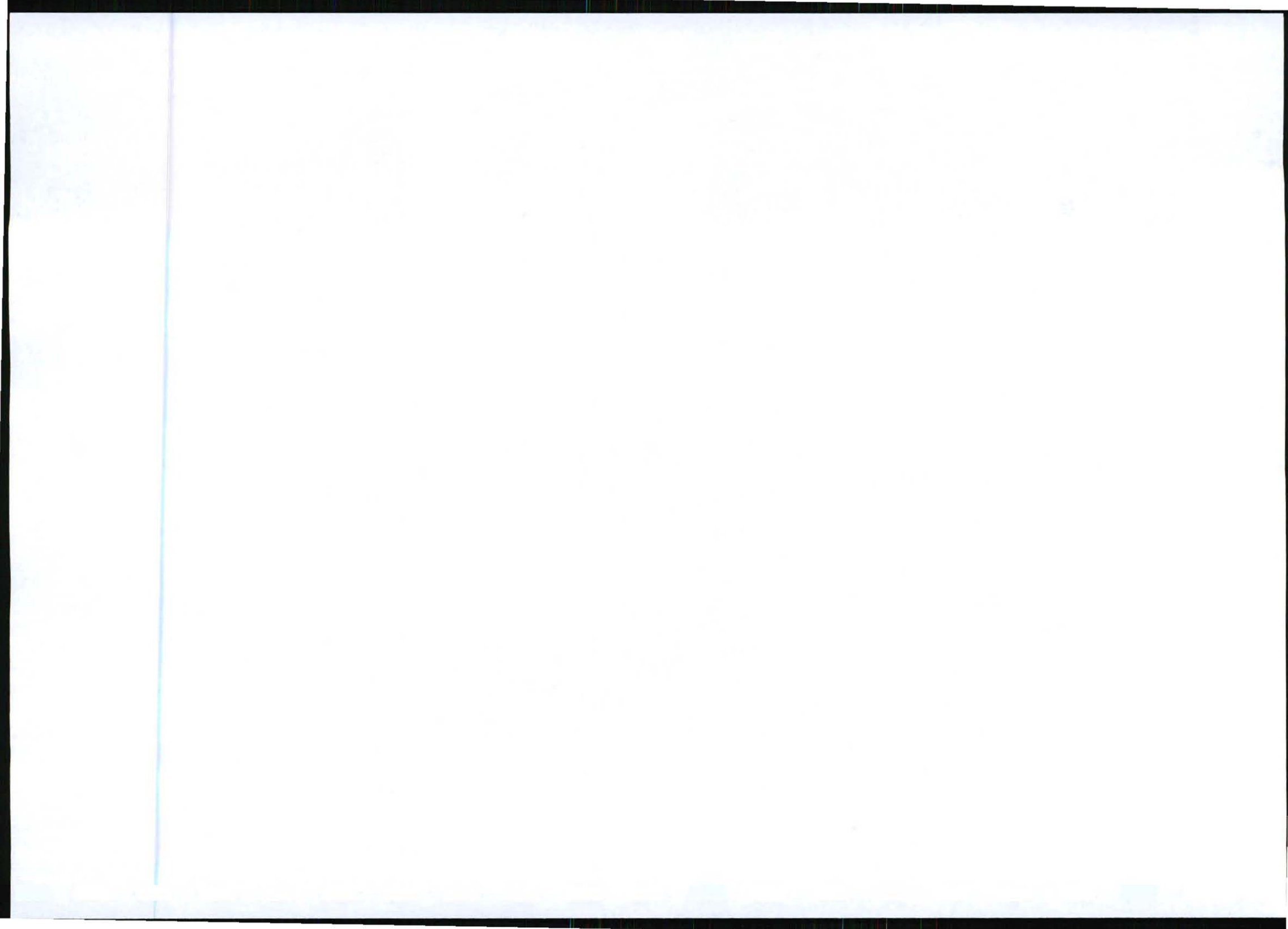


**Figure 3-2: Vegetation type at each borrow pit site**

The vegetation type and communities that occur in an area are closely associated with the geological features of each site as described above. Table 3-1 describes the main vegetation communities and their condition that were observed, as described in the specialist Vegetation Assessment (Appendix F).

A number of species of special concern including protected flora and endemic species with localised distribution are present within the proposed borrow pit sites. The species of special concern that can be expected on these sites are listed in Table 6-1, which is included in section 6.5.1 where the proper relocation techniques are also discussed. According to the vegetation specialist, most of these species present tend to have a wide distribution or where they are localised endemics, the areas where they do occur tend to either be highly disturbed or of limited conservation value within the greater context of the region.

Alien vegetation that occurs on the proposed borrow pit sites are listed in Table 6-2. These species are specifically present in the more disturbed areas such as the existing borrow pit at borrow pit 1 where *Acacia cyclops* and *A. Saligna* are abundant.



**Table 3-1: Main geological features and vegetation communities at each borrow pit site**

Borrow Pit	Vegetation Characteristics
BP 1	Highly degraded from mining activities on calcrete and dense alien invasion ( <i>Acacia cyclops</i> and <i>A. saligna</i> ) with substantial subsequent loss or original habitat. Intact outcrop vegetation is patchy and typically with grasses succulent species and some herbaceous cover.
BP 2	Somewhat degraded with patches of disturbed outcrops present. Heavy alien invasion and substantial subsequent loss or original habitat. Original vegetation typically composed of small thicket clumps and grasses, herbs and shrubs in interclump areas with outcrops commonly having succulent species.
BP 3	Vegetated dunes with typical dune thicket tree and shrub species. Interclump vegetation of a dune fynbos nature with grasses and sedges.
BP 4	Vegetated dunes with typical dune thicket tree and shrub species. Interclump vegetation of a dune fynbos nature with grasses and sedges. Moderately dense alien infestation observed.



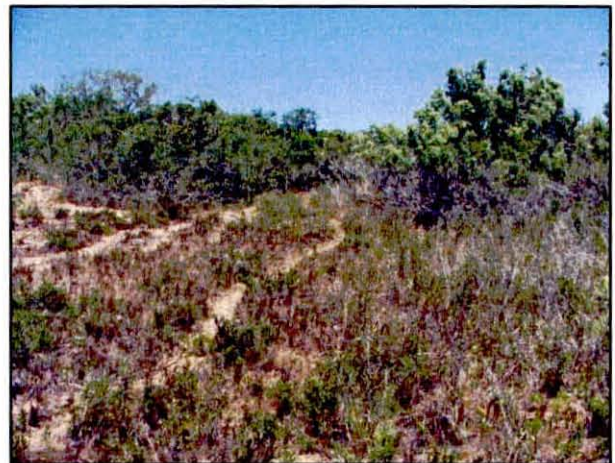
**Figure 3-3: Vegetation at borrow pit 1**



**Figure 3-4: Vegetation at borrow pit 2**

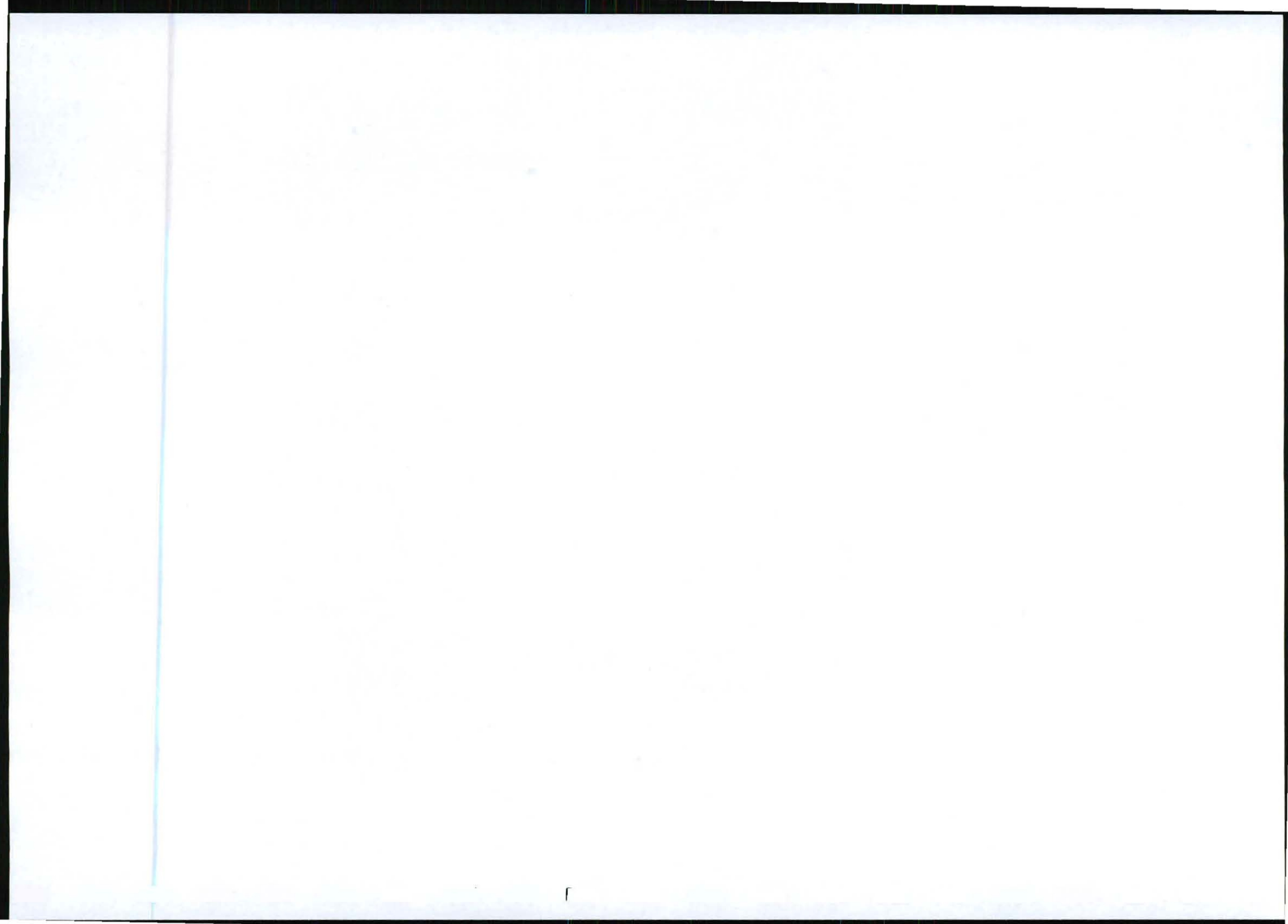


**Figure 3-5: Vegetation at borrow pit 3**



**Figure 3-6: Vegetation at borrow pit 4**

In terms of fauna, the proposed sites are nearby the predicted distribution range of the Pygmy hairy-footed gerbil (*Gerbillurus paeba*) according to the Conservation Assessment and Plan for the Nelson Mandela Bay Municipality (SRK Consulting, 2009). This species is however listed as Least Concern (LC) in the South African Red Data Book of 2004. Furthermore, according to the Eastern Cape Biodiversity Conservation Plan, reptiles such as the Tasmin’s girdled lizard (*Cordylus tasmani*)



and the Albany adder (*Bitis albanica*) may occur in these areas (Berliner & Desmet, 2007). However, seeing as small areas will be utilised for the proposed borrow pits and since much of the habitat for these species remain, a specialist study was not proposed to investigate potential impacts on them.

With regard to bigger mammals, livestock such as cattle often graze in these areas. Evidence of small antelope was also observed.

### **3.1.6 Air quality**

Air quality levels around the relevant sites are typically good in rural areas such as the affected environment, but may be affected by emissions from vehicles on the N2 National Route.

### **3.1.7 Noise**

The identified sites for the four borrow pits are all situated adjacent to the N2 National Route which is a source of noise in the Colchester and Cannonville area. The current ambient noise levels are assumed to be relatively high due to high traffic volumes on the N2. Receptors of this noise impact would be residents of Cannonville and Colchester located along the N2 road.

### **3.1.8 Sites of archaeological and cultural interest**

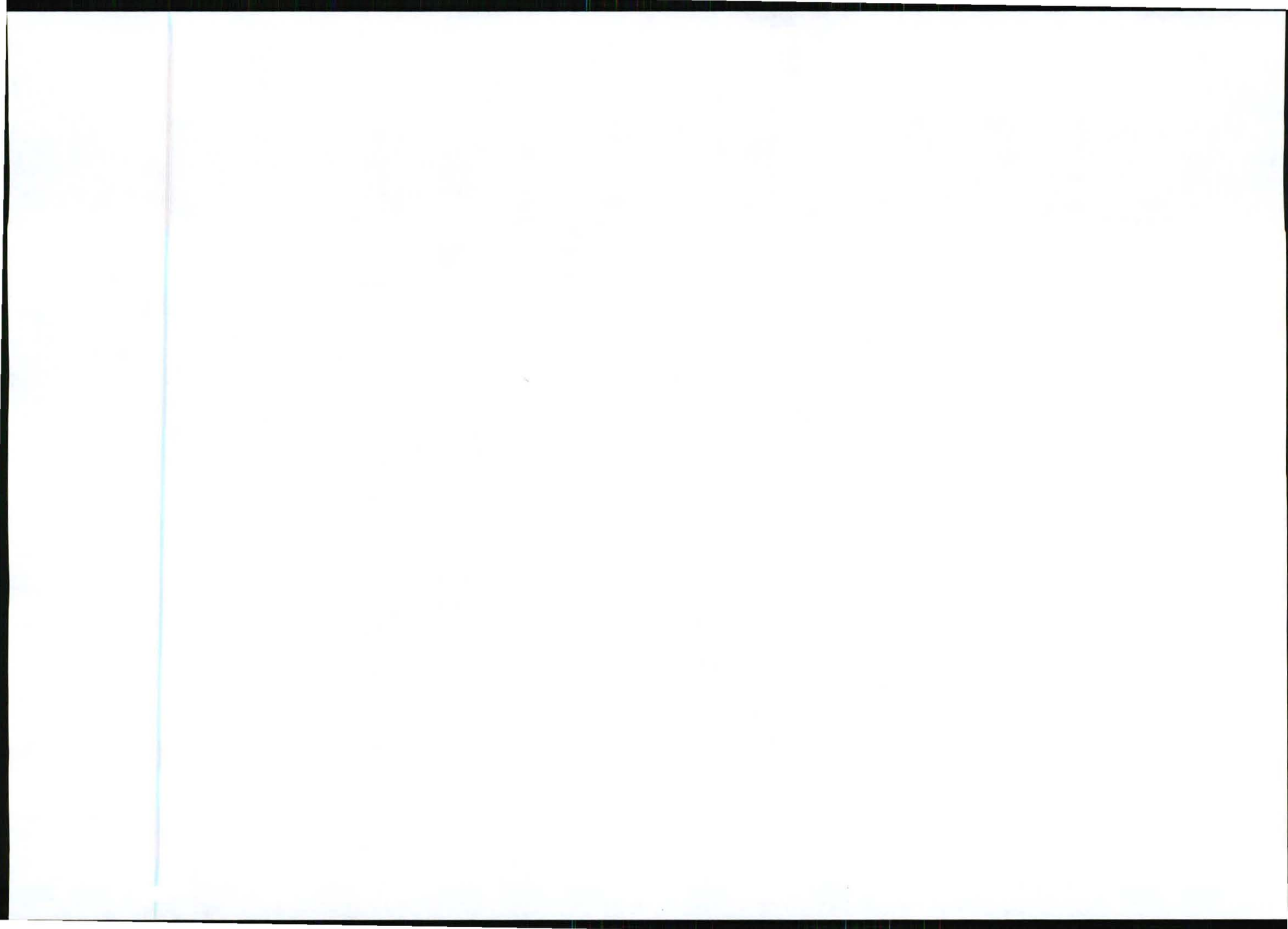
No visible cultural, archaeological or paleontological sites were identified within the proposed sites for borrow pits, and no heritage resources that are protected by the National Heritage Resources Act (Act No. 25 of 1999) are known to occur on site. A Phase 1 Archaeological Impact Assessment has been undertaken (see Appendix E).

## **3.2 Social and Economic Environment**

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

The proposed upgrading and rehabilitation of the National Route 2 Section 11 (N2/11) will improve the condition of the road and therefore improve road safety to all road users as well as to the surrounding local communities of Colchester and Cannonville. The proposed large traffic circle at the Cannonville intersection will accommodate additional side road traffic, reduce traffic speed and improve safety to road users and pedestrians.

No people should be directly affected by the proposed mining operations at the four borrow pits as no residents occur near any of the proposed sites.



## 4 Public Participation Process

### 4.1 Public Consultation

A public participation process has been carried out as part of the Environmental Basic Assessment process. Advertisements were placed in the media (Die Burger and The Herald) and Background Information Documents (BID's) were distributed to identified Interested and Affected Parties (IAP's), including via hand delivery to all properties within 100 m from the proposed site. Posters were also placed on and around the relevant sites. These informed the public of the proposed activities to be undertaken by the proponent. After the compilation of the Draft Basic Assessment Report, a public meeting was also held to discuss the findings.

No specific comments were received regarding the proposed mining operations to obtain material for the proposed activities on the N2/11.

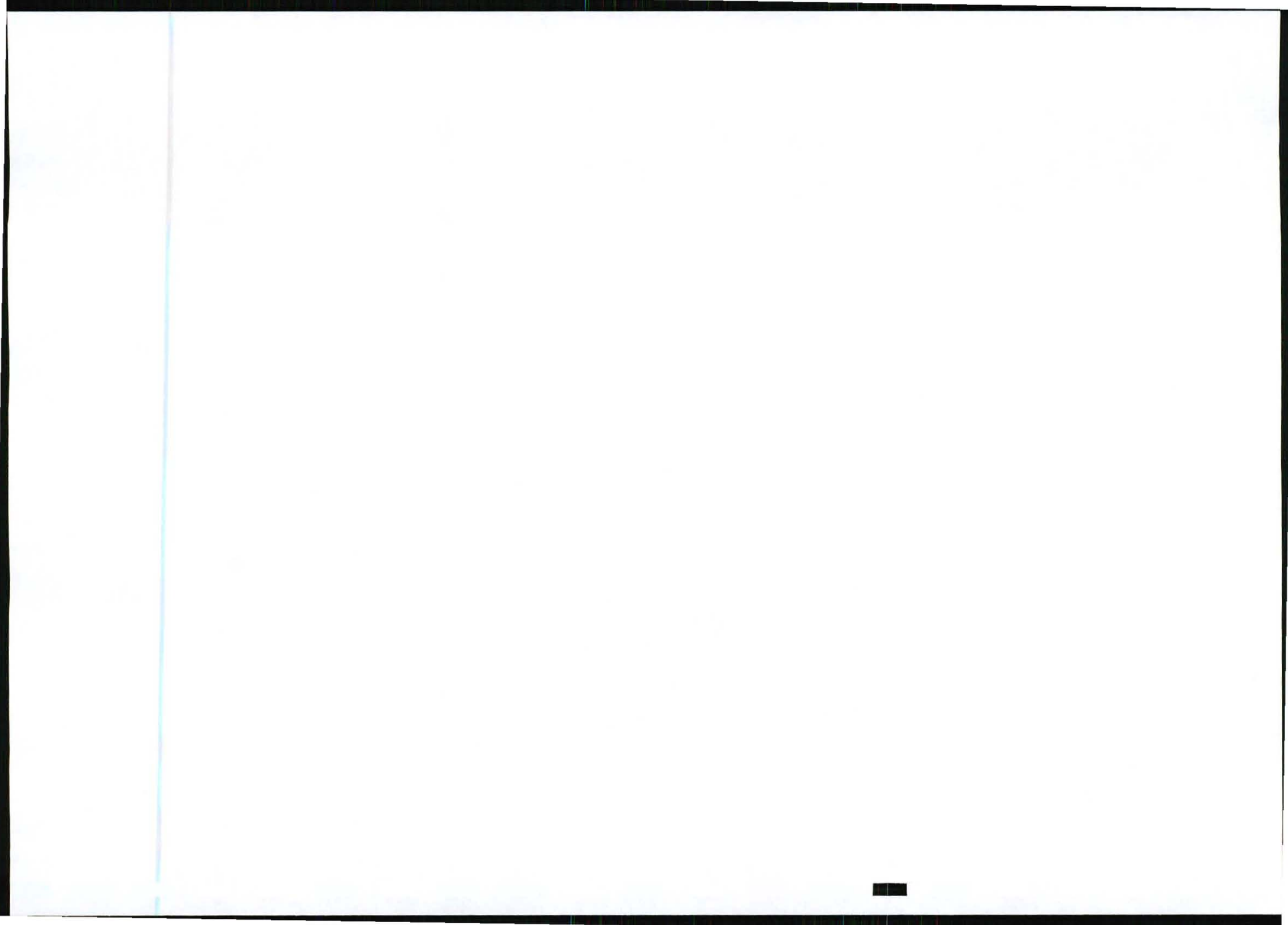
### 4.2 Landowner Consultation

Landowner consultation is a requirement for the proposed mining application. The landowners for the different proposed borrow pits are listed in Table 2-1 to Table 2-4. In this case, Pretoria Portland Cement (Pty) Ltd. (PPC) is the landowner of all four sites.

Landowner consultation was done by the project engineers (SA Aurecon Pty Ltd.) and the South African National Roads Agency Limited (SANRAL). SRK Consulting also attended a meeting with the landowners and the project team on 19 November 2009 in Cape Town to discuss the agreement between PPC and SANRAL for the proposed borrow pits. One of the criteria of this agreement was the acceptance of the Environmental Management Plan (this document) by PPC and DME.

A letter is included in Appendix D of this document in which the landowners indicate that they have been consulted and have no objections against the proposed activities. This is subject to the successful completion of a Service Level Agreement in which matters such as the completion and funding of the rehabilitation of the proposed borrow pits are specified. The final Service Level Agreement with the landowners is in process.







## 5 Assessment of Environmental Impacts

### 5.1 Potential Impacts

The key environmental issues identified by the environmental consultants were assessed by means of specialist studies. The objective of the specialist studies was to further investigate each of the issues identified and assess their potential environmental impact in order to determine their significance and propose mitigation measures to address the impacts, if required.

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, the specialist studies listed below have been conducted in order to investigate the potential environmental impacts associated with the proposed activities. All specialists were required to assess the significance of anticipated impacts and to recommend mitigation measures. The specialist studies have been attached to this document under Appendices E and F respectively:

- Heritage Impact Assessment; and
- Vegetation Impact Assessment.

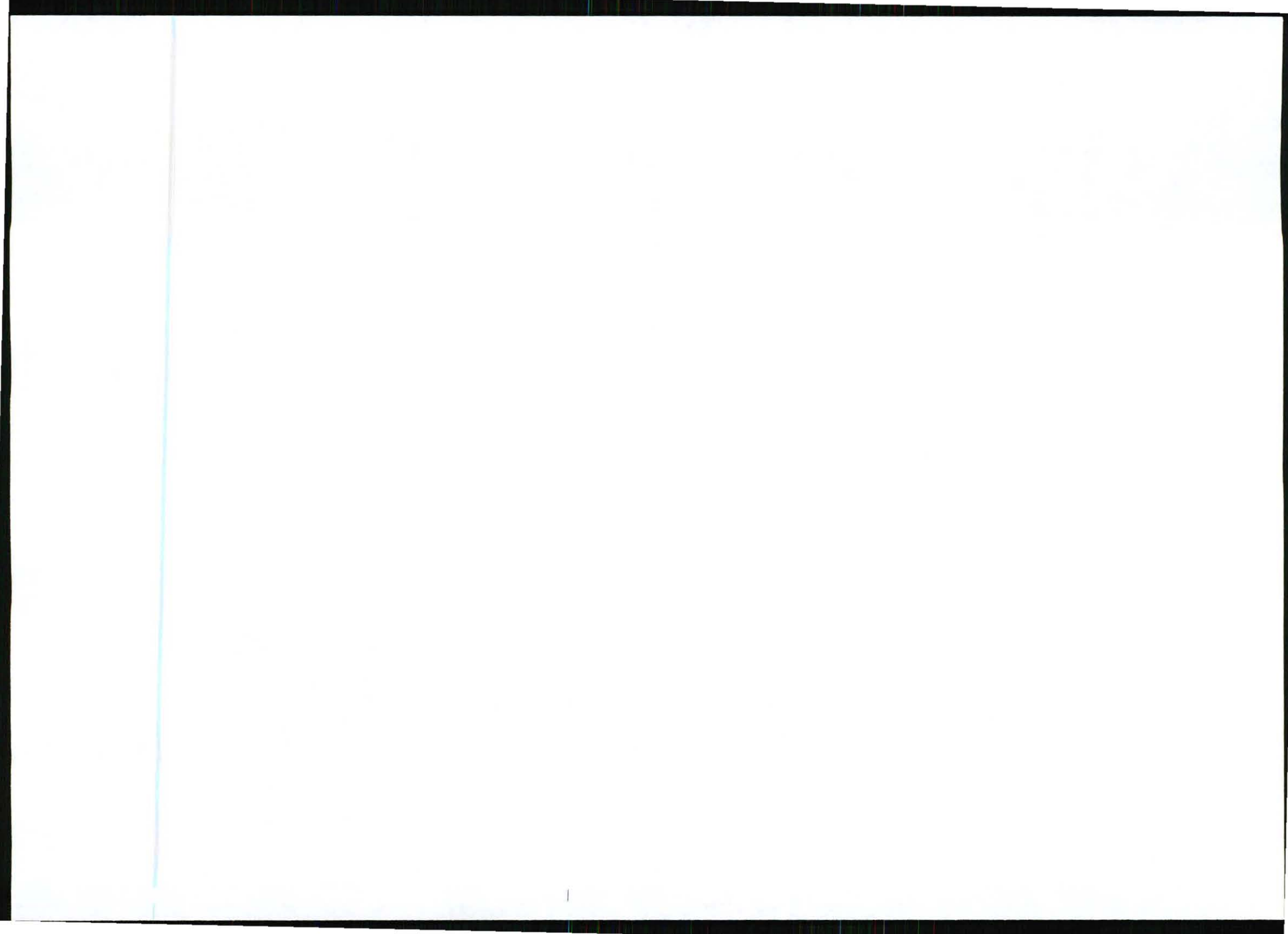
The following potential impacts have been addressed by SRK in consultation with the project team consultants and engineers:

- Air quality impacts;
- Noise impacts;
- Socio-economic impacts;
- Storm water and erosion impacts; and
- Waste management impacts.

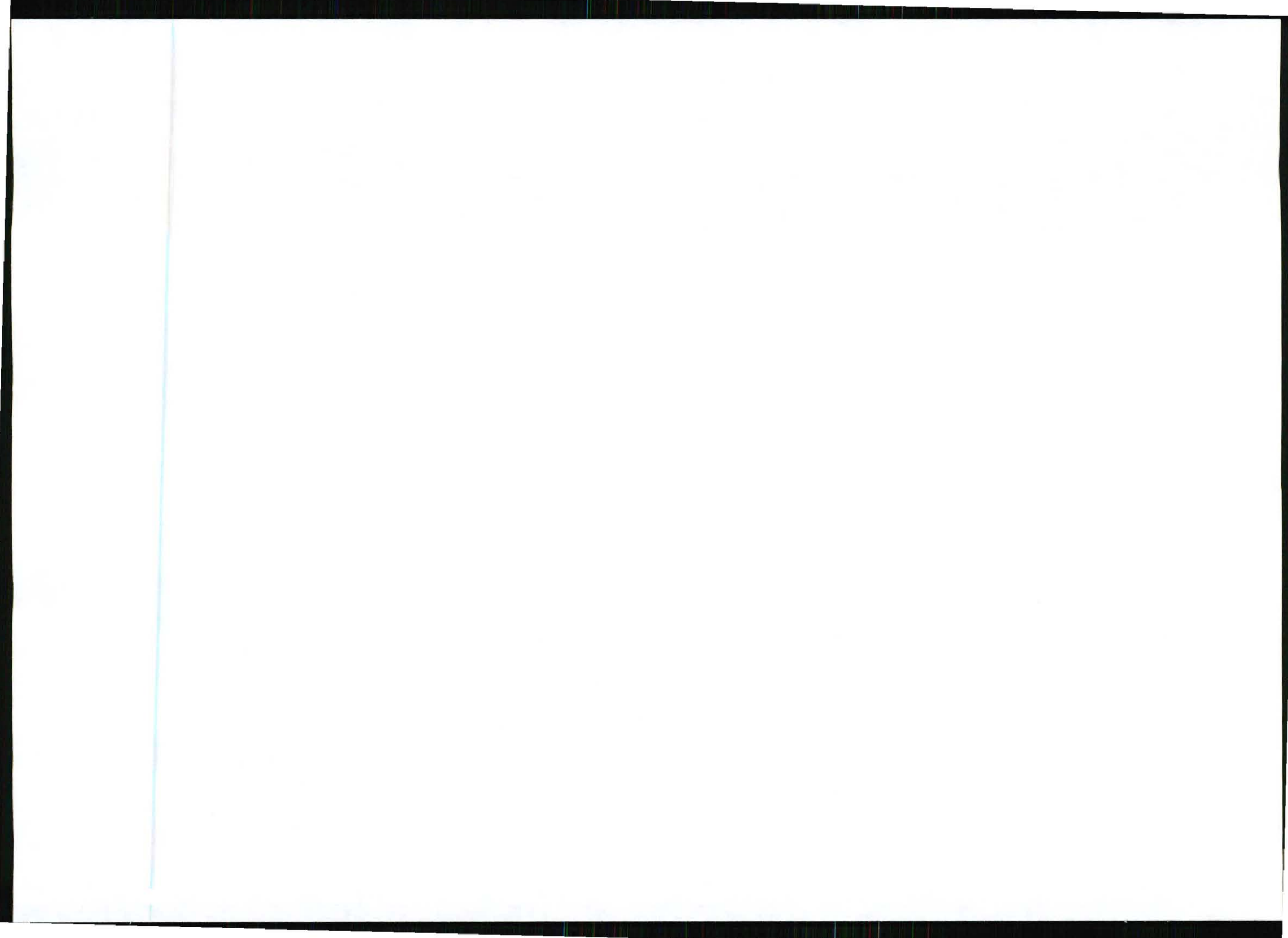
Table 5-1 summarises the potential impacts of the proposed four borrow pits on the surrounding environment. The status and significance of the relevant impacts are also listed (see Appendix G for the detailed impact rating table and rating methodology). All measures recommended to mitigate and manage the identified impacts are incorporated into Chapter 6 which lists the mitigatory specifications for the different phases of the proposed mining operations. The completed specialist studies and their findings have been integrated into Table 5-1 and Chapter 6.

**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 pits 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



Element	Description of Potential Impact	Status	Significance		Reference to Mitigation
			Without Mitigation	With Mitigation	
Geology	Permanent alteration of geology through the removal of material from borrow pits.	-ve	Medium	Low	Section 6.9.1.2
Soils	Potential loss of soil from borrow pits due to removal of topsoil and stockpiling for rehabilitation.	-ve	Medium	Very Low	Section 6.9.1.2
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 sites.	-ve	High	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 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 pits 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 on traffic on the N2.	-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 as there are no residents nearby the proposed sites.	-ve	Very Low	Insignificant	Section 6.5.5
Waste management	Pollution of 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
Archaeology / Heritage	No archaeological or cultural sites will be affected.	N/A	N/A	N/A	None required
Visual impact	Borrow pits should not be visible from the existing road (N2/11) as a berm will be retained/replaced between the road and the proposed borrow pits.	-ve	High	Low	Section 6.5.4
Socio-economic structure	No people directly affected by the mining operations as no residents occur near any of the proposed sites.	N/A	N/A	None required	None required



## **6 Mitigation and Management of Identified Impacts**

### **6.1 Introduction and scope**

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 Minerals and Energy (DME), 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 6.4, 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**

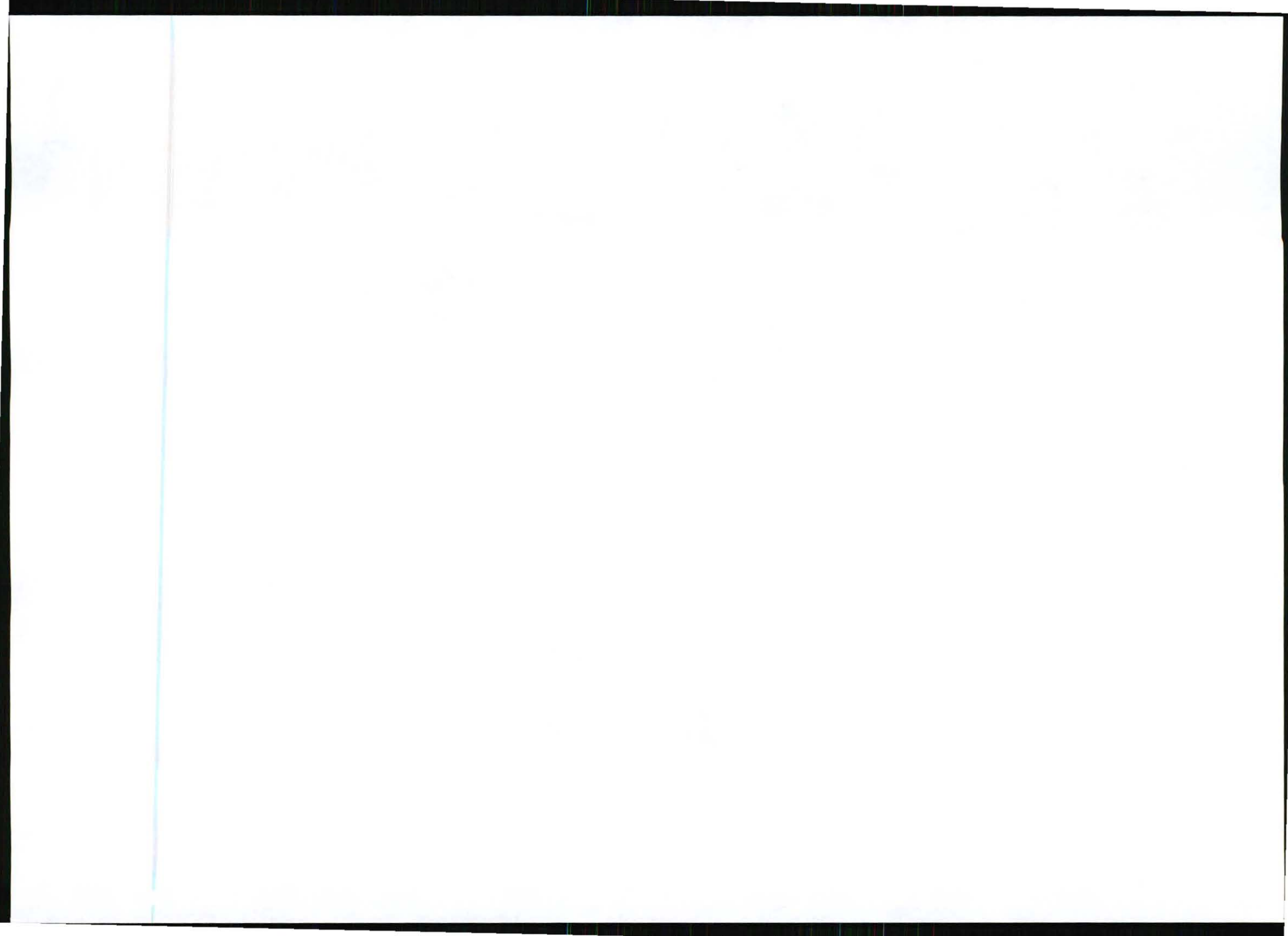
The environment affected by the mining operations shall be rehabilitated by the holder, as far as is practicable, to its natural state or to a predetermined and agreed to standard or land use which conforms with the concept of sustainable development. The affected environment shall be maintained in a 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.

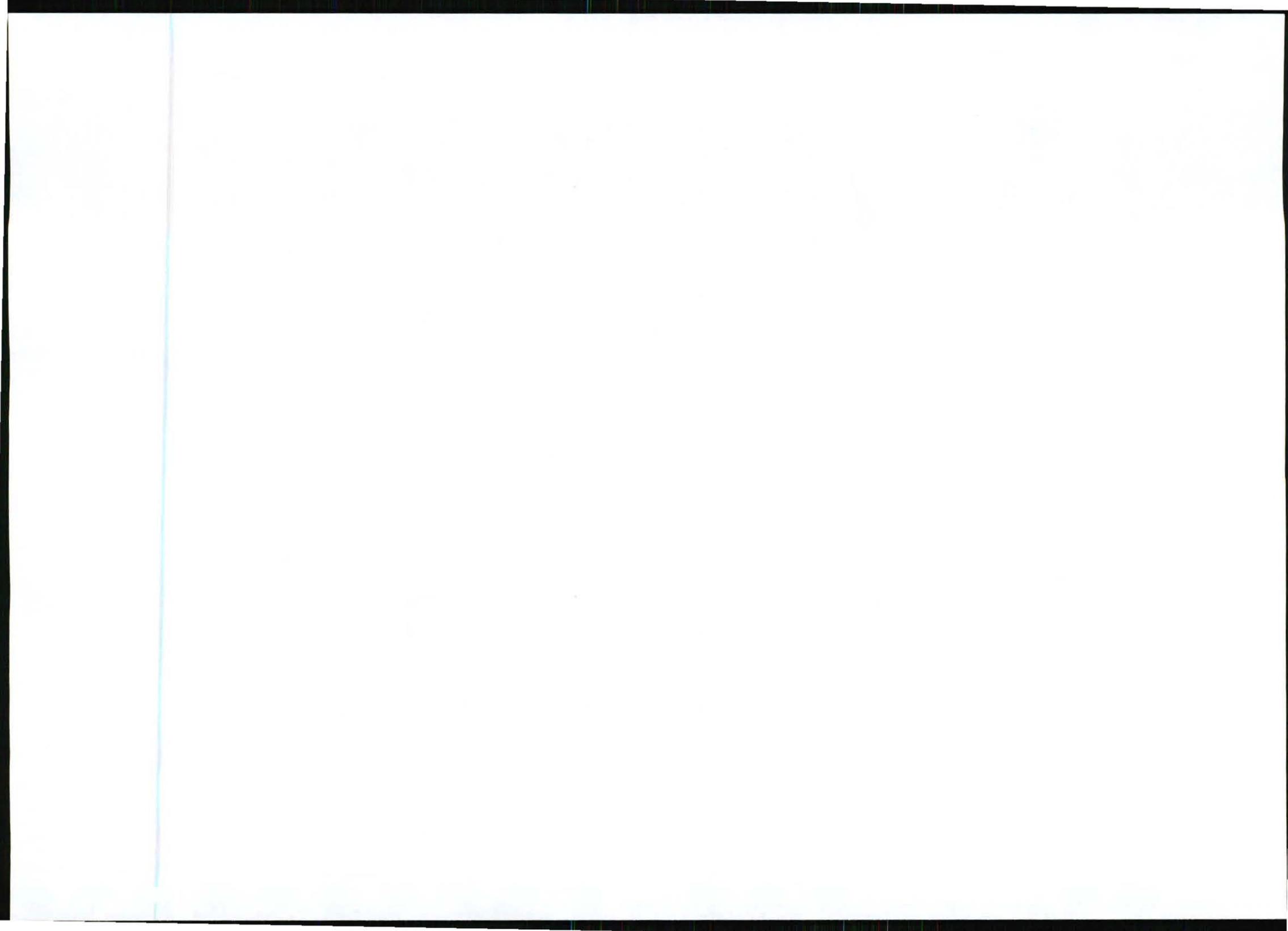
### 6.3.2 Training

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 pits or when operations have ceased.

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

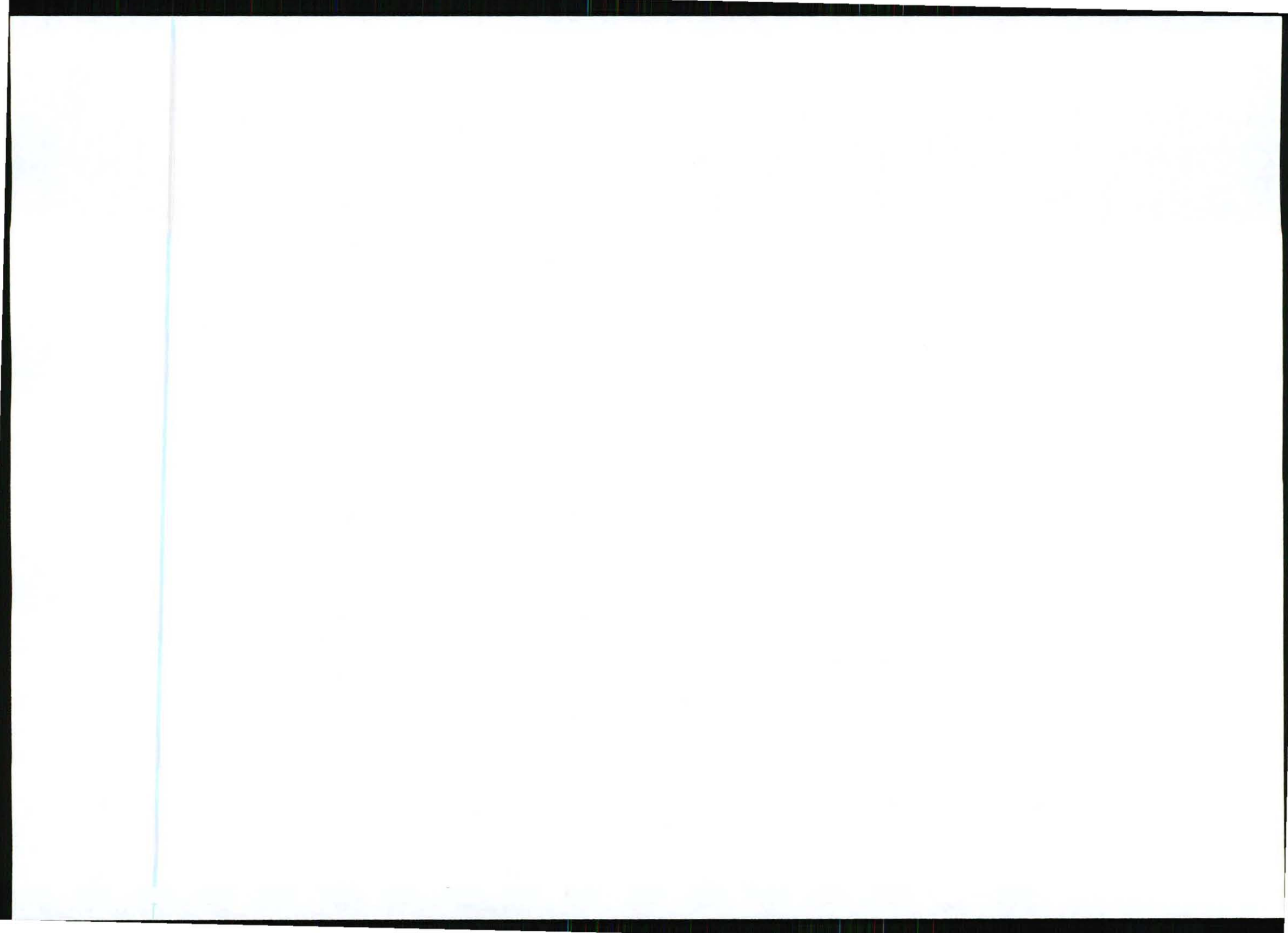
- a) The mining area must be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.
- b) Permanent beacons as indicated on the layout plan or as prescribed by the Regional Manager must be firmly erected and maintained in their 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 SARTM) shall be erected on either sides of the intersection of access and the National Route 2, Section 11 (N2/11).
- b) There will be no unauthorised access signs at the borrow pit gates.
- c) There will be a heavy vehicle crossing at the intersection of the access tracks and the road (N2/11).



- d) 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 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

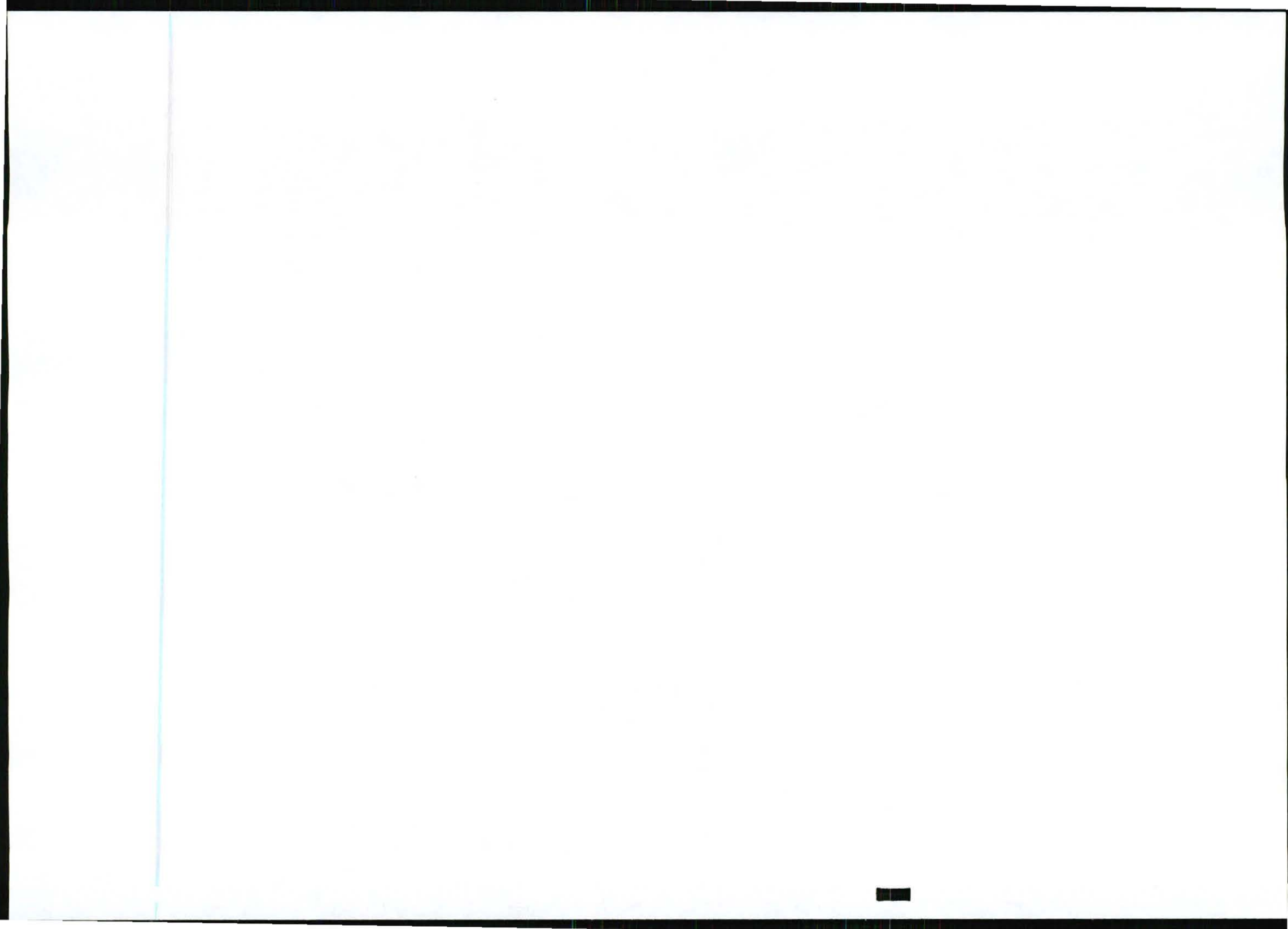
#### 6.5.1 Protection of Flora and Fauna

##### 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) (see Table 6-1) 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 Water Affairs and Forestry (DWAF) for NFA permits	Department of Economic Development and Environmental Affairs (DEDEA) for PNCO permits
Contact person: Mr Thabo Nokoyo	Contact person: Mr Alan Southwood
Tel: 041 586 4884	Tel: 041 508 5800
Fax: 041 586 0379	Fax: 041 585 1964/585 1958
Email: <a href="mailto:nokoyot@dwaf.gov.za">nokoyot@dwaf.gov.za</a>	Email: <a href="mailto:alan.southwood@deact.ecape.gov.za">alan.southwood@deact.ecape.gov.za</a>

- 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) A follow-up visit should be conducted by the botanist once relocation is complete to assess the success and a follow-up report submitted to DME;
- g) Alternatively, a private consultant, such as Linda Redfern (Landscape & Environmental Services) can be contacted to remove SSC to the CDC nursery for temporary/permanent storage. A clearance certificate will be issued after clearing and the rescued material can

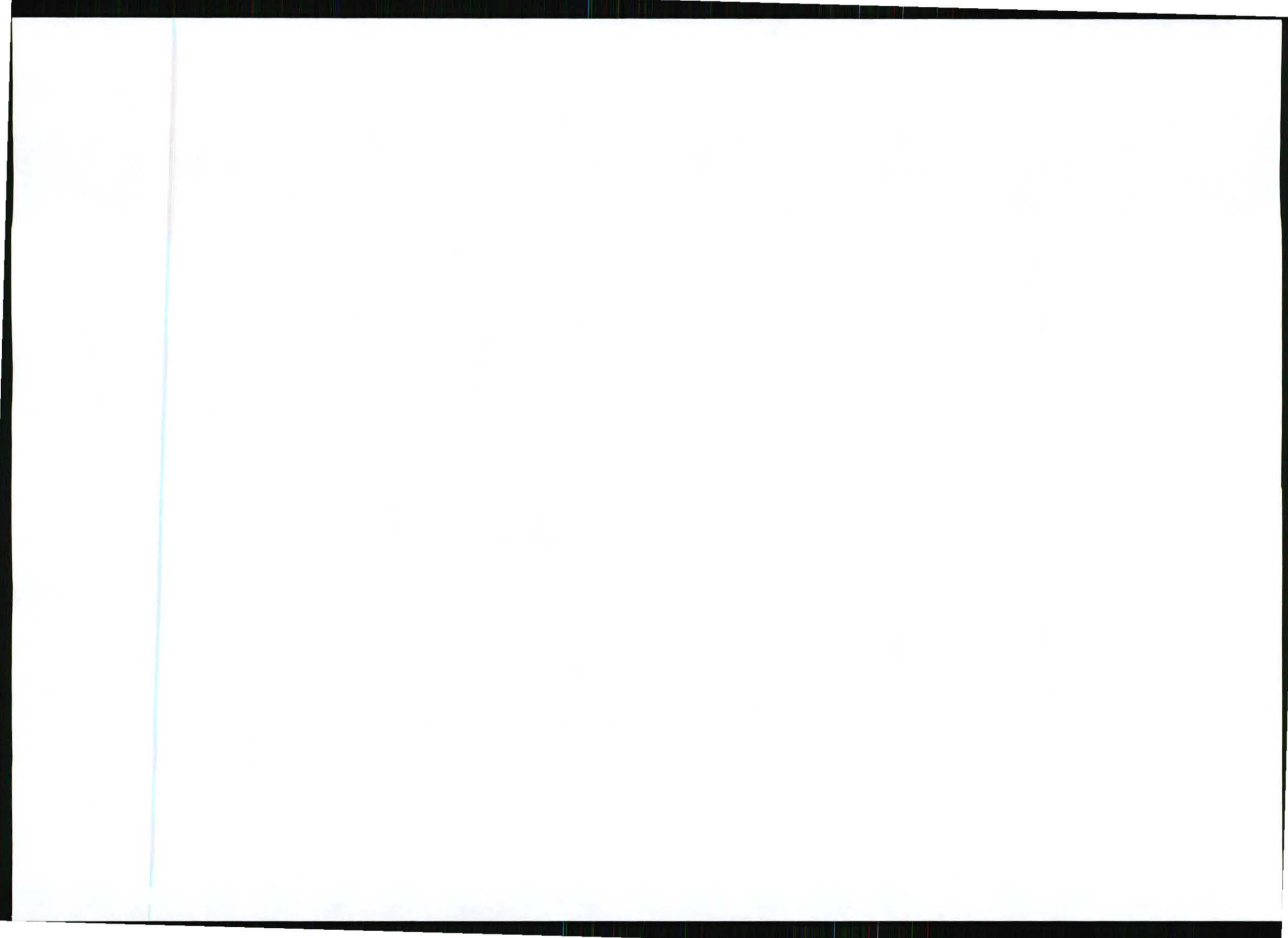


either be utilised in other areas for rehabilitation and/or returned after construction for on-site revegetation.

- h) Exotic alien plant species (as listed in Table 6-2) 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.
- i) 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 layout plans (Appendix B) and adequately stabilised against wind and water erosion.

**Table 6-1: Species having special protection status under PNCO, NFA or IUCN occurring within the relevant site (taken from Vegetation Assessment– Appendix F).**

Botanical Name*	Family	Status**
<i>Aloe africana</i>	Asphodelaceae	PNCO
<i>Aristea anceps</i>	Iridaceae	PNCO
<i>Asclepias sp.</i>	Apocynaceae	PNCO
<i>Bergeranthus addoensis</i>	Mesembryanthemaceae	PNCO, IUCN (NT)
<i>Boophone disticha</i>	Amaryllidaceae	PNCO
<i>Carpobrotus edulis</i>	Mesembryanthemaceae	PNCO
<i>Corpuscularia lehmannii</i>	Mesembryanthemaceae	PNCO, Endemic
<i>Crassula perforata</i>	Crassulaceae	PNCO
<i>Cyrtanthus spiralis</i>	Amaryllidaceae	PNCO, IUCN (En), Endemic
<i>Delosperma calycinum</i>	Mesembryanthemaceae	PNCO
<i>Delosperma sp.</i>	Mesembryanthemaceae	PNCO
<i>Drosanthemum sp.</i>	Mesembryanthemaceae	PNCO
<i>Euryops ericifolius</i>	Asteraceae	IUCN (VU), Endemic
<i>Gasteria bicolor</i>	Asphodelaceae	PNCO
<i>Glottiphyllum longum</i>	Mesembryanthemaceae	PNCO
<i>Haemanthus coccineus</i>	Amaryllidaceae	PNCO
<i>Lampranthus sp.</i>	Mesembryanthemaceae	PNCO
<i>Pentaschistis pallida</i>	Poaceae	IUCN (LC)
<i>Pittosporum viridiflorum</i>		NFA
<i>Rhombophyllum rhomboideum</i>	Mesembryanthemaceae	PNCO, IUCN (NT)
<i>Sansevieria hyacinthoides</i>	Dracaenaceae	PNCO



Botanical Name*	Family	Status**
<i>Schotia afra</i>	Fabaceae	NFA
<i>Sideroxylon inerme</i>	Sapotaceae	NFA
<i>Sutera polyantha</i>	Scrophulariaceae	IUCN (LC)
<i>Syncarpha recurvata</i>	Asteraceae	
<i>Trichodiadema bulbosum</i>	Mesembryanthemaceae	PNCO

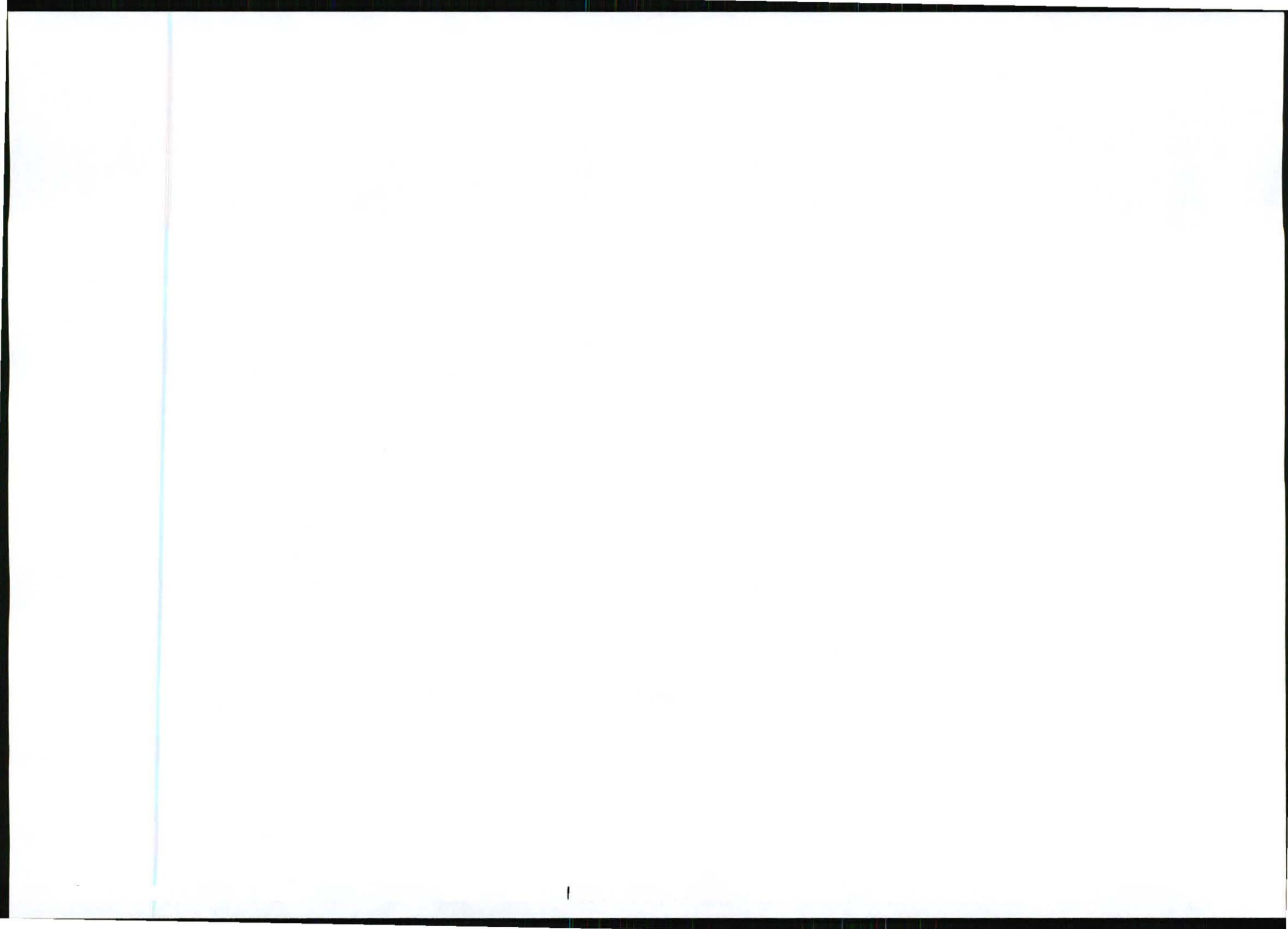
\* PNCO - Protected by the Provincial Nature Conservation Ordinance. NFA - Protected by the National Forests Act of 1998, IUCN - Classified as threatened or near threatened according to IUCN 2002 (Golding, 2002).

**Table 6-2: Alien invasive plants occurring on the activity sites (taken from Vegetation Assessment – Appendix F).**

Botanical Name	Family	Common Name	Category	Removal procedure
<i>Acacia cyclops</i>	Fabaceae	Rooikranz	CARA 2	Chop trees and remove brushwood
<i>Acacia saligna</i>	Fabaceae	Port Jackson	CARA	Chop trees and remove brushwood
<i>Opuntia ficus-indica</i>	Cactaceae	Prickly Pear	CARA 1	Chop and remove plant material
<i>Opuntia aurantiaca</i>	Cactaceae	Jointed Cactus	CARA 1	Chop and remove plant material

#### 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 plant or snare any animal. The Contractor shall provide sufficient fuel for cooking and heating as is needed by the site staff. All animal life, vegetation, firewood, etc., will remain the property of the land owner and will not be disturbed, upset or used without their express consent.
- 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.

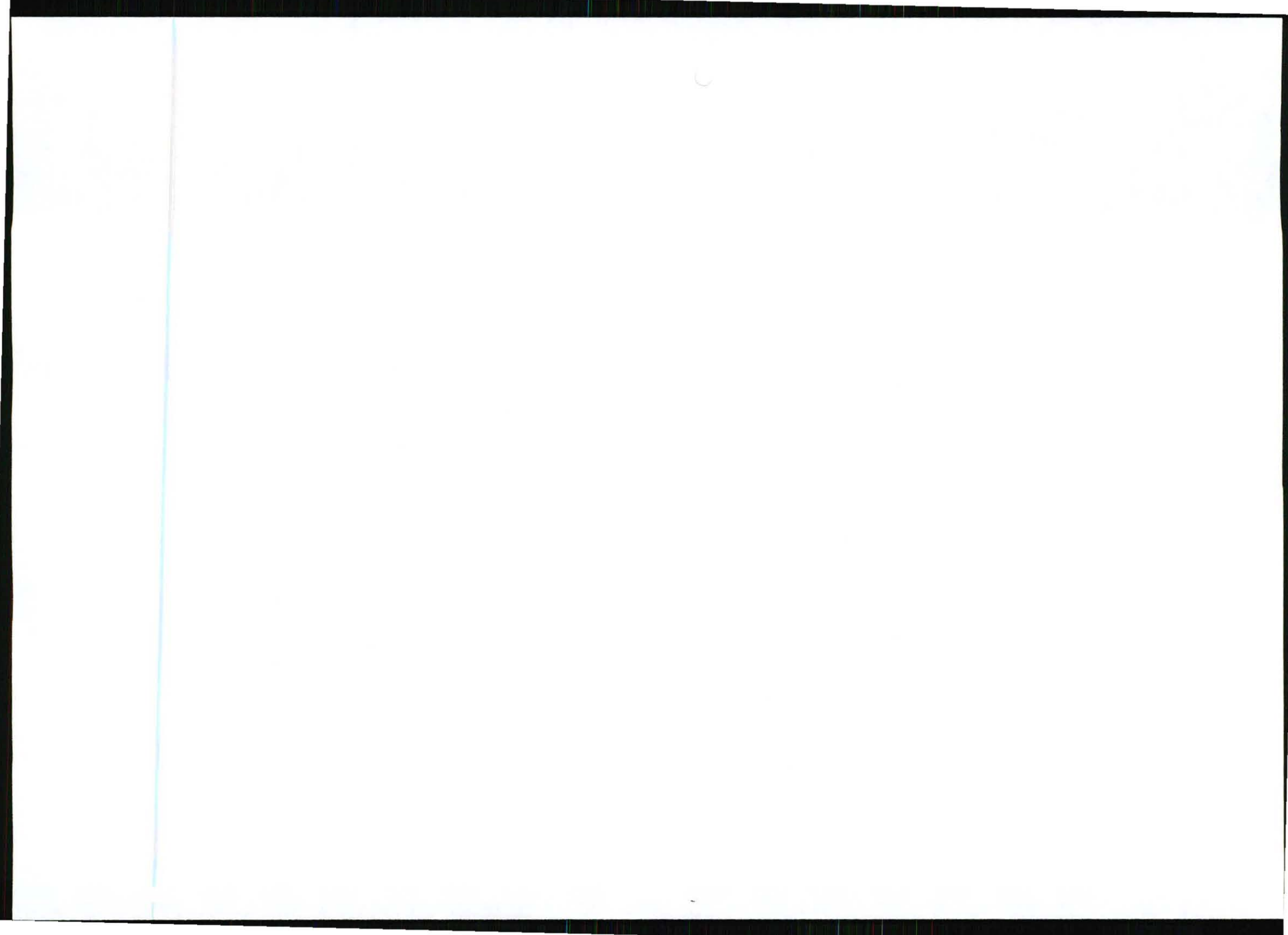




- j) The Contractor shall be held responsible for the removal of proclaimed weed or alien vegetation within all areas disturbed during mining activities, including (but not limited to) the access roads, construction camps, borrow pits areas, and temporary storage areas.
- k) The Engineer in consultation 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.
- l) Alien plants will be disposed of by temporarily storing it 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 stabilization 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 2 meters, and if left stored for longer than 6 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**

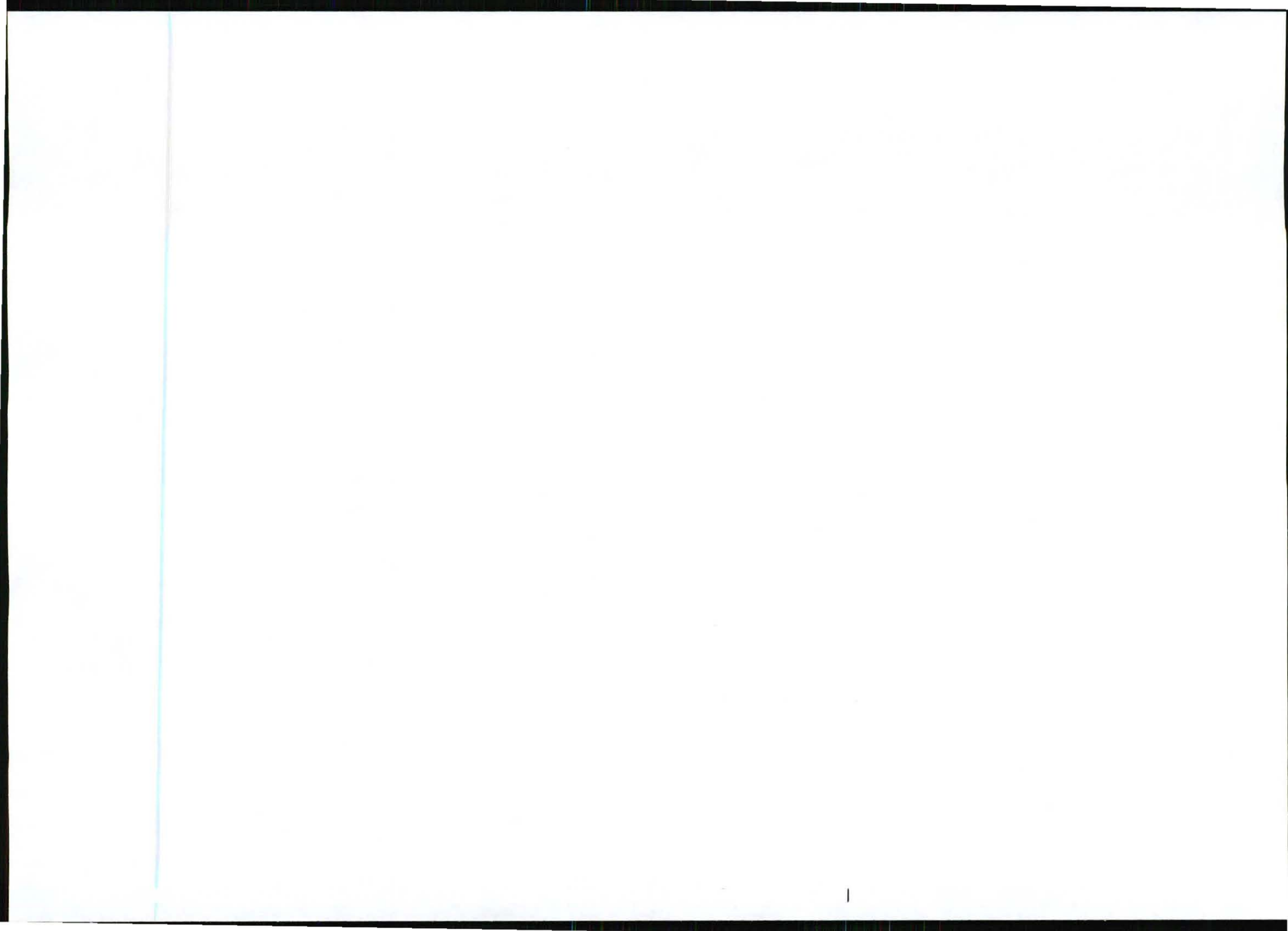
#### **6.5.3.1 Archaeological Sites**

- 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 be contacted and will appoint an archaeological consultant to investigate the site. Work may only resume once clearance is given in writing by the archaeologist.

#### **6.5.3.2 Graves**

If a 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) The borrow pits will not be visible from the National Route 2 as berms will be retained/replaced between the road and the proposed borrow pit.
- b) 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.
- c) The remains of all structures that may have been erected at the borrow pits shall be demolished and removed on completion of the project.
- d) Care must be taken to ensure that all rehabilitated areas merges with the immediate environment and any negative visual impacts will be rectified to the satisfaction of the Regional Manager.
- e) Overburden will be placed back into excavation as part of the rehabilitation programme (see section 6.9.1).

#### **6.5.5 Noise**

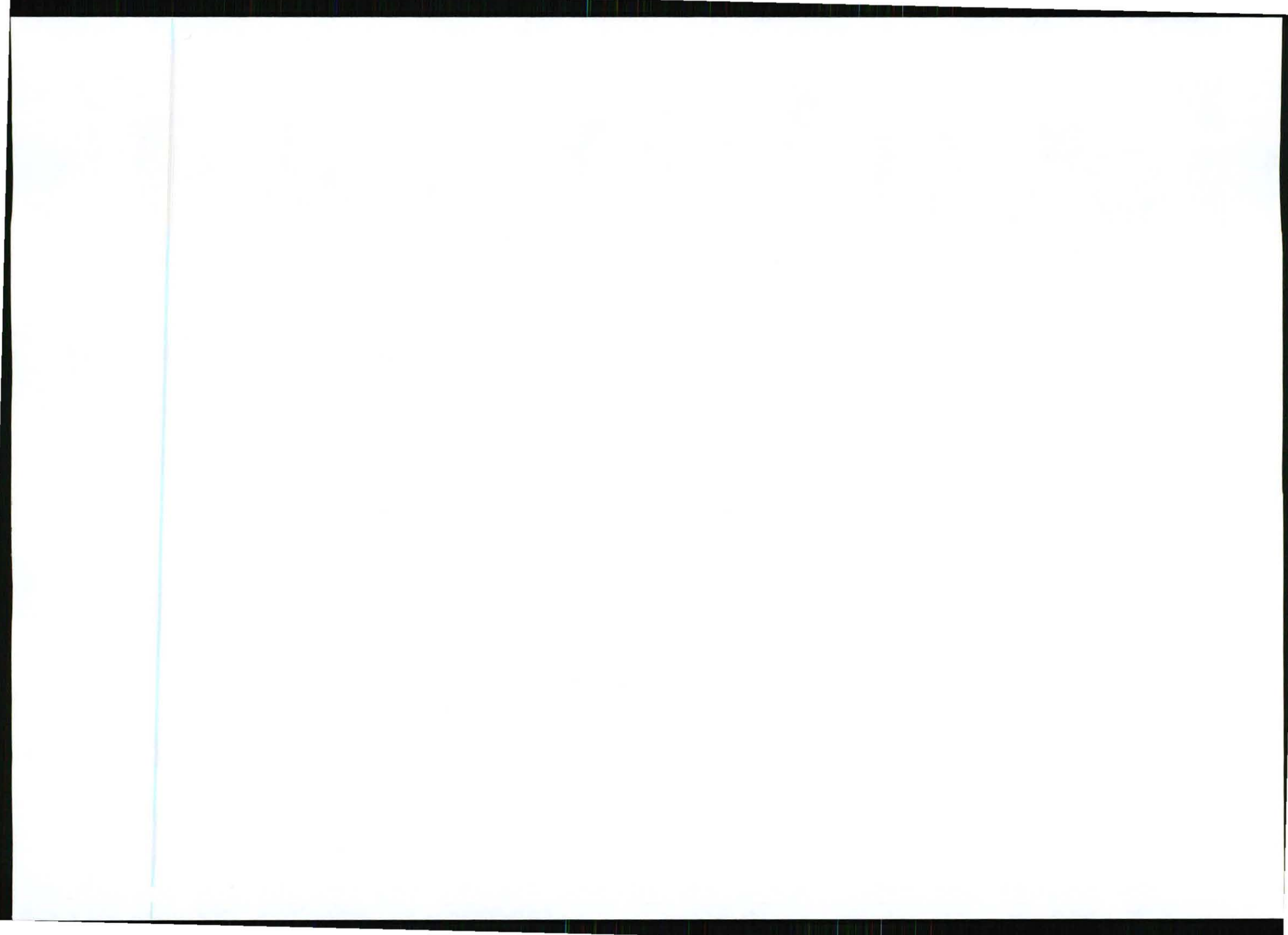
- a) Road construction and blasting activities will be limited to daylight hours. The hours of the activities will be reviewed on receipt of complaints (if any).
- b) Compliance with the appropriate legislation with respect to noise is mandatory.
- c) Regular maintenance of equipment and vehicles will 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.
- d) In open areas which are very exposed to wind, wind screens should be used to reduce wind and also dust at the site.

#### **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 an NMBM 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.

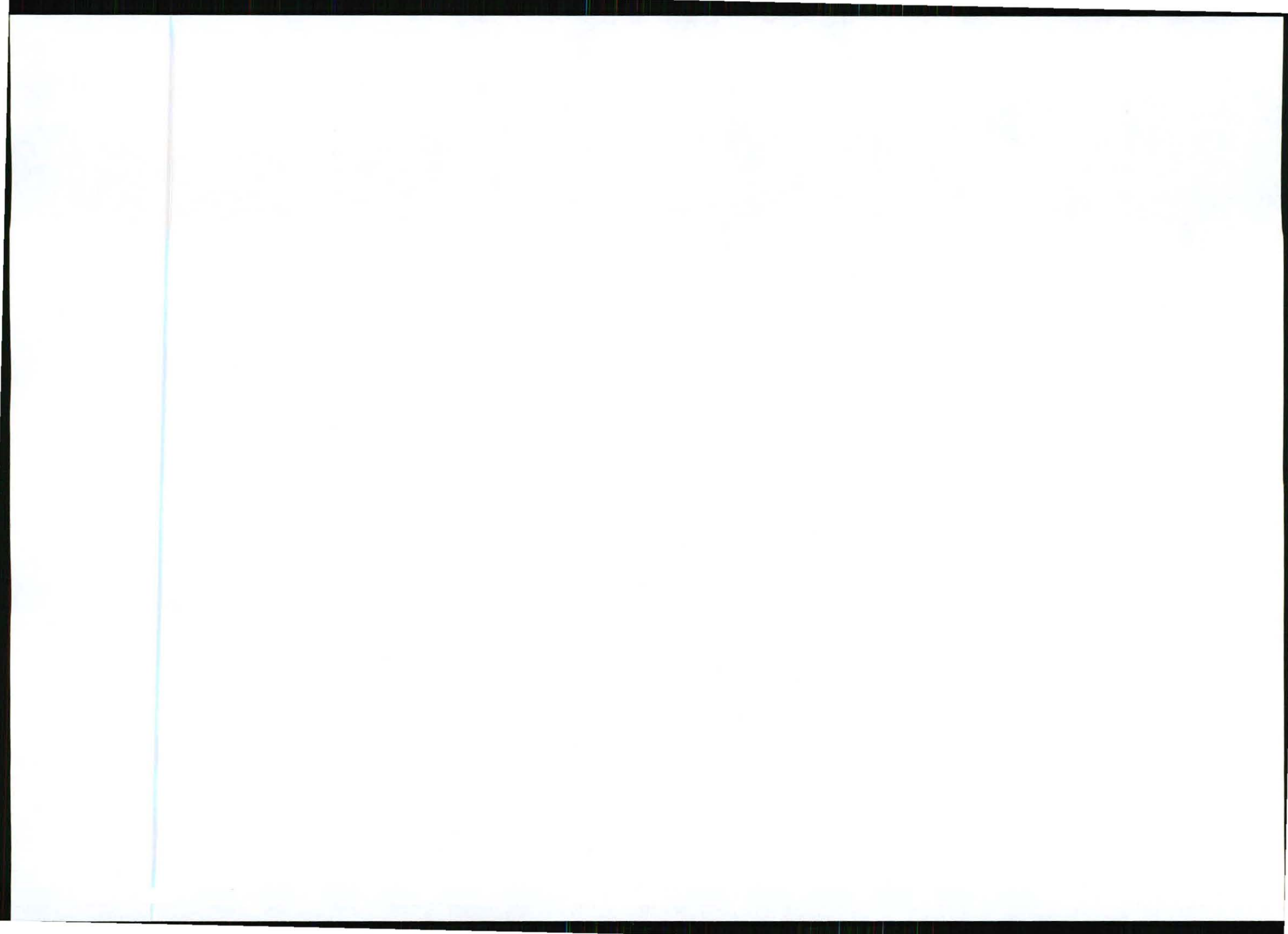
## **6.6 Infrastructural Requirements**

### **6.6.1 Access to Site**

No access roads are planned for the proposed borrow pits. Access to the sites will be gained from the road (N2/11) only using the installed gateway as indicated on the layout plans. No mitigation measures are therefore required.

However, an access road to a holiday house owned by the landowner (PPC) exists, which goes through the site specified for Borrow Pit 1. A new access road will be created to this house on the outside edge of the proposed Borrow Pit 1 site.

Also, any other roads that are identified at a later stage which should be constructed must then be included in the layout plans and the measures listed below should be implemented.





#### **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 landowner 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.
  - 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 landowner 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.
- f) The design, construction and location of access to provincial roads must be in accordance with the requirements laid down by the Provincial or controlling authority.

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

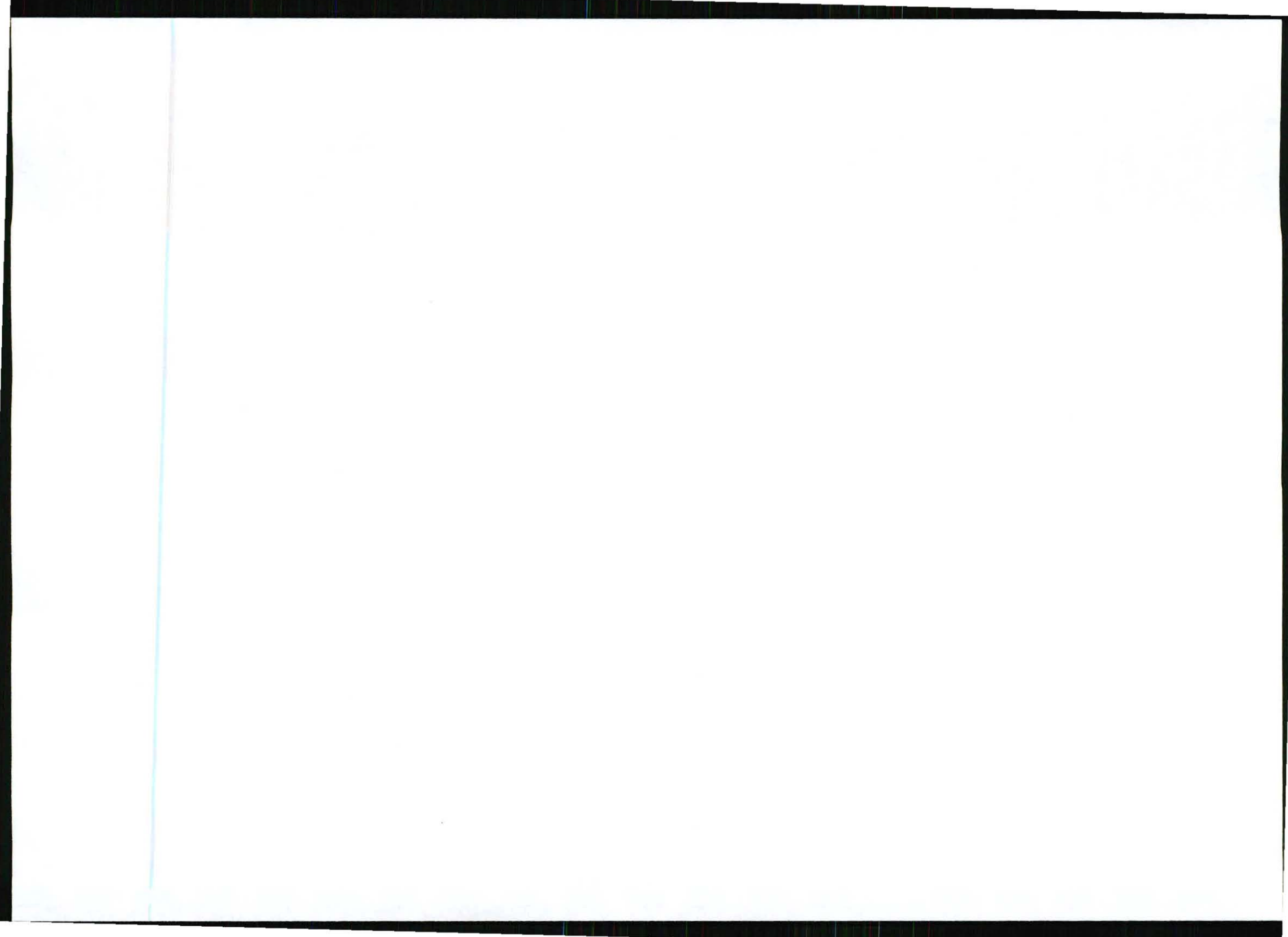
- a) In the case of dual or multiple use of access roads by other users, arrangements for multiple responsibility must be made with the other users. If not, the maintenance of access roads will be the responsibility of the holder of the mining permit.
- b) Newly constructed access roads shall be adequately 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.

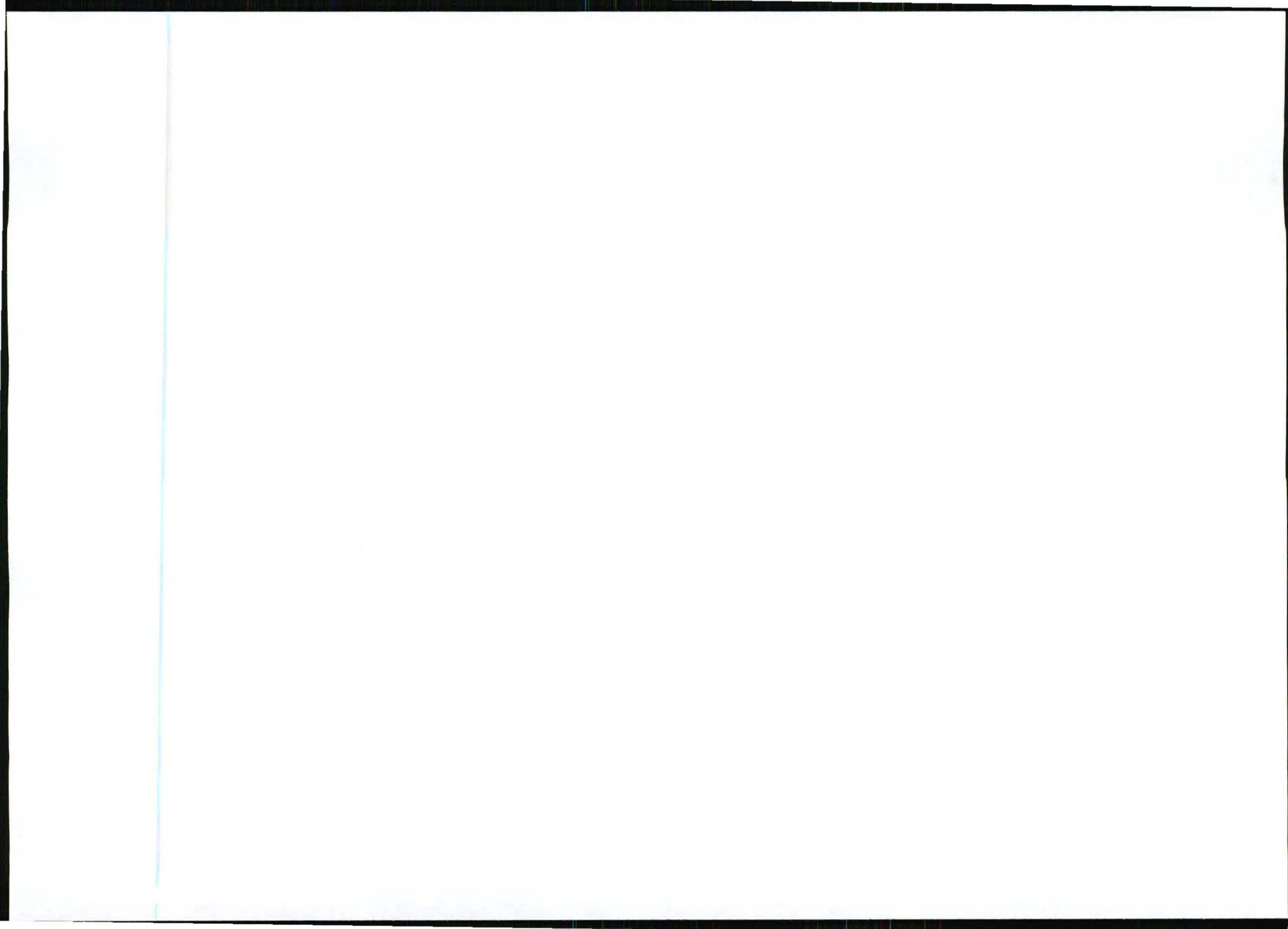
## **6.6.2 Stormwater and Erosion Control**

- a) No drainage works are required as surface water is expected to drain in the floor material of the borrow pits due to the permeable/sandy nature of material.
- b) Borrow pit 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 pits.
- d) All existing mined areas will be revegetated to control erosion and sedimentation.
- e) Existing vegetation must be retained as far as possible to minimize erosion problems.
- f) Rehabilitation of borrow pits 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) No river or surface water will be affected by silt emanating from the existing borrow pits.
- i) Groundwater will not be significantly affected by the borrow pits.

## **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 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 landowner.
- 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 the landowner and persons lawfully living in the vicinity shall be kept to a minimum.

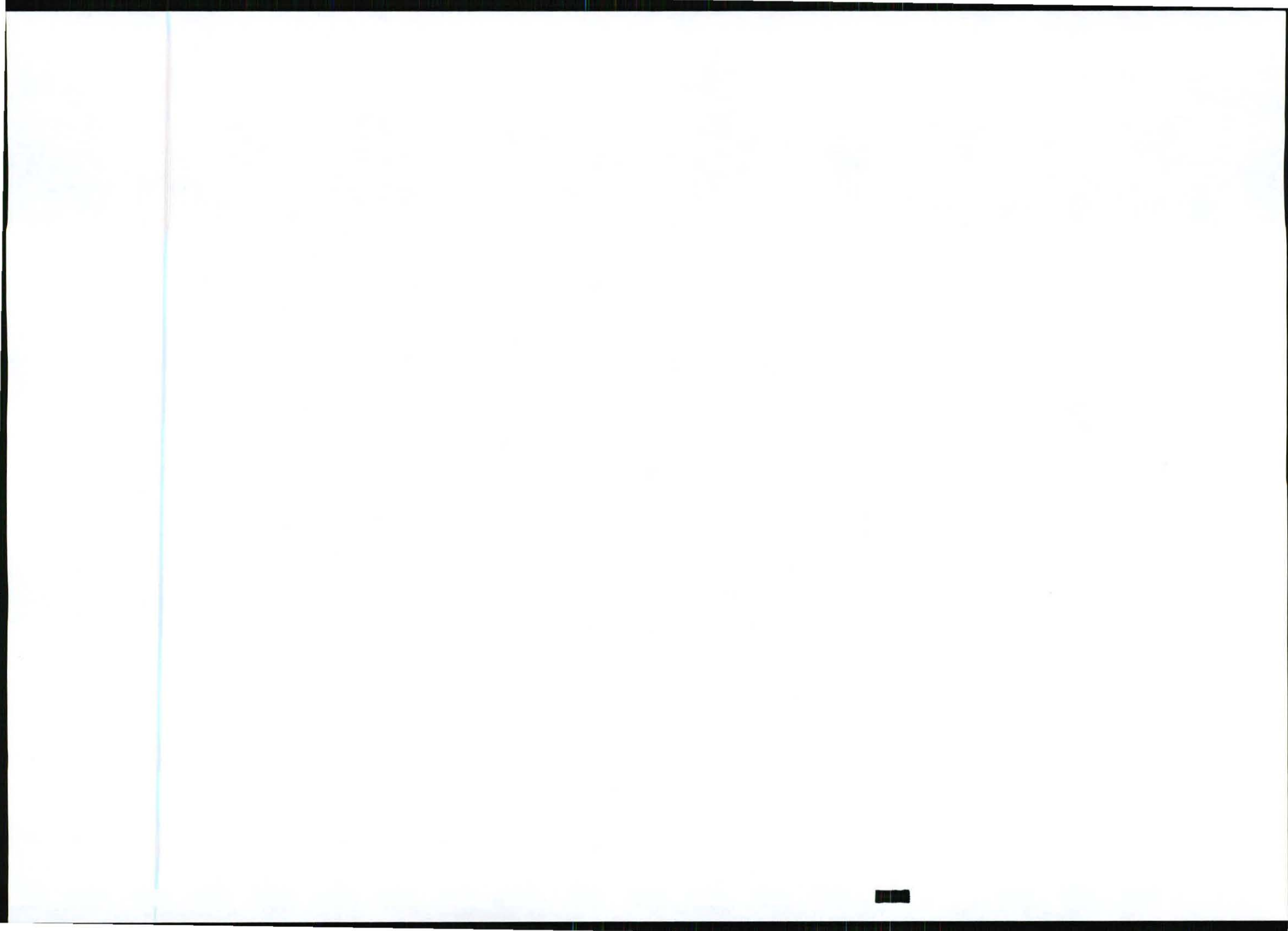


### 6.6.3.2 Toilet facilities, waste water and refuse disposal

- 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**

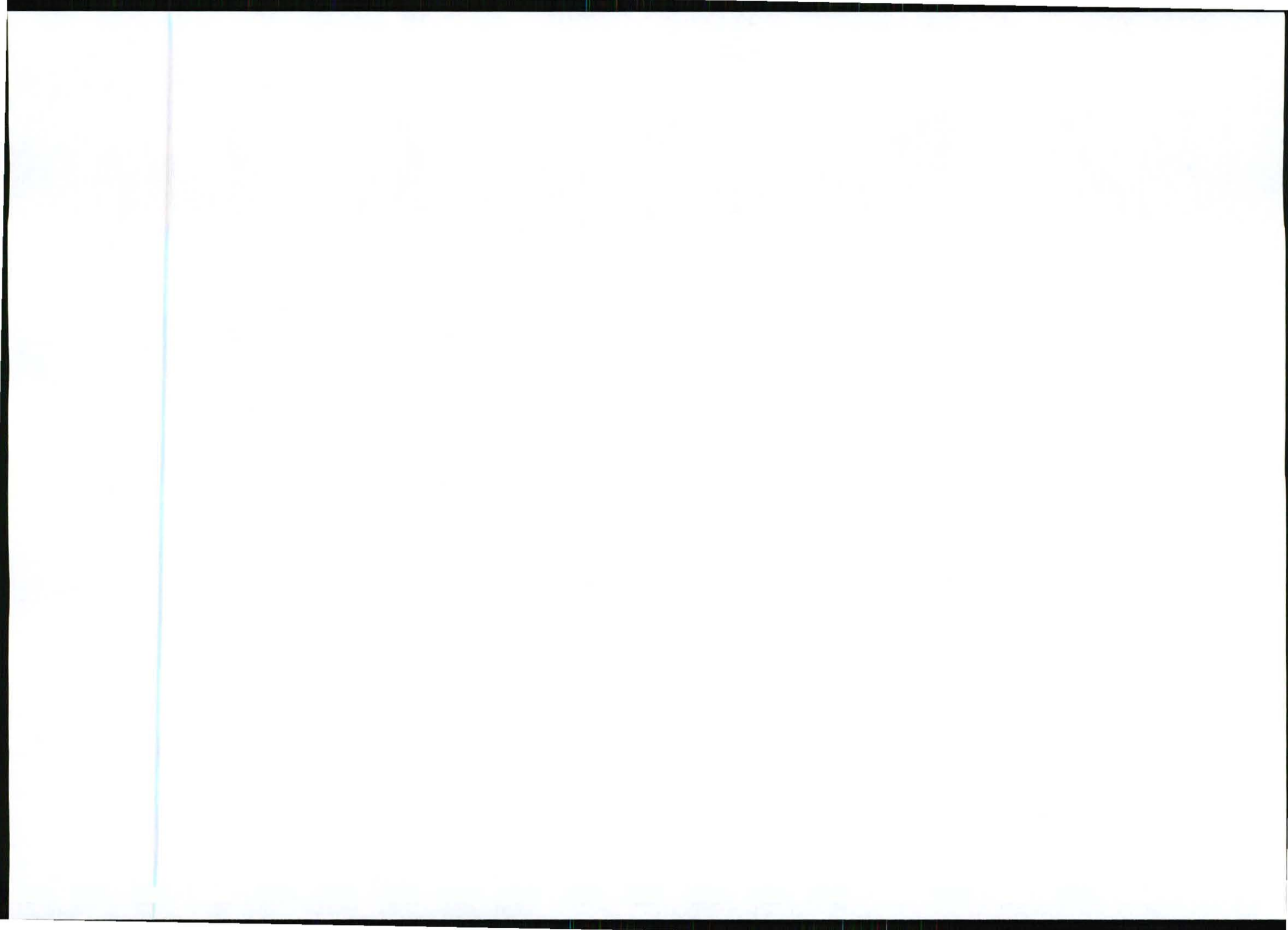
- a) The vehicle maintenance yard and secured storage area will be established as far as is practicable, outside the flood plain, above the 1 in 50 flood level mark within the boundaries of the mining area.
- b) The area chosen for these purposes shall be the minimum reasonably required and involve the 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**

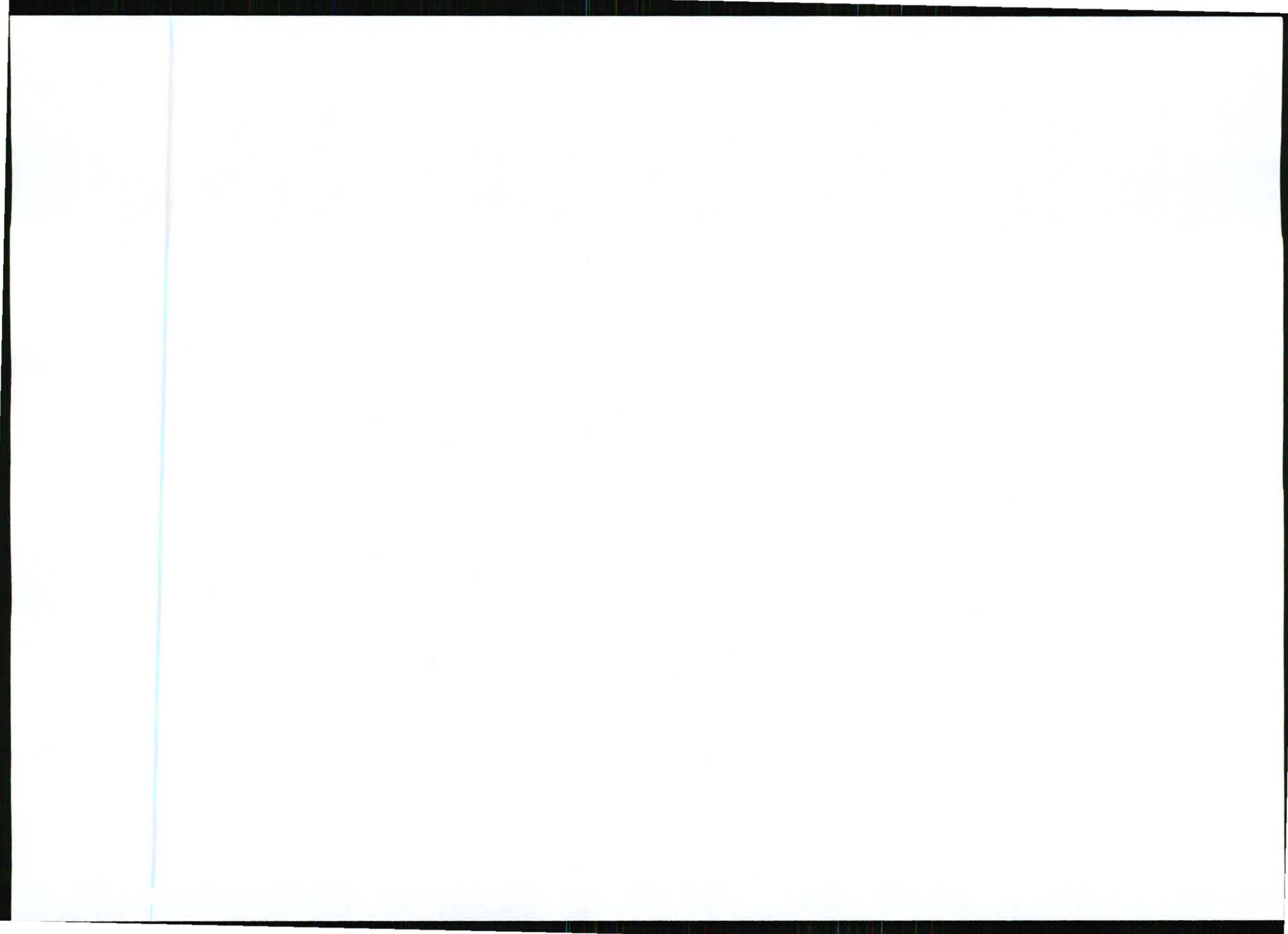
#### **6.7.1 Establishing the Excavation Areas**

Excavations shall be done as described in section 2.4 of this document. Whenever excavation of the borrow pits 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 borrow pit 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**

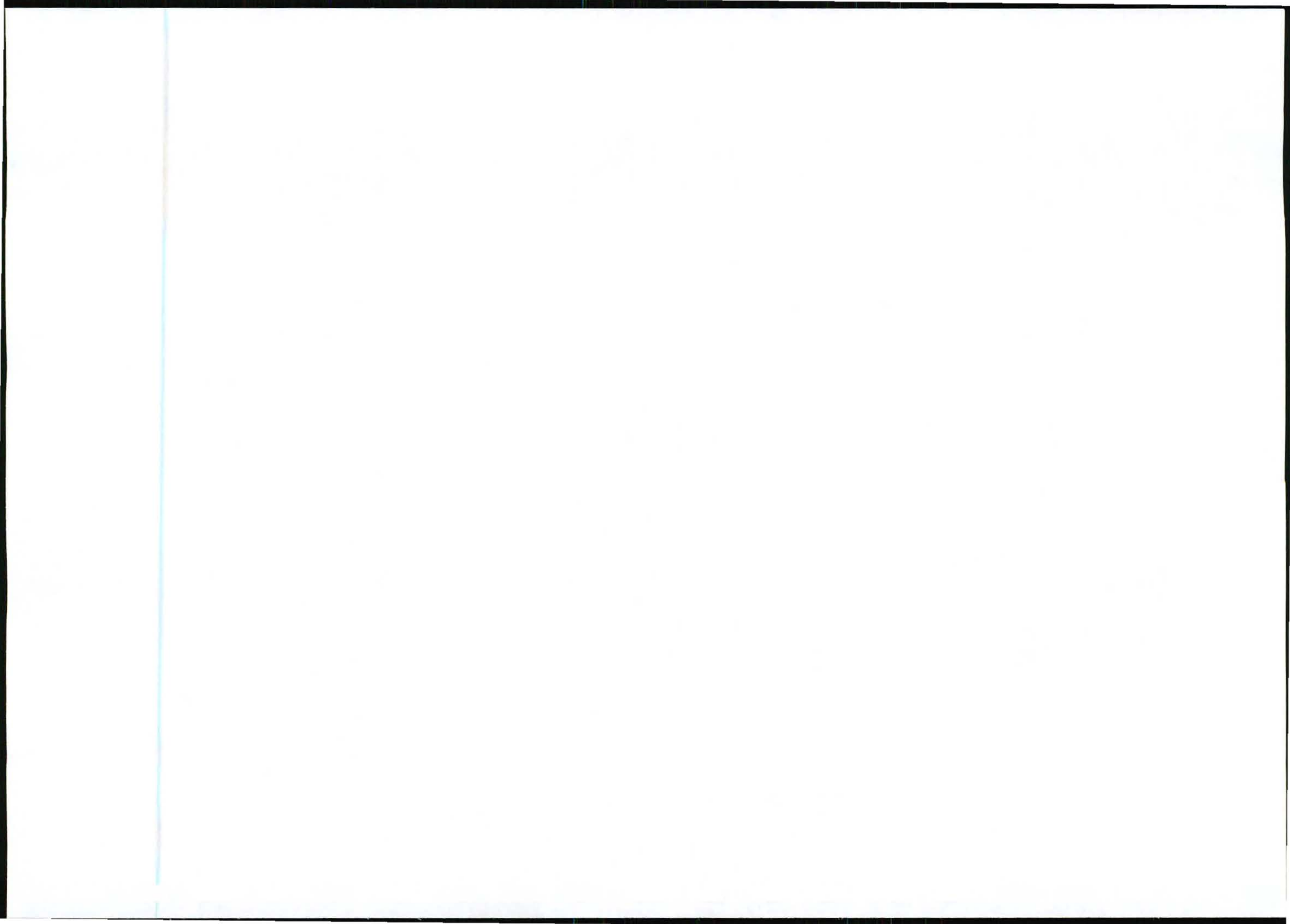
- a) Suitable accommodation and security must be provided by the contractors for their workers during construction.
- b) The contractor in conjunction with the client shall develop policies and procedures with regard to employee accommodation.
- c) The contractor will implement management commitments with respect to noise, dust, safety and blasting. Furthermore the contractor shall ensure that their staff is 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 (existing borrow pit at BP 1) will also be rehabilitated.
- b) The objective of rehabilitation will be to restore the borrow pits 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 Minerals and Energy, whichever is the longer.

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

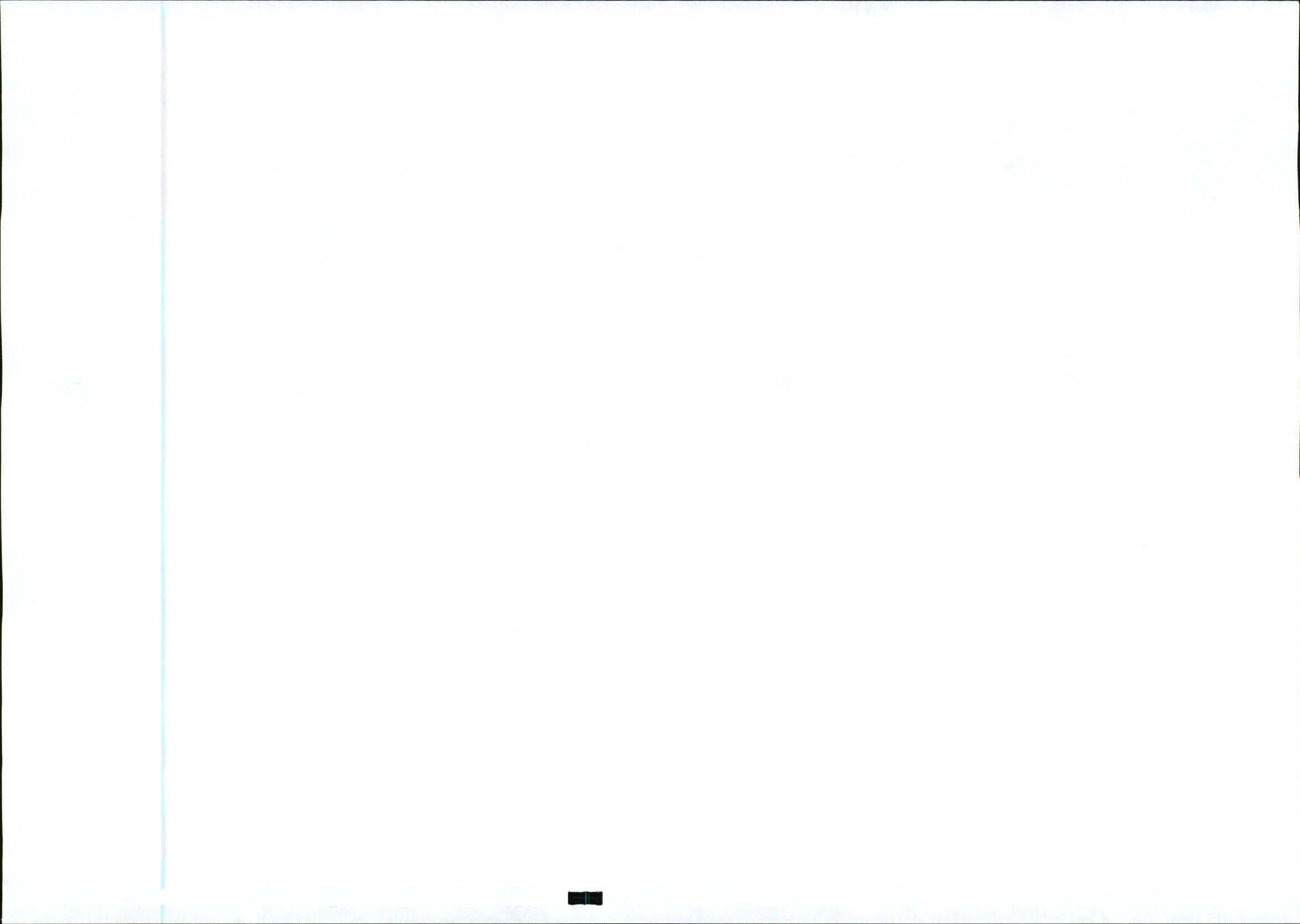
- a) On completion of borrowing, all surplus material in and around the excavations, including any stockpiled gravel or oversized rocks, but excluding topsoil, shall be returned and the sides of the pits shall be graded at 1V:3H slopes.
- b) Stockpiled gravel will be left inside the pits for use on future 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. *Melinis repens* and *Themeda triandra* are 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) Possible trees to utilize for reducing visual impact could include: *Aloe africana*, *Hippobromus pauciflorus*, *Olea europaea*, *Pappea capensis*, *Brachylaena discolor*, *Ptaeroxylon obliquum*, *Schotia latifolia* and *Plumbago auriculata*. Individual trees (excluding *Aloe* spp.) must be planted in square holes at least 1 m x 1 m x 1 m in size, filled with a suitable soil/compost mix, which can be imported from off site to maximize growth rates.
- 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)