mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

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

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

Reference: EC30/5/1/3/3/2/1/0441EM
Date: 9 July 2010

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

Case ID: 2186

ATTENTION: MR. T. LUNGILE

Sir / Madam

CONSULTATION IN TERMS OF SECTION 40 OF THE MPRDA OF 2002: ENVIRONMENTAL MANAGEMENT PLAN: CLAY (GENERAL) MINING ON FARM NO. 1959 AND FARM NO. 1960, DIVISION OF KING WILLIAM'S TOWN, EASTERN CAPE

1. The above refers.

2. Attached, a copy of the EMP received from Kei Brick and Tile Company (Pty) Ltd.

3. Any written comments or requirements your department may have in this regard, to this office no later than **6 September 2010**. Failure to do so, will lead to the assumption that your department has no objection(s) or comments with regard to the said document. Comments may be submitted at your earliest convenience e.g. 30 days from the date hereof in order to reduce the turnaround time for the application process.

4. Consultation in this regard has also been initiated with other relevant State Departments.

5. Kindly quote the relevant file reference number in all correspondence.

Yours faithfully

REGIONAL MANAGER

EASTERN CAPE

EC 30/5/1/3/2/0441 MP

ENVIRONMENTAL MANAGEMENT PLAN

SUBMITTED IN SUPPORT OF A MINING PERMIT APPLICATION IN TERMS OF THE MINERALS AND PETROLEUM RESOURCES DEVELOPMENT ACT, ACT 28 OF 2002

FOR

KEI BRICK AND TILE COMPANY (PTY) LTD

ON

A certain portion of the Farms 1959 and 1960 in the East London Magisterial District

EASTERN CAPE PROVINCE

BY

EHS

JULY 2010

Contact Details for the consultant are as follows:
Environmental Hydrological Solutions
Postal Address: PO Box 13248, Hatfield, 0028
Tel: 083 258 2463
082 304 8082
Fax: 086 655 1899
E-mail: wernerriekert@gmail.com
jacquesengels@gmail.com

Please copy the above consultant with regards to all correspondence regarding this document.

CONTENTS:

Tables and Figures:

Word Definitions:

In this document, unless otherwise indicated, the following words will have the meanings as indicated here:

Word:	Definition:
Act (The Act)	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
AMD	Acid Mine Draining
ARC – AGIS	Agricultural Research Council's Agricultural Geo-referenced Information System.
ARC – ISCW	Agricultural Research Council Institute for Soil, Climate and Water.
Archaeological	Material remains resulting from human activities, which are in a state of disuse and are in, or on, land and which are older than 60 years, including artefacts, human and hominid remains, and artificial features and structure.
Authority	National, regional or local authority, which has decision-making role or interest in the development
Best Practicable Environmental Option (BPEO)	BPEO is the outcome of a systematic consultative and decision-making procedure that emphasizes the protection of the environment across land, air and water. It establishes, for a given set of objectives, the option that provides the most benefit or least damage to the environment as a whole at an acceptable cost in the long term and as well as the short term.
BID	Background Information Document
Biodiversity	This refers to both the variety of different species of plants and animals, as well as genetic variability within species, which is essential in maintaining life-sustaining ecosystems.
Biome	A complex of communities of very wide extent, characterised by distinctive vegetation and climate.

Word:	Definition:
Borehole	A hole drilled for the purposes of prospecting i.e. extracting a sample of soil or rock chips by pneumatic, reverse air circulation percussion drilling, or any other type of probe entering the surface of the soil.
CARA	The Conservation of Agricultural Resources Act
Cultural resources	The physical elements of both the built and natural environment, which are integral to a sense of shared identity.
DEAT	Department of Environmental Affairs and Tourism
Development	This is a broad term which refers to actions taken by individuals, communities, industry or government aimed at improving quality of life and fulfilling human potential. Measures of development include average income per person and reduced levels of poverty, unemployment and child morality.
Disturbance	Any event or series of events that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment.
DME	Department of Minerals and Energy
DMR	Department of Mineral Resources
DWAF	The Department of Water Affairs and Forestry – both national office and their various regional offices, which are divided across the country on the basis of water catchment areas.
EAP	Environmental Assessment Practitioner
EIA	An Environmental Impact Assessment as contemplated in Section 38(1) (b)of the Act
EMP	An Environmental Management Plan as contemplated in Regulation 52 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) – this document.

Word:	Definition:
Endemic species	Species with a distribution restricted to specific geographical areas. Endemism may occur on local, regional, sub continental or continental scales. Local endemism is usually associated with particular habitat requirements.
ENPAT	Environmental Potential Atlas
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, cultural and political aspects.
Environmental impacts	The consequences of environmental aspects on environmental resources of particular value or sensitivity.
Environmental incident	♦ Any action undertaken (or omitted) by the proponent or his duly appointed representatives (e.g. contractors) that results in overly/unnecessary disturbance or damage to the environment. ♦ Non-adherence to environmental legal requirements/laws (including the stipulations of authorizations issued in respect of a proposed activity e.g. those contained in a Record of Decision).
Environmental Officer	Independent environmental consultant appointed to monitor compliance with the EMP.
Erosion	A process that involves the wearing away of the land surface by mechanical or chemical action.
Fauna	All living biological creatures, usually capable of motion, including insects and predominantly of protein-based consistency.
Feasible	Acceptable, capable of being used or implemented successfully, without unacceptably damaging the environment.

Word:	Definition:
Fence	A physical barrier in the form of posts and barbed wire and/or "Silex" or any other concrete construction, ("palisade"- type fencing included), constructed with the purpose of keeping humans and animals within or out of defined boundaries.
Flora	All living plants, grasses, shrubs, trees, etc., usually incapable of easy natural motion and capable of photosynthesis.
Ground water	All subsurface water occupying voids within a geological medium.
Habitat	The natural environment of an organism. The living space occupied by an organism. Physical surroundings in which an organism is likely to be found.
House	Any residential dwelling of any type, style or description that is used as a residence by any human being.
I&AP	Interested and/or affected party
Infrastructure	Refers to permanent physical structures such as roads, storm water drains and electricity lines.
Land-use	The actual or permitted activities on a defined piece of land.
MAMSL	Meters above mean sea level.
MAP	Mean Annual Precipitation, measured in mm.
Mitigation measures	Mitigation measures encompass all actions taken to eliminate offset or reduce potentially adverse environmental impacts to acceptable levels (World Bank, 1999:1).
MPRDA Regulation	Mineral and Petroleum Resources Development Regulation in terms of Government Notice R527, published on 23 April 2004.
NDA	National Department of Agriculture

Word:	Definition:
NEMA	National Environmental Management Act (Act 107 of 1998)
NWA	National Water Act, Act 36 of 1998
Pit	Any open excavation
Pollution	The introduction of substances into the environment, which can have a negative effect on human health or the quality of the environment.
"Porrel"	The term used for the sludge created at alluvial diamond diggings where the alluvial gravels are washed and the diamonds separated in a water-and-sand medium.
Project activities	Those activities or actions of a project, which are likely to give rise to an impact on the environment.
Proponent	An individual and/or organisation that is of the intention to undertake an activity identified in terms of Section 21 of the Environmental Conservation Act, 1989 (Act no. 73 of 1989). Typically a proponent, ♦ stands to benefit directly from the proposed activity (e.g. a private developer gaining financially), or ♦ is duly sanctioned in terms of its legal mandate (e.g. a government department) to undertake such activities for the attaining of its objectives.
Red data species	Species of animals and plants recognized internationally as having a high conservation value or which are being threatened through natural or unnatural causes.
Resource	Any goods, services or environmental conditions which may have the potential to enhance social well being.
Risk	The scientific judgement of probability and significance of harm to the environment.
ROD	Record of Decision

Word:	Definition:
SAHRA	South African Heritage and Resource Agency
Scoping	A procedure for narrowing the scope of an assessment and ensuring that the assessment remains focused on the significant issues or impacts. Scoping requires input from authorities and the public.
Significant	Factors or considerations are termed significant when they are important, because they are of consequence. For example, they will have a detectable influence on a process, the environment, or the end result.
Species	A group of organisms with distinctive characteristics and which remain distinct by virtue of barriers to interbreeding with other kinds of organisms.
Tc (Time of concentration)	This is the time it would take for a drop of water to flow along the furthest drainage path to the exit point of a defined catchment area.
Threatened	Used to describe the status of a species or population of a species, which has deteriorated through natural or unnatural causes to the point where it may be considered as rare, vulnerable or endangered.
Topsoil	The layer of soil covering the earth which: ♦ provides a suitable environment for the germination of seed; ♦ allows the penetration of water; ♦ is a source of micro-organisms, plant nutrients and in some cases seed; ♦ and are not of a depth of more than 0,5 metres or such depth as the Minister may prescribe for a specific prospecting or exploration area or mining area.
Trench	A type of excavation usually made by digging in a line towards a mechanical excavator and not pivoting the boom – a large, U-shaped hole in the ground, with vertical sides and about 6 – 8 metres in length. Also a prospecting trench.
Vegetation	Any and all forms of plants, see also Fauna

Word:	Definition:
Water – "Clean Water"	Any water that originates outside of the mining area, entering the mining area through overland flow, lateral subsurface flow, or any other natural movement of water.
Water – "Clean Water System"	Any dam, other form of impoundment, canal, works, pipeline and any other structure or facility constructed for the retention or conveyance of unpolluted water.
Water – "Dirty Water"	Any water that originates within the mining area, either as a result of precipitation or as part of mineral processing, as well as untreated sewage and Grey Water.
Water – "Dirty Water System"	Any dam, other form of impoundment, canal, works, pipeline, residue deposit and any other structure or facility constructed for the retention or conveyance of water containing waste.
Water – "Grey Water"	Domestic Wastewater not containing sewage.
Water – "Sewage"	Any water containing human waste.

Introduction:

Kei Brick and Tile Company (Pty) Ltd, hereinafter referred to as "the applicant" is a well established company and known in the community surrounding Mount Coke for more than 20 years. It is important to note that the brick factory at Mount Coke obtains different types of clay from each of the clay quarries in the region, and is therefore operated separately from the said quarries. The mining permit will secure clay resources for the brick factory, while prospecting and exploring the option of a mining right.

CHAPTER 1 – LOCALITY:

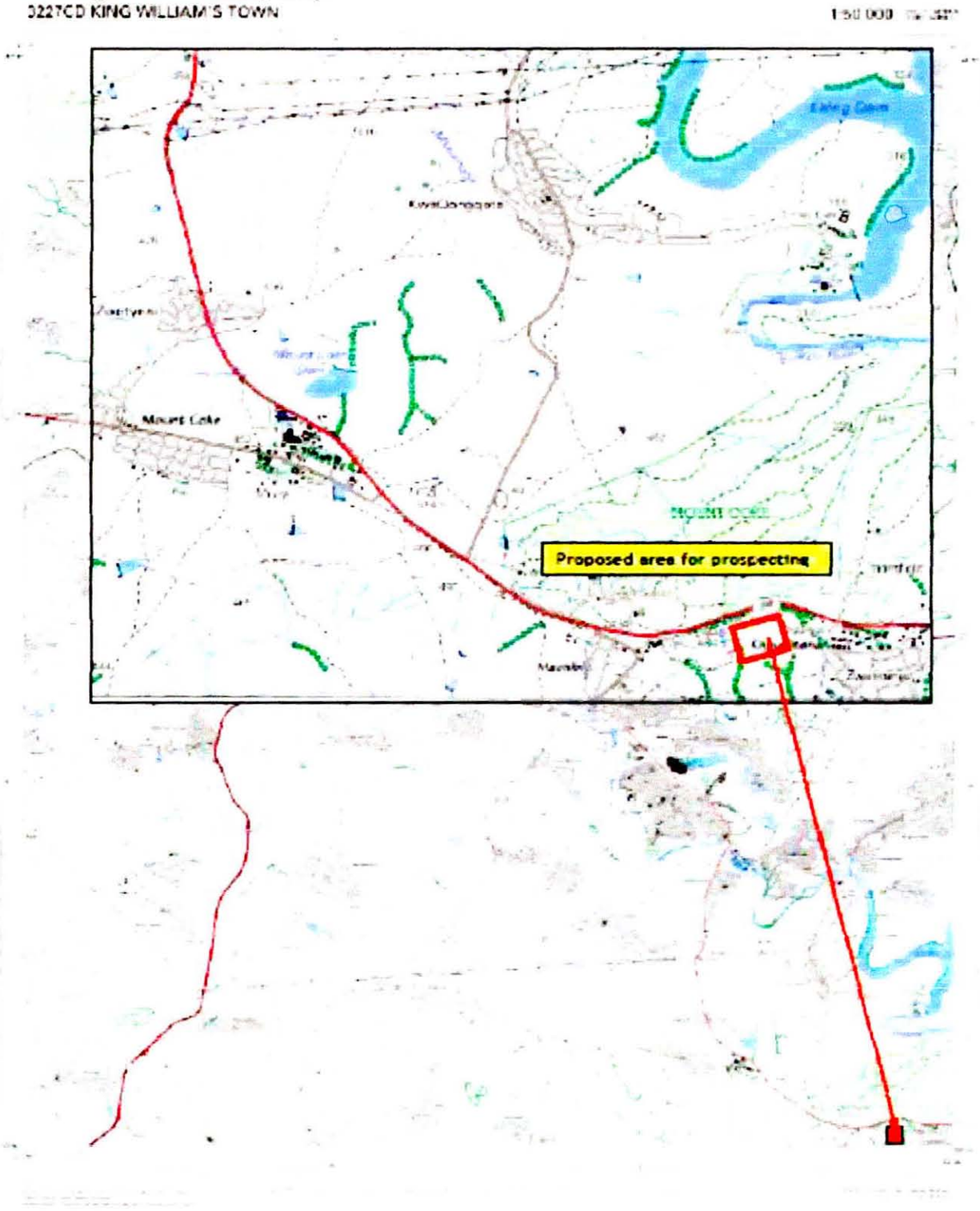
Locality Map:

The application area covers a certain portion of the Farm 1959 and Farm 1960 within the King Williams Town division of the Eastern Cape. The mining permit area is approximately 16km, south south-east of King Williams Town, Eastern Cape Province, Republic of South Africa. The area is situated to the northeast of the Mount Coke Operation of Kei Brick & Tile Company (Pty) Ltd adjacent to the R346 roadway.

The following figure shows the location of the application area (for both the mining permit and the adjacent prospecting right applied for):

Figure 1: Locality Map

3227CD KING WILLIAM'S TOWN



CHAPTER 2 – DETAILS OF THE APPLICANT:

Contact Details:

Company Name:	Kei Brick and Tile Company (Pty) Ltd
Company Registration Number:	1980/011821/07
Contact Person:	Mr C Clarke
Email:	chris@brickandclay.co.za
Telephone Number:	(040) 655 8253
Fax Number:	(040) 655 7807
Physical Address:	Mount Coke, Old East London Road (R346)
Postal Address:	P O Box 2990 King Williams Town 5600

CHAPTER 3 – SITE LAYOUT:

Layout Plan:

Due to the absence of any infrastructure on the site and the fact that none will be required for the mining permit, the following aerial view with the historical clay mining disturbances serves as the layout plan.

Figure 3.1: Site Layout Plan

Nature and Extent of the Development:

The application area covers an area of 1.5ha on a certain portion of the Farm 1959 and Farm 1960 within the King Williams Town division of the Eastern Cape.

A contractor will conduct the mining activities and deliver approximately 16,000m^3 of clay to the factory for a period of only three months during the first year, with no mining activities during the rest of that year. The clay excavated from this resource will be loaded directly on 20m^3 haul trucks for delivery to the Kei Brick clay brick manufacturing plant. No processing or stockpiling of clay will be allowed inside the mining permit area.

Topsoil will be excavated and stockpiled in the 9 meter boundary pillar for re-vegetation on completion of the mining activities.

Coordinates:

The coordinates of the application area is as follows:

Table 3.1: Site Coordinates

LO 27 WGS84		
ID	Y-Coordinate	X-Coordinate
A	-45 129.358	3 652 224.797
B	-45 270.312	3 652 173.494
C	-45 304.514	3 652 267.463
D	-45 163.560	3 652 318.766
A	-45 129.358	3 652 224.797

Limited Motivation:

The annual volume of clay needed by the Mount Coke Operation is approximately 48,000m^3. Due to the fact that the existing quarry at the Mount Coke factory is running out of reserves, a new source of clay must be secured. For this reason the applicant applied for this mining permit to source clay for the factory while determining the reserve of clay adjacent to the existing Mount Coke Operation.

The appointment of a contractor to conduct mining activities negates the need for the appointment of several employees, with the only cost with respect of technical skills that of the current operational manager of the Mount Coke Operation, Mr C Clarke.

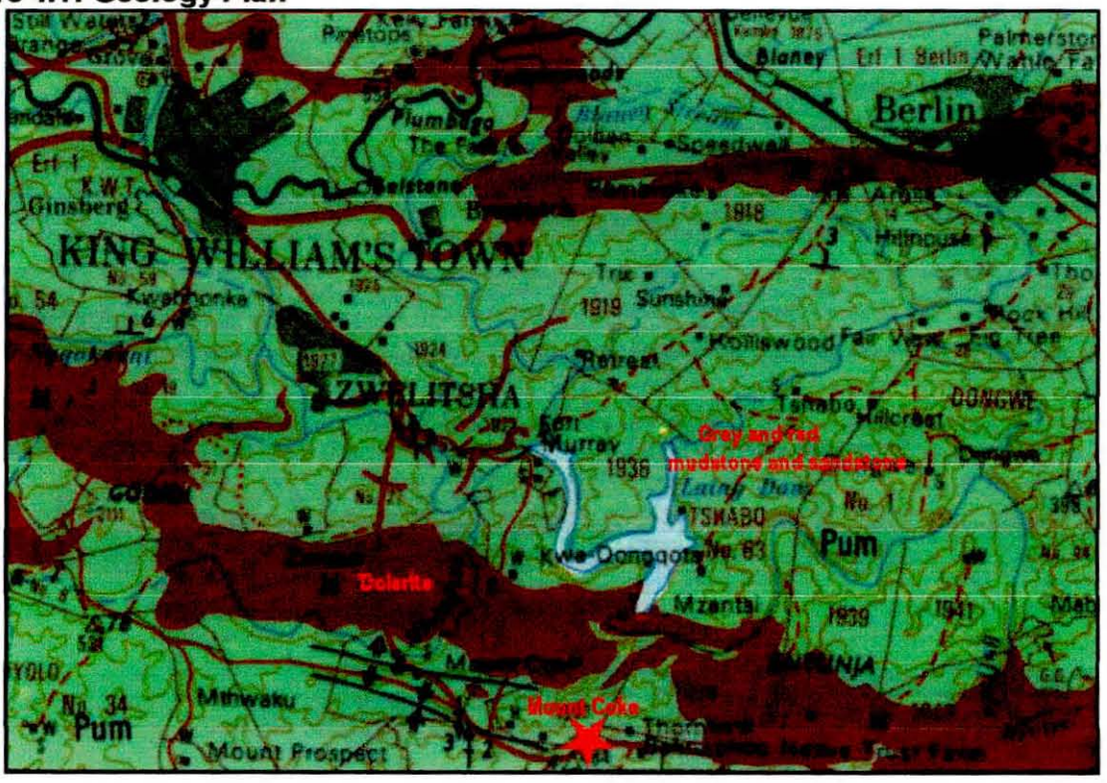
CHAPTER 4 – PRE-MINING ENVIRONMENT:

MPRDA Regulation 50 (a)
MPRDA Regulation 51(a)
MPRDA Section 39 (3)(a)

4.1. Geology:

The mining permit area is approximately 16km, south south-east of King Williams Town, Eastern Cape Province, Republic of South Africa. The area is situated to the northeast of the Mount Coke Operation of Kei Brick & Tile Company (Pty) Ltd adjacent to the R346 roadway. See the **Geology Plan** hereunder.

Figure 4.1: Geology Plan



The project area is underlain by sandstone and grey to red mudstone of the Middleton Formation, Adelaide Subgroup, Beaufort Group, Karoo Supergroup. Younger Jurassic dolerite outcrops to the north of the project area. The weathered profile of the grey and red mudstone (clay) is suitable for the production of clay bricks.

An area of 3600m^2 (35%) of the site has been disturbed by historical clay mining activities. This area is evident in the form of an un-rehabilitated clay quarry.

4.2. Climate:

The proposed mine is located in a typical Eastern Cape weather region, with hot summers and moderate winters. Rainfall occurs during the whole year, peaking in the summer months, while thunderstorms generally occur during the summer months. Fog occurs occasionally throughout the year, with occasional snow during the winter months. In general the prevailing winds in the region is northeast and south-westerly.

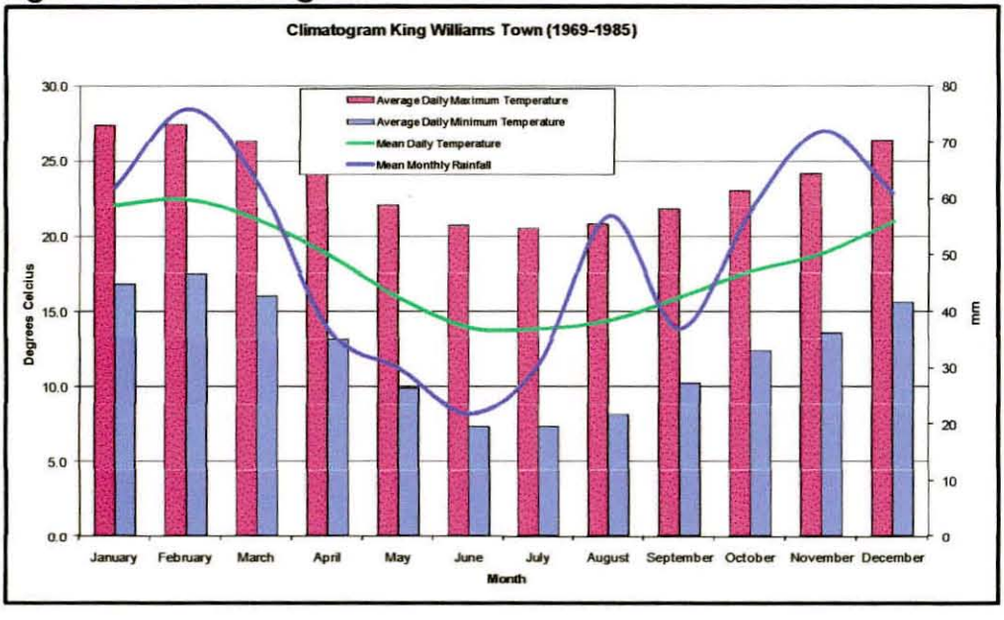
Regional Climate:

The following weather station was chosen to represent the regional climate:

Number: 0079712 X
Name: King Williams Town
Latitude: 32° 52' South
Longitude: 27° 24' East
Height: 400m
Period: 1969-1985

The following climatogram indicates the monthly changes in key weather indicators.

Figure 4.2.1: Climatogram



Monthly and Annual Rainfall:

The following table indicates the mean monthly rainfall, the 24 hour maximum recorded (including the year in which it occurred) and the average number of days with a measurable precipitation:

Table 4.2.2: Rainfall

Month	Mean Monthly Rainfall	24 Hour Maximum		No of Days
		Rainfall	Year	
January	62	69	1981	12.5
February	76	67	1973	12.2
March	63	68	1976	11.1
April	37	88	1978	7.8
May	30	40	1974	6.8
June	22	36	1970	5.3
July	31	80	1979	4.8
August	57	120	1970	6.9
September	37	35	1975	8.9
October	58	49	1978	10.8
November	72	50	1977	12.4
December	61	88	1970	12.0
Year	**606**	**120**	**1970**	**111.5**

Rainfall intensities:

The following table indicates the rainfall intensities for different return periods and storm durations:

Table 4.2.3: Rainfall Intensities

Storm Duration (hr)	Return Period (Years)						
	2	5	10	20	50	100	200
0.25	65	86	106	130	171	211	260
0.5	45	60	73	90	119	146	180
1	29	38	46	57	75	92	114
2	17	22	27	34	44	55	67

Temperature:

The following table indicates the daily mean maximum and minimum temperatures on a monthly basis.

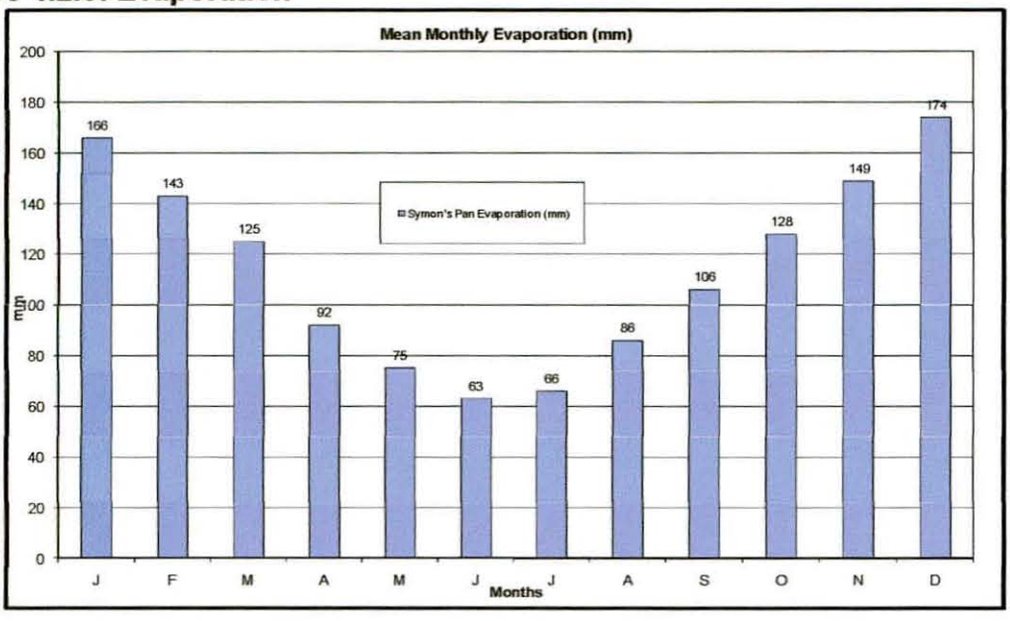
Table 4.2.4: Temperature

Month	Temperatures		
	Maximum	Minimum	Mean
January	27.4	16.8	22.1
February	27.5	17.5	22.5
March	26.3	16.0	21.2
April	24.5	13.1	18.8
May	22.1	9.9	16.0
June	20.7	7.3	14.0
July	20.5	7.3	13.9
August	20.8	8.1	14.5
September	21.8	10.2	16.0
October	23.0	12.4	17.7
November	24.2	13.6	18.9
December	26.4	15.6	21.0

Wind:
In general the prevailing winds in the region are northeast and south-westerly.

Evaporation:
The Laing Dam measuring station situated at the Tshabo Location was selected to indicate the evaporation for the area. The following figure indicates the Symon's Pan values observed for the period 1948 to 2002.

Figure 4.2.5: Evaporation



Extreme Weather Conditions:
The following table indicates the extreme weather conditions observed in 9 years at the King Williams Town Weather station.

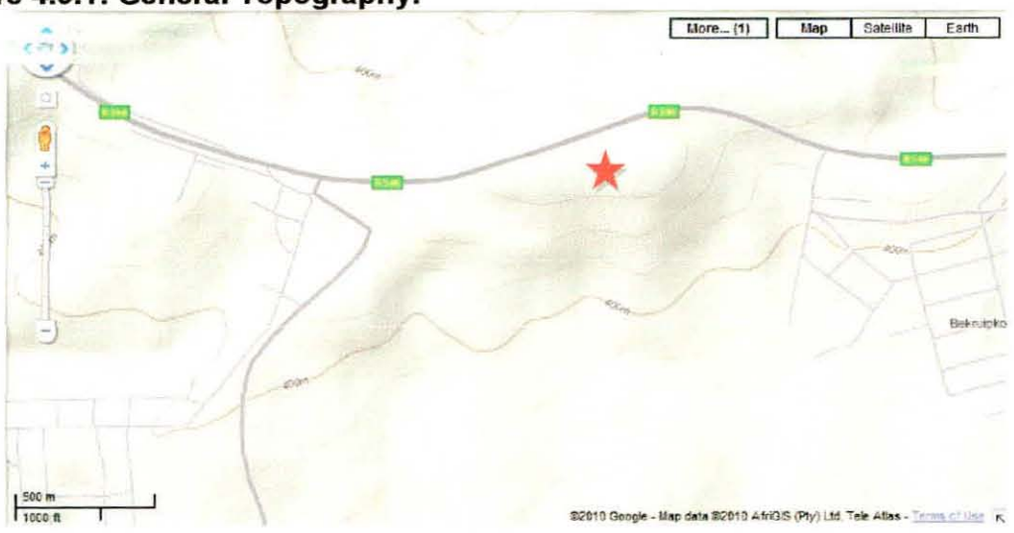
Table 4.2.6: Extreme weather conditions:

Month	Average number of days in 9 years with			
	Thunderstorms	Hail	Snow	Fog
January	3.3	0.0	0.0	0.1
February	3.8	0.0	0.0	0.0
March	3.5	0.0	0.0	0.0
April	1.5	0.0	0.0	0.4
May	0.7	0.0	0.0	0.0
June	0.4	0.0	0.1	0.0
July	0.4	0.0	0.5	0.0
August	1.0	0.1	0.0	0.3
September	2.0	0.0	0.0	0.2
October	3.2	0.0	0.0	0.1
November	2.6	0.0	0.0	0.0
December	3.8	0.1	0.0	0.0
Year	**26.2**	**0.2**	**0.6**	**1.1**

4.3. Topography:

See the following figure[1] for the topography on and around the area.

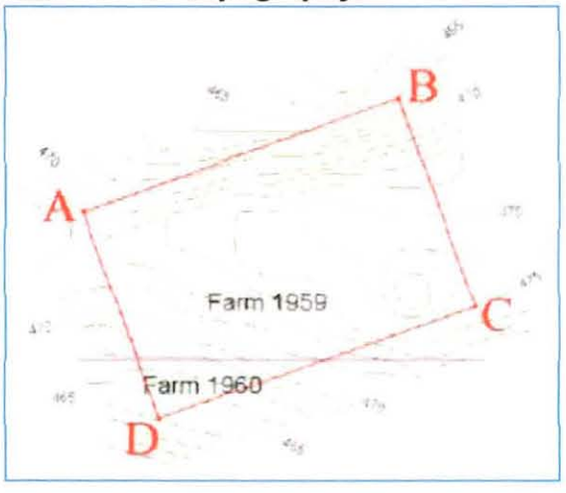
Figure 4.3.1: General Topography:



The site is located on a watershed diagonally through the application area, with the site sloping towards the south and north. The region consists of an undulating landscape between approximately 200 and 450 MAMSL.

A depression of 3,600m^2 (35% of the application area) on the site in the form of an un-rehabilitated clay quarry from historical mining activities is the most dominant topographical feature. The following figure[2] shows the topography on the permit application area.

Figure 4.3.2: Site Topography



[1] http://maps.google.co.za/
[2] Image cropped from the Regulation 2(2) Plan

4.4. Soil:

The underlying clay is covered by a thin layer of grey topsoil. Throughout the site outcrops of surface sandstone/silcrete can be found. The soil has previously been removed from an area of approximately 3,600m^2, where historical mining took place (approximately 35% of the application area).

4.5. Land Capability:

The steep slopes around the site and disturbed areas from historical clay mining restrict land capability to grazing land. Cultivation of the area is not viable.

4.6. Land use:

Pre-mining Land use:

The land in question had been used for clay mining and grazing purposes.

Evidence of Misuse:

The historical clay mining on the property has not been rehabilitated.

Existing Structures:

Due to the previous land use of grazing and historical mining, the only existing feature on the mining permit area is an un-rehabilitated clay quarry(approximately 35% of the application area).

4.7. Flora:

The application area falls within the Coastal Grassland vegetation of the Grassland Biome. The Coastal Grassland vegetation extends along the Eastern Cape coastal region.

The area slopes towards the south and is dominated by a single layer of grasses. The amount of grass cover depends on the rainfall and the degree of grazing. Some invader tree species, Black Wattle *Acacia mearnssi* and Bluegum *Eucalyptus spp,* are present along the northern and eastern boundary of the site.

Historical clay mining activities left an area of approximately 3,600m^3 (35% of the application area) without any vegetation cover, as can be seen in **Figure 3.1: Site Layout plan**.

The dominant grass species on and around the area is as follows:

Botanical name:	Common name:	Grazing value:	Plant succession:	Grazing status:
Cymbopogon Excavatus	Broad-leaved Turpentine grass	Low	Climax	Increaser I
Diheteropogon Amplectens	Broad Leaved Blue Stem	Average	Climax	Decreaser
Eragrostis spp	Love Grass	Low	Subclimax	Increaser II
Heteropogon Contortus	Spear grass	Average	Subclimax	Increaser II
Hyparrhenia spp	Thatching grass	Average	Climax	Increaser I
Imperata Cylindrica	Cottonwool grass	Low		Increaser I
Sporobolus Nitens	Curly Leaved Dropseed	Average	Climax	Increaser I

Botanical name:	Common name:	Grazing value:	Plant succession:	Grazing status:
Themeda Triandra	Red grass	High	Climax	Decreaser
Tristachya Leucothrix	Hairy Trident grass	Average	Climax	Increaser I

The ecological status of grass refers to the grouping of grasses on the basis of their reaction to different levels of grazing. A grass spp. reacts to grazing in one of two ways: it can either increase or decrease in number according to their criterion. All grasses and other herbaceous plants are classified into different groups. Grasses can be classified into 4 different ecological states:

- Decreaser: Grass that is abundant in good veld, but that decrease in number when the veld is overgrazed or under grazed. These grasses are palatable climax grasses.
- Increaser I: Grasses which are abundant in underutilized veld. These grasses are usually unpalatable, robust climax species that can grow without any defoliation.
- Increaser II: Grasses which are abundant in overgrazed veld. These grasses increase due to the disturbing effect of overgrazing and include most pioneer and subclimax species. They produce much viable seed and can thus quickly establish on new exposed ground. This group is common in lower rainfall areas.
- Increaser III: Grasses that are commonly found in overgrazed veld. These are usually unpalatable, dense climax grasses. These grasses are strong competitors and increase because the palatable grasses have become weakened through overgrazing. This group is more common in higher rainfall areas.

Grasses can also be defined as to the role they play in plant succession. Plant succession is the progressive succession of plant communities. When a disturbance takes place in an area, a new, better-adapted plant community colonizes the area. This new community improves the growth conditions, and a plant community that is better adapted to the new, improved growth conditions replaces the existing plant community. This progressive succession of plant communities is called plant succession and continues until the climax community has been established. When the succession process is disturbed once more, the veld will revert to the first stage, the pioneer stage.

- Pioneer plants: Hardened annual plants that can grow in unfavorable conditions. These plants improve the growth conditions for perennial grasses.
- Subclimax stage: Plants are denser than the pioneer plants. These grasses are mainly weak perennials with a life span of approximately 2 to 5 years. As growth conditions improve, climax grasses replace the subclimax grasses.

- Climax stage: Climax grasses are strong perennial plants that are adapted to normal, optimal growth conditions and will grow in an area as long as conditions prevail. The climax stage is the best stage for grazing and soil protection and is the basic stage towards which the plant succession process automatically progresses.

4.8. Fauna:

The following species were observed on and around the site:

Scientific Name	Common Name
Lanius collaris	Common Fiscal
Streptopelia capicola	Cape Turtle-Dove
Dicrurus adsimilis	Fork-tailed Drongo
Zosterops virens	Cape White-eye
Onychognathus morio	Red-winged Starling
Corvus capensis	Cape Crow
Vanellus armatus	Blacksmith Lapwing

The following information was obtained from the IUCN 2010. IUCN Red List of Threatened Species. Version 2010.1. According to the IUCN red list the following species may occur in the area:

Scientific Name	Common Name	Status	Population Trend
Equus zebra	Mountain Zebra	Vulknerable	Unknown
Mystromys albicaudatus	White-tailed Mouse	Endangered	Decreasing
Otomys saundersiae	Saunder's Vlei Rat	Least Concern	Unknown
Pronolagus crassicaudatus	Natal Red Rock Hare	Least Concern	Decreasing

Mountain Zebra:

This species was reintroduced only into several protected areas and does not occur naturally outside any protected areas. This species does therefore not occur on site.

White-tailed Mouse:

The species occurs in shrubland and grassland areas. A major requirement of the species is black loam with good vegetation cover. They breed once or twice a year and live up to 6 years.

The absence of black loam soil on the site, precludes the distribution of this species on the site.

Saunder's Vlei Rat:

This species is listed as Least Concern because it has a relatively wide distribution including a few protected areas, a presumed large population, and its population is not believed to be declining fast enough to qualify for listing in a more threatened category. It is found in shrubland and grassland habitat. It occurs in mountain fynbos, Drakensberg grassland, and in thickets. It is not known if the species can persist in modified habitats. The range of this species contains a few protected areas.

No evidence of this species was observed on the site.

Natal Red Rock Hare:
This species occurs in rocky areas on hill and mountain slopes with grass or scrub vegetation. The habitat is naturally fragmented due to the distribution of suitable habitat.

As this habitat is not present on site, this species is not expected to occur on site.

4.9. Surface Water:

Surface Water Quantity:
The mine is located in the upper part of the R40B quaternary catchment area which falls in the Mzimvubu to Kieskamma Water Management Area.

With the mine located on a watershed on the northern boundary of the application area, very little runoff is expected to enter the mining area. Rainwater draining from the mining area will drain in a southern direction in the form of overland flow before collecting in series of non-perennial watercourses that has its origin at least 150m from the edge of the application area. The non-perennial watercourses drain into dam approximately 2km to the south from where it will flow towards the southwest before ultimately draining into the Tyolomnqa River, which empties into the Indian Ocean.

Surface Water Quality:
Due to the absence of natural surface water bodies on the application area, no baseline for surface water quality was determined.

Surface Water Use:
No surface water will be used, nor is there any surface water uses close to the application area. Water for dust suppression will be obtained from the nearby Mount Coke Brick Factory as this is the closest reliable water source.

Water Authority:
The relevant water authority in this instance would be the Department of Water Affairs and Forestry – Mzimvubu to Kieskamma Water Management Area.

River Diversions:
There is no river diversions required by mining operations, as there is no water courses present on the site.

Wetland:
There are no wetlands on or in close proximity to the application area.

4.10. Groundwater:

Depth of the Water Table:

When evaluating the depth of the water table in the region, two factors were considered:

- The height of the application area.
- The presence of groundwater seepage at the adjacent old mine workings to the west of the application area.

The absence of groundwater seepage, with the height of the application area being approximately 460 to 480 MAMSL, and the nearest dam approximately 340 MAMSL, indicates that in all probability the ground water table exceeds the depth of any mining (12m) that will be required by this operation.

Boreholes and Springs:

There are no water boreholes or springs located on or near the application area.

Groundwater Quality:

The absence of groundwater seepage in the existing mine workings (adjacent to the west), as well as the absence of boreholes on the application area means that no water quality could be conducted.

Groundwater Use:

There will be no groundwater used on the application area.

4.11. Air Quality:

According to the Mine Health and Safety Act (No, 29 of 1996) an employer must maintain a healthy and safe environment that is without risk to the health of employees. As far as reasonably practicable every employer must identify the relevant hazards and assess the related risks to persons, who are not employees, who may be exposed and ensure that persons who are not employees, but who may be directly affected by the activities at the mine are not exposed to any hazards to their health and safety.

No baseline information is available for air quality. It is expected that the mine may contribute significantly as a source of dust pollution, if no mitigation measures are implemented.

4.12. Noise:

Noise pollution is generated from the adjacent brick manufacturing activities and the R346 roadway directly north of the application area. Together with the expected noise from mining, these sources of noise are unlikely to produce noise levels exceeding 80dB for any appreciable time.

4.13. Archaeological and Cultural sites:

Dr Johan Binneman on behalf of Eastern Cape Heritage Consultants conducted an Archaeological Investigation on both the application area for the mining permit and the one for prospecting. See the full report attached hereto as **Annexure A**. During this investigation no archaeological material with cultural value was found and Dr Binneman further indicated that it is unlikely that any such material or sites of contextual value will be exposed during future development of the property.

Although it is unlikely that any archaeological heritage remains of any value will be found in situ or of any contextual value, there is always a possibility that human remains and/or other archaeological and historical material may be uncovered during the development. Such material must be reported to the nearest museum, archaeologist or to the South African Heritage Resources Agency (SAHRA) if exposed, so that a systematic and professional investigation can be undertaken. Sufficient time should be allowed to remove/collect such material.

4.14. Regional Socio-economic Structure:

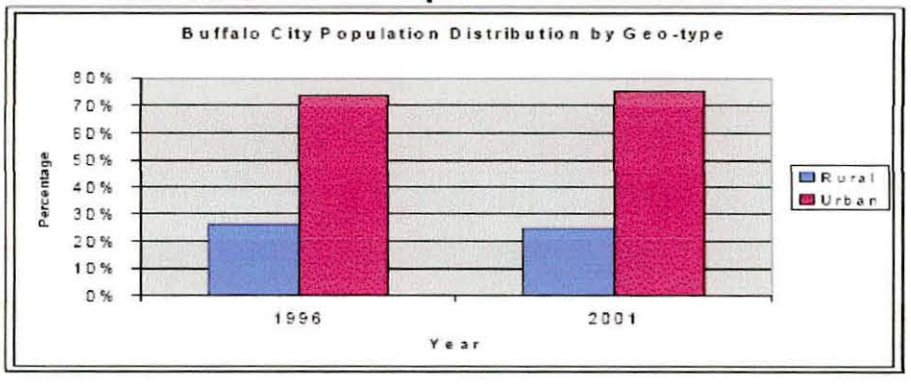
Buffalo City is situated relatively centrally in the Eastern Cape Province, which is bounded to the south-east by the long coastline along the Indian Ocean. Two of South Africa's major cities, Port Elizabeth and East London, are situated in this province. The Eastern Cape Province is the second largest province in land area in South Africa, and covers some 169,580 square kilometers, which is 13,9% of South Africa's total land area. The province has the third largest population in South Africa, approximately 6,4 million people (Census 2001), which is 14,1% of South Africa's people. The Province is generally seen as one of the two poorest in South Africa. Buffalo City is the key urban centre of the eastern part of the Eastern Cape. It consists of a corridor of urban areas, stretching from the port city of East London to the east, through to Mdantsane and reaching Dimbaza in the west. East London is the primary node, whilst the King Williams Town area, east of Dimbaza is the secondary node. It also contains a wide band of rural areas on either side of the urban corridor.

King William's Town functions as a Regional Service Centre and together with Bisho, is the Provincial Administrative Centre and contains the seat of the Provincial Government of the Eastern Cape Province, whilst East London is the dominant economic centre.

Buffalo City is broadly characterised by three main identifiable land use patterns. The first has been described above, that is the dominant urban axis of East London – Mdantsane – King Williams Town – Dimbaza, which dominate as the industrial and service sector centres and attract people from throughout the greater Amathole region in search of work and better access to urban service and facilities. The second is the area comprising the fringe peri-urban and rural settlement areas, which whilst remaining under the influence of the urban axis, is distinct in character and land use patterns. These include the Newlands settlements, those settlements that previously fell within the former Ciskei bantustans, and the Ncera settlements located west of East London. Thirdly, the commercial farming areas form a distinctive type of area. These areas are dominant in the north-eastern and southwestern (coastal) sectors of the Municipality and are characterized by extensive land uses, with certain areas making use of intensive farming (irrigation-based).

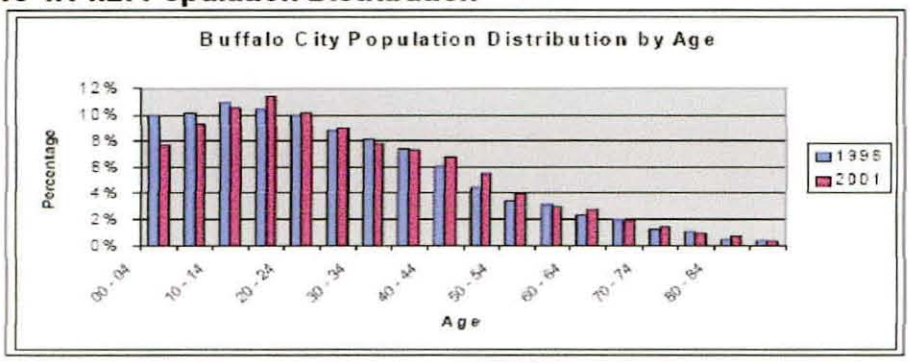
Population Density and Location:
Population distribution between urban and rural areas within Buffalo city shows a slight shift towards urban areas, with 26.4% of the population living in rural areas in 1996 as opposed to 25% in 2001. Nevertheless, a significant number of people (approximately 190,000 people) live in rural areas which suffer from large infrastructure backlogs and which possess few economic opportunities over and above subsistence agriculture.

Figure 4.14.1: Rural and Urban Population Distribution



The following figure shows the gender and age distribution of the population.

Figure 4.14.2: Population Distribution

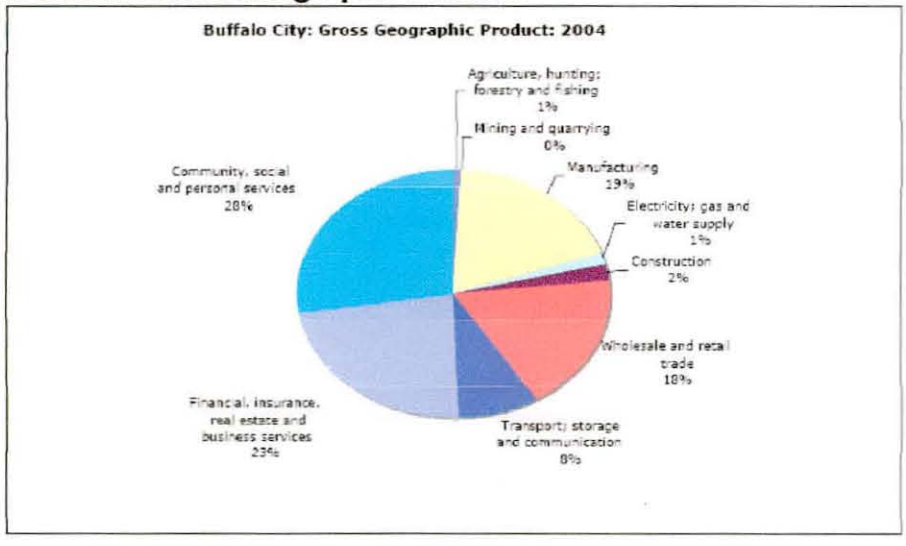


Socio Economic Structure and Key Economic Activities:
MPRDA Regulation 46(c)(ii)
The only three sectors to grow proportionally between 1996-2004 were retail/ wholesale, transport, and finance/ business services.

Much of this growth has been as a result of domestic consumption and spending power in the wholesale and retail, construction, transport, and financial and business service sectors. Significantly, the manufacturing sector has been relatively stagnant growing at an annual average of 1.27% p.a. between 1996 - 2004 This low growth has numerous causes, including the closure of inefficient/ uncompetitive enterprises in the former homelands as well as the inability of East London to attract much new foreign and domestic investment during this period.

The Buffalo City economy in 2004 is dominated by government services, followed by financial and business services, manufacturing, and wholesale and retail trade.

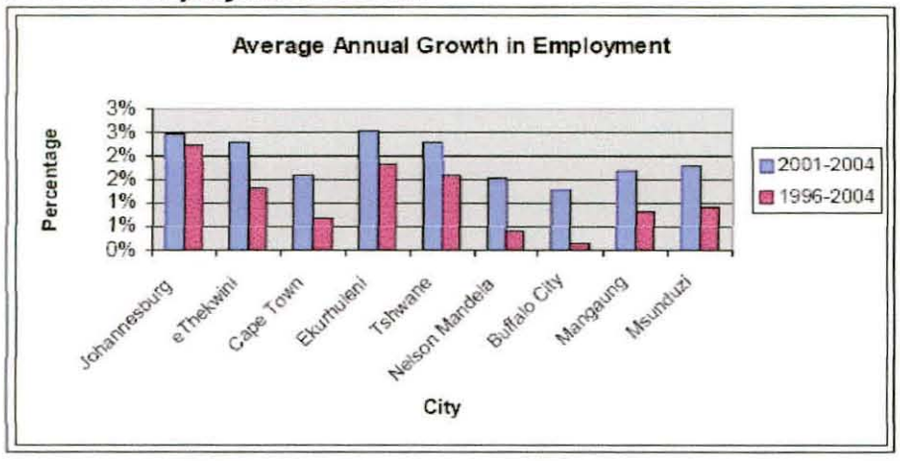
Figure 4.14.3: Gross Geographic Product



Unemployment Estimate for the Area:
Formal sector employment has declined by 13,340 jobs from 138,031 to 124,691 between 1995 and 2004.

Employment absorption rates grew more slowly in the period 1996-2004 than in the period 2001-2004. During the period 1996-2004 employment grew by 0.14% compared with 1.28% during the period 2001-2004. When comparing South Africa's nine major cities, it is evident that employment has grown most slowly in Buffalo City.

Figure 4.14.4: Employment Growth

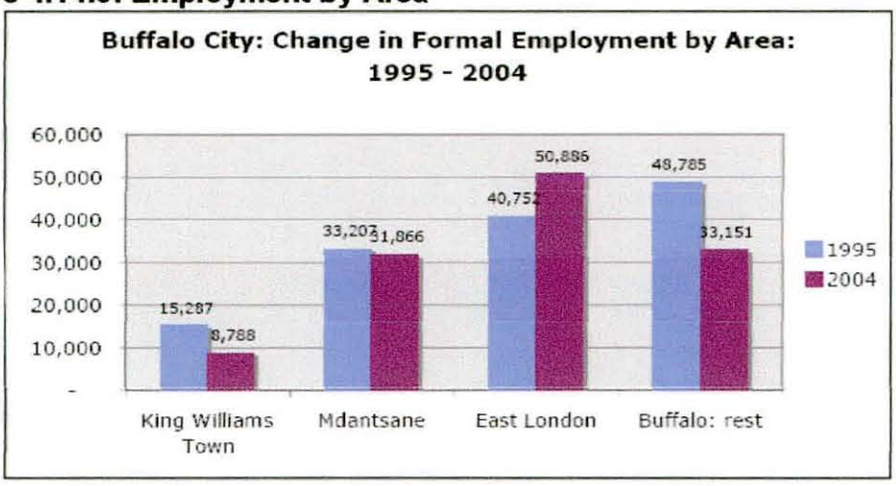


Only two sectors recorded nett job growth with manufacturing recording the greatest nett job loss of 9,120 jobs.

East London was the only node within Buffalo City recording a nett increase, largely due to the concentration of wholesale, retail, and business and financial services. Job creation is largely taking place in semi to skilled job categories, with technicians, plant operators and clerks showing proportional increases.

Unemployment in Buffalo City is recorded at 42.93% in 2002 and 32.01 in 2005. In 2005 75,378 Buffalo City residents were unemployed. 26.28% of the working age population in Buffalo City were unemployed in 2005.

Figure 4.14.5: Employment by Area



Poverty according to income level is wide-spread in BC. More than 28% of households receive no income. Of the households in Buffalo City that do receive an income more than half (57%) earn R19, 200 per annum or less (i.e. R1, 600/month). Hence, 59.3% of all households in Buffalo City earn less than R1,600 per month. Large portions of the population cannot afford basic services.

Social Infrastructure:

More residents live in formal housing in 2001 (63.6%) than in 1996 (61.8%). Similarly the number of people living in informal housing between 1996 (38.2%) and 2001 (36.4%) has been reduced. It is estimated that 130,000 housing units will be required between 2007 and 2027 (CDS: 2007)

Access to refuse removal has increased from 67.8% in 1996 to 73.6% in 2001. Still, in 2001, more than a quarter of the Buffalo City population does not have access to refuse removal.

Access to water has increased slightly from 90.4% to 93.8%. In 2001, 6.2% of residents in Buffalo City did not have access to water.

Access to sanitation has declined from 87.8% to 86.3% from 1996 to 2001. As of 2001 13.7% of residents did not have access to sanitation.

In 1996 little more than half of the City's residents (53.3%) had access to electricity, in 2001 this had increased to 63.3%. In 2001, more than one third (36.7%)of the population was still without access to electricity.

Telephone access has increased from 82.6% in 1996 to 93.9% in 2001. In 2001, 6.1% of residents did not have access to a telephone. 13.8% of the Buffalo City population report having access the Internet in the previous four weeks. The average population percentage across the nine major cities is 12.03%. Buffalo City ranks in line with eThekwini and is only exceeded by Cape Town.

Although difficult to compare the 2002/3 with the 2004/5 figures (this is a common experience as the reporting of crime statistics changed during these periods), a comparison by city of each period is possible. Buffalo City ranks have having a very low non-residential reported crime rate 2,617 cases were reported during 2002/3 and 816 cases during 2004/5 in Buffalo City.

4.15. Sensitive Environmental Features:

Features Requiring Protection:

There are no specific, sensitive environmental features identified on the application area that require protection.

Features Requiring Remediation:

There are no specific, sensitive environmental features identified on the application area that require remediation.

Features Requiring Management:

There are no specific, sensitive environmental features identified on the application area that require management.

Features Requiring Avoidance:

There are no specific, sensitive environmental features identified on the application area that require avoidance.

CHAPTER 5 – PHOTOGRAPHIC RECORD:

The following figure shows an aerial view of the mining permit area.

Figure 5: Aerial View

The following table shows some pictures that gives an indication of the site.

Table 5: Site Photographs

Photo:	Description:
	This picture shows a view from top of the mining area towards the Bekruipkop village in the distance (southeast of the site).

	This picture shows the historical clay mining area. Note the lack of topsoil and vegetation cover.
	This picture shows a view from the mining area towards the Mount Coke Brick Factory to the west of the site.
	This picture shows the entrance to the property from the R346 road directly north of the site.

CHAPTER 6 – PROJECT DESCRIPTION:

MPRDA Section 39 (3)(b)(i)
MPRDA Section 39 (3)(d)(i)

Mineral to be Mined:

The mining permit area is approximately 16.4 km, south south-east of King Williams Town, Eastern Cape Province, Republic of South Africa. The area is situated to the immediate east of the Kei Brick & Tile (Pty) Ltd brick yard adjacent to the R346 roadway (See the **Locality Plan**).

The project area is underlain by sandstone and grey to red mudstone of the Middleton Formation, Adelaide Subgroup, Beaufort Group, Karoo Supergroup. Younger Jurassic dolerite outcrops to the north of the project area. The weathered profile of the grey and red mudstone (clay) is suitable for the production of clay bricks.

The thickness of the clay underlying the mining permit area is estimated at 12 meters based on observations made from diamond drill holes drilled on the adjacent Kei Brick property during 2008.

The table below summarises the estimated resources underlying the mining right area.

Table 6.1: Estimated Clay Resources.

Area	Extent (Ha)	Clay Resource		
		Thickness (m)	Volume (m^3)	Volume (Spm^3)
Mining Permit Area	1.5000	10.77	161 000	193 860
LoM Area	1.0824	10.77	70 000	84 000

The LoM (Life of Mine) resource estimation was based on the following:

- A nine meter boundary pillar inside the mining permit area reduced the mineable surface area to 1.0824 hectares
- Design of a LoM excavation to the following parameters.
  - ✓ Final Depth – 12 meters
  - ✓ Final slope of excavation – 33 degrees
- Seed bearing soil thickness – 1.23 meter
- End use – dam as requested by the surface owner.

The clay excavated from this resource will be loaded directly on $20m^3$ haul trucks for delivery to the Mount Coke brick manufacturing plant. No processing or stockpiling of clay will be allowed inside the mining permit area.

Topsoil will be excavated and stockpiled in the 9 meter boundary pillar for re-vegetation on completion of the mining activities.

Production:
A mining contractor, using an excavator, removes approximately 16,000m^3 of clay annually. This is then taken to the nearby Mount Coke Brick Factory, where approximately 6,960,000 bricks are extruded annually from the clay. The clay excavated from this resource will be loaded directly on 20m^3 haul trucks for delivery to the Mount Coke brick manufacturing plant. No processing or stockpiling of clay will be allowed inside the mining permit area.

The open cast mining method will best achieve the optimum exploitation of the mineral. The table below shows the applicable time frames and scheduling of the various implementation phases.

Table 6.2: Applicable time frames and scheduling

NO	ACTIVITY / PHASE	DELIVERABLES	ESTIMATED COMPLETION DATE
1	Granting mining permit	Initiate planned mining.	Feb 2011
2	Surface Surveying	Place beacons to demarcate mining permit area and boundary pillar. Survey surface inside permit area.	Feb 2011
3	Commence excavation of clay	Excavate load and haul clay and transport to Kei Brick manufacturing plant. Mining will be conducted during the first three months of each year, and therefore in six mining phases.	Feb 2011
4	Mining Completed	Area rehabilitated.	Jan 2013

Surveyed Development and Rehabilitation Plans:
The absence of any infrastructure or sensitive features on the site means that the Plan submitted in terms of Regulation 2(2) of the Regulations clearly describes both the existing topography. Mining will be conducted during three months per year, and therefore in six distinct phases as indicated on the plan below.

Concurrent rehabilitation will be applied as follows:

- Topsoil will be removed from Phase 1 according to the Soil utilisation Guide and stored in the 9m mine boundary pillar.
- When Phase 1 is mined out, 85% of the topsoil from Phase 2 will be used to cover Phase 1, with the rest (15%) stored in the 9m boundary pillar to supplement the loss of topsoil of Phase 1 due to historical mining activities.
- When Phase 2 is mined out, 85% of the topsoil from Phase 3 will be used to cover Phase 2, with the rest (15%) stored in the 9m boundary pillar to supplement the loss of topsoil of Phase 1 due to historical mining activities.

- When Phase 3 is mined out, 85% of the topsoil from Phase 4 will be used to cover Phase 3, with the rest (15%) stored in the 9m boundary pillar to supplement the loss of topsoil of Phase 1 due to historical mining activities.
- When Phase 4 is mined out, 85% of the topsoil from Phase 5 will be used to cover Phase 4, with the rest (15%) stored in the 9m boundary pillar to supplement the loss of topsoil of Phase 1 due to historical mining activities.
- When Phase 5 is mined out, 85% of the topsoil from Phase 6 will be used to cover Phase 5, with the rest (15%) stored in the 9m boundary pillar to supplement the loss of topsoil of Phase 1 due to historical mining activities.
- When Phase 6 is mined out, the topsoil stockpiled in the 9m boundary pillar will be used to cover Phase 6.

Figure 6: Mining and Rehabilitation Phases.

Infrastructure:

Because no infrastructure or services will be constructed for the mining permit, the following will apply:

- The potable water source at the Mount Coke Brick Factory will be used to fill containers for the personnel at the mine.
- A chemical toilet will be placed on the site.
- Domestic waste will be placed in suitable containers and removed to the Mount Coke Brick Factory, from where it will be removed to an approved disposal facility periodically.
- Vehicles fill not be serviced on-site, and only repaired on-site in the case of emergency.
- No hazardous materials (such as hydrocarbons) will be stored on-site, but rather at the Mount Coke Brick Factory.
- No mine waste will be generated.
- No industrial waste will be generated.

CHAPTER 7 – ENVIRONMENTAL IMPACT ASSESSMENT:

Mining Activities:

The following table indicate the mining activities pertaining to the mining permit.

Table 7.1: Mining Activities

Phase:	Activity:	Description:
Construction Phase:	Due to the fact that there is an existing disturbance on the area which would be used as the initial box cut, no construction phase will take place.	
Operational Phase:	Topsoil Removal.	Topsoil will be removed and stored in the 9m boundary pillar according to the Soil Utilisation Guide below. **Soil Utilisation Guide:** The following design parameters will be taken into account when designing the topsoil stockpiles: ◆ Topsoil will be removed to a depth of 300mm. ◆ The stockpiles must be constructed on the most gradual slope possible. ◆ The slope of the stockpile material must be kept as low and possible to avoid extensive erosion of the natural resource. ◆ If erosion does occur the stockpiles can be stabilized through re-vegetation with pioneering grass species. Species include *Eragrostis curvula* and *Melinis repens*. ◆ Soil fertility need to be assessed and ameliorated where necessary prior to re-vegetation in order to ensure optimal growth.
Operational Phase:	Excavating.	All excavating will be conducted with an excavator in the form of bench mining. Excavated material is loaded directly onto dumper trucks.
Operational Phase:	Loading.	The stockpiled clay materials are loaded onto trucks with a loader.
Operational Phase:	Transport.	The clay material is transported from the stockpiles to the processing plants located in the area using the roads network surrounding the mine.
Operational Phase:	Replacing topsoil.	After the mined out areas are backfilled as far as possible, topsoil will be replaced on the areas.
Operational Phase:	Vegetating.	After topsoil is returned to the backfilled, mined-out areas, a grass seed mixture including *Eragrostis spp* and any other endemic species found surrounding the area will be sown.

Phase:	Activity:	Description:
Operational Phase:	Dust Suppression.	Approximately 10,000 litres of water will be sprayed onto the roads daily for dust suppression purposes, but is only expected to be required during the drier seasons of the year. This water will partly evaporate and partly drain into the soils. Water from the Mount Coke Brick Factory will be used for these purposes, as this is the closest reliable source of water.

Assessment of Potential Impacts:

The following table describes the potential impacts that may apply to the all phases of the mining activities.

Table 7.2: Impact Description

Activity:	Environmental Aspect:	Impact
Topsoil Removal:	**Geology:**	No impact.
	Topography:	The removal of topsoil will create a lowered topography.
	Soil:	The topsoil is removed to a stockpile in the 9m boundary pillar.
	Flora:	Vegetation is removed completely.
	Fauna:	Fauna will leave the area temporarily.
	Surface Hydrology:	The lowered topography will alter the surface water runoff patterns.
	Groundwater:	No Impact.
	Air Quality:	An increase in dust levels due to vehicle movement and excavation.
	Noise:	Vehicles and machinery will cause an increase in the noise levels.
	Visual Aspects:	No impact.
Excavating:	**Geology:**	The geological structure is removed through excavating.
	Topography:	Excavating will create a lowered topography and leave a final void.
	Soil:	No impact.
	Flora:	No impact.
	Fauna:	No impact.

Activity:	Environmental Aspect:	Impact
	Surface Hydrology:	The lowered topography and final void will alter the surface water runoff patterns.
	Groundwater:	No impact.
	Air Quality:	Excavating will cause an increase in dust levels.
	Noise:	Excavating will cause increase in noise levels.
	Visual Aspects:	The excavation will increase the visual impact of the mine.
Loading:	**Geology:**	No impact.
	Topography:	No Impact.
	Soil:	No Impact.
	Flora:	No Impact.
	Fauna:	No Impact.
	Surface Hydrology:	No Impact.
	Groundwater:	No Impact.
	Air Quality:	Movement of vehicles and machinery will increase the dust levels.
	Noise:	Movement of vehicles and machinery will increase the noise levels.
	Visual Aspects:	No impact.
Transport:	**Geology:**	No impact.
	Topography:	No impact.
	Soil:	No impact.
	Flora:	No impact.
	Fauna:	No impact.
	Surface Hydrology:	No impact.
	Groundwater:	No impact.
	Air Quality:	Movement of vehicles will increase the dust levels.

Activity:	Environmental Aspect:	Impact
	Noise:	Movement of vehicles will increase the noise levels.
	Visual Aspects:	No impact.
Replacing Topsoil:	**Geology:**	No impact.
	Topography:	The replacing of topsoil over the partially backfilled pit will have the final alteration on the topography.
	Soil:	No impact.
	Flora:	No impact.
	Fauna:	No impact.
	Surface Hydrology:	The replacing of topsoil over the partially backfilled pit will have the final alteration on the topography and changed runoff patterns.
	Groundwater:	No impact.
	Air Quality:	Movement of vehicles and machinery will increase the dust levels.
	Noise:	Movement of vehicles and machinery will increase the noise levels.
	Visual Aspects:	No impact.
Vegetating:	**Geology:**	No impact.
	Topography:	No impact.
	Soil:	No impact.
	Flora:	No impact.
	Fauna:	No impact.
	Surface Hydrology:	The newly established vegetation will result in a higher Tc (time of concentration), resulting in lower flood peaks and reduced risk of erosion and flood damage downstream. The subsequent slower surface water flow will change the runoff.
	Groundwater:	No impact.
	Air Quality:	No impact.

Activity:	Environmental Aspect:	Impact
	Noise:	No impact.
	Visual Aspects:	No impact.
Dust Suppression:	**Geology:**	No impact.
	Topography:	No impact.
	Soil:	No impact.
	Flora:	No impact.
	Fauna:	No impact.
	Surface Hydrology:	No impact.
	Groundwater:	No impact.
	Air Quality:	No impact.
	Noise:	The movement of vehicles will increase the noise levels.
	Visual Aspects:	No impact.

Impacts in this section are considered by the following criteria: Extent, Duration, Intensity (processes) and Probability, with a value awarded to each of the aspects considered.

The extent of each impact is described as either:

- Local: on the property (1).
- Regional: within municipal boundaries (2).
- Provincial: within provincial boundaries (3).
- National: within national boundaries (4).
- International: crossing national boundaries (5).

The duration of each impact is described as either:

- Short term: less than a month (1).
- Medium term: a month or more (2).
- Long term: until the end of the life of the mine (3).
- Permanent: after mining activities ceased (4).

The intensity is described as either:

- Undisturbed: natural processes continue undisturbed (1).
- Changed: natural processes continue, but are altered (2).
- Stop: natural processes stop (3).

The probability is described as either:

- Impossible: the impact will not take place (0).
- Unlikely: the impact may occur occasionally (up to 30%) (1).
- Likely: the impact may occur regularly (up to 60%) (2).
- Definite: the impact will definitely occur (up to 100%) (3).

The awarded values are used to determine the significance rating in the following way:

Rating = (Extent + Duration + Intensity) x Probability

The significance of each impact is then awarded according to the following scale:

Rating:	**Significance:**
0	No impact
3 - 14	Low impact
15 - 26	Medium impact
27 - 36	High impact

Note that the positive impacts contained in the above tables will be indicated as having no impact on the environment in the tables below, and as such require no mitigation or management.

The table following on the next page shows the possible impacts during the drilling phase:

Table 7.3: Impact Assessment

Activity:	Environmental Aspect:	Impact	Extent	Duration	Processes	Probability	Rating	Significance
Topsoil Removal:	Geology:	No impact.				Impossible	0	No Impact
	Topography:	Lowered.	Local	Long Term	Changed	Definite	18	Medium Impact
	Soil:	Removed.	Local	Long Term	Stop	Definite	21	Medium Impact
	Flora:	Removed.	Local	Long Term	Stop	Definite	21	Medium Impact
	Fauna:	Removed.	Local	Short Term	Changed	Definite	12	Low Impact
	Surface Hydrology:	Changed runoff.	Regional	Long Term	Changed	Definite	21	Medium Impact
	Groundwater:	No Impact.				Impossible	0	No Impact
	Air Quality:	Increased dust levels.	Regional	Long Term	Changed	Likely	14	Low Impact
	Noise:	Increased noise levels.	Regional	Long Term	Changed	Likely	14	Low Impact
	Visual Aspects:	No impact.				Impossible	0	No Impact
Excavating:	Geology:	Removed.	Local	Permanent	Stop	Definite	24	Medium Impact
	Topography:	Lowered.	Local	Permanent	Stop	Definite	24	Medium Impact
	Soil:	No impact.				Impossible	0	No Impact
	Flora:	No impact.				Impossible	0	No Impact
	Fauna:	No impact.				Impossible	0	No Impact
	Surface Hydrology:	Changed runoff.	Regional	Permanent	Changed	Definite	24	Medium Impact
	Groundwater:	No impact.				Impossible	0	No Impact
	Air Quality:	Increased dust levels.	Regional	Long Term	Changed	Likely	14	Low Impact
	Noise:	Increased noise levels.	Regional	Long Term	Changed	Likely	14	Low Impact
	Visual Aspects:	Increased visual impact.				Impossible	0	No Impact
Loading:	Geology:	No impact.				Impossible	0	No Impact
	Topography:	No Impact.				Impossible	0	No Impact
	Soil:	No Impact.	Local	Long Term	Changed	Unlikely	6	Low Impact
	Flora:	No Impact.				Impossible	0	No Impact
	Fauna:	No Impact.				Impossible	0	No Impact
	Surface Hydrology:	No Impact.				Impossible	0	No Impact
	Groundwater:	No Impact.				Impossible	0	No Impact
	Air Quality:	Increased dust levels.	Regional	Long Term	Changed	Likely	14	Low Impact
	Noise:	Increased noise levels.	Regional	Long Term	Changed	Likely	14	Low Impact
	Visual Aspects:	No impact.				Impossible	0	No Impact
Transport:	Geology:	No impact.				Impossible	0	No Impact
	Topography:	No impact.				Impossible	0	No Impact
	Soil:	No impact.				Impossible	0	No Impact
	Flora:	No impact.				Impossible	0	No Impact
	Fauna:	No impact.				Impossible	0	No Impact

Activity:	Environmental Aspect:	Impact	Extent	Duration	Processes	Probability	Rating	Significance
	Surface Hydrology:	No impact.				Impossible	0	No Impact
	Groundwater:	No impact.				Impossible	0	No Impact
	Air Quality:	Increased dust levels.	Regional	Long Term	Changed	Likely	14	Low Impact
	Noise:	Increased noise levels.	Regional	Long Term	Changed	Likely	14	Low Impact
	Visual Aspects:	No impact.	Regional	Long Term	Changed	Unlikely	7	Low Impact
Replacing Topsoil:	Geology:	No impact.				Impossible	0	No Impact
	Topography:	Altered topography.	Local	Permanent	Changed	Definite	21	Medium Impact
	Soil:	No Impact.				Impossible	0	No Impact
	Flora:	No impact.				Impossible	0	No Impact
	Fauna:	No impact.				Impossible	0	No Impact
	Surface Hydrology:	Changed runoff.	Local	Long Term	Changed	Definite	18	Medium Impact
	Groundwater:	No impact.				Impossible	0	No Impact
	Air Quality:	Increased dust levels.	Regional	Long Term	Changed	Unlikely	7	Low Impact
	Noise:	Increased noise levels.	Regional	Long Term	Changed	Likely	14	Low Impact
	Visual Aspects:	No impact.				Impossible	0	No Impact
Vegetating:	Geology:	No impact.				Impossible	0	No Impact
	Topography:	No impact.				Impossible	0	No Impact
	Soil:	No impact.				Impossible	0	No Impact
	Flora:	No impact.				Impossible	0	No Impact
	Fauna:	No impact.				Impossible	0	No Impact
	Surface Hydrology:	No impact.				Impossible	0	No Impact
	Groundwater:	No impact.				Impossible	0	No Impact
	Air Quality:	No impact.				Impossible	0	No Impact
	Noise:	No impact.				Impossible	0	No Impact
	Visual Aspects:	No impact.				Impossible	0	No Impact
Dust Suppression:	Geology:	No impact.				Impossible	0	No Impact
	Topography:	No impact.				Impossible	0	No Impact
	Soil:	No impact.				Impossible	0	No Impact
	Flora:	No impact.				Impossible	0	No Impact
	Fauna:	No impact.				Impossible	0	No Impact
	Surface Hydrology:	No impact.				Impossible	0	No Impact
	Groundwater:	No impact.				Impossible	0	No Impact
	Air Quality:	No impact.				Impossible	0	No Impact
	Noise:	Increased noise levels.	Regional	Long Term	Changed	Likely	14	Low Impact
	Visual Aspects:	No impact.				Impossible	0	No Impact

Emergency Incidences:

The following procedures must be made known to all employees:

- The spill of hydrocarbons or other chemical substances from vehicles, containers etc. can cause the pollution of soil, groundwater and surface water. In the event of a hydrocarbon spill, the following steps must be taken:
  - ✓ Management must be notified immediately.
  - ✓ The responsible person must immediately assess the extent of the spill and risk to the safety of personnel.
  - ✓ If possible, the contaminated soil must be treated in situ.
  - ✓ If in situ treatment is not possible, all contaminated soil must be removed and disposed of at an approved disposal facility in an appropriate manner.
- Slope failure on stockpiles or box cut. In the event of slope failure on stockpiles or box cut, the following steps must be taken:
  - ✓ Management must be notified immediately.
  - ✓ The responsible person must immediately assess the risk to personnel.
  - ✓ If needed, all mining activities in proximity to the incident must be ceased.
  - ✓ A suitably competent person must be appointed to take the necessary steps to ensure the safety of personnel.
  - ✓ The failed area must be repaired if needed.
  - ✓ If the area is declared safe, mining activities can continue.

Mitigation Measures:
The table below indicates the mitigation measures for the potential impacts.

Table 7.4: Mitigation Measures for Potential Impacts

Activity:	Environmental Aspect:	Impact:	Significance:	Mitigation Measures:
Topsoil Removal:	Topography:	Lowered.	Medium Impact	This impact will be mitigated when the topsoil is replaced over the mined out areas.
	Soil:	Removed.	Medium Impact	The impact on the soil will be rectified when the topsoil from the topsoil stockpile are used to cover these areas during the closure phase.
	Flora:	Removed.	Medium Impact	The area will be re-vegetated after topsoil is replaced over the mined out areas.
	Fauna:	Removed.	Low Impact	Fauna will return to the area once vegetation is established over mined out areas.
	Surface Hydrology:	Changed runoff.	Medium Impact	The regulations promulgated in Government Notice No.704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The run-off patterns will be restored (altered) during rehabilitation of each mined out area.
	Air Quality:	Increased dust levels.	Low Impact	The following steps will be taken: • A water cart must be present on site, and always in a working order, so that dust suppression can be practiced as frequently as necessary. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers.

Activity:	Environmental Aspect:	Impact:	Significance:	Mitigation Measures:
	Noise:	Increased noise levels.	Low Impact	These noise levels from machinery will attenuate to acceptable levels within a short distance (100m). Note that no significant noise increases are expected within a 500m radius of the activities, which may impact on surrounding residences. Personnel will be issued with the necessary protective gear to ensure their safety. All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.
Excavating:	Geology:	Removed.	Medium Impact	The mine will be committed to optimise the use of the mined mineral in order to ensure no resources are wasted. No other management measures will be possible.
	Topography:	Lowered.	Medium Impact	After topsoil is replaced over a mined out area, a final void will remain.
	Surface Hydrology:	Changed runoff.	Medium Impact	The regulations promulgated in Government Notice No.704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The run-off patterns will be restored (altered) during rehabilitation of each mined out area.

Activity:	Environmental Aspect:	Impact:	Significance:	Mitigation Measures:
	Air Quality:	Increased dust levels.	Low Impact	The following steps will be taken: • A water cart must be present on site, and always in a working order, so that dust suppression can be practiced as frequently as necessary. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers.
	Noise:	Increased noise levels.	Low Impact	These noise levels from machinery will attenuate to acceptable levels within a short distance (100m). Note that no significant noise increases are expected within a 500m radius of the activities, which may impact on surrounding residences. Personnel will be issued with the necessary protective gear to ensure their safety. All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.
Loading:	Air Quality:	Increased dust levels.	Low Impact	The following steps will be taken: • A water cart must be present on site, and always in a working order, so that dust suppression can be practiced as frequently as necessary. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers.