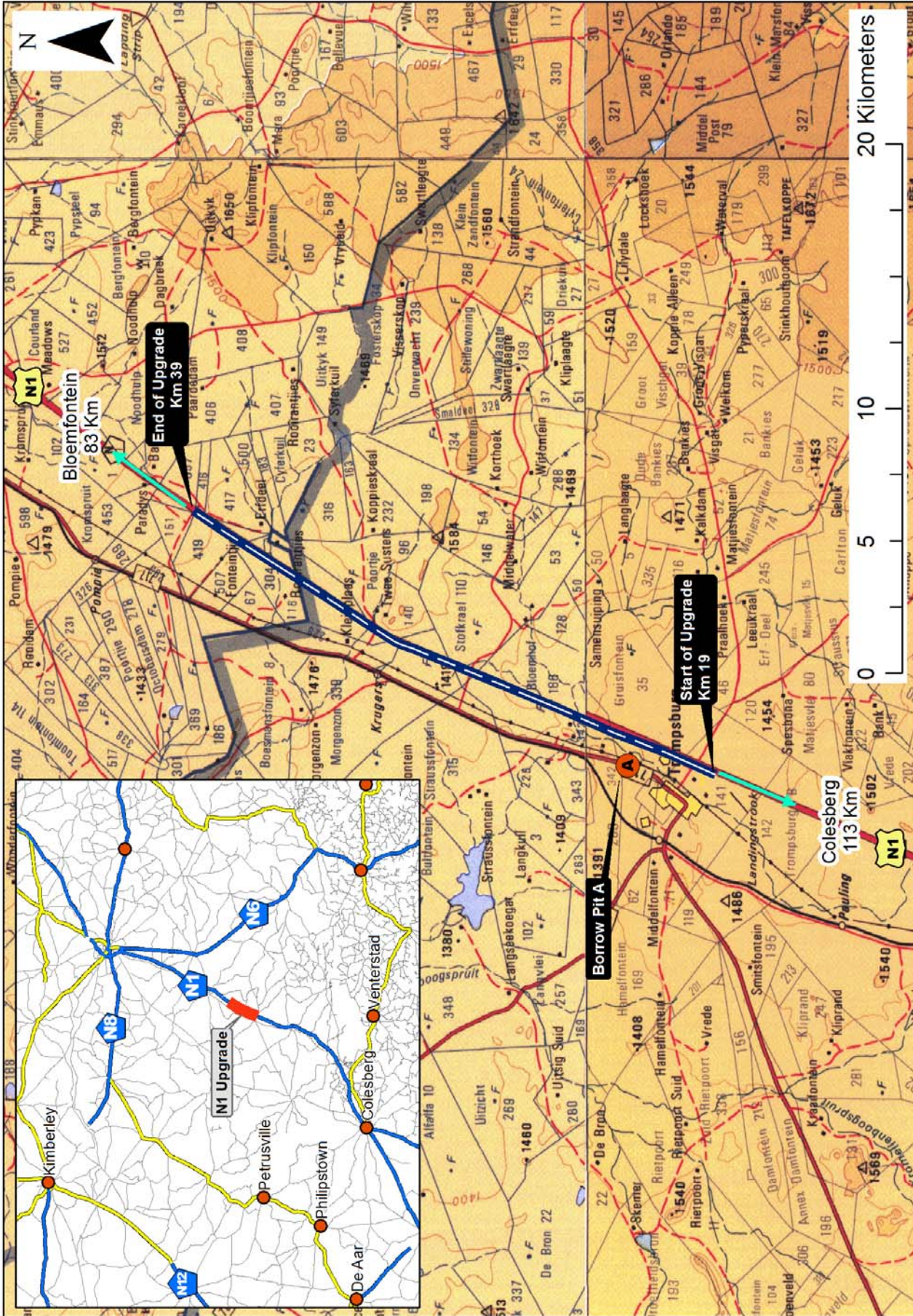


Appendix A1: Locality Plan of Borrow Pit



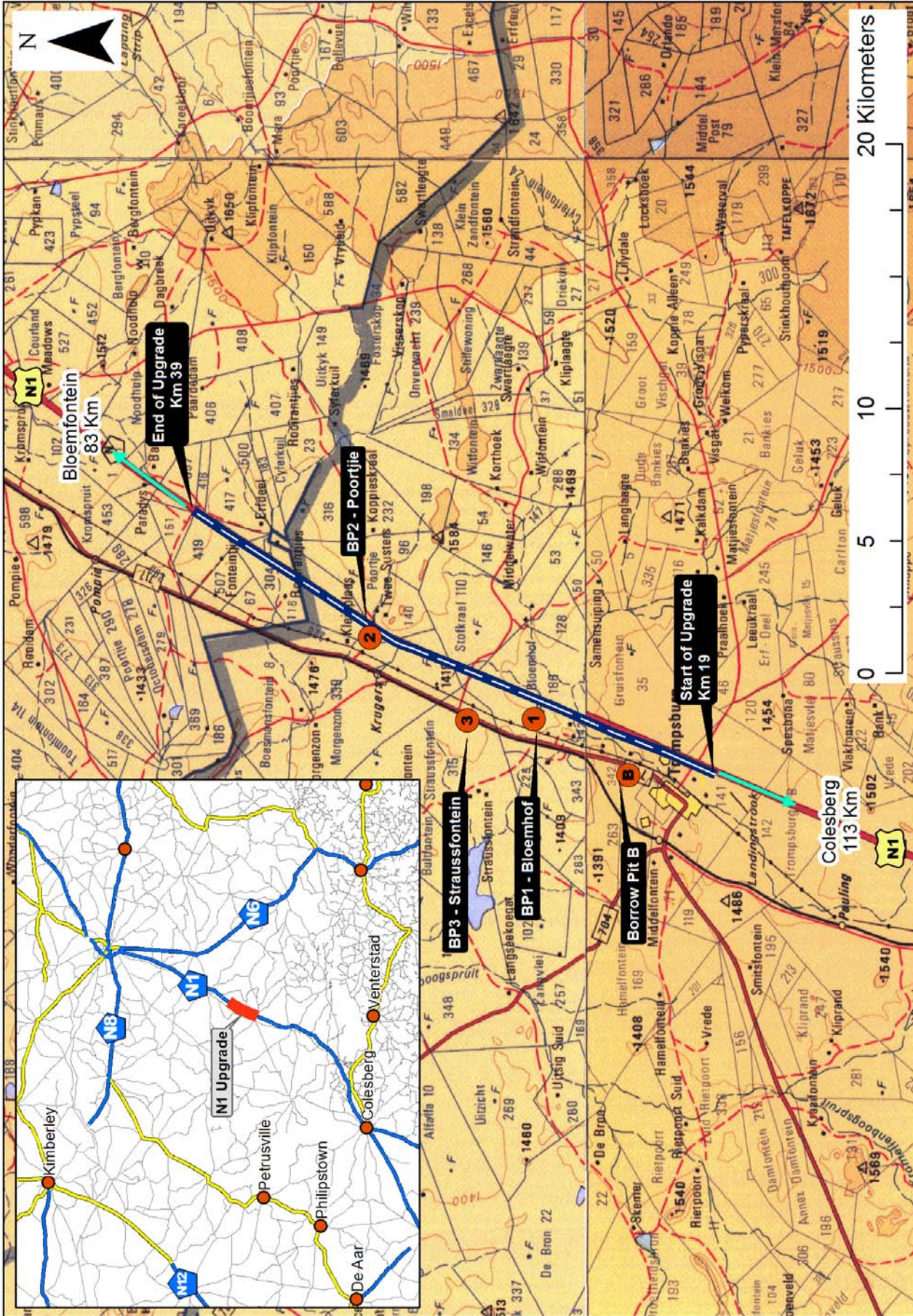
Scale:	1:208 000	A4
Projection:	TM	Date:
Central Meridian/Zone:	N/A	HH94
Date:	26/03/2014	Compiled by:
Project No.	445678	VERJ
Fig No.	001	
Revision:	A	Date:
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NATIONAL ROAD N1 SECTION 14 REHABILITATION

Locality - Municipal Borrow Pit A



**Appendix A2: Locality Plan showing
associated authorised borrow pits (BP1, BP2 &
BP3) and additional BP B in relation to Borrow
Pit A**



Scale:	1:208 000	A4
Projection:	TM	Date:
Central Meridian:	N/A	Zone:
Date:	26/03/2014	Compiled by:
Project No.:	445678	Fig No.:
Revision:	A	Date:

NATIONAL ROAD N1 SECTION 14 REHABILITATION

Locality - Borrow Pits Associated with Borrow Pit A



Appendix A3: Property Details

Appendix A3**Property details**

The proposed Borrow Pit A is located on municipal property, the details of which are provided below.

ID	LAND OWNER	FARM	PORTION	TITLE DEED	SG CODE
BPA	Kopanong Local Municipality	Gruisfontein 35	0 (Remaining Extent)	T12227/2008	F0340000000003500000

Table 1: Information on proposed Borrow Pit A

Required Information	Available Information
Information on the site	
Name of registered owner of property	Kopanong Local Municipality
Full name of the property on which mining operations will be conducted	Gruisfontein, 35
Name of subdivision	0 (Remaining Extent)
Title Deed	T12227/2008
SG Code	F0340000000003500000
Postal address of Property Owner	Private Bag X23, Trompsburg. 9913
Contact Details of Property Owner	Municipal Manager: LY Moletsane (Tel: 0517139202 / 0823044397)
Magisterial District	Kapanong Local Municipality
Central co-ordinates of mining area:	30° 0'53.19"S 25°47'35.64"E
Current uses of the property and surrounding areas	The property is used for commercial agricultural purposes (grazing) with the site consisting of an existing borrow pit. The surrounding area is mainly used for mixed commercial agriculture.
Any other, existing land uses that impact on the environment in the proposed mining area	The site has already been impacted on as the N1 and R717 are in close proximity and contribute to environmental impacts through vehicle emissions and noise. There is an existing borrow pit that is to be extended.
What is the name of the nearest town and specify the distance	Trompsburg – 2 km
Information on the mining activity	
Mineral to be mined	Weathered dolerite material for Subbase C3/C4, SSG G5/G6 and Fill G5/G6
Ultimate depth of the proposed mining operations	3 m below ground level
Total area of mining activities (ha)	Max. 7.1ha
Approximate volume of material to be mined	190,000 m ³
Time period of mining operations to be conducted	2 years construction contract & 1 year rehabilitation

Appendix A4: Description of the Environment

Appendix A4

Description of the Environment (Pre-mining)

As per regulation 52(2) of the MPRDA; the following subsections provide a description of the biophysical and socio-economic conditions of the area as it is currently and where applicable provide comment on potential impacts that may result from the proposed mining activities.

1 Socio-economic and Biophysical Environment

1.1 Topography

The area in which the proposed borrow pit is to be located can generally be described as flat, dotted with small koppies and steeper slopes located at rocky outcrops. Drainage of the region is mainly in an east-west direction.

1.2 Geology and Palaeontology

Sedimentary bedrock in the area is made up of alternating layers of Late Permian sandstone, siltstone and mudstone of the Adelaide Subgroup (Pa, Beaufort Group, Karoo Supergroup). These sedimentary rocks form the base on which younger, superficial deposits of Late Cenozoic age have been deposited. Superficial deposits include pedocretes, colluvial slope deposits, sheet wash and alluvium. The sedimentary rocks are penetrated in many places by weather-resistant dykes and sills of Jurassic dolerites. They determine the relief of the surrounding area, with the resulting hills and groups of hills typically steep-sided, sometimes flat-topped (Rossouw 2012).

The Karoo geological strata within the affected area are generally accepted to be Late Permian in age and are assigned to the Dicynodon Assemblage Zone (AZ). This biozone is characterized by the presence of a distinctive and fairly common dicynodont genus.

The Dicynodon AZ occupies most the Balfour Formation, extending from the top of the Oudeberg Member to the base of the Palingkloof Member. East of 25° the Dicynodon AZ becomes indistinguishable from the underlying Cistecephalus Assemblage Zone. Generally flat topography and widely scattered exposures makes it difficult to follow the Dicynodon AZ in the Free State, although small but rich exposures occur in the Bethulie, Smithfield, Thaba Nchu, Bloemfontein and Van Reenen districts.

The Dicynodon AZ represents the terminal phase of the Palaeozoic continental biota, which was dominated by therapsid “mammal-like reptiles” and Glossopteris Flora before it was largely wiped out by the end-Permian Mass Extinction Event. Other vertebrate fossils include palaeoniscoid fish and crocodile-like temnospondyls. Therapsids and other vertebrate fossils from this biozone are usually found as dispersed and isolated specimens in mudrock horizons, associated with an abundance of calcareous nodules. Fossil remains are commonly enclosed in some of these nodules. Plant fossils include Dadoxylon and Glossopteris. Trace fossils (arthropod trails, worm burrows) are also present. Productive localities occur mostly around areas of high relief such as on the slopes of koppies. Many exposures within the Dicynodon Assemblage Zone were metamorphosed by igneous dolerite intrusions causing changes in the colour and texture of the rocks as well as in the enclosed fossils.

Appendix A4

The sediments assigned to the Dicynodon AZ are associated with stream deposits consisting of floodplain mudstones and subordinate, lenticular channel sandstones.

Overlying Late Cenozoic valley fill deposits may occasionally contain much younger fossil biotas, including the skeletal remains of large vertebrates, non-marine molluscs and a variety of other microfossils. Numerous Quaternary-age fossils, assigned to the Pleistocene Period, have been recorded from various localities along the Riet and Modder Rivers and their tributaries to the north. Mammal fossils previously recorded in the region include the extinct species *Equus capensis*, *Megalotragus priscus*, *Pelrovis antiquus*, *Antidorcas bondi* and *Equus lylei* (Rossouw 2012).

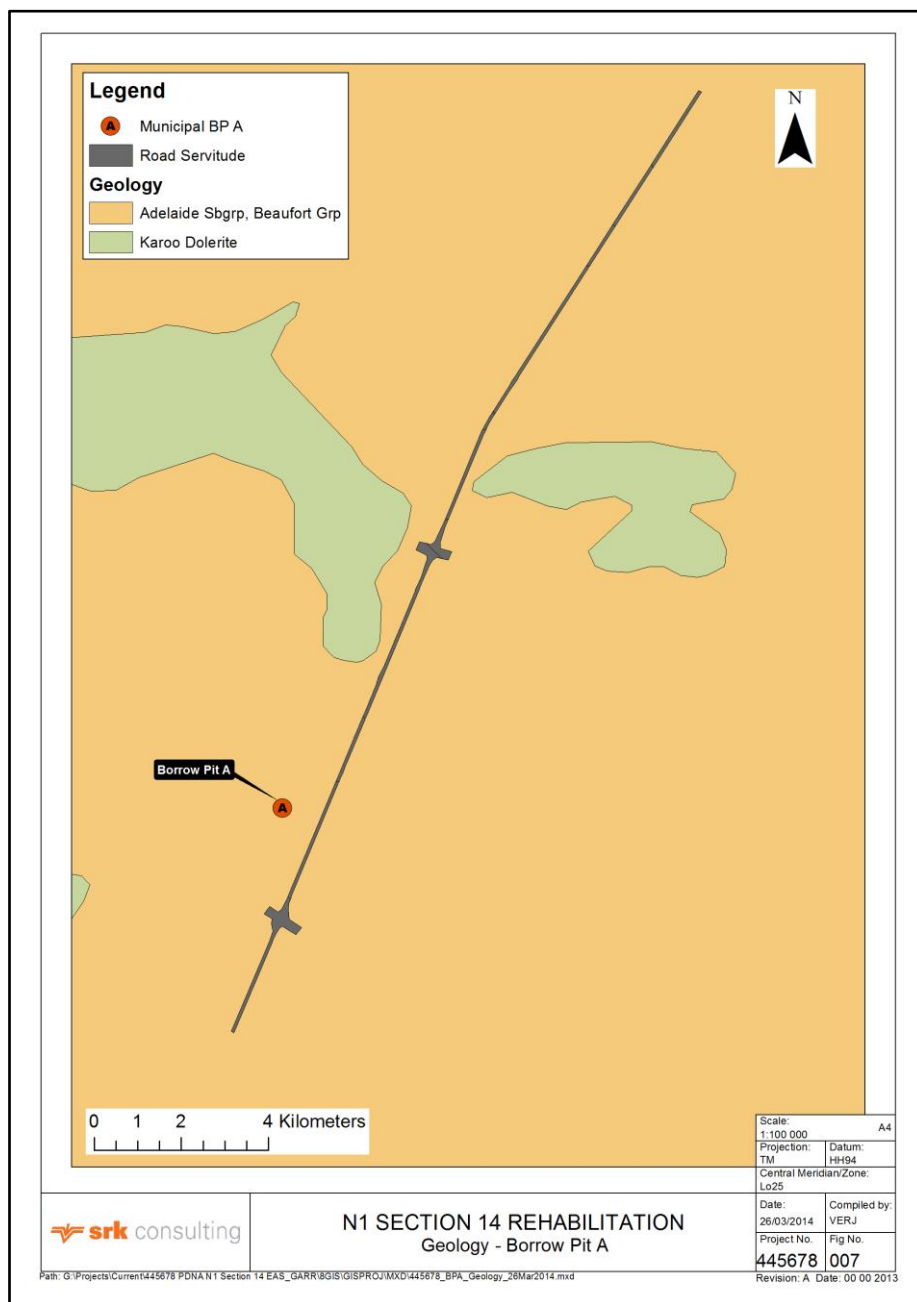


Figure 1: Geology at Borrow Pit A

Appendix A4

1.3 Hydrology

The study area hydrology is characterised by the upper catchment areas of the Nama Karoo Eco-region that drains into the Orange River. Flows within the study area sites are limited to periods with high rainfall. The Van Zylspruit River, a dominant river in the landscape, is followed by the Twee Zusters River, north of Trompsburg in terms of size and complexity.

BP A is not situated close to these rivers and is therefore not expected to have a major impact on this system. BP A is situated in excess of 100 m from streams and rivers, which are clearly visible on the vegetation map (see Figure 2).

Depending on the level of the water table, groundwater resources could potentially be affected by the mining activities due to possible fuel spills from machinery. If the management measures stated in the EMP are adhered to, it is not anticipated that groundwater resources would be significantly affected by the borrow pit activities.

1.4 Land Use

The land use in the area is a mix of commercial agriculture and infrastructure associated with the N1 road, the railway line running parallel to the road, and the towns of Trompsburg and Edenburg. These activities contribute to the pre-impacted state of the surrounding environment.

1.5 Ecology

According to the South African Vegetation Map (Mucina and Rutherford, 2006), the predominant vegetation type in the area of the proposed road rehabilitation and borrow pit site is Xhariep Karroid Grassland (see Figure 2). This vegetation type is widely distributed in the Free State Province and extends into the Northern Cape. Some 4 % of the area covered by Xhariep Karroid Grassland has been transformed by cultivation and dam building, and its conservation status is least threatened.

Approximately 19.5 Km of the road cuts through this vegetation type. The landscape supports low to medium height, open grassland intermingled with small patches of dwarf karroid shrubs. This element becomes more visible during summer and more so in years of higher precipitation. Low cover of grasses such as *Themeda trandra*, *Cymbopogon pospishilii* and *Digitaria erantha* is indicative of the relatively low rainfall.

Appendix A4

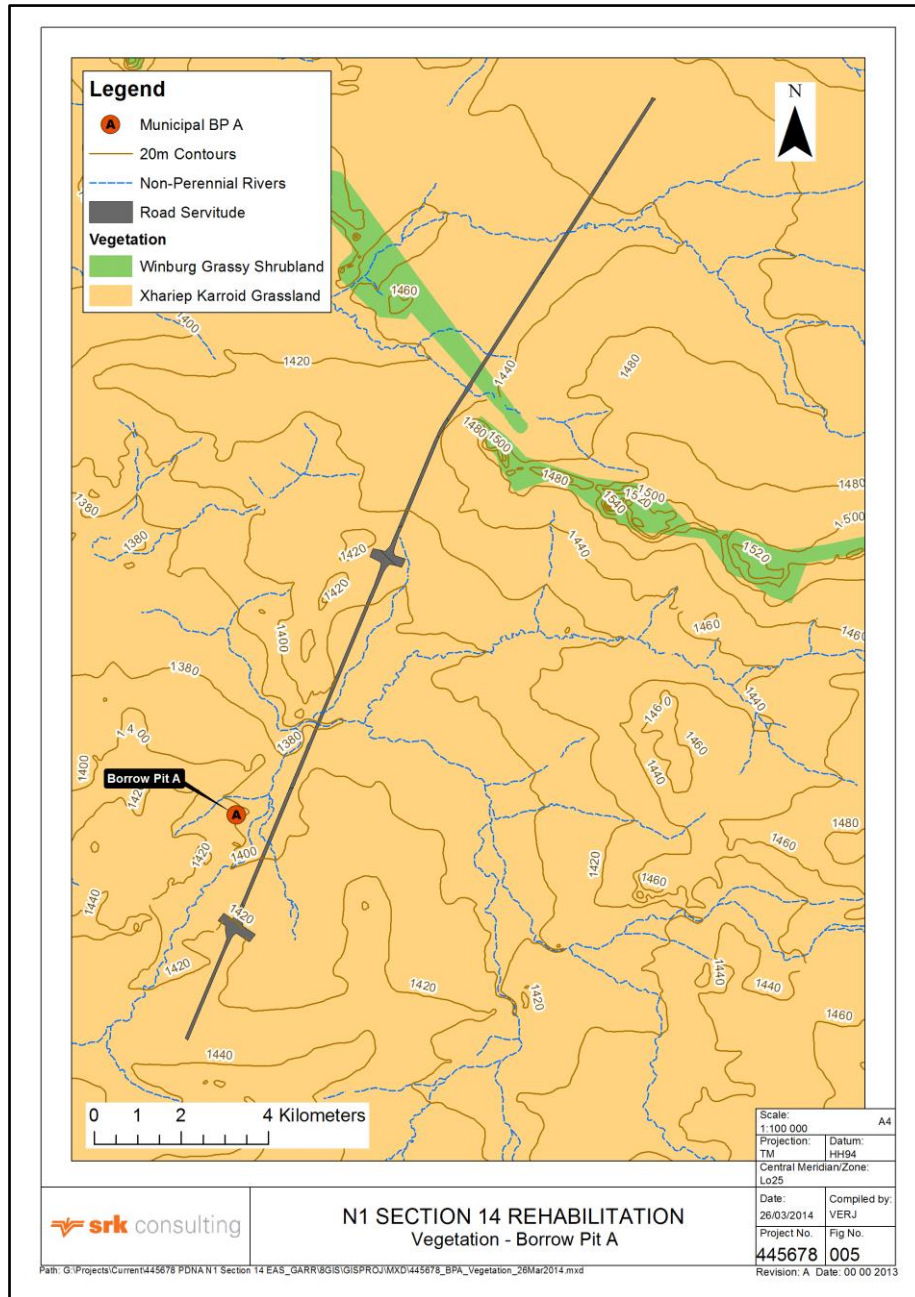


Figure 2: Vegetation at Borrow Pit A

1.6 Visual character

The landscape in the area is described as extensive, even or slightly undulating bottomland flats forming a matrix of large landscape patches interrupted by high dolerite sills/koppies (Figure 3). BP A is located adjacent to the R717 and so it will be visible to passers-by; however the site already consists of an active borrow pit where the Local Municipality are obtaining material for development projects in the area. The site is therefore already in a disturbed state, furthermore the site shows signs of poor housekeeping with the presence of illegally dumped materials as shown in Figure 4 below.

Appendix A4



Figure 3: Visual character of landscape at Borrow Pit A



Figure 4: Illegally dumped materials at Borrow Pit A

Appendix A4

1.7 Air quality

Air quality in the area is typically good as is characteristic in rural areas such as the affected environment, but may be temporarily affected by mining operations (with regard to dust) during construction of the road.

1.8 Noise

The identified site for BP A is situated adjacent to the R717 and heavy machinery is currently operating at the site. The current ambient noise levels are assumed to be relatively low considering the low amount of traffic utilising the R717 and limited number of machinery on site. Receptors of noise impacts during operation of the borrow pit would be landowners and residents on the farms that the site is located on, and those in close proximity.

1.9 Sites of Archaeological and Cultural Interest

Specialist heritage input (Archaeological Assessment) was obtained from Frans Prins of Active Heritage.

Two ruins in close proximity to the borrow pit. The archaeologist recommended that a 25 m buffer be kept around each of these ruins..

A copy of the Archaeological Impact Assessment is included as Appendix A5.

1.10 Paleontological Sites

As per the requirements of SAHRA a Paleontological Impact Assessment was carried out for this project by Lloyd Rossouw.

BP A is partially located on intrusive dolerite bedrock. Dolerite does not contain fossils and is not considerably palaeontologically significant, except where contact metamorphic zones adjacent to dolerite intrusions may be affected. The potential impact on palaeontology is, on the whole, considered to be very low.

A copy of the Paleontological Impact Assessment is included as Appendix A6.

1.11 Social and Economic Environment

Kopanong municipality is the largest local municipality in the Xhariep District in terms of area and covers 11.7% of the Free State. Agriculture is by far the largest contributor to the local economy. According to Statistics South Africa it produces 38% of the gross geographic produce in the Kopanong Local Municipality; other main contributors are general government (23%), finance (13.3%) and trade (10.2%). Almost a third of the employed population is employed in the agriculture sector which is dominated by large commercial farms with few small scale farms being found in the area (Kopanong Local Municipality, 2013).

The predominance of agriculture as the primary economic activity in the area means that cycles of prosperity and decline experienced in the agricultural sector impact on the economic prospects of the population.

Appendix A4

The N1 is on one of the most important routes in the country and is used by a high number of heavy vehicles. It is the main link between Gauteng (Johannesburg) and the Western Cape (Cape Town) as well as the Eastern Cape (Port Elizabeth).

According to the Kopanong Annual Report (Kapanong, 2012) the road network in the region needs to be maintained. The road condition is deteriorating rapidly and very little maintenance is done due to lack of funding. It is important to maintain and upgrade main routes in order to continue the flow of traffic through the area. Failure to rehabilitate the road before it becomes a major problem would therefore result in significant adverse effects to the National Economy as well as to the safety of all those that use the road.

Appendix A5: Archaeological Impact Assessment Report

ARCHAEOLOGICAL IMPACT ASSESSMENT OF TWO BORROW PITS ALONG THE NATIONAL ROUTE 1 NEAR TROPMSBURG, FREE STATE



ACTIVE HERITAGE cc.

For: SRK

Frans Prins
MA (Archaeology)
P.O. Box 947
Howick
3290

feprins@gmail.com

activeheritage@gmail.com

Fax: 086 7636380

www.activeheritage.webs.com

6 July 2014

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LIST OF ABBREVIATIONS AND ACRONYMS

EIA	Early Iron Age
ESA	Early Stone Age
HISTORIC PERIOD	Since the arrival of the white settlers - c. AD 1820 in this part of the country
IRON AGE	Early Iron Age AD 200 - AD 1000 Late Iron Age AD 1000 - AD 1830
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998 and associated regulations (2006).
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999) and associated regulations (2000)
SAHRA	South African Heritage Resources Agency
STONE AGE	Early Stone Age 2 000 000 - 250 000 BP Middle Stone Age 250 000 - 25 000 BP Late Stone Age 30 000 - until c. AD 200

EXECUTIVE SUMMARY

An archaeological survey of two borrow pits situated along the National Route 1 Section 14 near Trompsburg identified no archaeological or heritage sites on the footprint. Some ruins do occur in the near vicinity of the study area but these are not threatened by the proposed development. There is no archaeological reason why development may not proceed the footprint as planned. Attention is drawn to the South African Heritage Resources Act, 1999 (Act No. 25 of 1999) which, requires that operations that expose archaeological or historical remains should cease immediately, pending evaluation by the provincial heritage agency.

1 BACKGROUND INFORMATION ON THE PROJECT

Table 1. Background information

Consultant:	Frans Prins (Active Heritage cc) for SRK
Type of development:	The South African National Roads Agency SOC Limited (SANRAL) proposes to rehabilitate and widen the N1 Section 14 between the Trompsburg interchange (Km19) and Fonteintjie (Km39) in the Kapanong Local Municipality. Two additional borrow pits have been identified for mining in order to complete this project. These are located near Trompsburg adjacent to each other. One is already being mined by the local municipality and the other consists of grazing land.
Rezoning or subdivision:	n.a
Terms of reference	To carry out a Heritage Impact Assessment
Legislative requirements:	The Heritage Impact Assessment was carried out in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and following the requirements of the National Heritage Resources Act, 1999 (Act No. 25 of 1999).

1.1. Details of the area surveyed:

This section of the N1 is located in the Free State province about 86 kilometres south of Bloemfontein. The closest major towns are Colesberg in the South and Bloemfontein in the North (Fig 1). The current road is a two-lane single carriageway with travel lanes of about 3.7m wide and 2,4m paved shoulders. The route also includes borrow and quarry pits that was investigated. Two additional borrow pits have been identified that needs to be investigated. These borrow pits are situated just outside the town of Trompsburg on its northern aspect (Figs 1 & 2). They are located adjacent to each other on either side of the R171 (Figs 3 & 4). Municipal Borrow Pit A is an existing feature that has been quarried by the local municipality. The proposed Municipal Borrow Pit B is situated in a grassland environment that has been used for grazing. The GPS coordinates for these borrow pits are as follows:

- a) Municipal Borrow Pit A: S 30° 0' 53.23" E 25° 47' 35.63"
- b) Municipal Borrow Pit B: S 30° 0' 54.11" E 25° 47' 24.59"

1.2. Cultural Heritage legislation

According to Section 3 (2) of the NHRA, the heritage resources of South Africa include:

- a. places, buildings, structures and equipment of cultural significance;
- b. places to which oral traditions are attached or which are associated with living heritage;
- c. historical settlements and townscapes;
- d. landscapes and natural features of cultural significance;
- e. geological sites of scientific or cultural importance;
- f. archaeological and palaeontological sites;
- g. graves and burial grounds, including.
 - ancestral graves;
 - ii. royal graves and graves of traditional leaders;
 - iii. graves of victims of conflict;
 - iv. graves of individuals designated by the Minister by notice in the Gazette;
 - v. historical graves and cemeteries; and
 - vi. other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
 - h. sites of significance relating to the history of slavery in South Africa;
 - i. movable objects, including objects recovered from the soil or waters of South Africa, including
 - archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - ii. objects to which oral traditions are attached or which are associated with living heritage;
 - iii. ethnographic art and objects;
 - iv. military objects;
 - v. objects of decorative or fine art;
 - vi. objects of scientific or technological interest; and
 - vii. books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).”

In terms of section 3 (3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of:

- a. its importance in the community, or pattern of South Africa's history;

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

1.3 BACKGROUND TO ARCHAEOLOGICAL HISTORY OF AREA

1.3.1 Stone Age

The greater project area, including the southern Free State between Bloemfontein and Colesberg, is home to all three of the known phases of the Stone Age, namely: the Early- (2.5 million – 250 000 years ago), Middle- (250 000 – 22 000 years ago) and Late Stone Age (22 000 – 200 years ago). The Late Stone Age in this area also contains sites with San rock engravings. Early to Middle Stone Age sites are less common in this area; however rock-art sites and Late Stone Age sites appear to be more abundant.

Early Stone Age sites have been ascribed to *Homo erectus* and *Homo ergaster*. These early hominins were hunters and scavengers. They typically lived near permanent sources of water and that is also where most of these sites occur. Although they could control fire it is debateable to what extent they had symbolic cognitive expressions. It was only much later during the Middle Stone Age, some 200 000 years ago, that anatomically modern people or *Homo sapiens* emerged in Eastern and Southern Africa respectively. Unlike their hominin predecessors they manufactured a wider range of tools, with more advanced technologies that included the spear thrower and even the bow and arrow in some areas. This enabled skilled hunter-gatherer bands to adapt more successfully to different environments. From this time onwards, rock shelters were reoccupied over very long periods of time (Mitchell 2002).

The Late Stone Age, considered to have started some 20 000 to 40 000 years ago, is associated with the predecessors of the Khoisan hunter-gatherers that were encountered by the first Europeans in southern Africa some 300 years ago. Later Stone Age hunter-gatherers lived well into the 19th century in some places in SA including the greater project area. Stone Age sites most probably occur in many locales in the area. Later Stone Age sites have been systematically recorded in parts of the Karoo system, to the immediate south of the project area, the density of Later Stone Age sites has been postulated to be as much as 16 sites per square kilometer (Smith 2009) with areas such as the Seacow river producing over 16 000 sites. This is however an average number with sites displaying a clustering nature on the whole. A classic Stone Age location such as Smithfield (the original location of the Smithfield Industry) is located adjacent to the greater project area (Mitchell 2002).

The following Stone Age components could occur in this area:

- Early Stone Age sites dating to more than 300 000 years old.
- Middle Stone Age sites dating from approximately 200 000 to 30 000 years ago.
- Later Stone Age (San hunter-gatherer) artefacts dating to within the last 30 000 years.
- The possible presence of Khoikhoi herder sites within the area dating back to the last 1500 years.
- Rock art, in the form of paintings or engravings, dating mainly to the last 10 000 years (see below)

1.3.2 Rock Art

The SARADA data base indicates that rock art sites occur in small concentrations in the Southern Free State. This is mostly due to the geographic suitability of some areas, providing protection from the elements in the way of rock shelters, overhangs and caves. These sites are known for rock paintings while rock engravings occur over a larger variety of geological formations. These engravings are found mainly on andesite outcrops, although they also occur occasionally on basalt, dolomite, dolerite, gneiss granite and even on sandstone.

1.3.3 Iron Age

Although Later Iron Age sites, belonging to Bantu-speaking agropastoralists, are abundant in northern and eastern Free State none are known to occur in the southern Free State (Dreyer 1996; Maggs 1976). The area to the south of Bloemfontein was most probably too dry and not suitable for the dryland cultivation of Iron Age cultigens and crops (Mitchell 2002).

1.3.4 The Historic Era

The area was already transgressed by trekboers and later by Voortrekkers in the 1830's. Many farmsteads and associated cemeteries belonging to these early Dutch

settlers occur in the area. Sites belonging to the Anglo-Boer war period of 1899-1901 are also scattered throughout the southern Free State. None, however, are known from the footprint.

2 BACKGROUND INFORMATION OF THE SURVEY

2.1 Methodology

A desktop study was conducted of the available heritage and archaeological databases. In addition, the available archaeological literature covering the greater Trompsburg area was also consulted. The following documents were consulted in this study:

- South African National Archive Documents
- The SAHRIS website
- SAHRA Database of Heritage Studies
- Internet Search
- Historic Maps
- Google Earth 2011, 2009 & 2003 imagery
- Published articles and books
- JSTOR Article Archive
- South African Rock Art Digital Archive (SARADA)
- Rock Art Research Institute (RARI)

A ground survey, following standard and accepted archaeological procedures, was conducted. The field assessment was conducted by a SAHRA accredited archaeologist. The borrow pits were surveyed by foot. Phase 1 AIA fieldwork was limited to a surface survey; no excavation or subsurface testing was done. Sub-surface interpretation is based on exposed sub-surface sections.

Archaeological and cultural heritage site significance assessment and associated mitigation recommendations were done according to the system prescribed by SAHRA (2005) (Table 4). The field assessment aimed to locate, identify and assess the significance of cultural heritage resources, inclusive of archaeological deposits / sites, built structures older than 60 years, burial grounds and graves, graves of victims of conflict and basic cultural landscapes or viewsapes, as defined and protected by the NHRA 1999, that may be affected by the proposed development.

2.2 Restrictions encountered during the survey

2.2.1 Visibility

Visibility was good.

2.2.2 Disturbance

No overt disturbance of any potential heritage features was noted.

2.3 Details of equipment used in the survey

GPS: Garmin Oregon 550 (Datum: WGS84).

Digital cameras: Pentax K20D

All readings were taken using the GPS. Accuracy was to a level of 5 m.

3 DESCRIPTION OF SITES AND MATERIAL OBSERVED

3.1 Locational data

Province: Free State Province

Municipality: Kapanong Local Municipality

Town: Trompsburg

3.2 Heritage sites identified

3.2.1 Municipal Borrow Pit A

No archaeological or cultural heritage sites, as defined and protected under the NHRA 1999, were identified on the surface or within exposed sub-surface sections at this site. Exposed sections varied greatly in depth, ranging from 1- 2 m high across the widely utilised site. However, the site has been disturbed to such an extent that no cultural heritage sites or artefacts would have remained in situ (Figs 5 & 6).

Two ruins occur outside of the footprint in the near vicinity of Borrow Pit A. A short description of each follows below:

3.2.1.2 Ruin A

The first ruin, also called Ruin A, is a large rectangular enclosure measuring 30m x 10m (Figs 4 & 8). The GPS coordinates of the structure is: S 30° 00' 56.47" E 25° 47' 41.07". Portions of the wall has collapsed and the structure is dysfunctional. It most probably served as an enclosure for livestock in the past. The structure appears to be older than 60 years old.

The structure is rated as having medium heritage significance (Table 2). The site is protected by National Heritage Legislation and may not be damaged or altered without a permit issued by SAHRA. The developer is urged to maintain a buffer of 25m around this site. Should the developer wish to expand the Borrow Pit operations into this area

then a second phase heritage impact assessment, by a built heritage specialist, is called for. Applications for a permit to demolish or alter a portion of the structure would be an integral component of this second phase.

3.2.1.3 Ruin B

The second ruin, also called Ruin B, is a square enclosure measuring approximately 5m X 5m (Figs 4 & 9). The GPS coordinates of the structure is: S 30° 0' 58.46" E 25° 47' 42.45". The structure is dysfunctional as portions of its wall has collapsed. It most probably served as an enclosure for livestock in the past. The structure appears to be older than 60 years old.

The structure is rated as having medium heritage significance (Table 2). The site is protected by National Heritage Legislation and may not be damaged or altered without a permit issued by SAHRA. The developer is urged to maintain a buffer of 25m around this site. Should the developer wish to expand the Borrow Pit operations into this area then a second phase heritage impact assessment, by a built heritage specialist, is called for. Applications for a permit to demolish or alter a portion of the structure would be an integral component of this second phase.

3.2.2 Municipal Borrow Pit B

No archaeological or cultural heritage sites, as defined and protected under the NHRA 1999, were identified on the surface of this proposed Borrow Pit. The area has been used for grazing in the past and no features are visible (Figs 10 & 11).

4 STATEMENT OF SIGNIFICANCE (HERITAGE VALUE)

4.1 Field Rating

Not applicable as no archaeological or heritage sites were located on the footprint. However, both Ruins A and B, that are located in the near vicinity of the footprint, are rated as having medium significance (Table 2).

Table 2. Field rating and recommended grading of sites (SAHRA 2005)

Level	Details	Action
National (Grade I)	The site is considered to be of National Significance	Nominated to be declared by SAHRA
Provincial (Grade II)	This site is considered to be of Provincial significance	Nominated to be declared by Provincial Heritage Authority
Local Grade IIIA	This site is considered to be of HIGH significance locally	The site should be retained as a heritage site
Local Grade IIIB	This site is considered to be of HIGH significance locally	The site should be mitigated, and part retained as a heritage site
Generally Protected A	High to medium significance	Mitigation necessary before destruction
Generally Protected B	Medium significance	The site needs to be recorded before destruction
Generally Protected C	Low significance	No further recording is required before destruction

5 RECOMMENDATIONS

It is recommended that the establishment of Municipal Borrow Pit A and Municipal Borrow Pit B proceed as applied for without the developer having to comply with additional compliance requirements. There is no archaeological reason why the proposed development may not take place on the footprint as planned. However, care must be taken not to damage or compromise Ruins A and B that are situated in the near vicinity of Borrow Pit A. A buffer of 25m must be strictly maintained around each Borrow Pit. It must also be pointed out that the South Africa Natal Heritage Act requires that operations exposing archaeological and historical residues should cease immediately pending an evaluation by the heritage authorities.

7 MAPS AND FIGURES

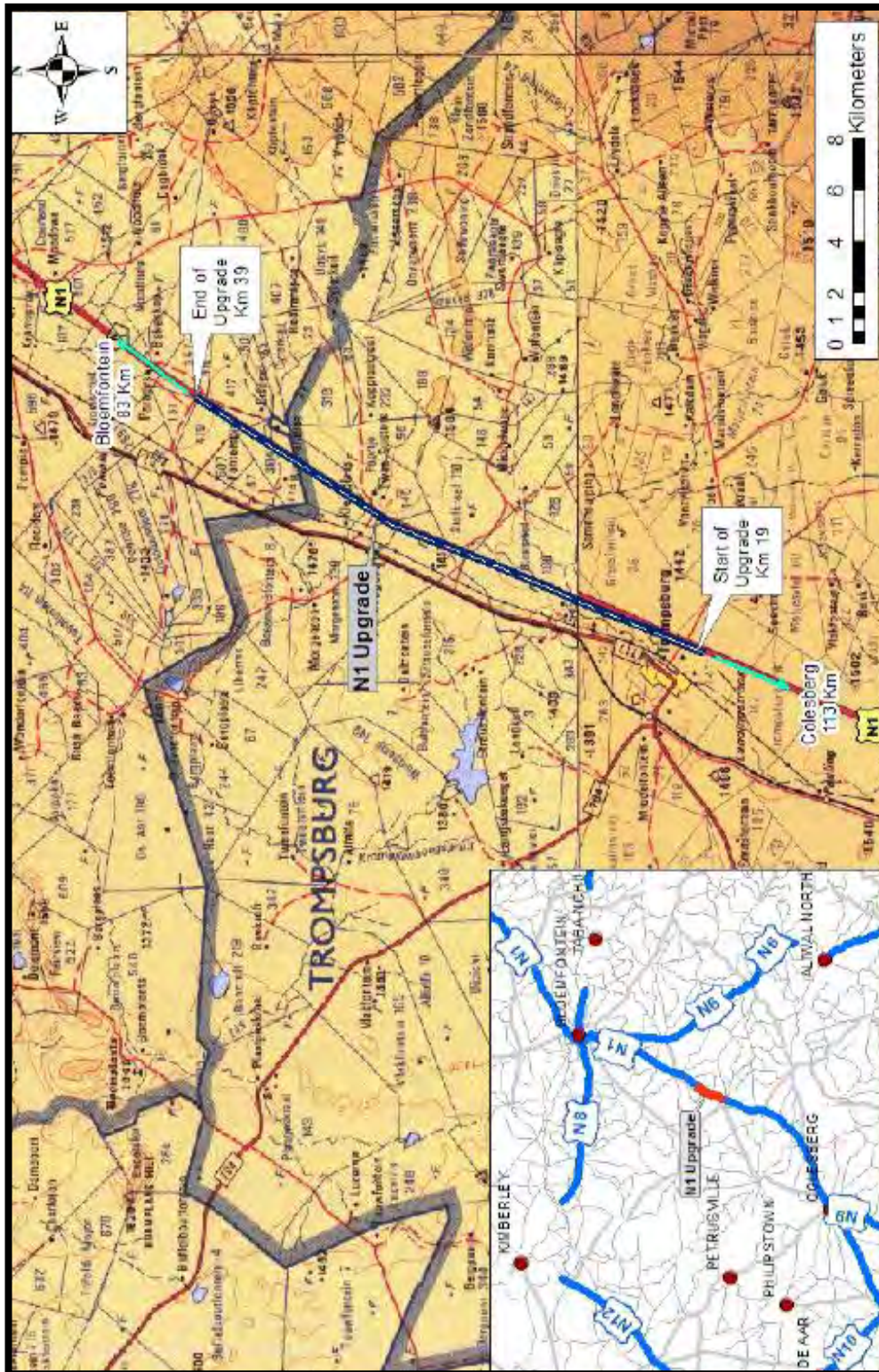


Figure 1. Site locality of the N1 section 14 rehabilitation



Figure 2. Google aerial photograph showing the location of Municipal Borrow Pits A & B on either side of the R171.



Figure 3. Municipal Borrow Pit A organisational plan (Source: SRK)



Figure 4. Ruins A and B situated in the near vicinity of Municipal Borrow Pit A. However, none of these ruins are situated less than 40m from the footprint.



Figure 5. Municipal Borrow Pit B organisational plan (Source: SRK)



Figure 6. View over Municipal Borrow Pit A



Figure 7. View over Municipal Borrow Pit A



Figure 8. Ruin A situated approximately 40m from the edge of Borrow Pit A.



Figure 9. Ruin B situated approximately 55m from the edge of Borrow Pit A.

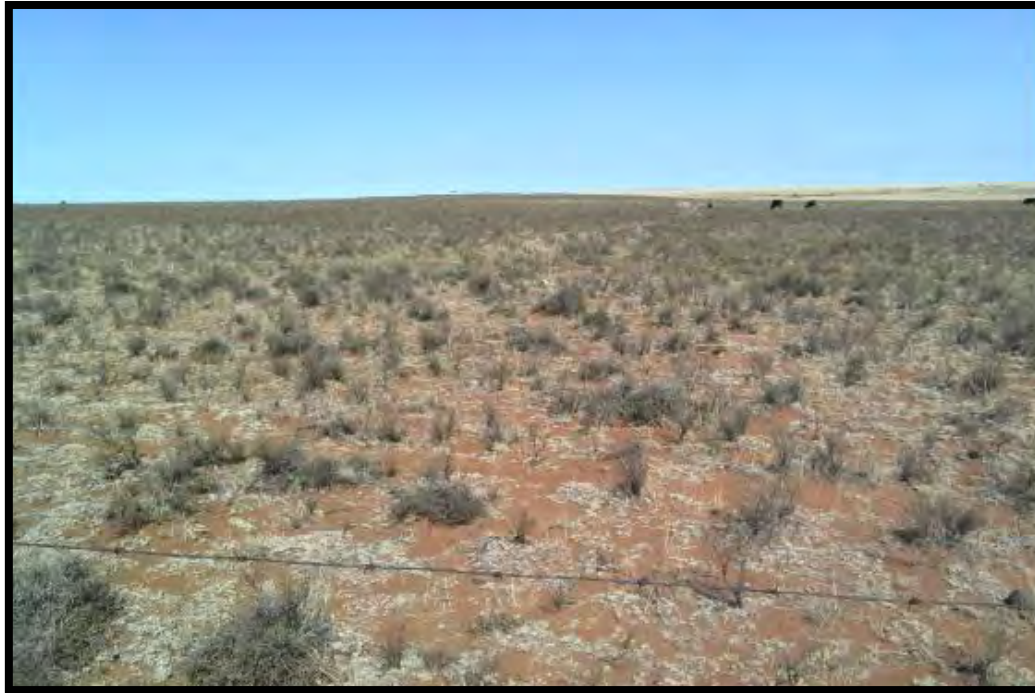


Figure 10. *View over proposed site for Municipal Borrow Pit B.*



Figure 11. *View over proposed site for Municipal Borrow Pit B.*

8 REFERENCES

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Appendix A6: Palaeontological Impact Assessment Report

**Palaeontological Desktop Evaluation of two borrow pits
near Trompsburg, Kapanong Local Municipality, FS
Province.**



Report prepared for:
SRK Consulting, Oakwood House, Palm Square,
Bonza Bay Rd, East London 5241
by
Paleo Field Services
PO Box 38806
Langenhovenpark
9330

Executive Summary

- As part of the South African National Roads Agency's (SANRAL) rehabilitation of the N1 Section 14, located within the Kapanong Local Municipality between the Trompsburg interchange and Fonteintjie, two additional Borrow Pits have been identified on the northern outskirts of Trompsburg.
- Borrow Pit A covers 4.7 ha and is part of an existing borrow pit that is already being mined by the Kapanong Municipality.
- The area demarcated for Borrow Pit B covers 12.2 ha, is undeveloped and consists of open veld.
- Test pits conducted by engineers at Borrow Pit A and Borrow Pit B indicate that both sites are located on intrusive dolerite bedrock.
- Dolerite does not contain fossils and is not considered palaeontologically significant, except where contact metamorphic zones adjacent to dolerite intrusions may be affected.
- The likelihood of finding intact fossil material in overlying, superficial deposits (Quaternary, residual soils) at Borrow Pit B is considered negligible.
- Potential for palaeontological impact at Borrow Pit A and Borrow Pit B is, on the whole, considered to be very low.

Introduction

As part of the South African National Roads Agency's (SANRAL) rehabilitation of the N1 Section 14, located within the Kapanong Local Municipality between the Trompsburg interchange and Fonteintjie, two additional Borrow Pits have been identified on the northern outskirts of Trompsburg that will be required for this project (**Fig. 1**). A desktop evaluation was subsequently conducted in order to identify potential paleontological impact at the two additional Borrow Pit sites.

Geology & Palaeontology

The geology around Trompsburg is shown on the 1: 250 000 geological map 3024 Colesberg (Council for Geoscience, Pretoria 1997) (**Fig. 2**). Sedimentary bedrock in the area is made up of alternating layers of Late Permian sandstone, siltstone and mudstone of the Adelaide Subgroup (*Pa*, Beaufort Group, Karoo Supergroup). The sedimentary rocks around Trompsburg are penetrated in many places by weather-resistant dykes and sills of Jurassic dolerites (*Jd*). Superficial deposits include colluvial slope deposits, sheet wash and alluvium.

The Adelaide subgroup strata around Trompsburg are generally accepted to be Late Permian in age and are assigned to the *Dicynodon* Assemblage Zone (AZ) (**Fig. 3**). This biozone is characterized by the presence of a distinctive and fairly common dicynodont genus (Kitching 1977, 1995). The *Dicynodon* AZ represents the terminal phase of the Palaeozoic continental biota, which was dominated by therapsid mammal-like reptiles. before it was largely wiped out by the end-Permian Mass Extinction Event. Other vertebrate fossils include palaeoniscoid fish and crocodile-like temnospondyls. Plant fossils include *Dadoxylon* and *Glossopteris*. Trace fossils (arthropod trails, worm burrows) may also be present. Neogene valley fill deposits may occasionally contain much younger fossil biotas, including the skeletal remains of large vertebrates, non-marine molluscs and a variety of other microfossils. Large mammal vertebrate fossil remains, assigned to the Pleistocene Period, have been recorded from various localities along the Riet and Modder Rivers and their tributaries to the north.

Site Details

Locality data

1 : 50 000 topographic map: 3025 BB Trompsburg

1 : 250 000 geological map: 3024 Colesberg

Site coordinates for Additional Borrow Pit A (**Fig 5**):

- A) 30° 0'47.30"S 25°47'34.16"E
- B) 30° 0'48.58"S 25°47'41.46"E
- C) 30° 0'54.63"S 25°47'42.52"E
- D) 30° 0'58.76"S 25°47'37.91"E
- E) 30° 0'57.37"S 25°47'30.60"E

Site coordinates for Additional Borrow Pit B (**Fig. 7**):

- A) 30° 0'49.24"S 25°47'18.09"E
- B) 30° 0'51.26"S 25°47'32.37"E
- C) 30° 1'1.52"S 25°47'28.62"E
- D) 30° 0'57.78"S 25°47'15.11"E

The additional Borrow Pits (BP A and BP B) are located next to the R717 road, about 2 km north of Trompsburg (**Figs. 4**). BP A covers 4.7 ha and is part of an existing borrow pit that is already being mined by the Koponong Municipality (**Fig. 5 & 6**). The area demarcated for BP B covers 12.2 ha, is undeveloped and consists of open veld (**Fig. 7 & 8**).

Impact statement

Test pits conducted by engineers at BP A and BP B indicate that both sites are located on intrusive dolerite bedrock (**Table 1 & 2; Addendum**). Dolerite does not contain fossils and is not considered palaeontologically significant, except where contact metamorphic zones adjacent to dolerite intrusions may be affected. The likelihood of finding intact fossil material in overlying, superficial deposits (Quaternary, residual soils) at BP B is considered negligible. Potential for palaeontological impact at BP A and BP B is, on the whole, considered to be very low.

Recommendation

Provided that excavation activities are restricted to within the boundaries assigned to the sites, there are no major palaeontological grounds to suspend the proposed development at BP A and BP B.

References

Kitching, J.W. 1977. The distribution of Karoo Vertebrate Fauna. Bernard Price Institute for Palaeontological Research. Memoir 1, 1 – 131.

Kitching, J.W. 1995. Dicynodon AZ. **In:** B.S. Rubidge (ed.) *Biostratigraphy of the Beaufort Group*. Biostrat. Ser. S.Afr. Comm. Strat. 1, 29 – 34.

Rubidge, B. S. (ed.) 1995. *Biostratigraphy of the Beaufort Group*. Biostrat. Ser. S.Afr. Comm. Strat. 1, 1 – 45.

Tables & Figures

Table 1. Results from test pit survey at BP A (test pit loc. shown in Fig. 5).

Test Pit No	Rock Type
TP1	Weathered Dolerite
TP2	Weathered Dolerite
TP3	Weathered Dolerite
TP4	Weathered Dolerite
TP5	Weathered Dolerite
TP6	Hard Rock
TP7	Hard Rock
TP8	Weathered Dolerite
TP9	Weathered Dolerite
TP10	Weathered Dolerite

Table 2. Results from test pit survey at BP B (test pit loc. shown in Fig. 7).

Test Pit No	Rock Type
TP1	Weathered Dolerite
TP2	Weathered Dolerite
TP3	Weathered Dolerite
TP4	Weathered Dolerite
TP5	Weathered Dolerite
TP6	Weathered Dolerite
TP7	Weathered Dolerite
TP8	Weathered Dolerite
TP9	Weathered Dolerite
TP10	Weathered Dolerite
TP11	Weathered Dolerite
TP12	Weathered Dolerite
TP13	Weathered Dolerite
TP14	Weathered Dolerite

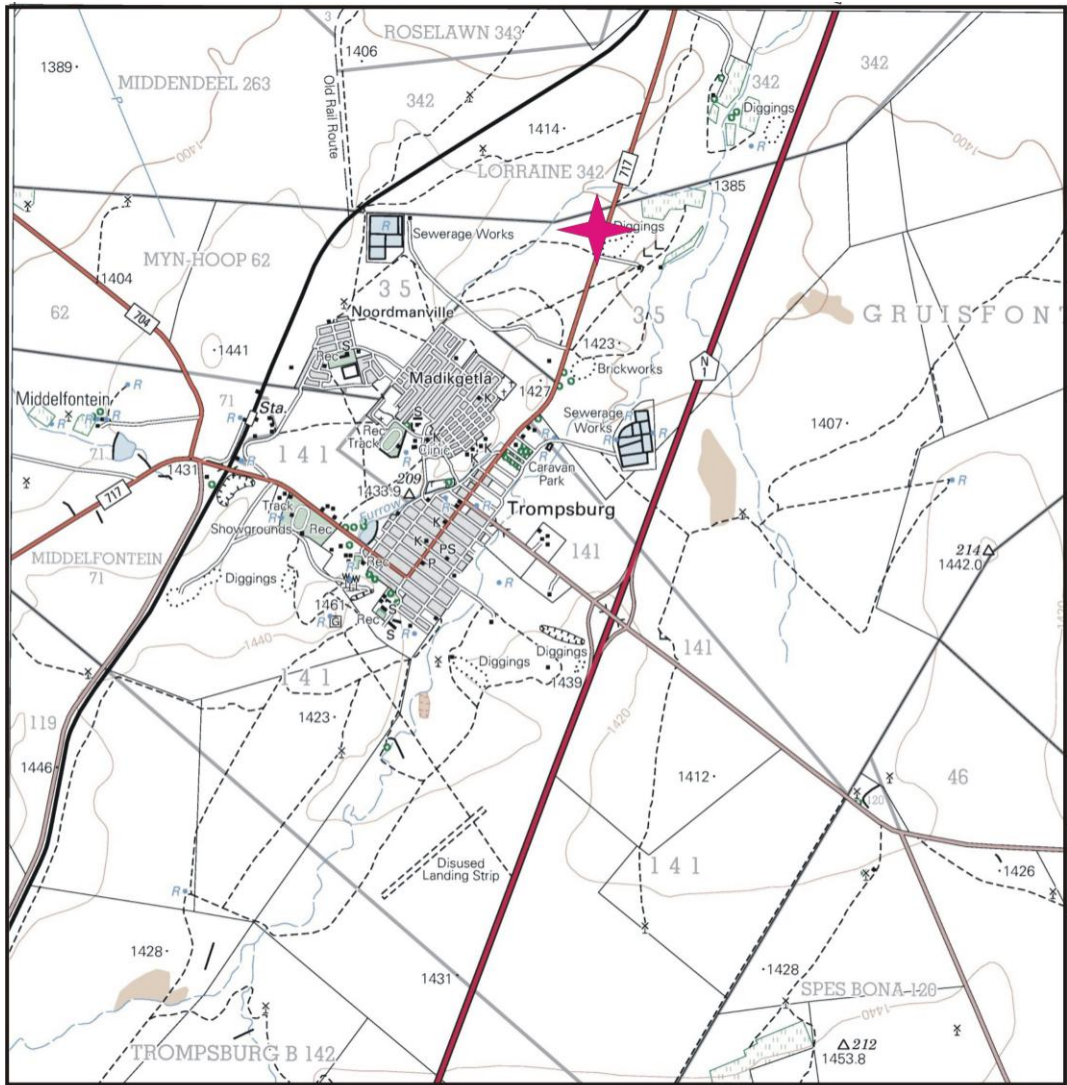


Figure 1. Locality of additional borrow pits near Trompsburg (portion of 1:50 000 scale topographic map 3025 BB Trompsburg).

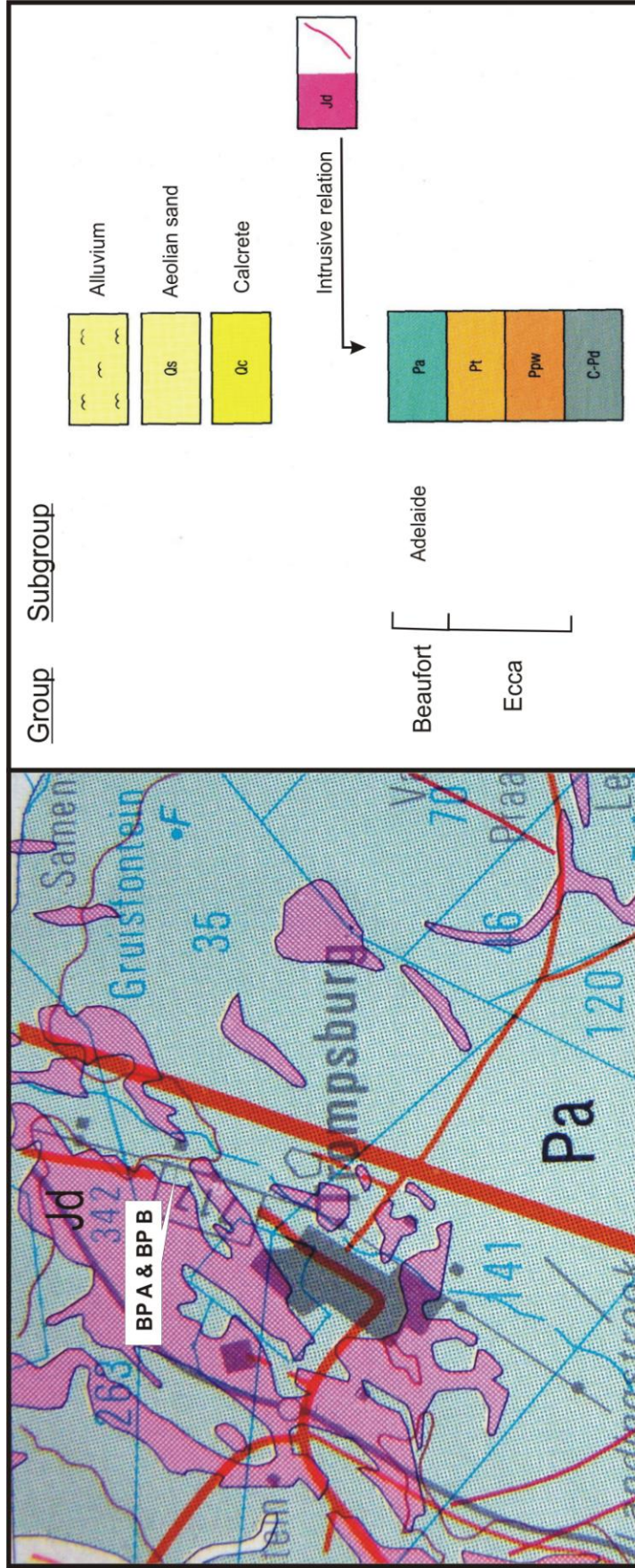


Figure 2. Portion of 1:250 000 scale geological map 3024 Colesberg of the area around Trompsburg..

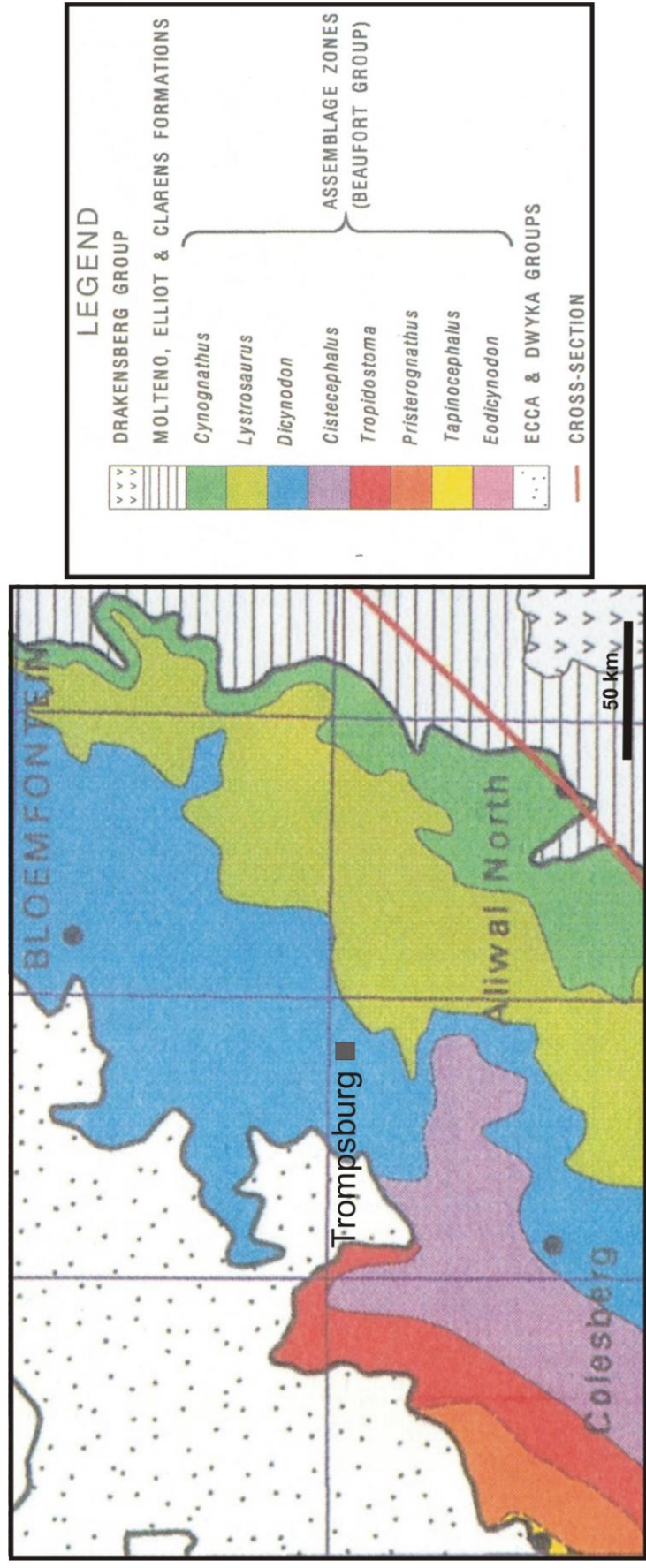


Figure 3. Geographical distribution of Karoo vertebrate biozones of the Beaufort Group near Trompsburg (after Rubidge 1995).



Figure 4. Aerial view of Trompsburg and the two additional borrow pit localities.

BORROW PIT ORGANISATION PLAN

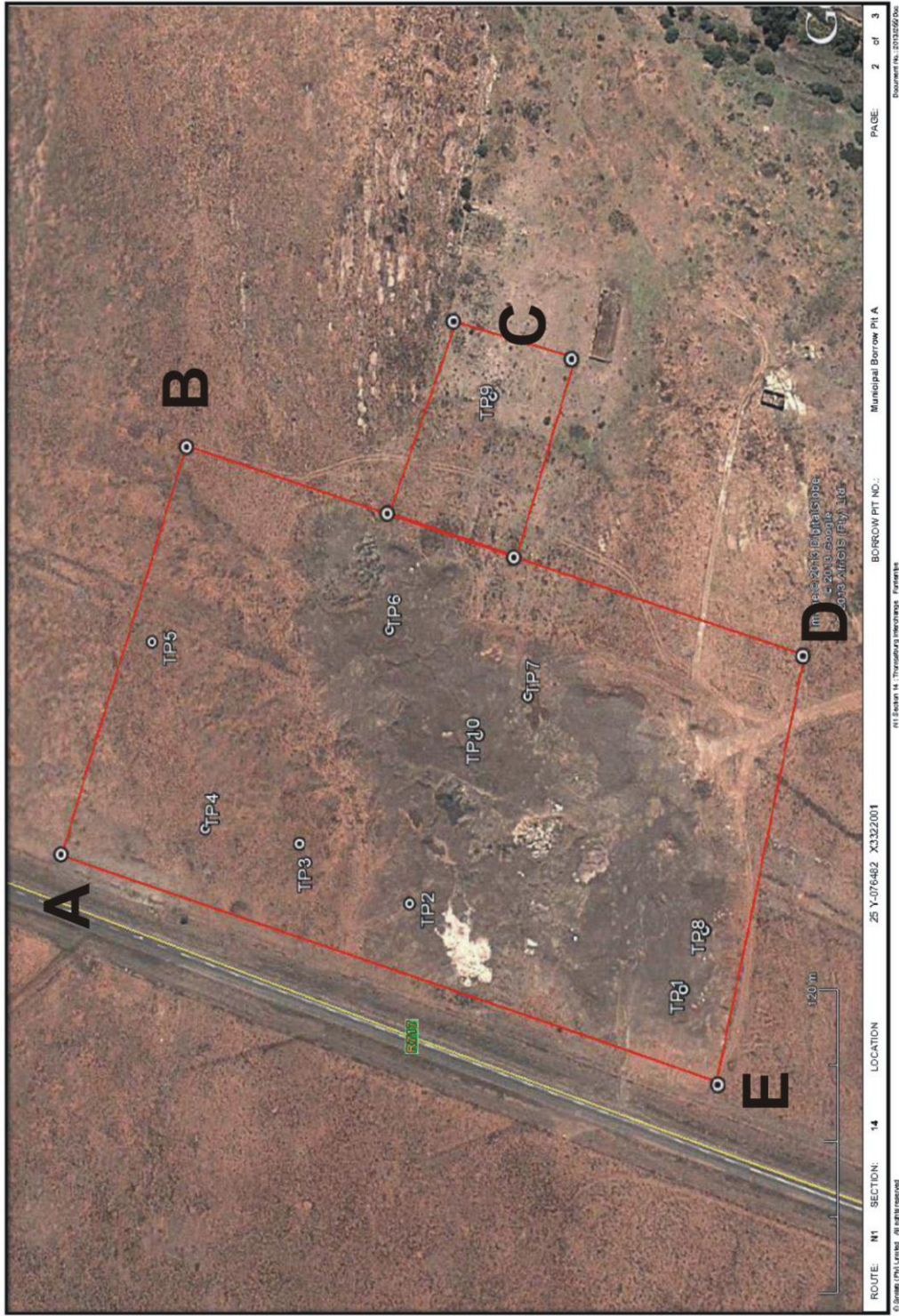


Figure 5. Aerial view of Borrow Pit A.

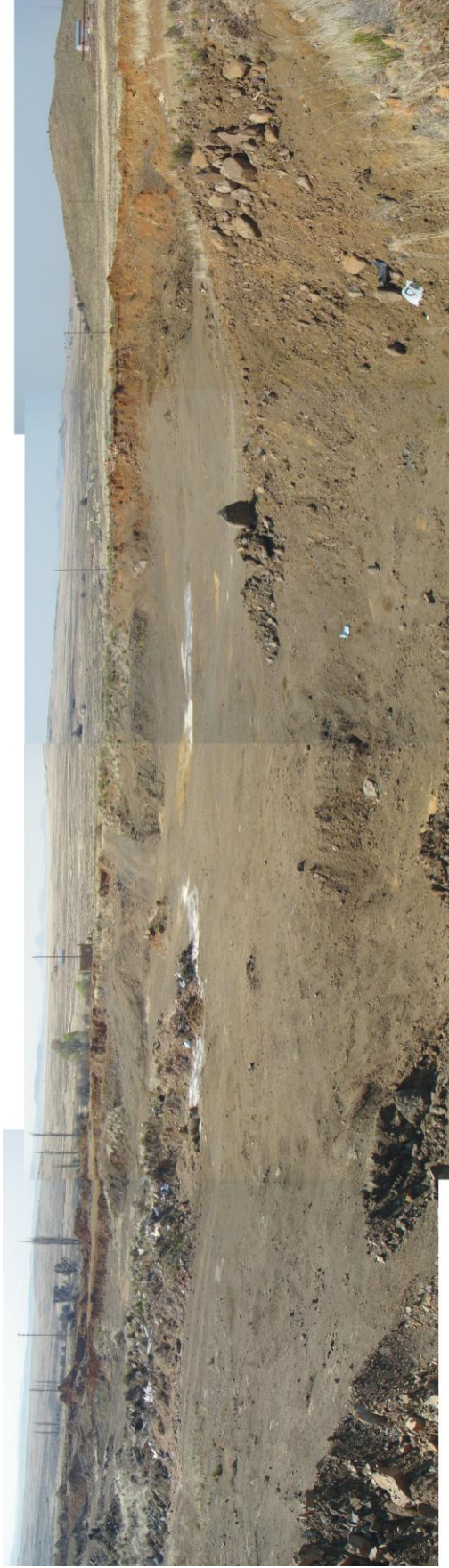


Figure 6. Borrow Pit A, looking east. The site is part of an existing borrow pit that is already being mined by the Koponong Municipality.

BORROW PIT ORGANISATION PLAN

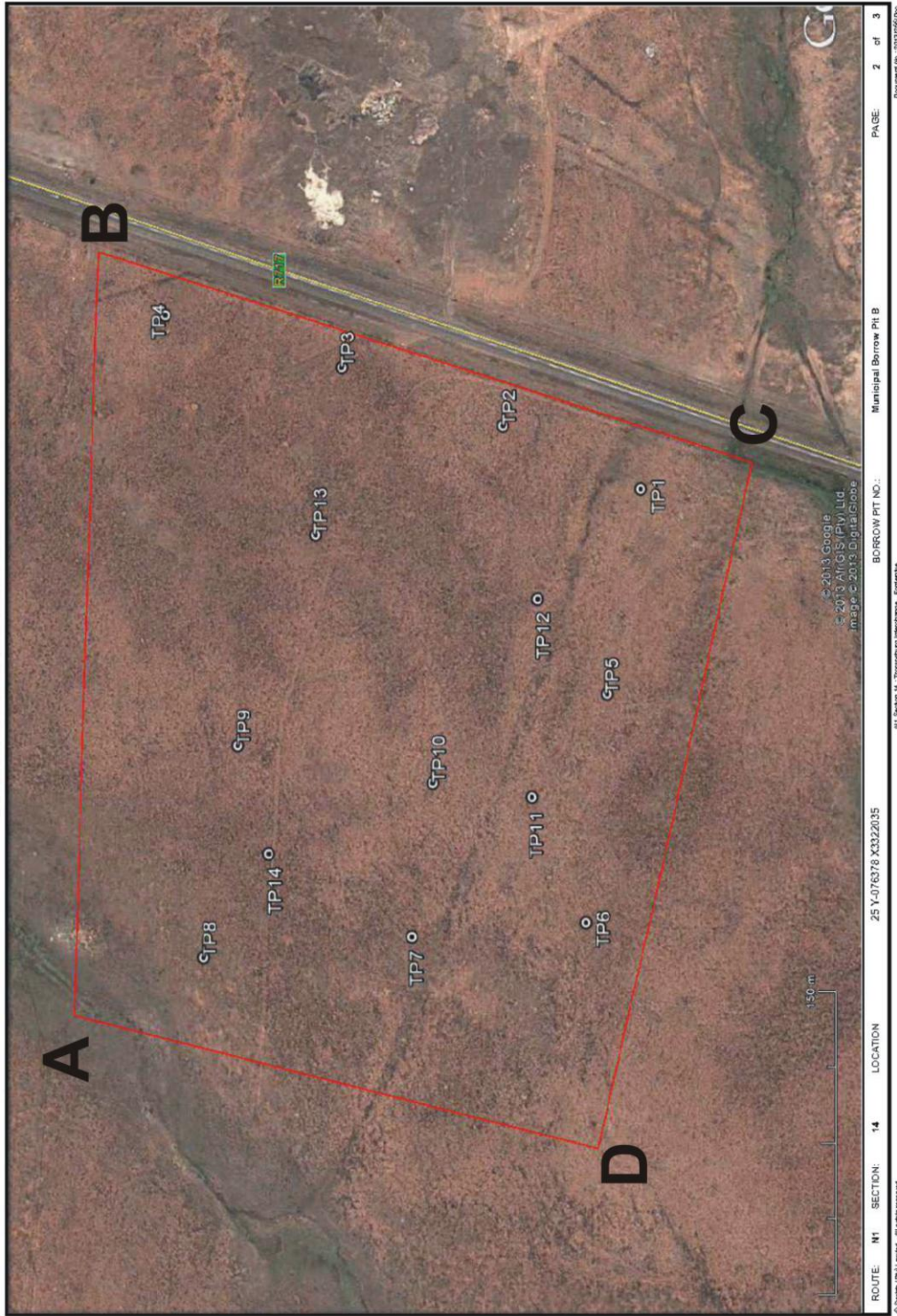


Figure 7. Aerial view of Borrow Pit B.

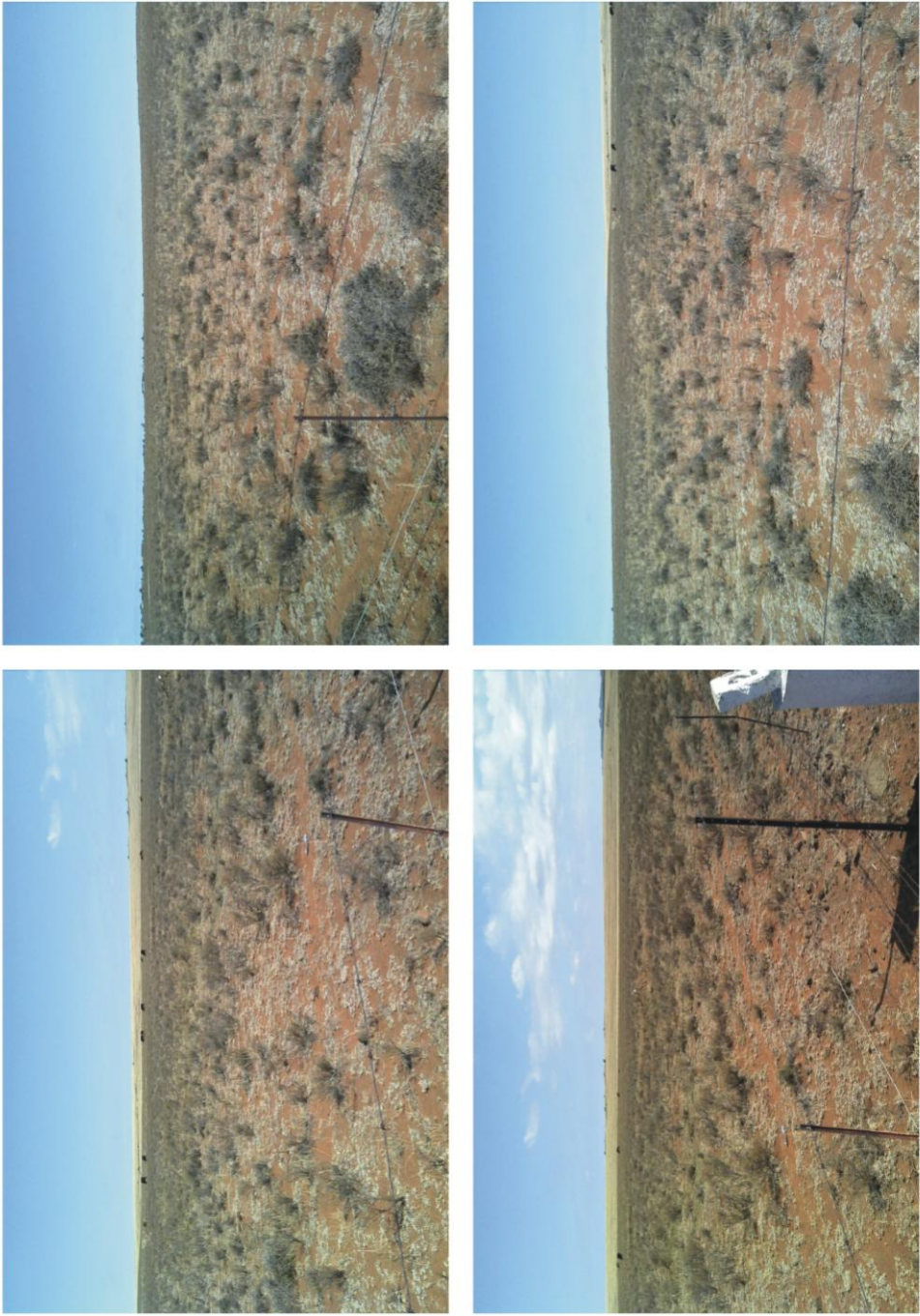


Figure 8. The Borrow Pit B site, looking northwest (A), southwest (B), north (C) and west (D).

Addendum

BORROW PIT ORGANISATION PLAN

<p>BORROW PIT NAME: OWNER: NAME ADDRESS CONTACT DETAILS</p>	<p>MUNICIPAL BORROW PIT A: East of R717 Kopomong Local Municipality Private Bag X23, Trompsburg, 9913 078 8-49 4806 / 051 713 0036</p>	<p>OVERBURDEN (AVG THICKNESS) m - 0,287</p> <p>GRAVEL (AVG THICKNESS) m 2,000</p> <p>BORROW PIT AREA m² 46800</p> <p>OVERBURDEN VOLUME m³ -</p> <p>GRAVEL VOLUME m³ 93600</p> <p>VEGETATION Grass</p>	<p>WHOLE UNIT BORROW AREA</p> <p>SELECTED AREA</p>	<p>MATERIAL DESCRIPTION SUITABLE FOR (LAYER) CLASSIFICATION</p> <p>Weathered dolomite C4, C3</p> <p>Weathered dolomite S5G G5 / G6</p> <p>Weathered dolomite F18 G5 / G6</p> <p><u>Notes:</u></p> <p>1.) The yield of 93600m³ was proven by means of a 22ton excavator.</p> <p>2.) A percussion drilling exercise was done which showed that the volume of material can be increased to 195000m³ only by light blasting.</p>	<p>TEST PIT CO-ORDINATES</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>TP1</td><td>25 Y+076448 X332121</td><td>TP4</td><td>25 Y+076460 X332096</td></tr> <tr><td>TP2</td><td>25 Y+076482 X332054</td><td>TP7</td><td>25 Y+076469 X332124</td></tr> <tr><td>TP3</td><td>25 Y+076506 X331951</td><td>TP8</td><td>25 Y+076473 X332130</td></tr> <tr><td>TP4</td><td>25 Y+076512 X331906</td><td>TP9</td><td>25 Y+076501 X332109</td></tr> <tr><td>TP5</td><td>25 Y+076580 X331885</td><td>TP6</td><td>25 Y+076502 X332102</td></tr> <tr><td></td><td></td><td>TP10</td><td>25 Y+076486 X332160</td></tr> <tr><td></td><td></td><td>TP11</td><td>25 Y+076602 X332160</td></tr> <tr><td></td><td></td><td>TP12</td><td>25 Y+076528 X3321923</td></tr> </table>	TP1	25 Y+076448 X332121	TP4	25 Y+076460 X332096	TP2	25 Y+076482 X332054	TP7	25 Y+076469 X332124	TP3	25 Y+076506 X331951	TP8	25 Y+076473 X332130	TP4	25 Y+076512 X331906	TP9	25 Y+076501 X332109	TP5	25 Y+076580 X331885	TP6	25 Y+076502 X332102			TP10	25 Y+076486 X332160			TP11	25 Y+076602 X332160			TP12	25 Y+076528 X3321923	<p>BORROW PIT ORGANISATION PLAN</p>
TP1	25 Y+076448 X332121	TP4	25 Y+076460 X332096																																			
TP2	25 Y+076482 X332054	TP7	25 Y+076469 X332124																																			
TP3	25 Y+076506 X331951	TP8	25 Y+076473 X332130																																			
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		TP10	25 Y+076486 X332160																																			
		TP11	25 Y+076602 X332160																																			
		TP12	25 Y+076528 X3321923																																			
<p>BORROW PIT NAME: OWNER: NAME ADDRESS CONTACT DETAILS</p>	<p>Municipal Borrow Pit A</p>	<p>PROPERTY: Kopomong Municipality</p> <p>KILOMETER DISTANCE: 25 Y+076482 X3322001</p> <p>ROUTE: NI SECTION 14 LOCATION</p>			<p>PAGE 1 of 3</p> <p><small>© Same (Pty) Limited - All rights reserved</small></p>																																	

Addendum A. Layout of Borrow Pit A as provided by SRK Consulting.

BORROW PIT ORGANISATION PLAN

BORROW PIT NAME:
OWNER:
NAME
ADDRESS
CONTACT DETAILS

MUNICIPAL BORROW PIT B: West of R717
 Koponong Local Municipality
 Private Bag X23, Trompsburg, 9913
 078 849 4806 / 051 713 0038



TEST PIT NO.	OVERBURDEN (m)	GRAVEL (m)	DESCRIPTION
1	0.300	1.400	Weathered dolerite
2	0.300	1.100	Weathered dolerite
3	0.270	1.100	Weathered dolerite
4	0.300	1.400	Weathered dolerite
5	0.200	2.500	Weathered dolerite
6	0.250	1.000	Weathered dolerite
7	0.200	2.000	Weathered dolerite
8	0.200	2.400	Weathered dolerite
9	0.200	2.000	Weathered dolerite
10	0.200	2.500	Weathered dolerite
11	0.100	2.100	Weathered dolerite
12	0.100	3.600	Weathered dolerite
13	0.100	2.700	Weathered dolerite
14	0.200	3.600	Weathered dolerite

WHOLE UNIT BORROW AREA	SELECTED BORROW AREA
m	0.210
m	2.120
m²	122000
m³	29620
m³	259000

MATERIAL DESCRIPTION	SUITABLE FOR (LAYER) CLASSIFICATION
Weathered dolerite	SSG
Weathered dolerite	FS
Stabilised	Subbase
	C4 / C3

Notes:
 1.) A yield of 260000m³ weathered dolerite was proven by means of a 2.0m excavator.
 2.) The above yields are based on the average shown above and the yield can be increased to 800000m³. Light blasting may be required at deeper than 4m.

TEST PIT CO-ORDINATES	BH A	BH B	BH C	BH D	BH E	BH F	BH G	BH H	BH I
TP1	25 Y-076315 X332186	25 Y-076061 X332186	25 Y-076385 X331985	25 Y-076188 X332197	25 Y-076286 X332023	25 Y-076142 X332197	25 Y-076119 X332046	25 Y-076200 X332141	25 Y-076294 X332020
TP2	25 Y-076348 X332123	25 Y-076188 X332197	25 Y-076385 X331985	25 Y-076188 X332197	25 Y-076286 X332023	25 Y-076142 X332197	25 Y-076119 X332046	25 Y-076200 X332141	25 Y-076294 X332020
TP3	25 Y-076378 X332035	25 Y-076188 X332197	25 Y-076385 X331985	25 Y-076188 X332197	25 Y-076286 X332023	25 Y-076142 X332197	25 Y-076119 X332046	25 Y-076200 X332141	25 Y-076294 X332020
TP4	25 Y-076405 X331939	25 Y-076188 X332197	25 Y-076385 X331985	25 Y-076188 X332197	25 Y-076286 X332023	25 Y-076142 X332197	25 Y-076119 X332046	25 Y-076200 X332141	25 Y-076294 X332020
TP5	25 Y-076212 X332178	25 Y-076188 X332197	25 Y-076385 X331985	25 Y-076188 X332197	25 Y-076286 X332023	25 Y-076142 X332197	25 Y-076119 X332046	25 Y-076200 X332141	25 Y-076294 X332020
TP6	25 Y-076061 X332071	25 Y-076188 X332197	25 Y-076385 X331985	25 Y-076188 X332197	25 Y-076286 X332023	25 Y-076142 X332197	25 Y-076119 X332046	25 Y-076200 X332141	25 Y-076294 X332020
TP7	25 Y-076378 X332035	25 Y-076188 X332197	25 Y-076385 X331985	25 Y-076188 X332197	25 Y-076286 X332023	25 Y-076142 X332197	25 Y-076119 X332046	25 Y-076200 X332141	25 Y-076294 X332020

PROPERTY:	Municipal Borrow Pit B
KILOMETER DISTANCE:	DISTANCE TO CENTRELINE (m):
ROUTE	14
SECTION	14
LOCATION	25 Y-076378 X332035
OWNER:	Koponong Municipality
BORROW PIT NO.:	Borrow Pit B
PAGE:	1 of 3

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 Document No.: 2012060.doc

Addendum B. Layout of Borrow Pit B as provided by SRK Consulting.