

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



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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

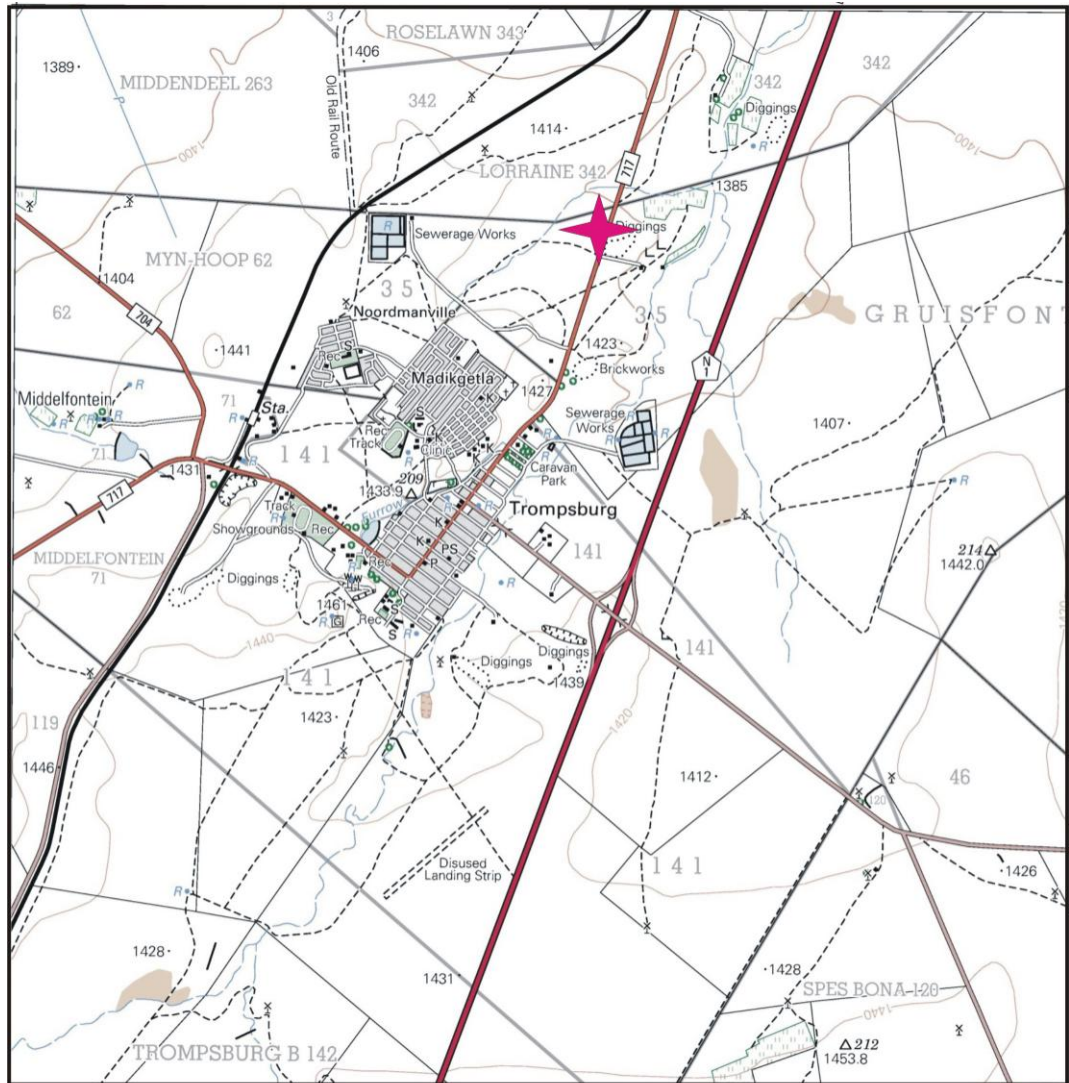


Figure 1. Locality of additional borrow pits near Trompsburg (portion of 1:50 000 scale topographic map 3025 BB Trompsburg).

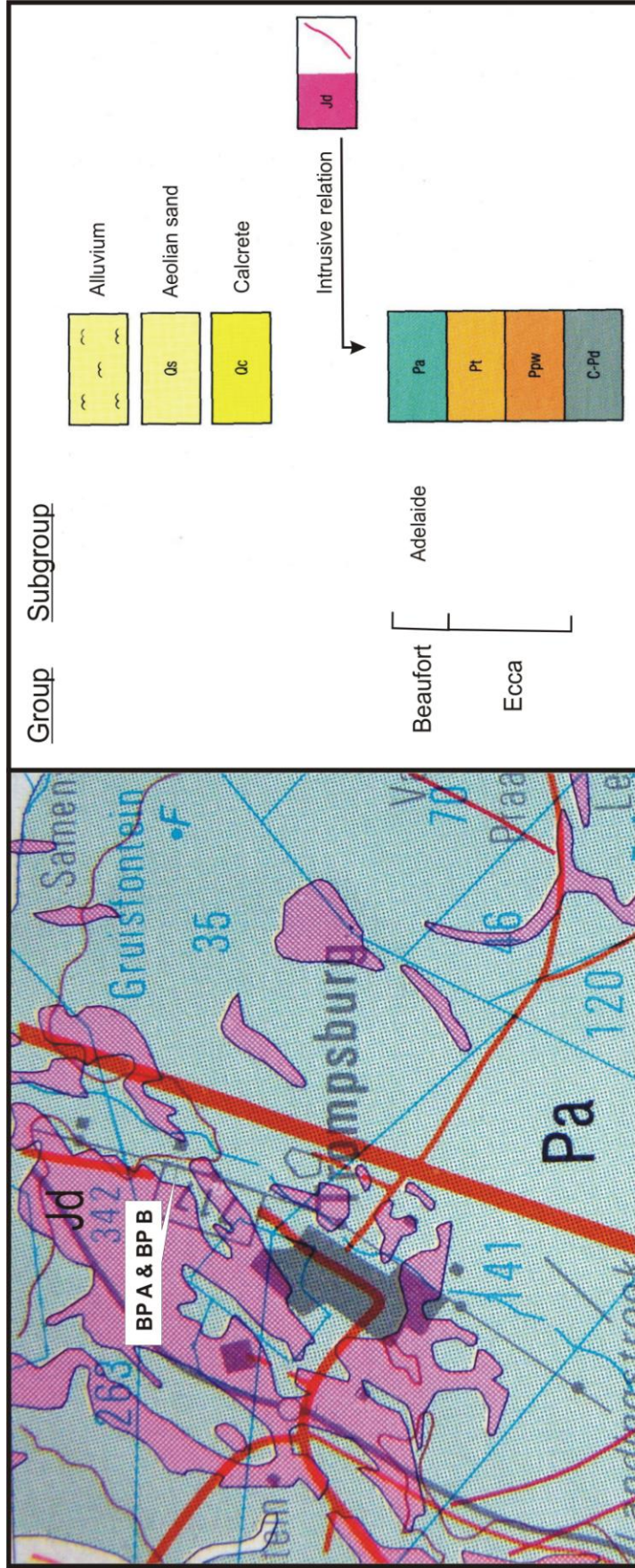


Figure 2. Portion of 1:250 000 scale geological map 3024 Colesberg of the area around Trompsburg..

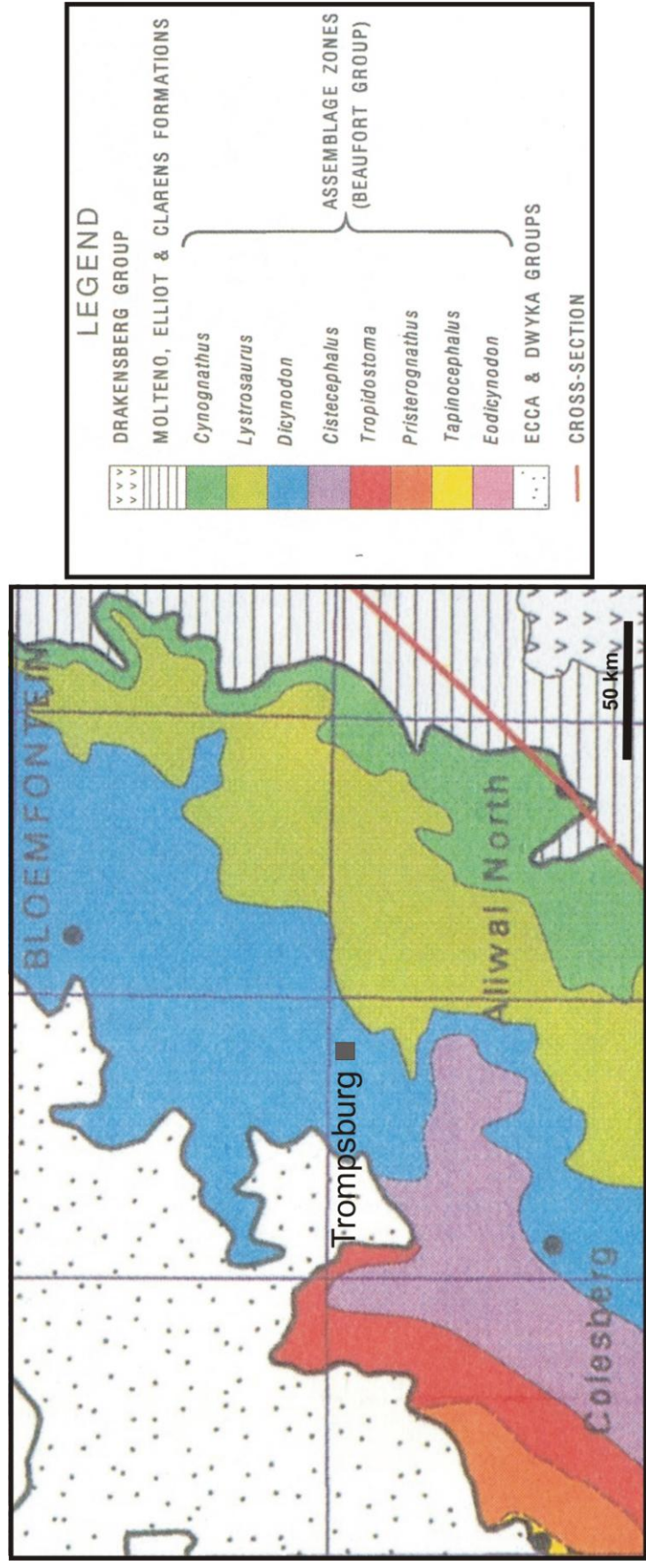


Figure 3. Geographical distribution of Karoo vertebrate biozones of the Beaufort Group near Trompsburg (after Rubidge 1995).

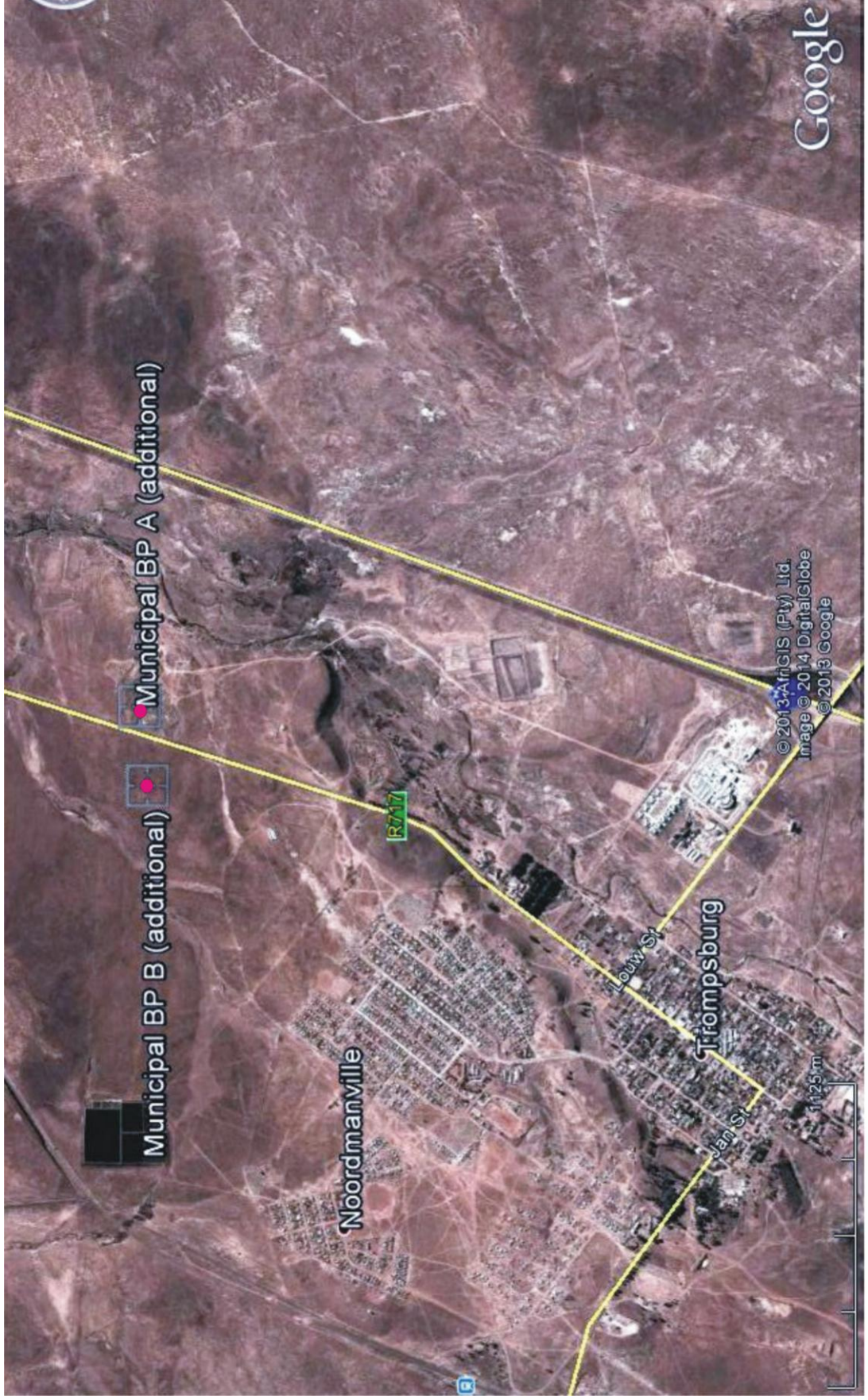
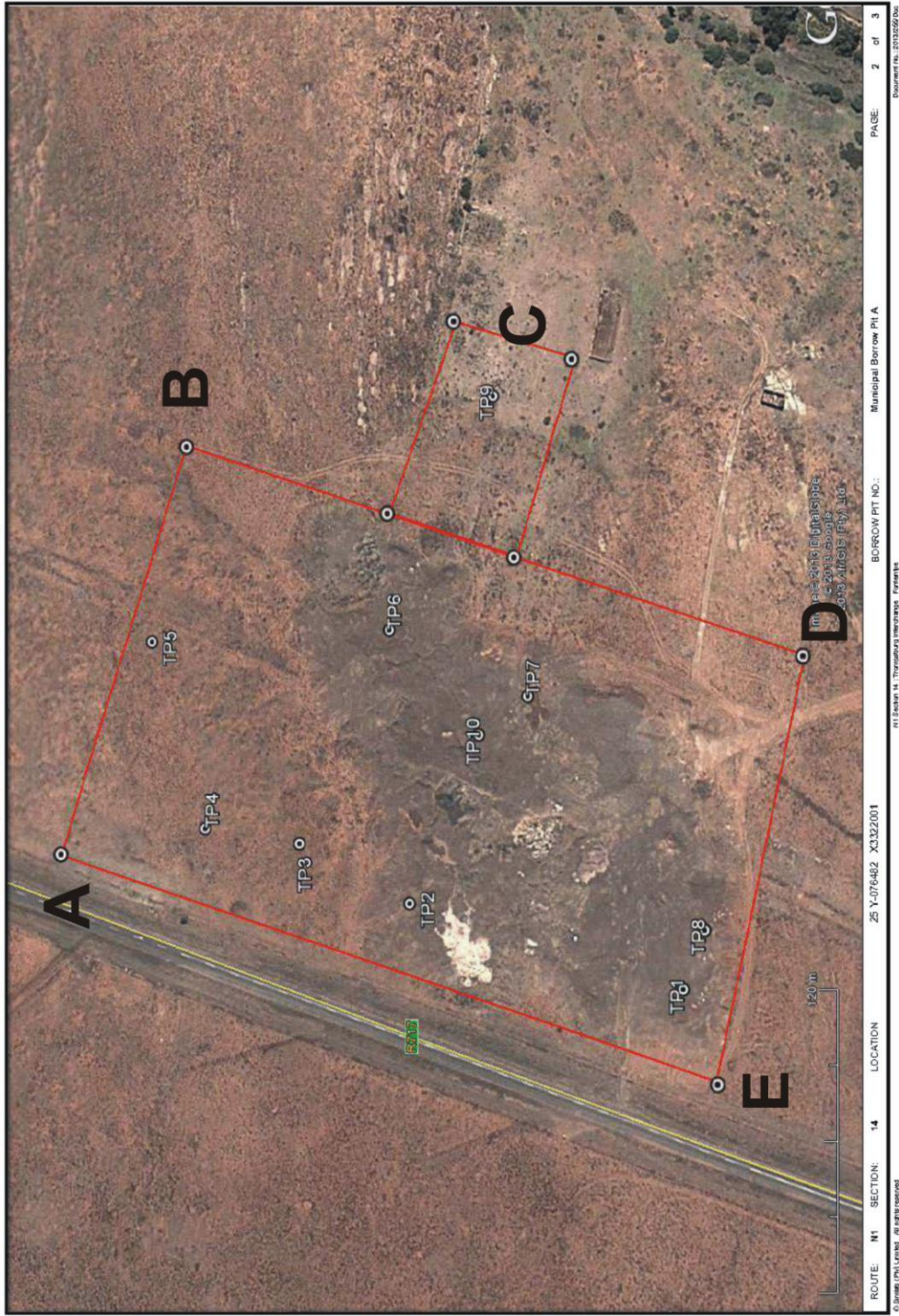


Figure 4. Aerial view of Trompsburg and the two additional borrow pit localities.

BORROW PIT ORGANISATION PLAN



ROUTE: M1 SECTION: 14 LOCATION: 25 Y-076482 X3322001 BORROW PIT NO.: Municipal Borrow Pit A PAGE: 2 of 3
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Figure 5. Aerial view of Borrow Pit A.

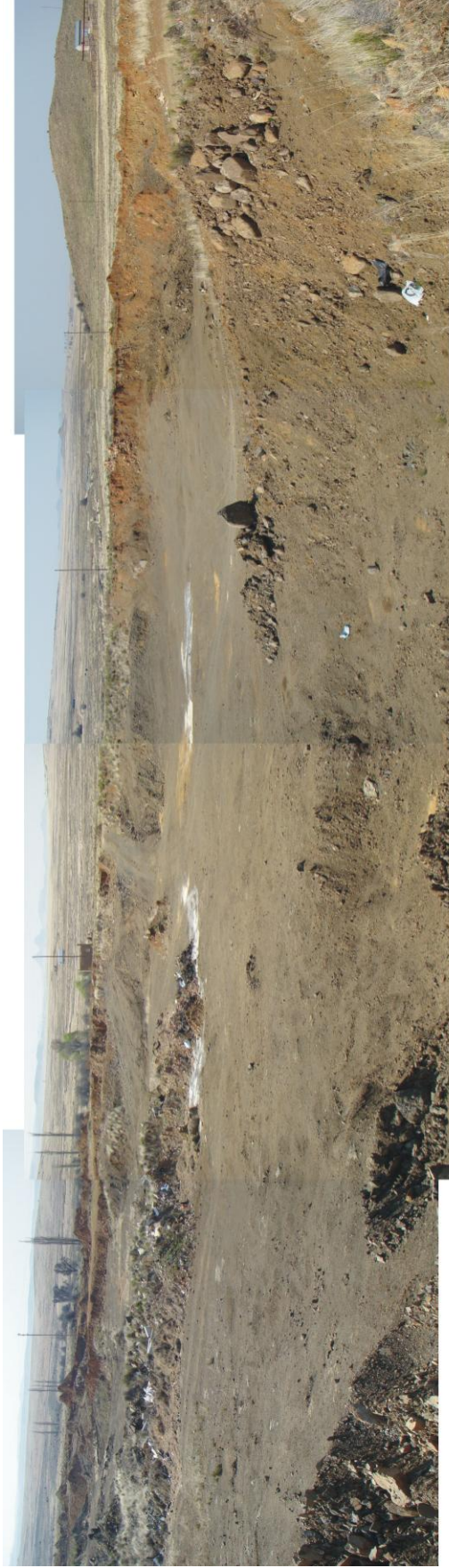


Figure 6. Borrow Pit A, looking east. The site is part of an existing borrow pit that is already being mined by the Koponong Municipality.

BORROW PIT ORGANISATION PLAN

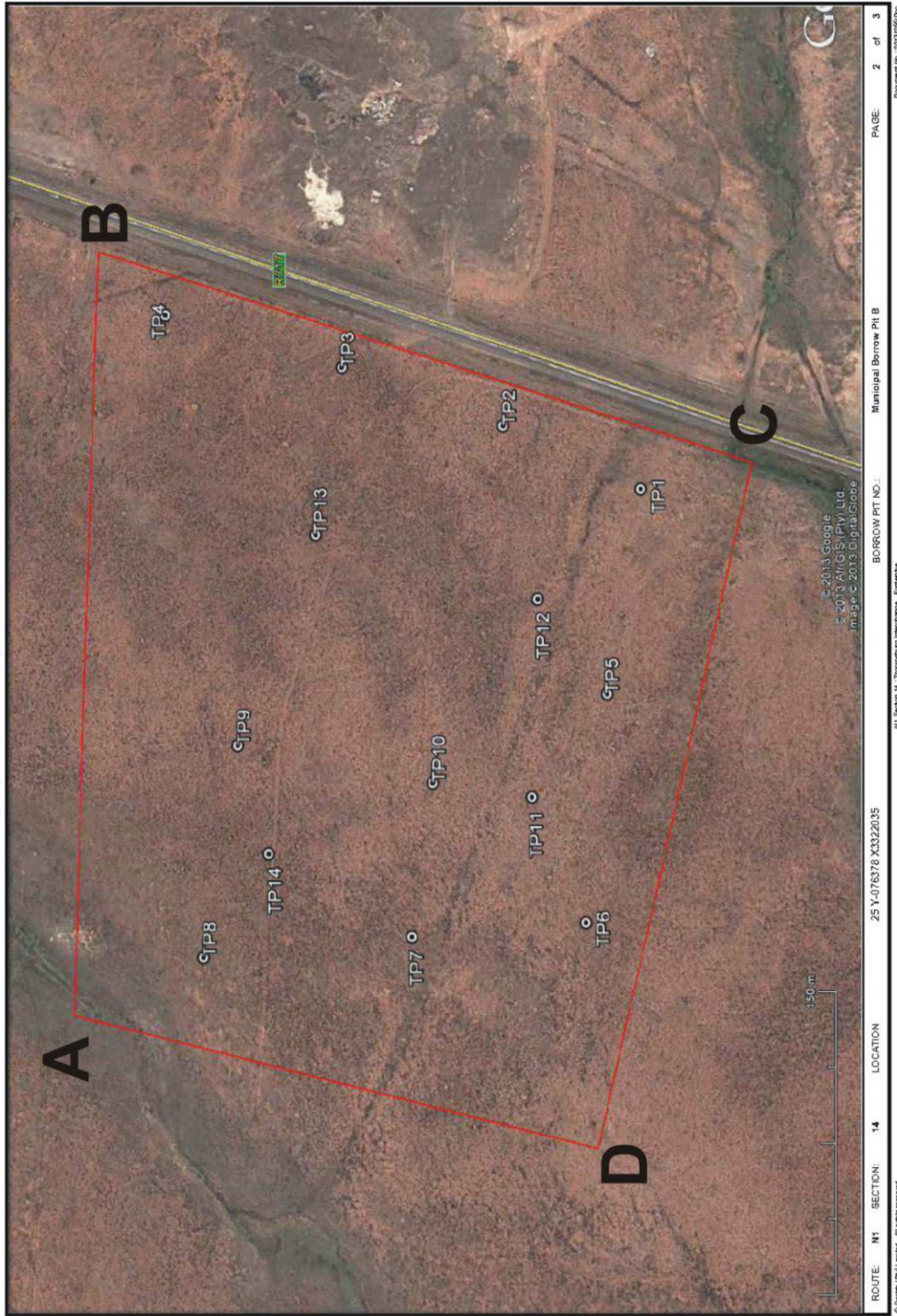


Figure 7. Aerial view of Borrow Pit B.

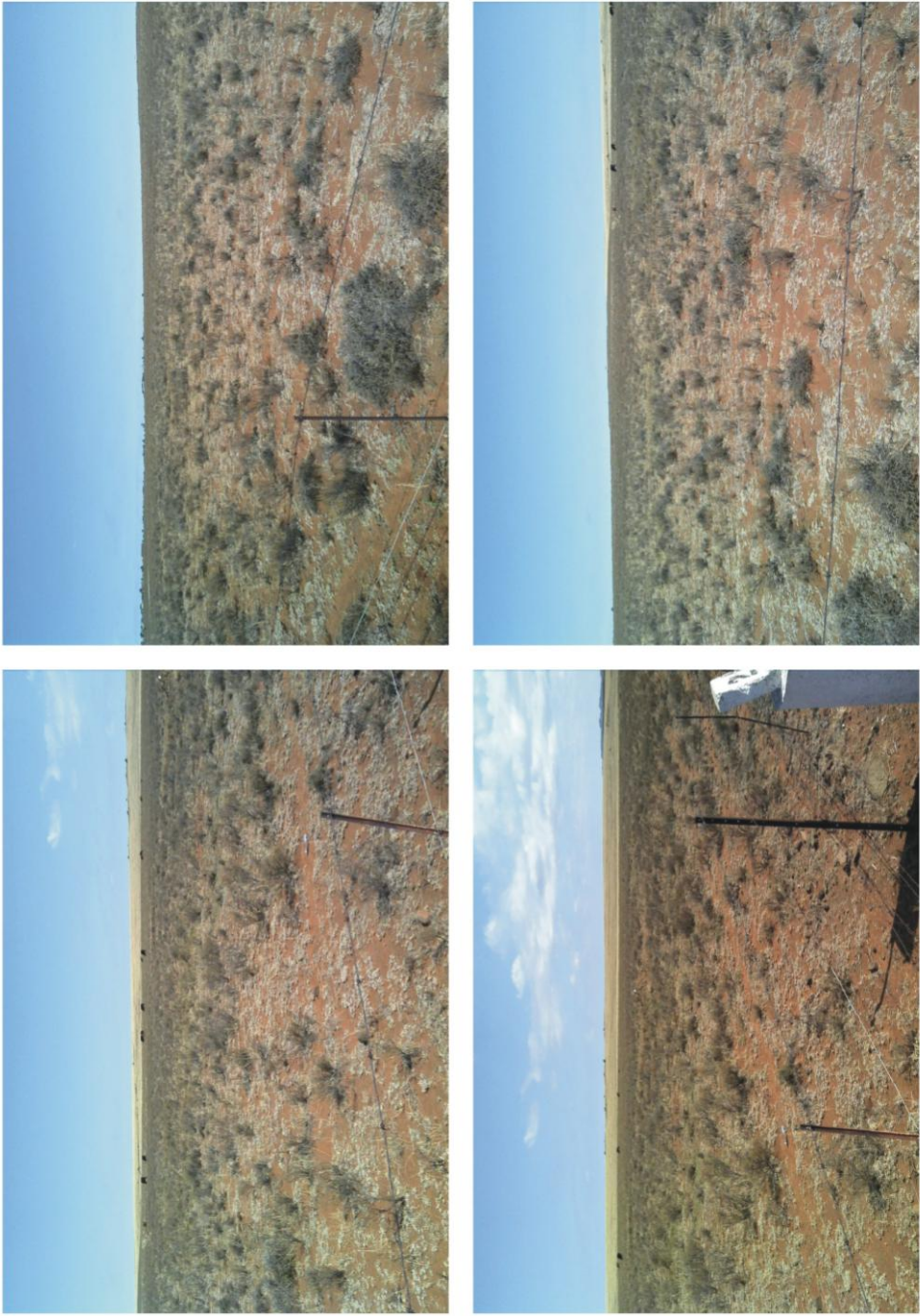


Figure 8. The Borrow Pit B site, looking northwest (A), southwest (B), north (C) and west (D).

