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## Is there light at the end of the tunnel?

### The rescue excavation of historical human remains from Silvertondale (Pretoria)

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Report on the excavation and recovery of human remains inadvertently discovered during  
construction activities at Silvertondale as authorized by:

- The Gauteng Provincial Department of Health (Reference Number: 33/1, dated 14 February 2008)
- The Gauteng Provincial Department of Local Government (Reference number: DPLG 12/10/1/A, dated 3 March 2008).
- The South African Heritage Resources Agency (SAHRA) as required by Section 36 of Act 29 of 1999 (Permit number: 80/08/01/004/51B, dated 25 March 2008).



## **Executive summary**

Pipe-jacking operations at Silvertondale uncovered human remains at the end of a tunnel 38.8m long and approximately 2.42m below the surface. These were most probably in a grave that was covered by material during the construction of the modern rail bridge over the Moreletta spruit. The construction of the embankment at the eastern side of the newer bridge most probably covered the grave which was just to the south of the 1886 NAZM railway on the eastern bank of the spruit.

The remains were fragmentary and poorly preserved and thus difficult to recover. The individual was buried in a coffin, in an extended supine position on its back. The position of the limbs could not be securely determined. Sex determination was carried out *in situ*. The remains were that of a female, as determined from the wide sciatic notch, presence of a pre-auricular sulcus and gracile facial features. The medial epiphysis of the right clavicle was fused and thus she was most likely older than 30 years. Some cranial suture closure was evident. The shape of the mandibular ramus and nose indicates Caucasoid descent, although other features such as the presence of a low and long skull are more consistent with that of Negroid affinity. Further analysis is needed in this regard. The individual was approximately 168.1 cm tall. No signs of trauma or chronic disease were noted, but pelvic scarring suggests that she gave birth to at least one child. Several beads and pieces of a safety pin were found with the remains. These were submitted for expert analyses which may help in dating the remains.

It is suggested that the individual might be related to the early pioneer families of Pretoria. Further investigation in this regard still needs to take place.

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## **1. Introduction**

Professional Grave Solutions (Pty) Ltd were contacted by the site engineer of Africon (an engineering firm) for assistance when human remains were uncovered during pipe jacking activities at Silvertondale (Pretoria). After a site visit with all parties concerned (representatives from Africon, the SAHRA Burial Grounds and Graves unit and Professional Grave Solutions (Pty) Ltd), it was decided to brick up the entrance to the pipe until the remains could be legally relocated.

As soon as the legal permissions were obtained, the remains were recovered as part of a rescue excavation by the Forensic Anthropology Research Centre assisting PGS (Pty) Ltd in this regard.

The remains are currently held at the department of Anatomy, University of Pretoria, and will be re-buried in a suitable formal cemetery on completion of this study.

## **2. Legal compliance**

In order to be able to mitigate the remains, permits were applied for and received from the following departments and compliance agencies:

- The Gauteng Provincial Department of Health (Reference Number: 33/1, dated 14 February 2008)
- The Gauteng Provincial Department of Local Government (Reference number: DPLG 12/10/1/A, dated 3 March 2008).
- The South African Heritage Resources Agency (SAHRA) as required by Section 36 of Act 29 of 1999 (Permit number: 80/08/01/004/51B, dated 25 March 2008).

These permissions enabled the rescue excavation, analysis and study and suitable re-burial of the remains.

### 3. Site description

The tunnel in question is located on the eastern bank of the Moreletta spruit where it is bridged by the main railway east of Pretoria (Fig. 1)<sup>1</sup>. The most probable location of the remains, taken on the surface of the embankment where the remains were estimated to be underground, is: S25°43'32.1" E 028°18'01.9" (GPS with 4m accuracy indicated). At this locality the spruit was previously bridged by the 1886 NAZM Railway and more recently by the modern (then SAS&H) railway. The remnants of the 1886 bridge as well as the rail cutting and embankments of the 1886 alignment are still in existence just to the north of the present railway (Fig. 2).

Figure 2. Showing remnants of the 1886 NAZM Railway bridge over the Moreletta spruit with the modern bridge in the background.



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<sup>1</sup> Figure 1 included as a full page at end of document.

Part of the 1886 cutting embankment, on the immediate east bank of the spruit, was demolished during the construction of the more recent railway bridge and the material used to construct the newer embankment. The excavations for the base of the pipe-jacking is situated in the area where the cutting was destroyed (it continues along the current rail alignment for some distance to the east of the site). The pipe-jacking tunnel continues, almost due south, from there for a distance of 38.8m (where it had stopped due to the discovery of human remains). The mouth of the tunnel is 2.42m below the surface at the southern side of the base excavation and the embankment continues to slope steeply upwards from there to reach the level of the modern raised railway (Fig. 3).

Figure 3. Pipe-jacking at Silvertondale.





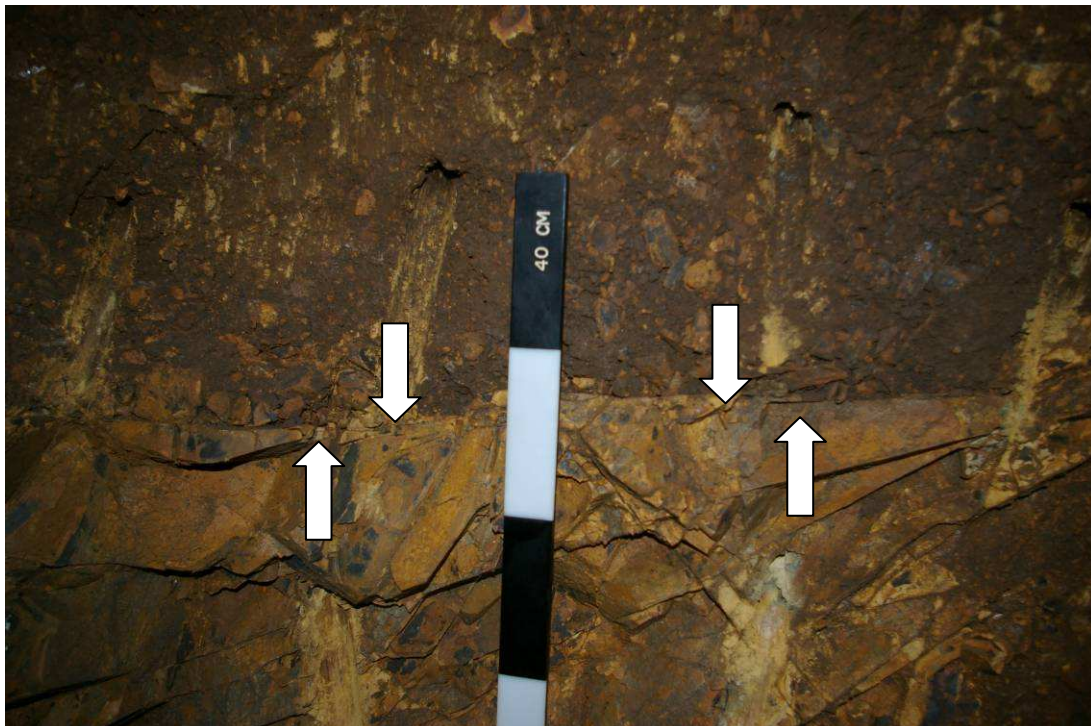
The human remains were discovered on the digging face of the excavations for laying the pipe. The pipe tunnel, along which the pipes are jacked from the base excavation, diagonally intersected the burial pit, exposing some bones on the face. These were left as found after the initial discovery (Fig. 4).

Figure 4. Human remains at Silvertondale as found.



The burial pit and human remains were clearly visible in the dug face, as well as in the roof of the tunnel excavation (Fig. 5). The remains were oriented somewhat to the north of east-west (no exact measurements of direction could be taken due to the difficulty of using a compass underground).

Figure 5. Burial pit visible in the roof of the tunnel excavation.



#### 4. Recovery methodology

The aim of the excavation was the *in situ* exposure of the burial and associated artefacts (Nienaber and Steyn, 1999). The focus was on accurate and complete documentation (Nienaber, 1997). Various methods for the excavation of graves have been proposed by different authors (Hester, 1975; Joukowsky, 1980; Krogman and Iscan, 1986; Morse, 1978) and all stress the need for adequate work space around the exposed remains and a systematic approach to the removal of individual bones. Due to the constraints of working at the end of a small tunnel the skeleton was exposed



from the northern side. The approach was adapted for the situation due to the unique nature of the recovery conditions (Nienaber, 1999). All possible attempts were made to leave the skeletal elements *in situ* until they could be documented. Both the poor preservation of the bones, as well as the hard clay matrix made this difficult to accomplish in the cramped space available. The archaeological method, including test trenching (where possible) to prevent damage to the remains, was employed. The approach was largely similar to that of forensic archaeology where buried body cases are concerned. The methods of forensic archaeology are discussed by Steyn, *et al.* (2000).

#### **5. Physical anthropological analysis: methods**

The remains were cleaned and reconstructed and standard physical anthropological techniques were applied during assessment of the remains. Age was determined based on the dental eruption of the 3<sup>rd</sup> molar and the assessment of the cranial sutures using Nemeskéri's complex method (Acsadi & Nemeskéri 1970; Krogman & Iscan 1986; Buikstra & Ubelaker 1994). Due to the fragmentary nature of the remains, no other methods could be employed.

Both metric and non metric techniques were used to determine sex. Nonmetric characteristics of the pelvis was used (Krogman & Iscan 1986; Iscan & Loth 2000; Patriquin et al 2003) as well as metric data from the left humerus and right tibia. (Iscan & Loth 2000; Steyn & Iscan 1997)

Morphological features from the skull were used to determine population affinity (Krogman & Iscan 1986; Iscan et al 2000). This was further assessed by calculating

the Penrose distances for the maxillary teeth using the mesiodistal and buccolingual measurements of the first and second molars and both premolars. This is similar to the methods used in the analysis of the remains of a black participant in the Anglo-Boer War (Nienaber & Steyn 1999).

Antemortem stature was determined using the physiological length of the right tibia and standard regression formulae developed for White South Africans by Dayal *et al* (in print) In addition, the remains were assessed for signs of trauma and pathological changes.

## **6. Results**

### **a. Description of remains as found**

Due to the nature of the recovery, extensive observations of the burial position were difficult. Poor preservation and the disturbance of the legs during initial discovery further complicated observations and documentation. The skeletonised remains were found lying extended on the back with both arms extended along the sides. The left radius and ulna occurred below the bones of the pelvis, indicating that the left hand was below the body at the time of burial. The skull was resting on its base with the mandible articulated, indicating that the neck was flexed. The skull was rotated to the right so that it faced in a south-westerly direction. Both legs were extended, but were previously disturbed. The left lower leg was rotated so that the left foot rested on its left side. The left foot was somewhat flexed (Figs. 6&7).

Figure 6. Human remains at Silvertondale *in situ*.



Figure 7. The skull at Silvertondale *in situ*.



### **b. Description of associated cultural materials**

The remains were recovered from a well defined burial pit. It appeared that the burial pit was rectangular in shape. Due to the nature of the recovery conditions it could not be accurately measured, but the following dimensions were estimated as carefully as possible: Width – wider than 62cm; length (at the depth of the remains – 197cm (Refer Fig. 5).

Remnants and indications of a wooden coffin and iron nails were found with the remains. At the feet the pattern of nails forming the corner of the coffin was observed (Fig. 8).

Figure 8. Nails from the coffin *in situ* indicating the corner of a wooden coffin.



Two hollow pearl shaded bulb-shaped glass beads and a larger opaque green oval glass bead with spiraled indentations along the sides were recovered from the vicinity of the remains (Fig. 9). These might represent a sting of beads worn by the deceased.

A corroded copper safety pin was also found (Fig. 10).

Figure 9. Beads found with the remains.



Figure 10. Safety pin found with the remains.



### c. Skeletal analysis

The remains were fragmentary and damaged. Nearly all the skeletal elements were present, although it was poorly preserved.

#### *Age*

The fragmentary nature of the remains and poor preservation made age estimation difficult. The 3<sup>rd</sup> lower left molar and both upper 3<sup>rd</sup> molars were erupted. Some teeth were lost antemortem but the remaining permanent teeth had erupted. Therefore the individual was an adult older than 18 years of age. Furthermore, the sternal or medial end of the left clavicle was fused indicating an age older than 30 years. Assessment of the cranial sutures using Nemeskéri's complex method indicated an age range of 30 to 60 with a mean age of 43.7 years.

#### *Sex*

The pelvic bones had wide, shallow sciatic notches. The skull was small and gracile with small mastoids, sharp supra-orbital ridges and a vertical forehead as seen in figure 9 and 10. These features are all indicative of a female. Furthermore, pelvic scarring suggested that the individual had at least one child.

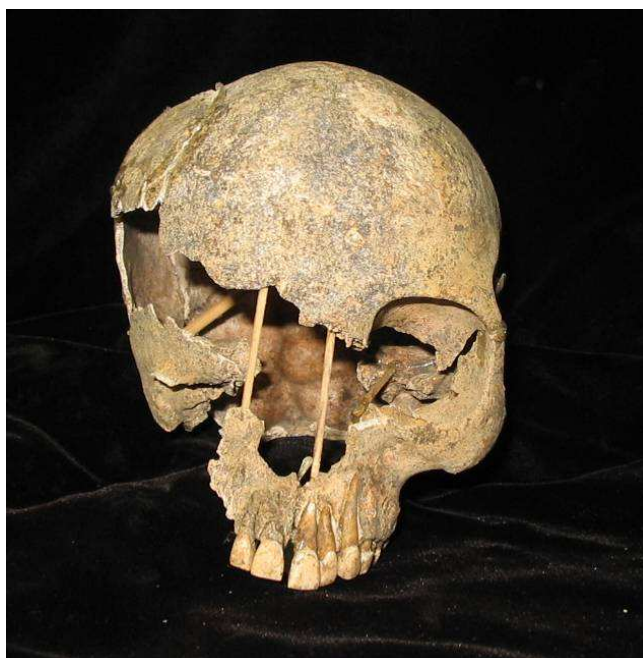


Figure 9. The skull after reconstruction in anterior view

Figure 10. The skull after reconstruction in lateral view



The diameter of the humeral head, the humeral epicondylar breadth, circumference of the femoral midshaft, tibial proximal breadth, tibial circumference at the nutrient foramen and tibial distal breadth all indicated measurements consistent with that of a white female. All post-cranial measurements are shown in Table 1.

### *Ancestry*

The skull height is medium and the nasal opening is narrow with a sharp inferior nasal margin. Due to the fragmentation, no cranial measurements could be taken. Penrose distance analysis was calculated using the maxillary teeth, and the results can be seen in Table 2. The data was compared to modern South African Black and White populations as well as a modern British population (Kieser 1990). According to this analysis, the smallest distances can be seen with the South African White females and therefore the individual was most probably of South African White origin.

### *Stature*

Stature was calculated using the physiological length of the right tibia. The long bones needed reconstruction and were still damaged thus only an estimate could be obtained. Stature was calculated to  $165.5 \pm 11.5$  cm was obtained. This is a medium height for an individual of this population group (Steyn & Smith 2007).

### *Teeth*

Most of the teeth were present. The lower right first, second and third molars and lower left first and second molars were lost antemortem. The upper left second premolar was also lost antemortem. The upper right first premolar was broken while the upper right canine was absent postmortem. The rest of the teeth were all present. Dental health was poor and tartar deposits were evident. Tooth decay was present but no signs of dental caries or periodontal disease was observed. The teeth were worn and no dental procedures and modifications were present.

### *Trauma and pathology*

There were no signs of trauma or pathology.

### *Factors of individualization*

No observable factors of individualization could be found.

## **d. Analysis of cultural materials**

Preliminary analysis of the beads and safety pin found with the remains indicate that they are historical in origin. Comparison with reference collections in order to



establish a possible date of manufacture and an understanding of the distribution of the beads are underway and might contribute to establish a relative date for the burial.

## **7. Historical and geographical context**

### **a. History of Silverton**

Silvertondale is an extension of the Silverton suburb and therefore most likely fell in the boundaries of the original farm. The area of Silverton was originally part of the farm Hartbeestpoort No. 308 also referred to as Hartbeestfontein by some sources (Kritzinger, 1980; Roodt-Coetzee and Louw, 1976; Van Der Waal Collection, UP). The two versions of the name probably occurred when the farm was divided into a northern and southern part and sold in 1853 (Pretorius, 2001). This farm was originally owned by David Adolph (some records say Alwyn, but this is due to an illegible handwriting on the original entry for the farm as seen in Registrar of Deeds documents) Botha as early as 1848 (Pretorius, 2001; Roodt-Coetzee and Louw, 1976; Kritzinger, 1980; Roodt-Coetzee and Louw, 1976; Van Der Waal Collection, UP). Botha was a Voortrekker, who registered the farm in his name only on 23 January 1858 (Pretorius, 2001; Kritzinger, 1980; Van Der Waal Collection, UP). It is believed that the oldest standing building in Pretoria, the “Pioneer Museum”, was originally built by D. A. Botha somewhere in 1850 (Pretorius, 2001; Van Der Waal Collection, UP). From here the farm was divided up and sold to various persons over the time span of 32 years before it was set out to become a new suburb of Pretoria in 1890 (Kritzinger, 1980).

The first portion of the farm was sold to Guillaume Christoffel Vermeulen, after whom Vermeulen Street in Pretoria was named (Kritzinger, 1980) and his son-in-law

Frederik Matthys de Beer on 20 April 1853 (Pretorius, 2001; Roodt-Coetzee and Louw, 1976; Van der Waal Collection, UP). *“The farm was subdivided at the same time; the portion north of the Rademeyer River (Moreletaspruit), where the creek turns westward, was allocated to De Beer. The southern three quarters- that portion on which the Pioneer House stands- as well as a portion of the lands fell to Guillaume Vermeulen.”* (Pretorius, 2001) In 1859, however, G. C Vermeulen sold his portion to his son, Hendrik Johannes Vermeulen, and in 1872 F. M. de Beer sold his portion to Cornelius Petrus Moll (Pretorius, 2001; Kritzinger, 1980). In the following year, 1873, H. J. Vermeulen in turn sold his portion to Guillaume Schoombie Pretorius; Willem Adriaan Fourie; and Jan Albert Vermeulen (Kritzinger, 1980). However, in 1875 Hans Heinrich Mundt bought all portions of the farm belonging to the Vermeulen family and in 1890 he sold the portion west of the Moreletta Spruit to Silverton Estate Co. which later became part of the Silverton suburb (Kritzinger, 1980). The rest of the farm, including the portion the Pioneer House stood belonged to the Mundt family until 1961 (Pretorius, 2001).

#### **b. Historical context of the human remains**

It has been noted that part of the original farmland on which Silverton today is situated belonged to various families; all of whom might have had family graveyards, which might be linked to the human remains found at Silvertondale. The archaeological recovery of the human remains revealed that there was only one grave containing the remnants of a coffin as well as a single individual. The burial style is similar to that of a Christian burial where the deceased is placed in a coffin in an extended supine position on his or her back. The burial position seems to suggest an east-west alignment of the body, with the head to the west and the feet to the east

further suggesting a Christian burial (Webster and Brown, 1997). This is contemporaneous with the burial practice of Voortrekkers and Pioneer people from the 19<sup>th</sup> century in South Africa (Meyer, 2007). Since the grave possibly dates prior to the construction of the NZASM Bridge over the Moreletta Spruit in 1886 it can be assumed that any graves within this area belonged to either one of the families who owned part of the farm Hartbeestpoort from 1848 to 1890. Artifacts found with the individual was also preliminarily determined to be of historical age which further suggests that the grave dates to the time before the area became government property.

### **8. Dating**

Due to the presumed historical age of the burial it can not be directly dated by C14 methods. At present the only indications of the relative age of the burial is its association with the railway line construction in the area. The burial most probably dates from the Afrikaner pioneer era in Pretoria and possibly pre-dates the 1886 railway. It is, however possible that the burial was next to the 1886 railway after it was built. It is probably older than the mid 20<sup>th</sup> century construction of the new railway since taphonomical indications show that the burial was disturbed at that time.

Pending better relative indications of age as a result of the analysis of the associated cultural objects it is suggested that the that the burial dates from the Afrikaner pioneer era (approximately mid 19<sup>th</sup> century) and is at least older than *circa* 1950.

## **9. Synthesis of results**

The remains belonged to a white female who was part of the Pioneer community and was buried during historical times. She was approximately 177 cm tall and between 30 to 60 years when she died. Pelvic scarring suggests that she had at least one child.

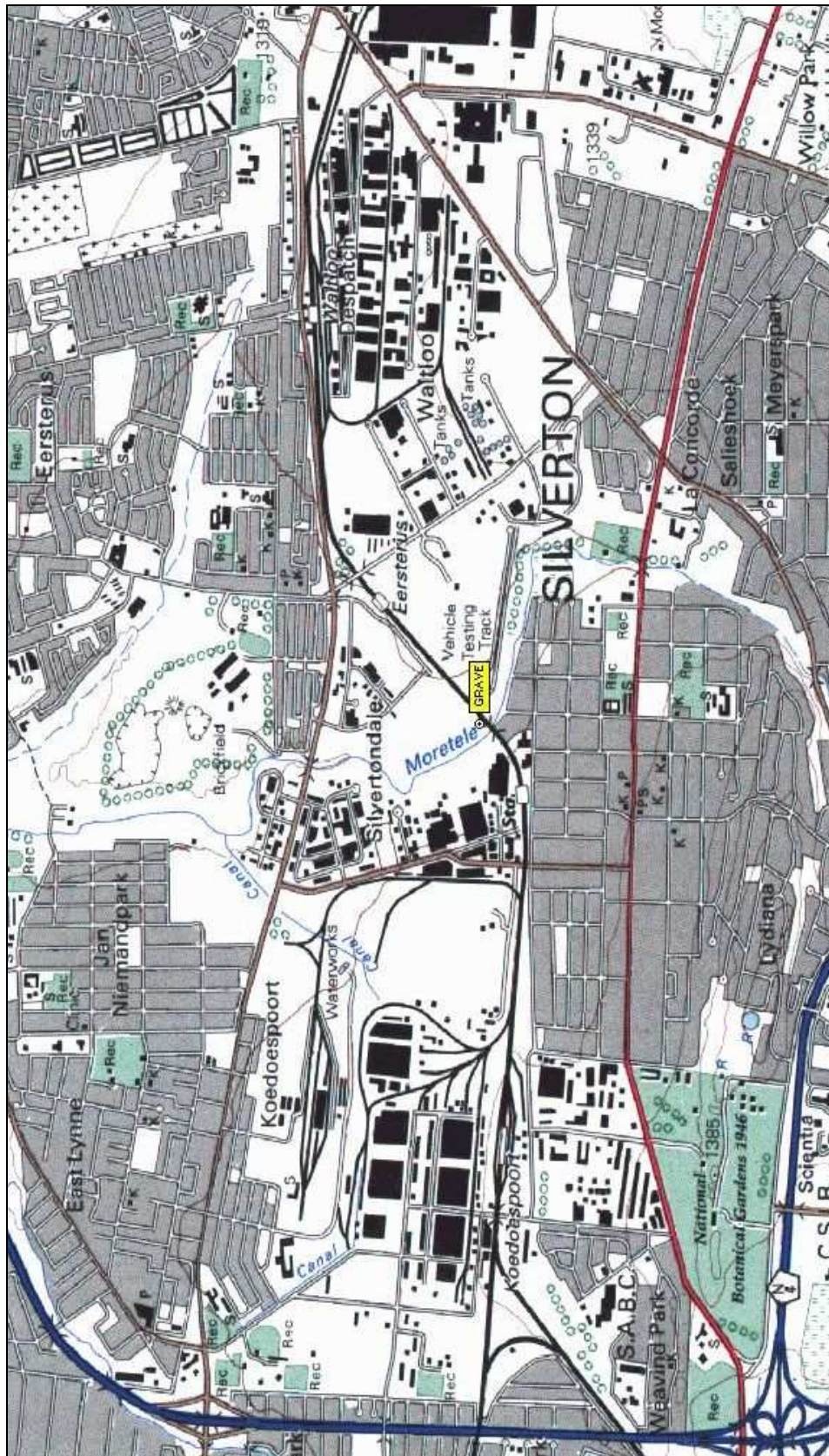
## **10. Conclusion**

There is historical mention of one formal family graveyard to the north of the Pioneer House, which is said to contain the remains of some of the early inhabitants of the entire farm (Pretorius, 2001). These include the remains of Guillaume Vermeulen and his wife; the grandparents of Frederik Coenraad de Beer; Hendrik Vermeulen's first wife; two Fourie boys; and Hans Mundt, his wife and a few of his children and grandchildren (Pretorius, 2001). The Silvertondale grave in question could therefore not be the remains of these individuals. Yet it is known that Voortrekker and Pioneer families often buried family members in small family graveyards, mostly laid out informally and sometimes unmarked, with graves being designated only by a mound of stones, and sometimes a larger slab of stone for a headstone (Kritzinger, 1980), therefore making it difficult to recognize graves after a number of years. It could therefore be possible that the Silvertondale grave remains belong to either one of the earlier families who lived on the farm. There is no mention of any deaths in the Botha family during the time they lived on the farm, although records of this time are known to be very inconsistent and patchy. Genealogical data of this early time period is very incomplete because of the difficulty in documenting births and deaths in a frontier situation. In any event, before 1894 there was no formal registration of births and deaths in South Africa, and what registration did take place was limited to the Cape (Van Heyningen, 2005). In the Boer republics there were few censuses with only two

in the Orange Free State in 1880 and 1890, and one in the Transvaal in 1890 (Van Heyningen, 2005). It therefore becomes difficult to exclude any one of the families who lived on the farm as possible candidates for the Silvertondale grave, except for those known to have been buried in the family graveyard to the north of the Pioneer House.

Another possibility could be that the Silvertondale remains belonged to a *bywoner* who worked on the farm at some time. *Bywoners* were migrating pastoralists who exchanged their labour for fresh grazing for their cattle or sheep (Giliomee, 2004). These families would travel across the country and stay in one place for short periods of time. Should any of the family members pass away it would be likely that they were buried on the farm they stayed on at that time. The person would, however, not be buried in the farm owner's family graveyard but in another place on the farm. Since the Silvertondale grave seems to be a single grave this scenario might fit the pattern, yet the specific identity of this individual remains unknown.

Figure 1. Locality map based on 1:50 000 Topographical map 2528CB (Office of the Surveyor General).



**Table 1.** Post-cranial metric data (Buikstra & Ubelaker 1994)

<b>Measurement</b>	<b>Left</b>	<b>Right</b>
<i>Clavicle</i>		
Maximum length	139mm	-
Sagittal diameter at midshaft	13mm	13mm
Vertical diameter at midshaft	8mm	7mm
<i>Humerus</i>		
Maximum length	228mm	-
Epicondylar breadth	60mm	60mm
Maximum vertical diameter of head	42mm*	-
Maximum diameter at midshaft	18mm	17mm
Minimum diameter at midshaft	16mm	16mm
<i>Radius</i>		
Sagittal diameter at midshaft	-	11mm
Transverse diameter at midshaft	-	14mm
<i>Ulna</i>		
Dorso-volar diameter	-	13mm
Transverse diameter	-	15mm
Minimum circumference	-	40mm
<i>Femur</i>		
A-P diameter at midshaft	32mm	-
Transverse diameter at midshaft	24mm	-
Circumference at midshaft	90mm	-
<i>Tibia</i>		
Maximum length	-	416mm
Maximum proximal breadth	64mm	58mm*
Maximum distal breadth	45mm	-
Circumference at nutrient foramen	95mm	85mm*
Physiological length	-	403mm

\* Approximate values as elements were degraded

**Table 2.** Results of the Penrose distance analysis (maxillary measurements)

	Silvertondale	SA White females	SA Black females	Modern British females
Silvertondale	-	2.594831	2.77156	3.07084
SA White females		-	0.162139	0.16032
SA Black females			-	0.319285
Modern British females				-

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