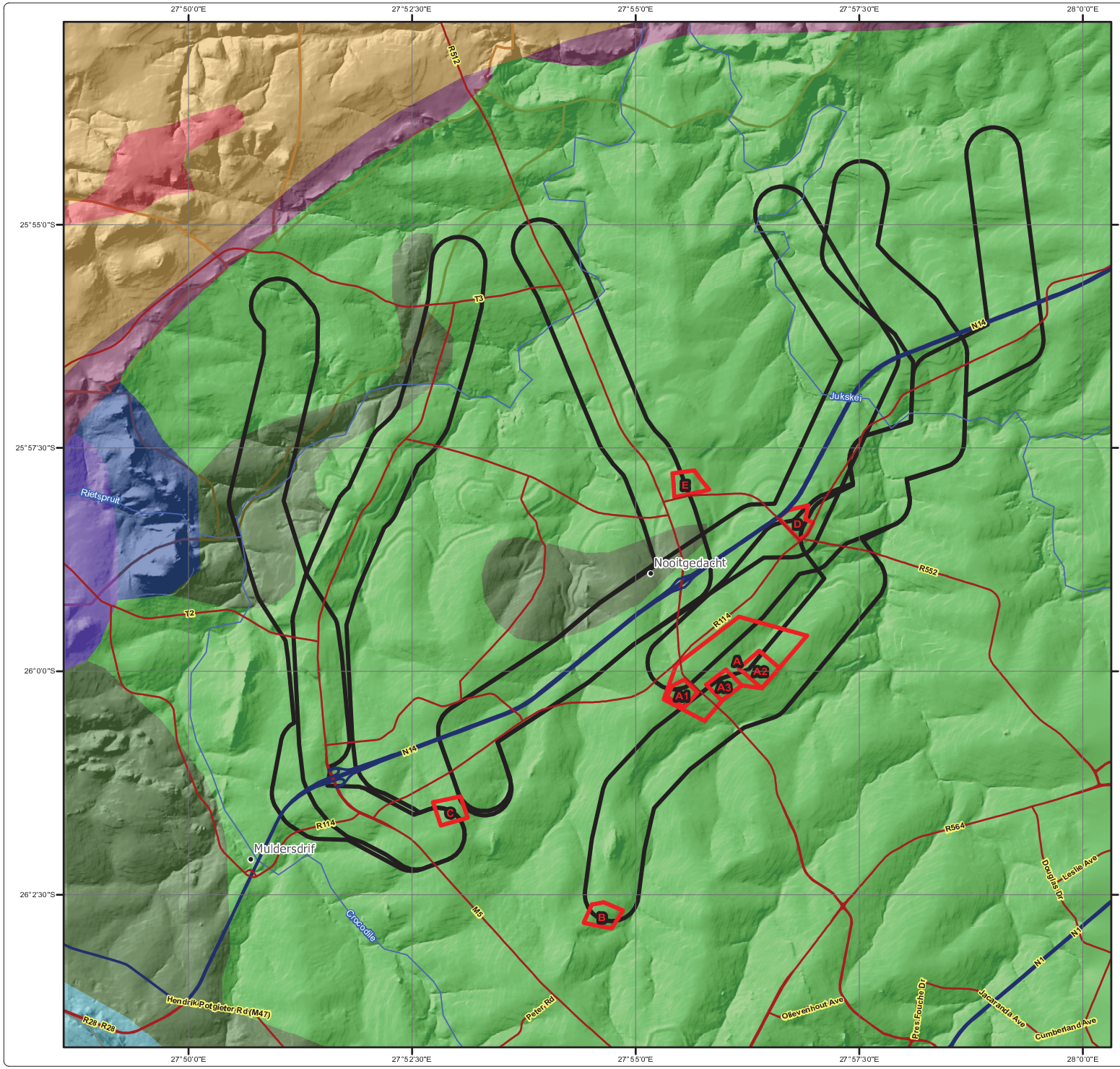

Plan 4

Roodepoort Strengthening

Geology

Legend

- Transmission Line Study Corridors
- Proposed Substations
- Secondary Town
- Other Town
- Settlement
- Main Roads
- National Roads
- Observed Faults
- Rivers
- Dams

Geology

- Black Reef Fm, Transvaal Spgrp
- Halfway House Granite
- Hospital Hill Sbgrp, West Rand Grp
- Malmani Sbgrp, Chuniespoort Grp
- Platberg Grp, Ventersdorp Spgrp
- Pretoria Grp, Transvaal Spgrp
- Swazian Erathem
- Witwatersrand Spgrp
- Dolomite Compartments

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

Ref #:amc.PBA1076.201208.033
Revision Number: 1
Date: 06/08/2012

N

0 0.5 1 2 3 4

Kilometres

1:80 000

3.3.2 Fossil sites in the COH WHS

The area of the COH WHS is underlined by a cave system that has formed in the dolomite limestone. These caves have helped facilitate the preservation of fossils and stone tools. Dolomite outcrops frequent the COH WHS landscape and it is at these dolomite outcrops that fossil sites are usually found. Due to the discovery of fossil hominins and animals at a large number of palaeoanthropological and archaeological sites, the area was declared a UNESCO World Heritage Site in 1999.

Early lime mining activities in the COH WHS led to the discovery of fossil-rich caverns and caves. Since the mid-1930s, Sterkfontein and Swartkrans have been the subject of many palaeontological finds. Hominin finds include those of *Paranthropus robustus* and *Australopithecus africanus* (Mrs Ples), *Homo habilis* and *Homo ergaster*. Investigations at Swartkrans, in particular, have greatly added to the understanding of early hominin behaviour. It has yielded evidence of the earliest controlled use of fire more than 1 million years ago (mya). Sterkfontein and Swartkrans are located approximately 12 km west of Option 3.

Additional discoveries of fossil hominins, stone tool assemblages, and fossil of extinct animals have been made at Kromdraai and at Gladysvale, approximately 9 km north of Option 3.

In 1999, Professor Lee Berger of the Institute of Human Evolution (IHE) at the University of the Witwatersrand discovered the Motsetse site in the COH WHS (Berger & Lacruz, 2003). This site has been excavated since its discovery and has produced fossils of primates and extinct false sabre-tooth cats (Hilton-Barber & Berger, 2002; Berger & Lacruz, 2003). Motsetse is located in the COH WHS, approximately 1.5 km north of Option 3.

3.3.3 Stone Age

In southern Africa, the Stone Age is divided into three periods: Early Stone Age (ESA), Middle Stone Age (MSA), and Late Stone Age (LSA). The succession from the ESA to the MSA and LSA is a result of the physical, social and mental development of our ancestors whose use of stone tools allowed them to exploit food resources that were high in protein and that contributed to an increase in brain size.

The ESA dates from 2.5 mya to 200 000 years ago and is associated with the appearance of *Homo habilis*. These early humans fashioned large, fairly unsophisticated stone tool assemblages known as the Oldowan (simple flaked tools used as choppers) and the Acheulean (bifacially flaked hand axes and cleavers) (Mitchell, 2002). Stone tool assemblages at Sterkfontein Cave (approximately 15 km from the route Option 3) consist of quartzite stone tools and a large number of core stones. The MSA to LSA sequence is marked by the manufacture and use of increasingly smaller stone tools. In southern Africa, early MSA stone tool technology is distinguished by the more prominent presence of blades but the overall characteristics of the MSA industries vary across the region.

The LSA stone tool technology is highly sophisticated compared to the ESA and MSA industries. In the LSA, specific tools were being created for specific purposes and bone tools were introduced to assemblages thereby making the LSA a highly sophisticated tool technology compared to the ESA and MSA (Mitchell, 2002). Other features of the LSA include beads and pendants, and rock paintings and engravings. The occurrence of LSA stone tool assemblages in the COH WHS is extensive and almost every cave has some evidence of human occupation (Hilton-Barber & Berger, 2002). Uitkomst Cave situated in the John Nash Nature Reserve (approximately 8 km north of Option 3) and has yielded LSA stone tool assemblages.

Due to the extensive distribution of Stone Age assemblages as well as the preserving quality of the dolomitic limestone, it is highly likely that potential heritage resources exist along the western boundary of the project area and particularly at the northern sections of the Option 3 and Option 6 power lines.

3.3.4 Iron Age

Several new technologies and innovations were introduced in the Iron Age. These included metal working, ceramic production, domesticated animals (specifically cattle), agriculture and eventually certain settlement patterns. The Iron Age has been studied by classifying different ceramic styles into various facies. These facies help track the migration of different groups, as well as the shifting and dynamic identities within these various groups and time periods of the Iron Age (Hall, 1987). The Iron Age is divided into three periods: the Early Iron Age spans from 300 to 900 CE, the Middle Iron Age spans a period from 900 to 1300 CE, and the Late Iron Age spans a period from 1300 to 1840 CE.

Evidence of Early Iron Age occupation and settlement occur within the study area, although very little is known regarding the Early Iron sites and settlements. The first Bantu-speaking settlements have been dated to approximately 500 CE and are found in the Broederstroom area (Hilton-Barber & Berger, 2002). Excavations at these Early Iron Age sites have revealed a settlement pattern comprising residential huts surrounding a central cattle area. Raised huts and underground pits were used to store grain. An Early Iron Age smelting site was identified and excavated near the Hartebeespoort Dam. This smelting site was dated from 430 CE to 780 CE (Huffman, 2007). The site consisted of a furnace site with dense concentrations of tuyère pipes and slag pieces (Friede & Steel, 1985). Other artefacts that were uncovered include iron weapons and agricultural implements, beads and copper artefacts (Hilton-Barber & Berger, 2002). This smelting site is one of the oldest discovered in the country and is located approximately 16.5 km north of the project area.

By the 1500s, Late Iron Age Sotho-Tswana groups settled in the COH WHS area. The most prominent and visible Late Iron Age site type are stonewalled sites. These are predominantly associated with Sotho-Tswana-speaking groups and are known as Type N and Klipriviersberg sites. The date range for these sites is between 1400 and 1800 CE. These stonewalled settlements are characterised by the presence of scalloped walls and 'sunflower' shaped settlements respectively and they date to the 18th and 19th centuries (Huffman, 2007).

Uitkomst Cave is situated in the John Nash Nature Reserve in the COH WHS. This cave was discovered by archaeologist Revil Mason in the 1960s. Uitkomst Cave contains evidence of a transition from the LSA to the Iron Age and a variety of archaeological artefacts such as Sotho-Tswana pottery, smelting furnaces and debris associated with stonewalls, were recovered from the cave. The Iron Age resources include two iron furnaces dating to approximately 1500 CE as well as a more contemporary furnace built over one of the older ones (Mason, 1962). Both copper and iron was processed at the site and the diagnostic pottery consists of the type specific *Uitkomst facies* (Mason, 1962).The ceramic facies that can be found in the project area are presented in Table 3-1 below.

Table 3-1: Ceramic facies located within and around the project area

Ceramic Facies	Dates
Mzonjani	450 – 750 CE
Uitkomst	1650 – 1820 CE

Ceramic Facies	Dates
Olifantspoort	1500 – 1700 CE
Buispoort	1700 – 1840 CE

Given the proximity of Option 3 and Option 6 to the COH WHS, it is reasonable to assume that Late Iron Age stone walling may occur on koppies along these routes, particularly in the vicinity of the COH WHS.

3.3.5 Historic Period

The historical landscape can be characterised by episodes related to the *Difeqane* and *Mfecane*. This was a period of massive population displacement throughout South Africa that was caused by the Matabele (Ndebele) raiding parties of Mzilikazi who violently migrated from present northern KwaZulu-Natal during the last decade of the 18th century (Carruthers, 2007). The BaPo, who were one of several original Tswana occupiers of the region, were conquered by Mzilikazi in the early 1800s who then settled in the area. Several *Difeqane* refuge sites and Matabele settlements are scattered across the landscape (Carruthers, 2007; Hilton-Barber & Berger, 2002). Evidence of Mzilikazi's violent raids can still be found today in the deep interiors of caves such as Gladysvale where Sotho-Tswana-speaking groups hid their cattle.

The movement of the *Voortrekkers* (Boers) into the interior caused great tensions between them and the indigenous population. Tensions with the Matabele ultimately led to the Battle of Vegkop in October 1836 which resulted in Mzilikazi's defeat (Carruthers, 2007). This area is located north of the COH WHS, along the *Voortrekker* inroads into the Magaliesberg towards Pretoria.

In 1877, the British annexed the Transvaal. The Boers rejected the annexation of the Transvaal and this led to the Transvaal War from 1880 to 1881 (Carruthers, 2007). About 4 000 Boers met at Paardekraal, near present-day Krugersdorp, to proclaim their independence from the British. In 1890, the Paardekraal Monument was erected. It is located in Krugersdorp, approximately 11 km southwest of the proposed Route 3.

New development occurred with discovery of gold in the Witwatersrand. One of the oldest gold mines was established in 1874 at Blaauwbank and another in 1891 on the farm Kromdraai. The discovery of gold led to an influx of people and soon the Boers began to establish large settlements around the COH WHS (Copley, 1993; Hilton-Barber & Berger, 2002; Carruthers, 2007). In 1886 and 1887, the towns of Johannesburg and Krugersdorp were established respectively.

Lime was in great demand by gold-mining companies as it can be used for processing gold and by the construction industry for the manufacture of cement. Once the miners blasted the lime out of the rock, they used kilns to process the lime. Today these lime kilns are found with the COH WHS.

With the discovery of gold, new hostilities developed between the Boers and British, with the latter seeking control. In 1899, the First Anglo-Boer War (also known as the South African War) broke out. The Magaliesberg area which lies to the north-west of the project area was an important focal point during the war as many battles were fought here. The mountain range served as a base for many Boer commandos and the mountain passes served as important thoroughfares from Pretoria to Rustenburg (Copley, 1993; Hilton-Barber & Berger, 2002). It was on these passes that the Boers developed the technique of guerrilla warfare (Copley, 1993; Hilton-Barber & Berger, 2002). The Boers also built stone walls, known as 'skanse', that were high enough to conceal a man lying down (Carruthers, 2007). The 11th of

July 1900 marked the beginning of guerrilla warfare with the battles of Dwarsvlei and Silkaatsnek.

The battle of Dwarsvlei took place on 11 July 1900 with a 1300 strong British force marching from Krugersdorp toward Hekpoort. Along the route, just north of Krugersdorp, they were met by 750 Boers who opened fire on them. The Boers were able to capture most of the wagons and supplies that were destined for Rustenburg (Copley, 1993; Hilton-Barber & Berger, 2002). On that same day, the Boers had an even greater success at the battle of Silkaatsnek. General De la Rey, who was travelling with some 200 Boers north of Silkaatsnek towards Rustenburg, decided to attack on a small British force commanded by Colonel H.R Roberts. The Boers surrounded the British Colonel Roberts surrendered the next day (Copley, 1993). The biggest battle that occurred during the Anglo-Boer War was the battle at Nooitgedacht on 13 December 1900 in the vicinity of Krugersdorp along the Magaliesberg range.

While the Boers were engaged in the Magaliesberg area, the general Boer population were ruthlessly suppressed by the British (Hilton-Barber & Berger, 2002; Carruthers, 2007). Many Boer farms were destroyed by the British 'scorched earth' policy and many Boer women and children were imprisoned in the British concentration camp near Krugersdorp (Hilton-Barber & Berger, 2002; Carruthers, 2007). In the early 1900s, the British began to gain control of the Magaliesberg area. In an attempt to fortify the mountain range, the British built a number of forts, blockhouses and trenches at strategic points along the route (Carruthers, 2007).

Remnants of this aspect of the historical landscape may include graves, battlefields, historical homestead complexes, and other structures, as well as subsurface evidence such as middens. Another important aspect that should be considered in characterising the historical landscape is various old limestone mines and kilns that were in operation during the late 1800s. Examples of these structures are found in protected areas such as at Gladysvale Cave and at the Krugersdorp Game Reserve.

More recently, socio-political heritage includes dispossessed landscapes. Many black families and communities were forcibly removed from land they occupied, especially from 1960 onwards. Some intangible aspects that should also be considered can include historical initiation sites.

During a previous heritage survey of the Cosmo City development area, an old initiation site associated with the Ndebele was recorded (Teurlings Environmental, 2002; The MSA Group, 2009). According to local guides, this initiation site was moved because it was too close to the current informal Lion Park Settlement (The MSA Group, 2009). This may suggest that the site is currently not in use. The site is situated with the Option 3 and Option 6 study areas.

3.4 Relevant Databases and Collections

The archival and database survey was conducted by consulting the following resources:

- University of the Witwatersrand (WITS) Archaeology Site Database
- South Africa National Archives - TAB – National Archives Repository (Public Records of former Transvaal Provinces and its predecessors as well as of magistrates and local authorities)
- Genealogical Society of South Africa (GSSA)

A survey of the WITS Archaeological Site Database identified a total of ten sites within an 8 km distance from the project area (Table 3-2). The sites include open area LIA sites as well as sites with stonewalled settlements, one Early Iron Age site and one shelter.

The archival search did not reveal many relevant documents for the affected properties; however the following information pertaining to the Diepsloot and Nooitgedacht farms was found:

- Diepsloot 262: A number of meetings were held on the property, mostly of the Yokeskie Farmer's Association. They discussed issues such as the bad state of the roads in the area, as well as the closing of a local Post Office at Witskei in 1924 (LPA; 158; 29/1923/16).
- Nooitgedacht and Diepsloot: A transport scheme operated between the years 1931 and 1955. This transported school children to the local schools in the area (TOD; 1091; E30/26/30).
- Diepsloot: A permit for mineral prospecting was submitted for the Farm Diepsloot in 1936. After gold was discovered in Johannesburg, all farms in the surrounding farms were prospected for further mineral sources (KPB; 2/1/13; 8/1/2).

The archival results are important in showing that the cultural landscape is continuously changing character from agricultural to mining and back to agriculture.

The Genealogical Society of South Africa (GSSA) database identified 12 registered cemeteries within the project area (Table 3-3 and Table 3-4). Of the registered cemeteries, four were located outside of the project area and eight were located within the study area. Only one cemetery is located on the proposed footprint on Option 4.

Table 3-2: Summary of archaeological sites identified from the WITS Archaeological Site database

Project No.	Map No.	Site No.	Site name	Latitude	Longitude	Type	Category	Farm	Route	Description
PBA1076	2527DD	I009	Swartkop 1	-25.9803	27.8306	Stone walling	LIA	Zwartkop 525 JQ	Option 3	1.5 km west of the project boundary
PBA1076	2527DD	I010	Swartkop 2	-25.9806	27.8347	Stone walling	LIA	Zwartkop 525 JQ	Option 3	1 km west of the project boundary
PBA1076	2527DD	I011	Aloe Ridge	-25.9643	27.8363	Stone walling	LIA	Zwartkop 525 JQ	Option 3	500 m west of the project boundary
PBA1076	2527DD	I012	Nooitgedacht	-25.9836	27.9084	Stone walling	LIA	Nooitgedacht 543 JQ	Option 5	600 m west of the project boundary
PBA1076	2527DD	I013	Rietfontein	-25.9775	27.8255	Stone walling	LIA	Rietfontein 522 JQ	Option 3	1.9 km west of the project boundary
PBA1076	2527DD	I014	Rietfontein	-25.9784	27.8219	Stone walling	LIA	Rietfontein 522 JQ	Option 3	2.4 km west of the project boundary
PBA1076	2627BB	I015	Gelden 1	-26.0228	27.7911	Open air	LIA	Kromdraai 520 JQ	Option 3	5.8 km west of the project boundary

Project No.	Map No.	Site No.	Site name	Latitude	Longitude	Type	Category	Farm	Route	Description
PBA1076	2627BB	I016	Gelden 2	-26.0236	27.7911	Open air	LIA	Kromdraai 520 JQ	Option 3	5.9 km west of the Route 3 project boundary
PBA1076	2627BB	S001	Gelden 3	-26.0167	27.7742	Open air	ESA	Kromdraai 520 JQ	Option 3	7.6 km west of the Route 3 project boundary

Table 3-3: Cemeteries identified on Option 1, Option 2, and Option 3

Option 2			Option 3		
Cemetery name & site no.	**Latitude**	**Longitude**	**Cemetery name & site no.**	**Latitude**	**Longitude**
Zandspruit (001)	-26.006	27.9388	Tweefontein 523 (002)	-25.935	27.8291
			Rietfontein 189/2 (008)	-26.035	27.8643

Table 3-4: Cemeteries identified on Option 4 and Option 5

Option 4			Option 5		
Cemetery name & site no.	**Latitude**	**Longitude**	**Cemetery name & site no.**	**Latitude**	**Longitude**
Bultfontein 3 (009)	-25.9625	27.9464	Lindley 3	-25.9183	27.9007
Nooitgedacht 534/3 (010)	-25.982	27.925	Lindley 4	-25.9303	27.9002
Nooitgedacht 534/2 (011)	-26.0013	27.8945	Lindley 2	-25.9338	27.9007
Nooitgedacht 534/1 (012)	-26.0055	27.9125	Bultfontein 1	-25.9616	27.9179
			Bultfontein 2	-25.9667	27.9314

3.5 Desktop Cartographic Survey

A desktop cartographic survey was conducted in order to assess potential for heritage sites within the project area and the surrounding region. This was done by examining topographical maps, historical maps and satellite imagery to identify potential heritage sites. Due to the presence of dolomite outcrops in the COH WHS and their potential for archaeological resources, this cartographic survey paid particular attention to the potential existence of dolomite outcrops within the project area and surroundings.

The 1:50 000 topographical maps of 2527DD Broederstroom was surveyed for any heritage structures or graves. The map indicated several nature reserves on Tweefontein 523 JQ, Zwartkop 525 JQ and Mooiplaats 524 JQ, particularly the Motsetse Nature Reserve and the Kromdraai Conservancy area which are protected areas (Option 3 and Option 6). There are several hiking trails within the boundaries of the nature reserve. Based on the map survey, a literature review and from experience, there is a high likelihood that dolomite outcrops exist near small hills along the western boundary of Tweefontein and Zwartkop. Dolomite outcrops are also expected to occur on Mooiplaats.

The 1:50 000 topographical map of 2627BB Roodepoort was surveyed for any heritage structures of graves. The map indicated a number of small farms and holiday resorts, particularly on farms Driefontein 179 IQ and Rietfontein 189 IQ (Option 6). An old mine is indicated on Driefontein outside the project area. The R512 is an existing servitude that is located on farms Lindley 528 JQ and Botesdal 529 JQ (Option 5). A landing strip was identified on Nooitgedacht 534 IQ (Option 4 and Option 5). The Diepsloot Nature Reserve is a protected area that is indicated on farms Rietfontein 532 JQ and Diepsloot 388 JR (Option 1, Option 2 and Option 5). No additional heritage resources were identified during the topographical map survey.

An aerial imagery survey resulted in no additional heritage resources that could be identified. It is noted that the proposed power line routes will for the most part, follow existing roads and servitudes.

3.6 Relevant Previous Impact Assessment Reports

The following local impact assessment reports were consulted:

- Van der Walt, J. (2006). Proposed Wildlife Residential Estate on the Farm Doornrandje 386JR, Gauteng Province. Doornrandje Heritage Assessment.
- Huffman, T. N. (2007). Driefontein: Heritage Impact Assessment.
- Coetzee, F.P. (2007). Environmental Impact Assessment for the proposed Crane Valley Estate – Archaeological Survey.
- Coetzee, F. P. (2008). Cultural Heritage Survey of the Proposed Residential Development of Phase 2 of Cosmo City, City of Johannesburg Metropolitan Municipality.
- Van der Walt, J. (2008). Archaeological Impact Assessment on Portion 315 and Remaining Extent Portion 29 of Farm Rietfontein 189IQ, Muldersdrift, Gauteng Province. Report prepared for Eco Assessment Environmental Consultants.

Relevant local impact assessment reports were collated and considered for located sites. A review of the relevant baseline reports identified 23 sites within and around the project area. Table 3-5 summarises the heritage sites identified from the baseline reports.