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# Heritage Impact Assessment

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HERITAGE IMPACT ASSESSMENT FOR THE  
PROPOSED UPGRADING OF THE STORM WATER  
DRAINAGE NETWORK FOR THE TOWN OF SOMERSET  
EAST, EASTERN CAPE PROVINCE.

PREPARED BY:  
G&A HERITAGE

PREPARED FOR:  
CEN



MAY 2010

# CREDIT SHEET

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***Disclaimer;** Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. GAIGHER & ASSOCIATES and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

SIGNED OFF BY: STEPHAN GAIGHER



# MANAGEMENT SUMMARY

**Site name and location:** Proposed upgrading of storm water drainage network for the town of Somerset East – Eastern Cape.

**Magisterial district:** Blue Crane Route Local Municipality

**Developer:** Cacadu District Municipality.

**Consultant:** G&A Heritage, PO Box 522, Louis Trichardt, 0920, South Africa

**Date development was mooted:** January 2010

**Date of Report:** 26 May 2010

**Proposed date of commencement of development:** June 2010

**Somerset East Storm Water Drainage Project;** The project proposes the upgrading of the existing storm water drainage network for the town of Somerset East. The upgrading of the existing canals will be along specific roads as indicated in the report. The existing infrastructure is to be upgraded to standardised concrete canals and sufficiently reinforced culverts and gabions. The current storm water drainage system is in serious disrepair and is not servicing the occupational areas effectively.

## Findings;

In terms of tangible historic and archaeological structures, only one area containing an informal cemetery was identified along the northern section of the proposed upgrading project. Mitigation of this feature will be needed during the construction phase of the project.

Since the proposed development will be within the occupational built environment of the existing township of Somerset East, a comprehensive public participation process is recommended for this project.

The following changes to the cultural landscape of the study area are anticipated;

- The development of dilapidated infrastructure into functioning components
- Protection of the existing graveyard/cemetery from water run-off that is currently undermining and eroding some of the burial grounds.

The anticipated impacts on this landscape are therefore seen as being mostly positive as indicated above.

## Recommendations;

- It is recommended that the services of a registered heritage practitioner are secured for the construction phase that will include the area close to the cemetery. The purpose of this appointment will be to assist the construction crew in terms of the safety of the burial ground.
- Procedures should be put in place to ensure the safety of any sub-surface sites of archaeological, historic or social value (as outlined later in this report).
- Access to the cemetery site should be controlled to ensure the safety of the grave site. This is necessary due to increased access to the site caused by the increase in people.
- Access to the cemetery site for family members of deceased should not be hampered in any way

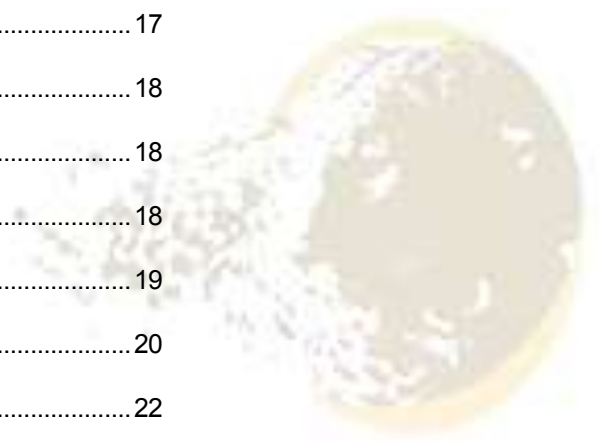
- by the construction activities.
- It is recommended that the entire cemetery site be moved at a later stage to a safer and more controlled burial ground administered by the local municipality.

**It is therefore anticipated that this development could have a positive effect on the perceived identity of the cultural landscape in this area.**



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# GLOSSARY

**Archaeology:** *Remains resulting from human activity which is in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.*

**Early Stone Age:** *The archaeology of the Stone Age between 300 000 and 2500 000 years ago.*

**Fossil:** *Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.*

**Heritage:** *That which is inherited and forms part of the National Estate (Historical places, objects, fossils, etc) as defined by the National Heritage Resources Act 25 of 1999.*

**Late Stone Age:** *The archaeology of the last 20 000 years associated with fully modern people.*

**Middle Stone Age:** *The archaeology of the Stone Age between 20 000-300 000 years ago associated with early modern humans.*

**Midden:** *A concentration of shellfish, bone, stone artefacts and sometimes pottery which has resulted from the actions of human activity.*

**National Estate:** *The collective heritage assets of the Nation.*

**Palaeontology:** *Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.*

**SAHRA:** *South African Heritage Resources Agency – the compliance authority which protects national heritage.*

**Structure (historical:)** *Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.*

**Wreck (protected):** *A ship or an aeroplane or any part thereof that lies on land or in the sea within South Africa is protected if it is more than 60 years old.*



## HERITAGE IMPACT ASSESSMENT (HIA)

### PROPOSED UPGRADING OF THE EXISTING STORM WATER DRAINAGE INFRASTRUCTURE FOR SOMERSET EAST.

## INTRODUCTION

G&A Heritage was contracted by CEN to conduct a first phase Basic Heritage Impact Assessment (HIA) on the proposed upgrading of a section of the storm water drainage infrastructure of the town of Somerset East in the Eastern Cape Province.

This HIA forms part of the Environmental Impact Assessment (EIA) as required by the Environmental Conservation Act (ECA) 73 of 1989, the Minerals & Petroleum Resources Development Act, 28 of 2002 and the Development Facilitation Act (DFA), 67 of 1995. The HIA is performed in accordance with section 38 of the National Heritage Resources Act (NHRA), 25 of 1999 and is intended for submission to the South African Heritage Resources Agency (SAHRA).

Qualified personnel from Gaigher & Associates conducted the assessment. The team comprised a Principal Investigator with a minimum of an Honours degree in an applicable science as well as at least ten years of field experience in heritage management assisted by a fieldworker with at least a BA degree in an applicable science. All of our employees are also registered members of the Association of South African Professional Archaeologists (ASAPA).

A member of Gaigher & Associates performed the assessment on 9 May 2010.

The indicted study areas were investigated for signs of sites with any heritage significance. Any sites identified were plotted using a Global Positioning System (GPS) using the WGS 84 datum and photographed digitally. The sites were surveyed on foot and by vehicle.

All results will be relayed in this report, firstly outlining the methodology used and then followed by the results and recommendations for the identified resources.

## LEGISLATIVE REQUIREMENTS

This study is conducted in terms of Section 38 (1) of the National Heritage Resources Act (No 25 of 1999) which makes provision for a compulsory HIA when constructing a road or similar linear developments exceeding 300m in length or developing an area exceeding 5000m<sup>2</sup> in extent. The law provides protection for the following categories of heritage:

- Archaeological remains which is defined as material older than 100 years and includes artefacts, structures, etc. as well as artefacts associated with military history older than 75 years (Section 35);
- Paleontological and rare geological specimens and meteorites (Section 35);
- Living Heritage which can include cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems, etc;
- Historical sites, buildings and objects older than 60 years (Section 34);
- Graveyards and graves older than 60 years (Section 36);



- Proclaimed heritage sites, public monuments and memorials (Section 37);
- Ethnographic art objects and objects of decorative and visual arts (Section 32).

Further, the National Estate may include (Section 3 (2));

- Places, buildings, structures and equipment of cultural significance;
- Places to which oral traditions are attached or which are associated with living heritage;
- Historical settlements and townscapes (and this can include open space, including a public square, street or park);
- Landscapes and features of cultural significance;
- Sites of significance related to the history of slavery in South Africa.

## SCOPE AND LIMITATION

The scope of work was defined as the heritage sensitivity evaluation of the following areas to be affected by the upgrading of infrastructure;

- Formalise and construct a storm water channel from an existing culvert at Primrose Street down to Frances street.
- Construct a retention pond south-west of the graveyard at Frances street.
- Install a large diameter storm water conduit along Frances street and/or lanes intersecting with Frances street down to the channel in Koffie Street, including storm water kerb inlets, catch-pits and manholes
- Install smaller diameter storm water conduits along 1st to 8th Avenue streets and formalize the road surfaces
- Formalise and construct a storm water channel/conduit along Koffie Street.
- Provide a minor drainage system for the area at Mnandi to cope with 1:5 year floods which will consist of pipes ranging from 450 – 600 mm diameter and storm water kerb inlets, catch pits and manholes.
- Re-design of existing storm water culverts.
- Re-design and formalise storm water channels from Frances Street sports field down to the culvert at Glen Avon street
- The storm water from the above will finally be discharged into the natural river south of Glen Avon

Although much information is available on the historic town of Somerset East, very little information is available concerning the newer townships such as Avon. No information could be found on heritage studies performed during the layout of these new areas.

Local interviews also indicated that the identified graveyard is not necessarily associated with inhabitants of the Avon township. Access to the graveyard could not be arranged and the age of the graves could therefore not be determined.

The original title deeds for the Glen Avon property is not very clear, however no indications could be found on the surveyor maps of the graveyard.

## REGIONAL OVERVIEW

Prior to the arrival of European settlers, this area was populated by San ("Bushmen"), who were hunter gatherers and Khoi San ("Hottentots") who were semi-nomadic pastoral people. The San had no conception of property while the Khoi, and later the Xhosa and settlers as well, cattle and other livestock represented wealth. Consequently hunting (or poaching, depending on the point of view) was always a source of aggravation. Sadly, the San were ultimately hunted nearly to extinction by all races and little remains of their heritage from Easter Cape except for their celebrated rock art.

During the 18th century Dutch speakers from the west began to settle and farm in the district while Xhosa

were appearing in the *Zuurveld* to the east. Pressure on both sides to expand created friction between these two races. And so were laid the foundations of black/white conflict in South Africa with a series of "Frontier Wars" which started while the Cape was still under Dutch rule and continued for many years after the British took control.

Lord Charles Somerset, the governor at the Cape from 1814 to 1826, founded in 1814 an experimental farm in the shadow of the *Boschberg*. Here many different crops were grown, including tobacco which was in short supply due to the British-American War. After the ending of that war, tobacco production on the farm ceased but it continued to help provision the army garrison.



In 1825 a township was laid out on the grounds of this farm and was named after Lord Somerset. The "East" was to distinguish it from the other Somerset ("West") near Cape Town and was only added 30 years later.

The first street of this new township was Paulet Street, at the foot of the *Boschberg*, and still contains many properties dating from this early era.

In 1835 a volunteer mounted unit of about 170 of the town's citizens was formed to take part in the 6th Frontier War and also saw action in subsequent wars.

When Dr William Gill, the district surgeon, died in 1863 he bequeathed most of his estate for an institution of higher learning but with the stipulation that none of the money be spent on erecting or acquiring buildings. The local farmers and townfolk clubbed together and *Gill College* opened in 1869. (received from Somerset East Tourism Office)

## **GLEN AVON**

The history of Glen Avon is that of Robert Hart who was regarded as being the "Father of the 1820 Settlers".

In 1795 Robert Harte was an 18 year old private in the Argyllshire Highlanders when the regiment disembarked at Cape Town. The regiment served for a while on the Cape frontier until Britain returned the Cape to Holland where after it returned to Britain.

In 1807, however, Robert Hart, now a married man, returned to the Cape as an officer in Colonel

Graham's newly formed Cape Regiment and was stationed at Grahamstown. Later, he was put in charge of the experimental farm founded by Lord Charles Somerset, the governor of the Cape, and which provided supplies to the army.



• The Hart Cottage - 1817



• Water Mill 1827

In 1825 the farm was closed down and the little town of Somerset East laid out on its grounds. Many of the original houses still stand here.

Hart and his family then settled on farmland adjacent to the town which he was granted in recognition of his services to the government. Here he built a homestead - Glen Avon. Hart, who was a pioneer of Merino sheep farming, farmed sheep, grew fruit, especially citrus, and grain. So successful was grain production in the region that it justified him building a commercial mill for neighbouring farmers.

The machinery and equipment was made at Leeds in England, shipped to Algoa Bay, transported by bullock wagon to Glen Avon via the old *Zuurberg* Pass and assembled on the spot.

Robert Hart died in 1867 at the ripe old age of 90. The farm is still farmed by the descendents of Robert Hart. Due to the care the family has taken over the intervening years, the farm's original buildings are in a fine state of preservation and are a wonderful example of the Colonial architecture of the period. (Courtesy, Glen Avon Farm)

## PROPOSED PROJECT

The areas of Somerset East located east of Main Road, and its extension, Worcester Road, have been subjected to repeated flooding of residential and commercial erven even under moderate rainfall intensity. To alleviate this periodic flooding, the Blue Crane Route Municipality (BCRM), together with Cacadu District Municipality (CDM), intends upgrading the existing roads and storm water drainage system in these areas. This includes, *inter alia*, the following:

- Rehabilitation of existing storm water drainage system.
- Formalise and construct a storm water channel from an existing culvert at Primrose Street down to Frances street.
- Construct a retention pond south-west of the graveyard at Frances street.
- Install a large diameter storm water conduit along Frances street and/or lanes intersecting with Frances street down to the channel in Koffie Street, including storm water kerb inlets, catch pits and manholes
- Install smaller diameter storm water conduits along 1st to 8th Avenue streets and formalize the road surfaces
- Formalise and construct a storm water channel/conduit along Koffie Street.
- Provide a minor drainage system for the area at Mnandi to cope with 1:5 year floods which will consist of pipes ranging from 450 – 600 mm diameter and storm water kerb inlets, catch pits and manholes.



- 
- Re-design of existing storm water culverts.
- Re-design and formalise storm water channels from Frances Street sports field down to the culvert at Glen Avon street
- The storm water from the above will finally be discharged into the natural river south of Glen Avon



Built Environment



Existing Infrastructure – Storm water drains



## PROJECT AREA

The proposed upgrade is planned in existing urban areas within the Somerset East municipal boundaries located east of Main Road, specifically the suburbs of New Brighton, West View, Mnandi and Kwanjoli. The centre co-ordinates of the proposed activity are 32°43' 08"S and 25°35' 24"E. Below is a copy of a Google Earth image indicating the relative location of the proposed upgrades.



Cold and windy weather conditions were experienced during the field investigations.

## URBAN EDGE

The study area lies within the urban edge of the town of Somerset East within the administration of the Blue Crane Route Local Municipality.

## ALTERNATIVES

No alternatives were considered for this project as it entails the upgrading of existing infrastructure and not the development of new structures.



## PALEONTOLOGICAL SITES

No sites of paleontological value were noted in the study areas. None of the literature studies consulted mentioned the existence of any sites of paleontological value. Since this project entails the upgrading of existing infrastructure, any unknown sites of paleontological value would probably have been destroyed during the initial construction phase.

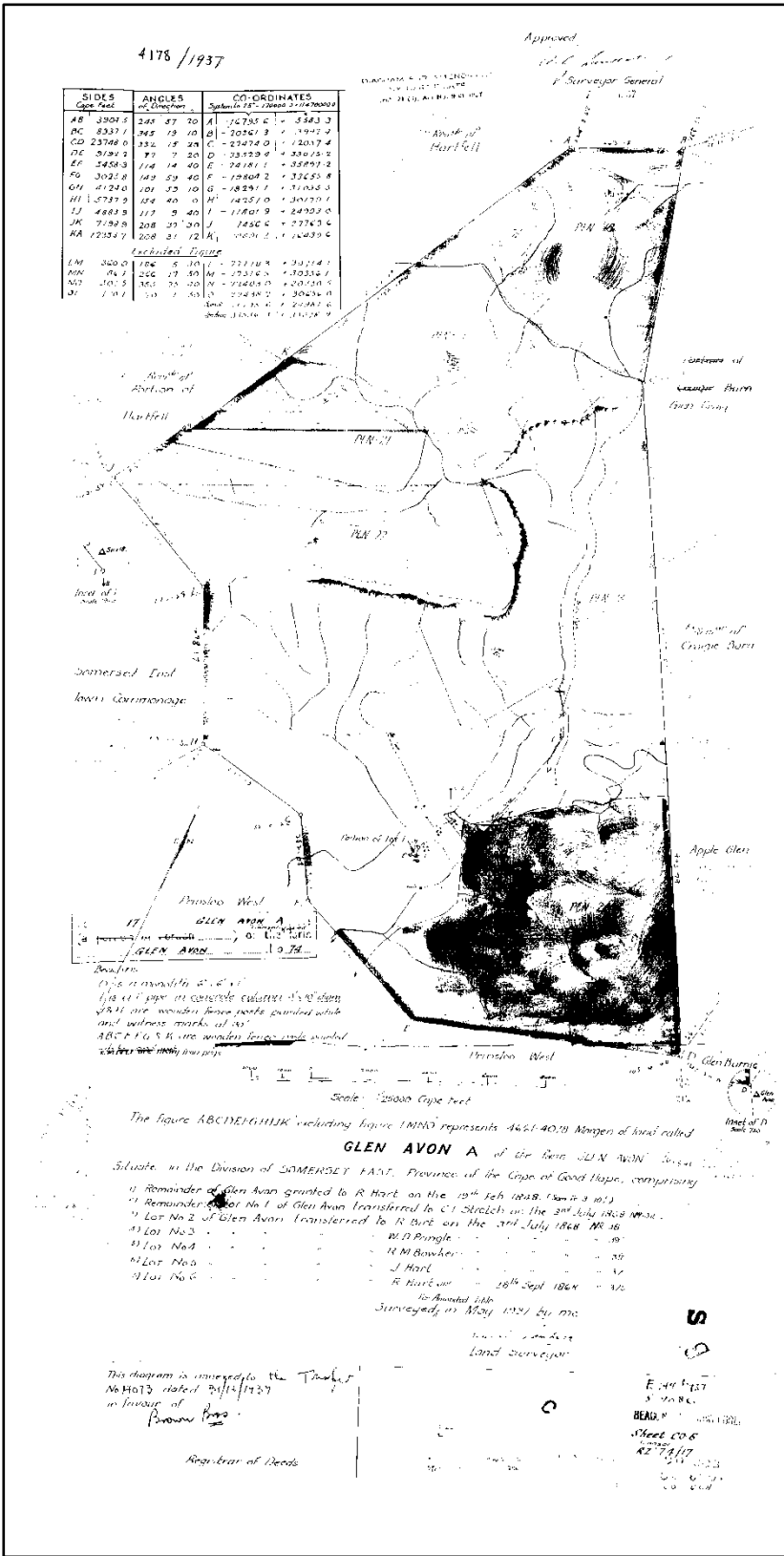
## ARCHAEOLOGICAL SITES

The Somerset East Museum in the Wesleyan Chapel could not provide evidence of any sites of archaeological importance within the study area. No literature references could be found indicating the location of archaeological sites in the study area. Unknown sites would have been subject to the same damage during the initial construction phase as the paleontological sites mentioned above.

## BUILT ENVIRONMENT

The proposed upgrading of the existing infrastructure lies within the built environment associated with the town of Somerset East. Due to the fact that no new structures are to be built but only existing ones upgraded, the impact on the built environment is anticipated to be very limited. The only area of high sensitivity that could possibly be affected by this project is the informal cemetery located on the northern part of the project. Most of the township areas are located on old agricultural land, as indicated by the original Glen Avon title deeds;





### RESOURCE INVENTORY

This section will contain the results of the heritage site inventory. Any identified sites will be indicated on the accompanying map plotted using a Geographic Information System (GIS).



## SITE 1 - GRAVEYARD

GPS 32° 42' 52" S

25° 35' 55" E

This is a modern graveyard of relatively recent origin (it could not be located on the 1937 surveyors map of the area). It is however thought to predate much of the built environment in this area. It is located along a incline that is steeper than the 1/25 slope normally recommended for cemeteries. The layout is informal and access is limited. A diamond mesh fence in disrepair surrounds the main area. The whole graveyard is thought to be in around 300m x 70m in size, although it does not have a distinct boundary. There is thought to be in excess of 100 graves located here.



## RESOURCE EVALUATION

### SITE 1 - GRAVEYARD

This site is not of any historic or archaeological value, however it has great social value and is also protected under section 36 of the NHRA and as such it deserves conservation. The site is definitely of recent nature and dates from the post colonial era and probably from the modern era (1950's and on).

#### Site significance characteristics slide scale (Post-Contact Criteria)

<b>Scientific Significance</b>	1
<b>Historic Significance</b>	2
<b>Public Significance</b>	4
<b>Other Significance</b>	1
<b>Ethnic Significance</b>	1
<b>Economic Significance</b>	0



The evaluation shows that the burial site lies on the high side of the moderate significance scale. Due to its social and cultural value this site should be preserved and protected.

## IMPACT IDENTIFICATION AND ASSESSMENT

### SITE 1 – GRAVEYARD

After interviews with the lead consultants as well as planning officials, it was determined that the upgrading of the storm water drain could possibly affect some of the burial sites within the identified cemetery. Even though the construction plans indicate that the graveyard should not be affected, it is anticipated that construction work could take place as close as five meters from some of the graves. Added to this the heightened activity factor during the construction phase and the fact that the cemetery fence will have to be breached, it is anticipated that secondary impacts on the site could be expected.

<i>Impact Effect</i>	<i>Score</i>
<b>Magnitude</b>	1
<b>Severity</b>	2
<b>Duration</b>	1
<b>Range</b>	1
<b>Frequency</b>	1
<b>Diversity</b>	1
<b>Cumulative effect</b>	2
<b>Rate of change</b>	1
<b>Total score:</b>	10

This table shows that significant impacts could be expected due to secondary effects of the construction project. It is recommended that these be mitigated – see below.

## RESOURCE MANAGEMENT RECOMMENDATIONS

### SITE 1 – GRAVEYARD

Due to the variety of activities proposed during the construction phase of this project it is recommended that this site be monitored during the construction phase. A suitably qualified heritage practitioner should be appointed to be on site during this phase of the project to ensure the safety of the graves involved. The services of the heritage practitioner need only be employed during this specific phase of the project.

### Terms of Reference for Appointed Heritage Practitioner (HP)

- ✓ The appointed professional will be responsible for the safety of the indicated graves
- ✓ The breached section of the graveyard should be monitored on the ground during any construction activities.
- ✓ No-go zones should be clearly marked with barrier-tape.
- ✓ The HP should liaise with the social consultant on the project to ensure that next of kin of localized gravesites are informed of the process as well as the steps taken for the protection of said graves.
- ✓ All materials possibly related to unmarked and accidentally exposed graves (grave goods, bones etc.) should be analysed and curated by the HP and relevant recommendations should be given through to the construction team.

- ✓ Workers employed in this part of the project should be made aware of the possible location of graves and what to look out for during excavations.
- ✓ Should unmarked graves be exposed, the steps as outlined beneath should be followed.

## Further Recommendations

It is recommended that the public participation process be extended to the construction phase and that the community be kept abreast of the processes involved.

Although unlikely, sub-surface remains of heritage sites could still be encountered during excavations on site. Such sites would offer no surface indication of their presence due to the high state of alteration in the area. The following indicators of unmarked sub-surface sites could be encountered;

- Ash deposits (unnaturally grey appearance of soil compared to the surrounding substrate)
- Bone concentrations, either animal or human
- Ceramic fragments such as pottery shards either historic or pre-contact
- Stone concentrations of any formal nature

Although no other sites of heritage significance were identified within the proposed study area, the following recommendations are given should any sub-surface remains of heritage sites be identified as indicated above;

- All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered.
- All construction in the immediate vicinity of the site should cease.
- The heritage practitioner should be informed as soon as possible.
- In the event of obvious human remains the SAPS should be notified.
- Mitigative measures (such as refilling etc.) should not be attempted.
- The area in a 50m radius of the find should be cordoned off with hazard tape.
- Public access should be limited.
- The area should be placed under guard.
- No media statements should be released until such time as the heritage practitioner has had sufficient time to analyze the finds.

**The graveyard site is located on an unsuitable plot of land for this type of activity. It is strongly recommended that the Local Municipality consider moving the graveyard to a more suitable area where issues such as soil erosion and ground water pollution can be addressed.**

## CULTURAL LANDSCAPE ANALYSIS

The cultural landscape and its associated heritage resources can be divided into two distinct categories;

### LANDSCAPE UNIT A

A part of the proposed project lies within a low-cost section of the township of Somerset East. This cultural landscape type identifies strongly with poverty and forced settlement and it is recommended that the project does not perpetuate this image as it is seen as a negative cultural landscape type. The upgrading of services infrastructure will go a long way in alleviating this perceived identity.

### LANDSCAPE UNIT B

The rest of the proposed project is located within a middle-income residential and light commercial area.

Historic structures are found in this area; however they are not endangered by the development. It is not anticipated that the project would have either a positive or negative influence on this cultural landscape type.

### RECOMMENDATIONS

Where the project is to impact on the cultural landscape this impact is seen as being largely positive and therefore the project on a whole is seen as having an overall positive effect on the cultural landscape.



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# APPENDIX A

## METHODOLOGY



# METHODOLOGY

## INVENTORY

Inventory studies involve the in-field survey and recording of archaeological resources within a proposed development area. The nature and scope of this type of study is defined primarily by the results of the overview study. In the case of site-specific developments, direct implementation of an inventory study may preclude the need for an overview.

There are a number of different methodological approaches to conducting inventory studies. Therefore, the proponent, in collaboration with the archaeological consultant, must develop an inventory plan for review and approval by the SAHRA prior to implementation (*Dincause, Dena F., H. Martin Wobst, Robert J. Hasenstab and David M. Lacy 1984*).

## SITE SURVEYING

Site surveying is the process by which archaeological sites are located and identified on the ground. Archaeological site surveys often involve both surface inspection and subsurface testing. For the purposes of heritage investigations, *archaeological sites* refer to any site with heritage potential (i.e. historic sites, cultural sites, rock art sites etc.).

A systematic surface inspection involves a foot traverse along pre-defined linear transects which are spaced at systematic intervals across the survey area. This approach is designed to achieve representative area coverage. Alternatively, an archaeological site survey may involve a non-systematic or random walk across the survey area. Subsurface testing is an integral part of archaeological site survey. The purpose of subsurface testing, commonly called "shovel testing", is to:

- (a) assist in the location of archaeological sites which are buried or obscured from the surveyor's view, and
- (b) help determine the horizontal and vertical dimensions and internal structure of a site.

In this respect, subsurface testing should not be confused with evaluative testing, which is a considerably more intensive method of assessing site significance (*King, Thomas F., 1978*).

Once a site is located, subsurface testing is conducted to record horizontal extent, depth of the cultural matrix, and degree of internal stratification. Because subsurface testing, like any form of site excavation, is destructive it should be conducted only when necessary and in moderation.

Subsurface testing is usually accomplished by shovel, although augers and core samplers are also used where conditions are suitable. Shovel test units averaging 40 square cm are generally appropriate, and are excavated to a sterile stratum (i.e. C Horizon, alluvial till, etc.).

Depending on the site survey strategy, subsurface testing is conducted systematically or randomly across the survey area. Other considerations such as test unit location, frequency, depth and interval spacing will also depend on the survey design as well as various biophysical factors. (*Lightfoot, Keng G. 1989*).

## SURVEY SAMPLING

Site survey involves the complete or partial inspection of a proposed project area for the purpose of locating archaeological or other heritage sites. Since there are many possible approaches to field survey, it is important to consider the biophysical conditions and archaeological site potential of the survey area in designing the survey strategy.

Ideally, the archaeological site inventory should be based on intensive survey of every portion of the impact area, as maximum area coverage will provide the most comprehensive understanding of archaeological and other heritage resource density and distribution. However, in many cases the size of the project area may render a complete survey impractical because of time and cost considerations.

In some situations it may be practical to intensively survey only a sample of the entire project area. Sample selection is approached systematically, based on accepted statistical sampling procedures, or judgementally, relying primarily on subjective criteria (*Butler, W., 1984*).



## SYSTEMATIC SURVEY SAMPLING

A systematic sample survey is designed to locate a representative sample of archaeological or heritage resources within the project area. A statistically valid sample will allow predictions to be made regarding total resource density, distribution and variability. In systematic sample surveys it may be necessary to exempt certain areas from intensive inspection owing to excessive slope, water bodies, landslides, land ownership, land use or other factors. These areas must be explicitly defined. Areas characterized by an absence of road access or dense vegetation should not be exempted. (*Dunneil, R.C., Dancey W.S. 1983*).

## JUDGEMENTAL SURVEY SAMPLING

Under certain circumstances, it is appropriate to survey a sample of the project area based entirely on professional judgement regarding the location of sites. Only those areas which can reasonably be expected to contain archaeological or heritage sites are surveyed.

However, a sufficient understanding of the cultural and biophysical factors which influenced or accounted for the distribution of these sites over the landscape is essential. Careful consideration must be given to ethnographic patterns of settlement, land use and resource exploitation; the kinds and distribution of aboriginal food sources; and restrictions on site location imposed by physical terrain, climatic regimes, soil chemistry or other factors. A judgemental sample survey is not desirable if statistically valid estimates of total heritage resource density and variability are required (*McManamon F.P. 1984*).

## ASSESSMENT

Assessment studies are only required where conflicts have been identified between heritage resources and a proposed development. These studies require an evaluation of the heritage resource to be impacted, as well as an assessment of project impacts. The purpose of the assessment is to provide recommendations as to the most appropriate manner in which the resource may be managed in light of the identified impacts. Management options may include alteration of proposed development plans to avoid resource impact, mitigative studies directed at retrieving resource values prior to impact, or compensation for the unavoidable loss of resource values.

It is especially important to utilize specialists at this stage of assessment. The evaluation of any archaeological resource should be performed by professionally qualified individuals.

## SITE EVALUATION

Techniques utilized in evaluating the significance of a heritage site include systematic surface collecting and evaluative testing. Systematic surface collection is employed wherever archaeological remains are evident on the ground surface. However, where these sites contain buried deposits, some degree of evaluative testing is also required.

Systematic surface collection from archaeological sites should be limited, insofar as possible, to a representative sample of materials. Unless a site is exceptionally small and limited to the surface, no attempt should be made at this stage to collect all or even a major portion of the materials. Intensive surface collecting should be reserved for full scale data recovery if mitigative studies are required.

Site significance is determined following an analysis of the surface collected and/or excavated materials (*Miller, C.L. II, 1989*).

## SIGNIFICANCE CRITERIA

There are several kinds of significance, including scientific, public, ethnic, historic and economic, that need to be taken into account when evaluating heritage resources. For any site, explicit criteria are used to measure these values. Checklists of criteria for evaluating pre-contact and post-contact archaeological sites are provided in Appendix B and Appendix C. These checklists are not intended to be exhaustive or inflexible. Innovative approaches to site evaluation which emphasize quantitative analysis and objectivity are encouraged. The process used to derive a measure of relative site significance must be rigorously documented, particularly the system for ranking or weighting various evaluated criteria.

Site integrity, or the degree to which a heritage site has been impaired or disturbed as a result of past land alteration, is an important consideration in evaluating site significance. In this regard, it is important

to recognize that although an archaeological site has been disturbed, it may still contain important scientific information.

Heritage resources may be of scientific value in two respects. The potential to yield information which, if properly recovered, will enhance understanding of Southern African human history is one appropriate measure of scientific significance. In this respect, archaeological sites should be evaluated in terms of their potential to resolve current archaeological research problems. Scientific significance also refers to the potential for relevant contributions to other academic disciplines or to industry.

Public significance refers to the potential a site has for enhancing the public's understanding and appreciation of the past. The interpretive, educational and recreational potential of a site are valid indications of public value. Public significance criteria such as ease of access, land ownership, or scenic setting are often external to the site itself. The relevance of heritage resource data to private industry may also be interpreted as a particular kind of public significance.

Ethnic significance applies to heritage sites which have value to an ethnically distinct community or group of people. Determining the ethnic significance of an archaeological site may require consultation with persons having special knowledge of a particular site. It is essential that ethnic significance be assessed by someone properly trained in obtaining and evaluating such data.

Historic archaeological sites may relate to individuals or events that made an important, lasting contribution to the development of a particular locality or the province. Historically important sites also reflect or commemorate the historic socioeconomic character of an area. Sites having high historical value will also usually have high public value.

The economic or monetary value of a heritage site, where calculable, is also an important indication of significance. In some cases, it may be possible to project monetary benefits derived from the public's use of a heritage site as an educational or recreational facility. This may be accomplished by employing established economic evaluation methods; most of which have been developed for valuating outdoor recreation. The objective is to determine the willingness of users, including local residents and tourists, to pay for the experiences or services the site provides even though no payment is presently being made. Calculation of user benefits will normally require some study of the visitor population (*Smith, L.D. 1977*).

## ASSESSING IMPACTS

A heritage resource impact may be broadly defined as the net change between the integrity of a heritage site with and without the proposed development. This change may be either beneficial or adverse.

Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource. For example, development may have a beneficial effect by preventing or lessening natural site erosion. Similarly, an action may serve to preserve a site for future investigation by covering it with a protective layer of fill. In other cases, the public or economic significance of an archaeological site may be enhanced by actions which facilitate non-destructive public use. Although beneficial impacts are unlikely to occur frequently, they should be included in the assessment.

More commonly, the effects of a project on heritage sites are of an adverse nature. Adverse impacts occur under conditions that include:

- (a) destruction or alteration of all or part of a heritage site;
- (b) isolation of a site from its natural setting; and
- (c) introduction of physical, chemical or visual elements that are out-of-character with the heritage resource and its setting.

Adverse effects can be more specifically defined as direct or indirect impacts. Direct impacts are the immediately demonstrable effects of a project which can be attributed to particular land modifying actions. They are directly caused by a project or its ancillary facilities and occur at the same time and place. The immediate consequences of a project action, such as slope failure following reservoir inundation, are also considered direct impacts.

Indirect impacts result from activities other than actual project actions. Nevertheless, they are clearly induced by a project and would not occur without it. For example, project development may induce changes in land use or population density, such as increased urban and recreational development, which may indirectly impact upon heritage sites. Increased vandalism of heritage sites, resulting from improved



or newly introduced access, is also considered an indirect impact. Indirect impacts are much more difficult to assess and quantify than impacts of a direct nature.

Once all project related impacts are identified, it is necessary to determine their individual level-of-effect on heritage resources. This assessment is aimed at determining the extent or degree to which future opportunities for scientific research, preservation, or public appreciation are foreclosed or otherwise adversely affected by a proposed action. Therefore, the assessment provides a reasonable indication of the relative significance or importance of a particular impact. Normally, the assessment should follow site evaluation since it is important to know what heritage values may be adversely affected.

The assessment should include careful consideration of the following level-of-effect indicators, which are defined in Appendix D:

- magnitude
- severity
- duration
- range
- frequency
- diversity
- cumulative effect
- rate of change

The level-of-effect assessment should be conducted and reported in a quantitative and objective fashion. The methodological approach, particularly the system of ranking level-of-effect indicators, must be rigorously documented and recommendations should be made with respect to managing uncertainties in the assessment. (*Zubrow, Ezra B.A., 1984*).

<i>Impact Effect</i>	<i>Score</i>
<b>Magnitude</b>	0-4
<b>Severity</b>	0-4
<b>Duration</b>	0-4
<b>Range</b>	0-4
<b>Frequency</b>	0-4
<b>Diversity</b>	0-4
<b>Cumulative effect</b>	0-4
<b>Rate of change</b>	0-4
<b>Total score:</b>	0-32

Impact severity table.



Impacts will be defined along the following parameters of severity;

<i>Effect</i>	<i>Score</i>
<b>No effect on site</b>	0
<b>Insignificant impact on site</b>	1-5
<b>Significant impact on site</b>	6-16
<b>Major destruction of site and attributes</b>	17-24
<b>Total destruction of sites and attributes</b>	25-32

The study area was surveyed using standard archaeological surveying methods. The area was surveyed using directional parameters supplied by the GPS and surveyed by foot. This technique has proven to result in the maximum coverage of an area. This action is defined as;

*'an archaeologist being present in the course of the carrying-out of the development works (which may include conservation works), so as to identify and protect archaeological deposits, features or objects which may be uncovered or otherwise affected by the works'* (DAHGI 1999a, 28).

Standard archaeological documentation formats were employed in the description of sites. Using standard site documentation forms as comparable medium, it enabled the surveyors to evaluate the relative importance of sites found. Furthermore GPS (Global Positioning System) readings of all finds and sites were taken. This information was then plotted using a **eTrex Legend** GPS (WGS 84- datum).

Indicators such as surface finds, plant growth anomalies, local information and topography were used in identifying sites of possible archaeological importance. Test probes were done at intervals to determine sub-surface occurrence of archaeological material. The importance of sites was assessed by comparisons with published information as well as comparative collections.

*Test excavation is that form of archaeological excavation where the purpose is to establish the nature and extent of archaeological deposits and features present in a location which it is proposed to develop (though not normally to fully investigate those deposits or features) and allow an assessment to be made of the archaeological impact of the proposed development. It may also be referred to as archaeological testing'* (DAHGI 1999a, 27).

*'Test excavation should not be confused with, or referred to as, archaeological assessment which is the overall process of assessing the archaeological impact of development. Test excavation is one of the techniques in carrying out archaeological assessment which may also include, as appropriate, documentary research, field walking, examination of upstanding or visible features or structures, examination of aerial photographs, satellite or other remote sensing imagery, geophysical survey, and topographical assessment'* (DAHGI 1999b, 18).



All sites or possible sites found were classified using a hierarchical system wherein sites are assessed using a scale of zero to four according their importance. These categories are as follows;

<i>Degree of significance</i>	<i>Justification</i>	<i>Score</i>
<b><i>Exceptional significance</i></b>	Rare or outstanding, high degree of intactness. Can be interpreted easily.	13 – 16
<b><i>High significance</i></b>	High degree of original fabric. Demonstrates a key element of item's significance. Alterations do not detract from significance.	9 – 12
<b><i>Moderate significance</i></b>	Altered or modified elements. Element with little heritage value, but which contribute to the overall significance.	5 – 8
<b><i>Little significance</i></b>	Alterations detract from significance. One of many. Alterations detract from significance.	1 – 4
<b><i>Intrusive</i></b>	Damaging to the item's heritage significance.	0

Table 1. Site significance table for pre-contact sites.

<i>Degree of significance</i>	<i>Justification</i>	<i>Score</i>
<b><i>Exceptional significance</i></b>	Rare or outstanding, high degree of intactness. Can be interpreted easily.	29 – 24
<b><i>High significance</i></b>	High degree of original fabric. Demonstrates a key element of item's significance. Alterations do not detract from significance.	13 – 18
<b><i>Moderate significance</i></b>	Altered or modified elements. Element with little heritage value, but which contribute to the overall significance.	7 – 12
<b><i>Little significance</i></b>	Alterations detract from significance. One of many. Alterations detract from significance.	1 – 6
<b><i>Intrusive</i></b>	Damaging to the item's heritage significance.	0

Table 2. Site significance table for post contact sites.

The qualitative value of a site's significance will be calculated by tabling its significance characteristics (as outlined in appendix B & C) on a sliding value scale and determining an accumulative value for the specific site. Two tables will be used;

Site significance characteristics slide scale (Pre-Contact Criteria)					
<b>Scientific Significance</b>	0	1	2	3	4
<b>Public Significance</b>	0	1	2	3	4
<b>Ethnic Significance</b>	0	1	2	3	4
<b>Economic Significance</b>	0	1	2	3	4
					<b>Total Score</b>

Table 3. Pre-contact site criteria (0- no value, 4- highest value)

Site significance characteristics slide scale (Post-Contact Criteria)					
<b>Scientific Significance</b>	0	1	2	3	4
<b>Historic Significance</b>	0	1	2	3	4
<b>Public Significance</b>	0	1	2	3	4
<b>Other Significance</b>	0	1	2	3	4
<b>Ethnic Significance</b>	0	1	2	3	4
<b>Economic Significance</b>	0	1	2	3	4
					<b>Total Score</b>

Table 4. Post-contact site criteria (0- no value, 4- highest value)

The values calculated (as specified in appendix B&C) are attributed to a category within the site significance table to provide the site with a quantifiable significance value. This will only be done for identified sites. Should an area under investigation not show any evidence of human activity this will be stated and no further qualifying will be done.

This information will be contained in a report that will strive to;

Review the purpose, approach, methodology and reporting of archaeological assessment and monitoring and propose guidelines on how to adequately address four key questions:

- i. What is the research value and potential of the archaeological remains?
- ii. What will the impact of development be?
- iii. What types of mitigation (by design modification or further investigation) would be appropriate to mitigate the impact of development and/or make a useful contribution to knowledge?
- iv. What will be the likely cost and timescale of any further investigation, analysis and reporting, given the nature of the archaeology and the type and extent of further work required?

### Scientific Significance

(a) Does the site contain evidence which may substantively enhance understanding of culture history, culture process, and other aspects of local and regional prehistory?

internal stratification and depth

- chronologically sensitive cultural items
- materials for absolute dating
- association with ancient landforms
- quantity and variety of tool type
- distinct intra-site activity areas
- tool types indicative of specific socio-economic or religious activity
- cultural features such as burials, dwellings, hearths, etc.
- diagnostic faunal and floral remains
- exotic cultural items and materials
- uniqueness or representativeness of the site
- integrity of the site

(b) Does the site contain evidence which may be used for experimentation aimed at improving archaeological methods and techniques?

- monitoring impacts from artificial or natural agents
- site preservation or conservation experiments
- data recovery experiments
- sampling experiments
- intra-site spatial analysis

(c) Does the site contain evidence which can make important contributions to paleoenvironmental studies?

- topographical, geomorphological context
- depositional character
- diagnostic faunal, floral data

(d) Does the site contain evidence which can contribute to other scientific disciplines such as hydrology, geomorphology, pedology, meteorology, zoology, botany, forensic medicine, and environmental hazards research, or to industry including forestry and commercial fisheries?

## **Public Significance**

(a) Does the site have potential for public use in an interpretive, educational or recreational capacity?

- integrity of the site
- technical and economic feasibility of restoration and development for public use
- visibility of cultural features and their ability to be easily interpreted
- accessibility to the public
  
- opportunities for protection against vandalism
- representativeness and uniqueness of the site
- aesthetics of the local setting
- proximity to established recreation areas



present and potential land use  
land ownership and administration  
legal and jurisdictional status  
local community attitude toward development

(b) Does the site receive visitation or use by tourists, local residents or school groups?

### **Ethnic Significance**

(a) Does the site presently have traditional, social or religious importance to a particular group or community?

ethnographic or ethno-historic reference  
documented local community recognition or, and concern for, the site

### **Economic Significance**

(a) What value of user-benefits may be placed on the site?

visitors' willingness-to-pay  
visitors' travel costs

### **Scientific Significance**

(a) Does the site contain evidence which may substantively enhance understanding of historic patterns of settlement and land use in a particular locality, regional or larger area?

(b) Does the site contain evidence which can make important contributions to other scientific disciplines or industry?

### **Historic Significance**

(a) Is the site associated with the early exploration, settlement, land use, or other aspect of southern Africa's cultural development?

(b) Is the site associated with the life or activities of a particular historic figure, group, organization, or institution that has made a significant contribution to, or impact on, the community, province or nation?

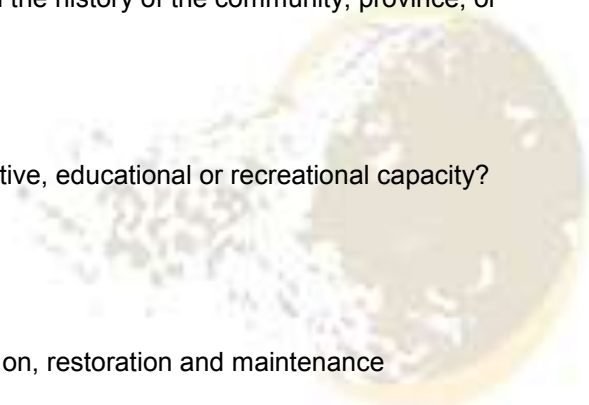
(c) Is the site associated with a particular historic event whether cultural, economic, military, religious, social or political that has made a significant contribution to, or impact on, the community, province or nation?

(d) Is the site associated with a traditional recurring event in the history of the community, province, or nation, such as an annual celebration?

### **Public Significance**

(a) Does the site have potential for public use in an interpretive, educational or recreational capacity?

visibility and accessibility to the public  
ability of the site to be easily interpreted  
opportunities for protection against vandalism  
economic and engineering feasibility of reconstruction, restoration and maintenance  
representativeness and uniqueness of the site



- proximity to established recreation areas
- compatibility with surrounding zoning regulations or land use
- land ownership and administration
- local community attitude toward site preservation, development or destruction
- present use of site

(b) Does the site receive visitation or use by tourists, local residents or school groups?

### **Ethnic Significance**

(a) Does the site presently have traditional, social or religious importance to a particular group or community?

### **Economic Significance**

(a) What value of user-benefits may be placed on the site?

- visitors' willingness-to-pay

- visitors' travel costs

- Integrity and Condition

(a) Does the site occupy its original location?

(b) Has the site undergone structural alterations? If so, to what degree has the site maintained its original structure?

(c) Does the original site retain most of its original materials?

(d) Has the site been disturbed by either natural or artificial means?

### **Other**

(a) Is the site a commonly acknowledged landmark?

(b) Does, or could, the site contribute to a sense of continuity or identity either alone or in conjunction with similar sites in the vicinity?

(c) Is the site a good typical example of an early structure or device commonly used for a specific purpose throughout an area or period of time?

(d) Is the site representative of a particular architectural style or pattern?

## **Indicators of Impact Severity**

### **Magnitude**

The amount of physical alteration or destruction which can be expected. The resultant loss of heritage value is measured either in amount or degree of disturbance.

### **Severity**

The irreversibility of an impact. Adverse impacts which result in a totally irreversible and irretrievable loss of heritage value are of the highest severity.

### **Duration**

The length of time an adverse impact persists. Impacts





may have short-term or temporary effects, or conversely, more persistent, long-term effects on heritage sites.

### **Range**

The spatial distribution, whether widespread or site-specific, of an adverse impact.

### **Frequency**

The number of times an impact can be expected. For example, an adverse impact of variable magnitude and severity may occur only once. An impact such as that resulting from cultivation may be of recurring or ongoing nature.

### **Diversity**

The number of different kinds of project-related actions expected to affect a heritage site.

### **Cumulative Effect**

A progressive alteration or destruction of a site owing to the repetitive nature of one or more impacts.

### **Rate of Change**

The rate at which an impact will effectively alter the integrity or physical condition of a heritage site. Although an important level-of-effect indicator, it is often difficult to estimate. Rate of change is normally assessed during or following project construction.

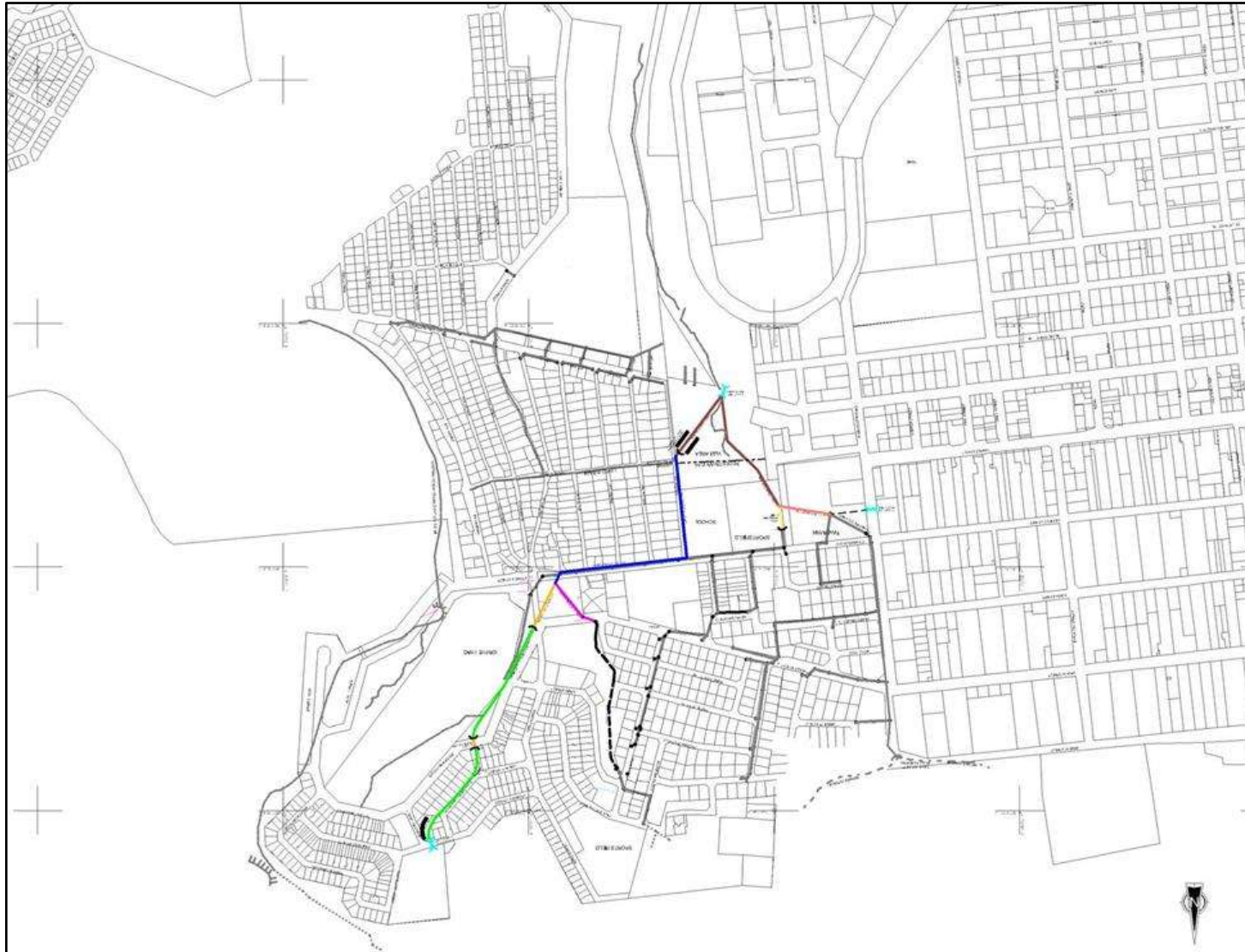




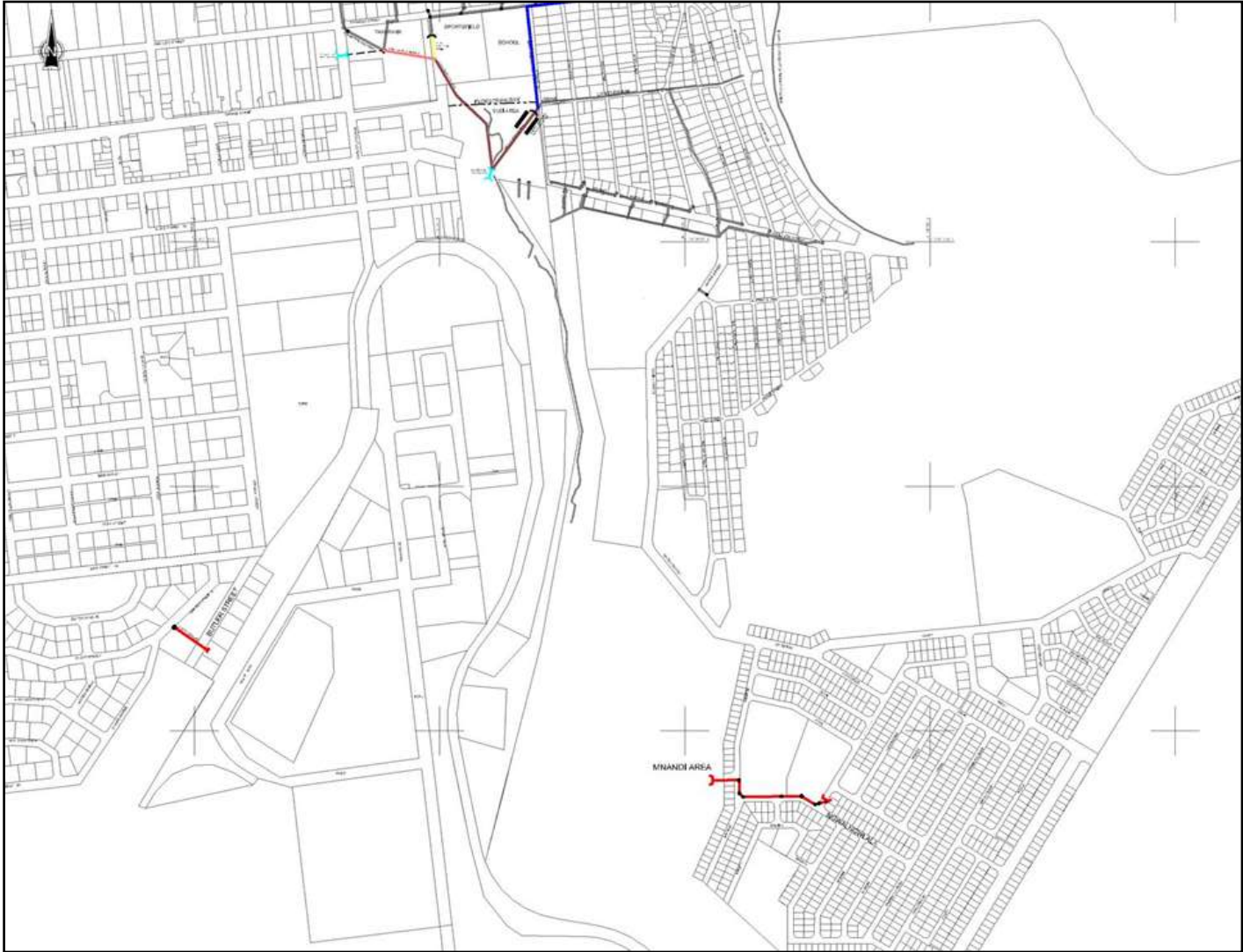
# APPENDIX B

## LOCATION MAPS



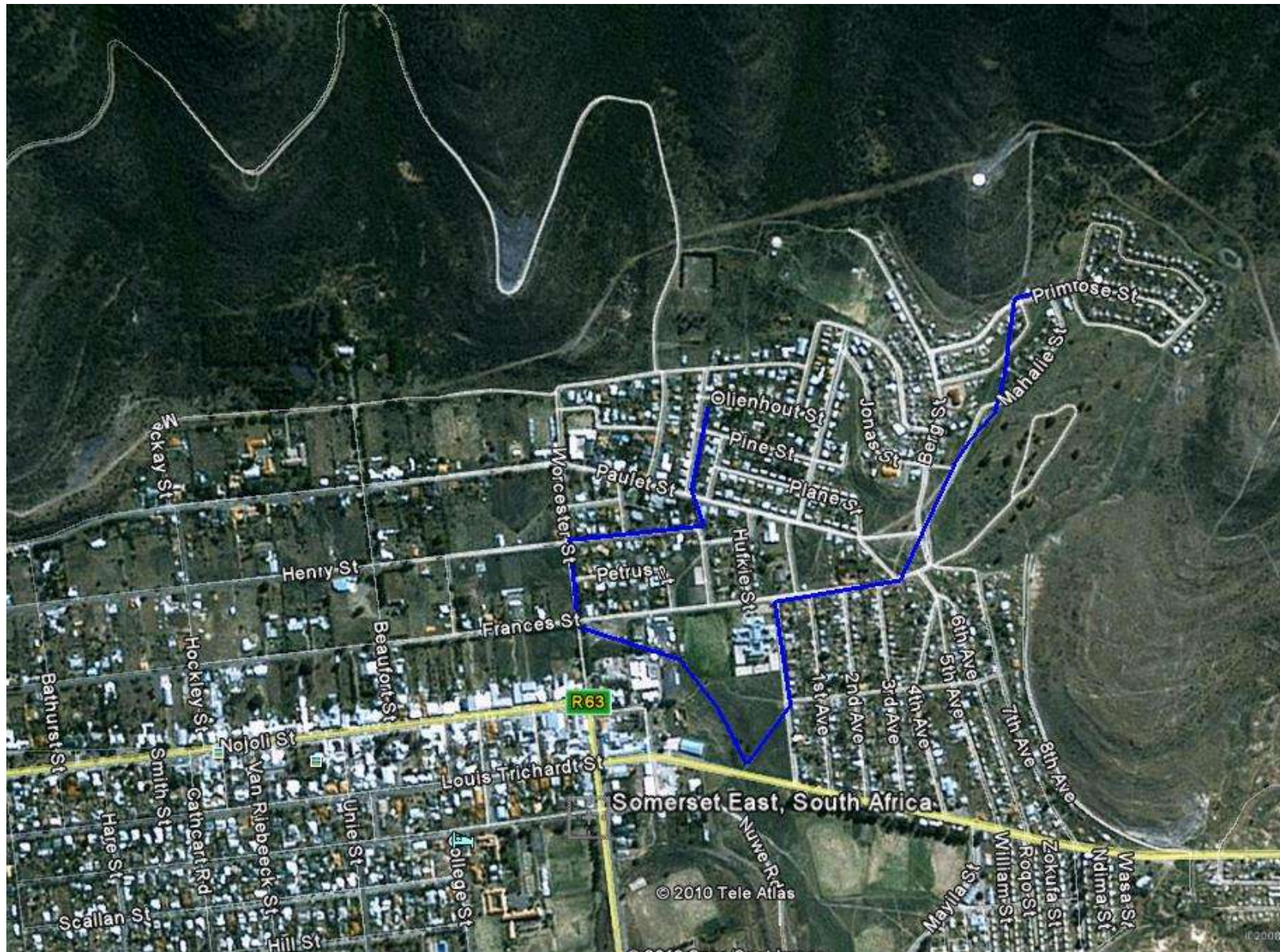


Pipeline Route 1



Pipeline Route 2





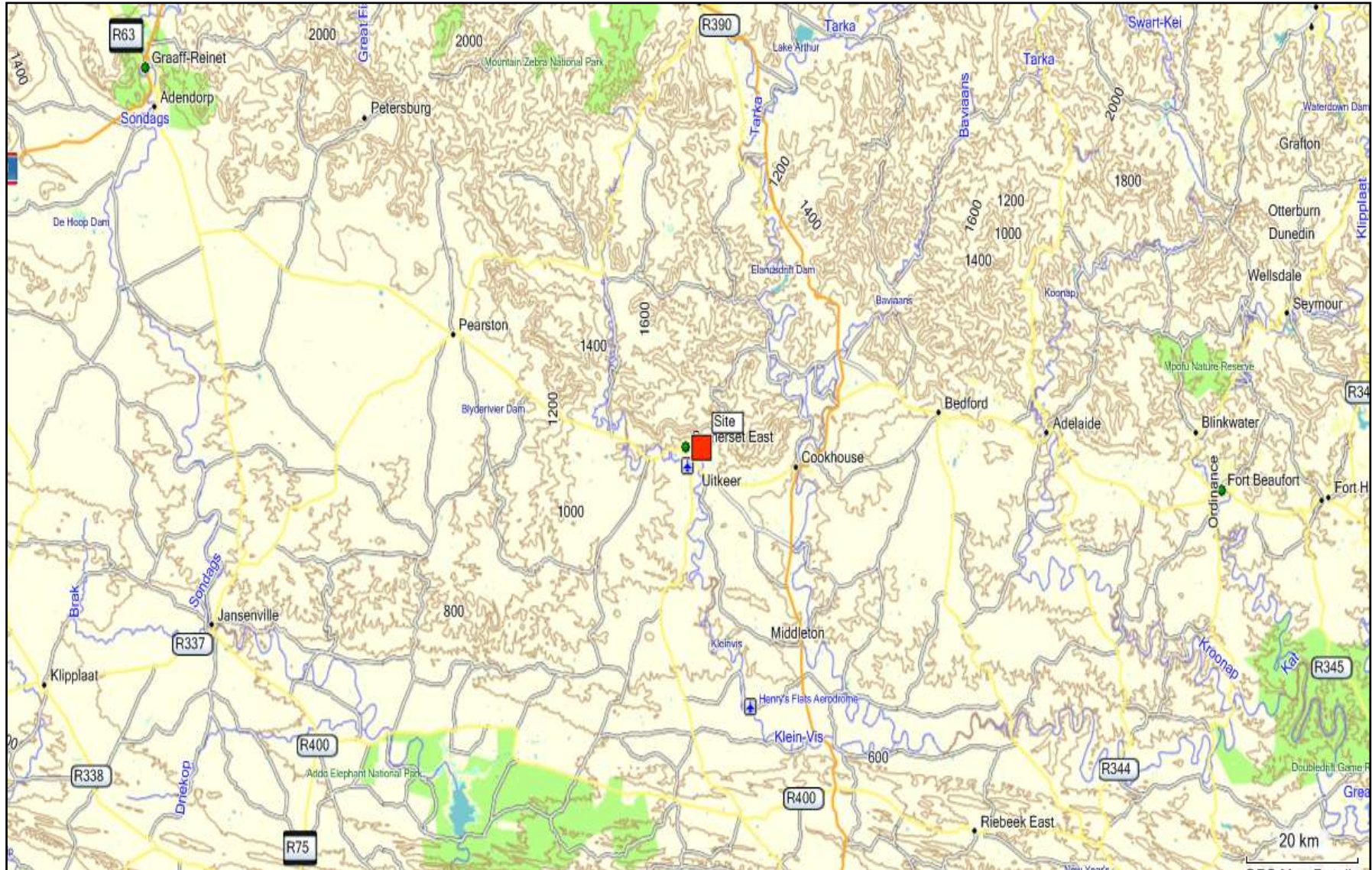
Pipeline Route 1 - Blue





• Pipeline Route 2 - Red





• Location of Study Area