# Heritage Impact Assessment Report

## HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED UPGRADING OF STORMWATER INFRASTRUCTURE IN VALENCIA, ADDO, SUNDAYS RIVER VALLEY MUNICIPALITY, EASTERN CAPE PROVINCE

PREPARED BY:

PREPARED FOR:

# CREDIT SHEET


## Project Director

STEPHAN GAIGHER (BA Hons, Archaeology, UP)

Principal Investigator for G&A Heritage

Member of ASAPA (Site Director Status)

Tel.: (015) 516 1561

Cell.: 073 752 6583

E-mail: stephan@gaheritage.co.za

Website: http://www.gaheritage.co.za

## Report Author

STEPHAN GAIGHER


***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. G&A Heritage and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

**Statement of Independence**

As the duly appointed representative of G&A Heritage, I Stephan Gaigher, hereby confirm my independence as a specialist and declare that neither I nor G&A Heritage have any interests, be it business or otherwise, in any proposed activity, application or appeal in respect of which the Environmental Consultant was appointed as Environmental Assessment Practitioner, other than fair remuneration for work performed on this project.

SIGNED OFF BY: STEPHAN GAIGHER

# EXECUTIVE SUMMARY

**Site name and location:** Valencia, Addo, Stormwater Infrastructure System

**Municipal Area:** Sundays River Valley Municipality.

**Developer:** Sundays River Valley Municipality

**Consultant:** G&A Heritage, PO Box 522, Louis Trichardt, 0920, South Africa. 38A Voster Str. Louis Trichardt, 0920

**Date of Report:** 02 July 2013

The purpose of the management summary is to distil the information contained in the report into a format that can be used to give specific results quickly and facilitate management decisions. It is not the purpose of the management summary to repeat in shortened format all the information contained in the report, but rather to give a statement of results for decision making purposes.

This study focuses on the construction of stormwater infrastructure at the Valencia Township in the Addo area.

This study encompasses the heritage impact investigation. A preliminary layout has been supplied to lead this phase of this study.

The purpose of this study is to determine the possible occurrence of sites with cultural heritage significance within the study area. The study is based on archival and document combined with fieldwork investigations.

**Findings**
No sites of any heritage significance could be identified on site.

**Recommendations**
The social conditions in the study area is of such low quality due to previous alterations that the social benefits of this development far outweigh any negative impacts.

**Fatal Flaws**
No fatal flaws were identified.

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# List of Abbreviations

Bp.....Before Present

EIA ..... Early Iron Age

ESA.....Early Stone Age

Fm..... Femtometre ($10^{-15}$m)

GPS ..... Geographic Positioning System

HIA.....Heritage Impact Assessment

LIA..... Late Iron Age

LSA .....Late Stone Age

MYA .....Million Years Ago

MSA ..... Middle Stone Age

NHRA .....National Heritage Resources Act no 22 of 1999

SAHRA .....South African Heritage Resource Agency

S&EIR.....Scoping & Environmental Impact Reporting

Um .....Micrometre ($10^{-6}$ m)

WGS 84..... World Geodetic System for 1984

Chapter 1

# PROJECT RESOURCES

## Heritage Impact Report

Heritage Impact Report for the Proposed Valencia Stormwater Infrastructure

## Introduction

**Legislation and methodology**

G&A Heritage was appointed by AECOM to undertake a heritage impact assessment (HIA) for the proposed construction of stormwater infrastructure in the Valencia Township. Section 38 (A) and 3 (2) of the South African Heritage Resources Act (25 of 1999) requires that a heritage study is undertaken for:

(a) construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
(b) construction of a bridge or similar structure exceeding 50 m in length; and
(c) any development, or other activity which will change the character of an area of land, or water –
(1) exceeding 10 000 $m^2$ in extent;
(2) involving three or more existing erven or subdivisions thereof; or
(3) involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years; or
(d) the costs of which will exceed a sum set in terms of regulations; or
(e) any other category of development provided for in regulations.

A heritage impact assessment is not limited to archaeological artefacts, historical buildings and graves. It is far more encompassing and includes intangible and invisible resources such as places, oral traditions and rituals. A heritage resource is defined as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes the following:

(a) places, buildings, structures and equipment;
(b) places to which oral traditions are attached or which are associated with living heritage;
(c) historical settlements and townscapes;
(d) landscapes and natural features;
(e) geological sites of scientific or cultural importance;
(f) archaeological and paleontological sites;
(g) graves and burial grounds, including –
(1) ancestral graves,
(2) royal graves and graves of traditional leaders,
(3) graves of victims of conflict (iv) graves of important individuals,
(4) historical graves and cemeteries older than 60 years, and
(5) other human remains which are not covered under the Human Tissues Act, 1983 (Act No.65 of 1983 as amended);
(h) movable objects, including ;
(1) objects recovered from the soil or waters of South Africa including archaeological and paleontological objects and material, meteorites and rare geological specimens;
(2) ethnographic art and objects;
(3) military objects;
(4) objects of decorative art;
(5) objects of fine art;
(6) objects of scientific or technological interest;
(7) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings; and
(8) any other prescribed categories, but excluding any object made by a living person;

(i) battlefields;
(j) traditional building techniques.

A '**place**' is defined as:
(a) A site, area or region;
(b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);
(c) a group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures); and (d) an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.

'**Structures**' means any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

'**Archaeological**' means:
(a) material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
(b) rock art, being a form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation; and
(c) wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land or in the maritime cultural zone referred to in section 5 of the Maritime Zones Act 1994 (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;
(d) features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

**'Paleontological'** means 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.

**'Grave'** means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. The South African Heritage Resources Agency (SAHRA) will only issue a permit for the alteration of a grave if it is satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned.

The removal of graves is subject to the following procedures as outlined by the SAHRA:

- Notification of the impending removals (using English, Afrikaans and local language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;
- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from the SAHRA;
- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

The limitations and assumptions associated with this scoping study are as follows;
- It was assumed that the aligment as provided by AECOM is accurate.
- We assumed that the public participation process performed as part of the Scoping and Environmental Impact Reporting (S&EIR) process will be sufficiently encompassing not to be repeated in the Heritage Scoping Phase.

Table 1. Impacts on the NHRA Sections

| Act | Section | Description | Possible Impact | Action |
|---|---|---|---|---|
| National Heritage Resources Act (NHRA) | 34 | Preservation of buildings older than 60 years | No impact | None |
| | 35 | Archaeological, | No Impact | None |

| | | | | |
|---|---|---|---|---|
| | | paleontological and meteor sites | | |
| | 36 | Graves and burial sites | Possible Impact | PP and Monitoring |
| | 37 | Protection of public monuments | No impact | None |
| | 38 | Does activity trigger a HIA? | Yes | HIA |

Table 2. NHRA Triggers

| Action Trigger | Yes/No | Description |
|---|---|---|
| Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length. | Yes | Storm water drains/pipelines |
| Construction of a bridge or similar structure exceeding 50m in length. | No | N/A |
| Development exceeding 5000 $m^2$ | No | The stormwater ponds will cover a combined area of 23,685 m2 |
| Development involving more than 3 erven or sub divisions | No | N/A |
| Development involving more than 3 erven or sub divisions that have been consolidated in the past 5 years | No | N/A |
| Re-zoning of site exceeding 10 000 $m^2$ | No | N/A |
| Any other development category, public open space, squares, parks or recreational grounds | No | N/A |

# Background Information

## Proposed Valencia Stormwater Infrastructure

### Project Description

The Sundays River Valley Municipality has applied for an Environmental Authorisation for the proposed construction of three stormwater detention ponds, the expansion of four bulk stormwater outlets and interconnecting stormwater infrastructure. The proposed project is located within the urban area of Valencia, situated on the south western border of the town of Addo. Addo falls under the jurisdiction of the Sundays River Valley Municipality, which forms part of the Cacadu District Municipality in the Eastern (Figure 1: Locality Map). Stormwater Pond 1 and bulk stormwater outlet 1 is located on the northern border of Valencia, adjacent to Harvey Street (northern side). Stormwater Pond 2 and bulk stormwater outlet 4 is located between the western border of Valencia and on the eastern side of the railway line. Stormwater Pond 3 and bulk stormwater outlet 2 and 3 are located between the railway line (eastern side) and the R335 (western side) (Figure 2: Layout Map).

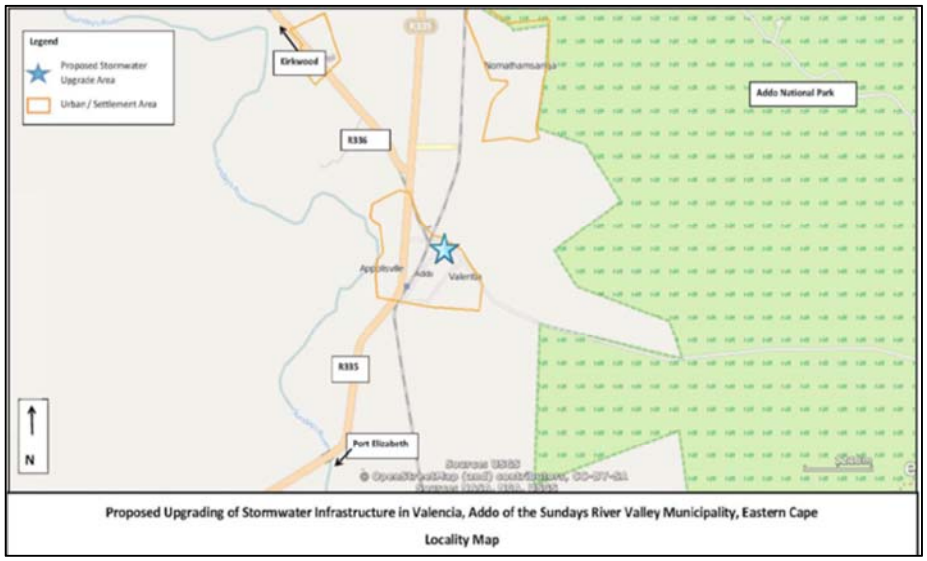

Figure 1. Location Map

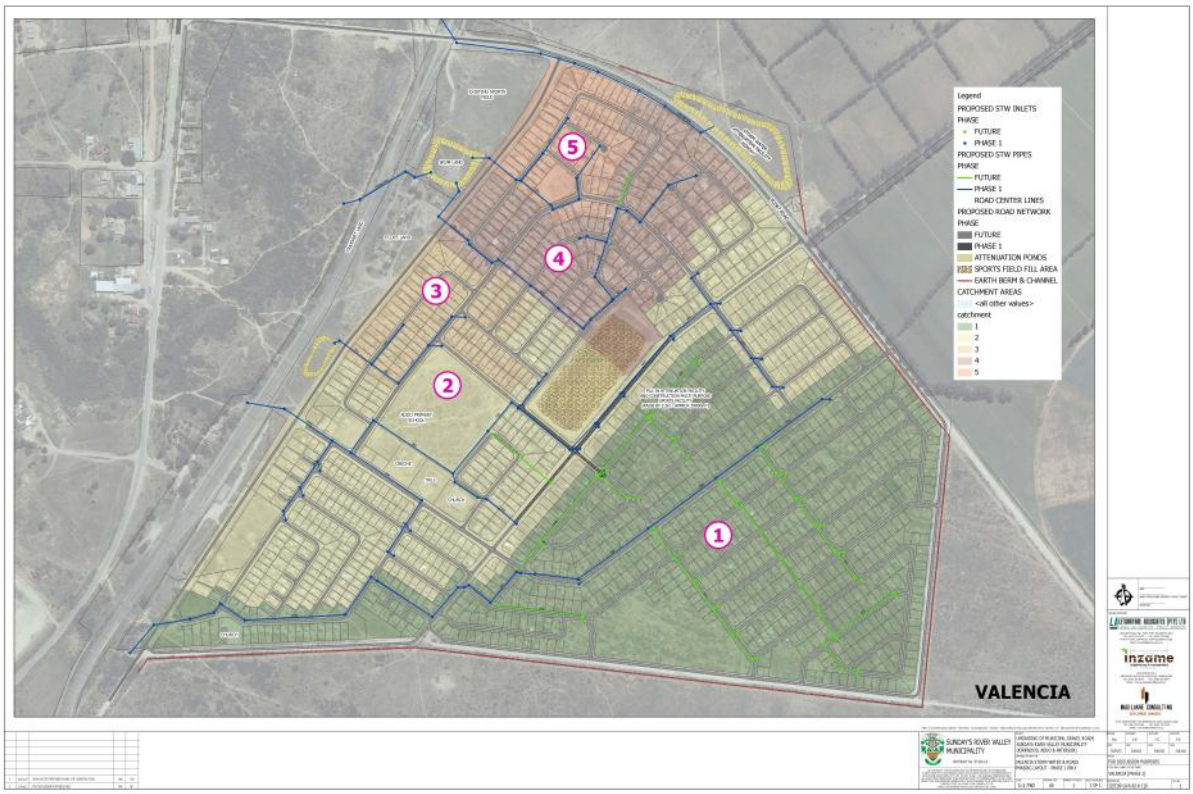


Figure 2. Layout of site

# Methodology

This study defines the heritage component of the basic assessment process being undertaken for the Valencia Township Stormwater Infrastructure. It is described as a Heritage Impact Assessment (HIA). This report attempts to evaluate the accumulated heritage knowledge of the area.

## Evaluating Heritage Impacts

The study was mainly focused on systematic field surveys of the study area. The majority of the proposed stormwater infrastructure for this project is located within the Valencia Township and follows roadways and open-air sites. The Valencia Township municipal infrastructure has been subject to serious degradation. Most of the roads are barely passable and current drainage is very limited.

The majority of the areas under investigation fall within the Valencia Township itself. This as a whole is a significantly altered environment with nearly none of the areas being original. For this reason it is unlikely that any possible heritage sites would not have undergone total destruction during the fairly recent construction activities. The areas within the township itself were surveyed on foot. Although the infrastructure here is highly dilapidated the social structure of this community seems particularly robust with people being helpful and information being freely shared with investigators.

The proposed pipeline routes for the stormwater runoff pipelines follows outside of the Valencia Township Development. The proposed Southwestern Detention Pond 1 is also located on the northeastern side of the access road to the Addo Park. This area is not built-up however it has been subject to earthmoving and dumping activities. Further to the north of this area, orchards with Cyprus windbreaks are found.

The second area designated Southwestern Detention Pond 2, is located to the south of the community sportsfield in the area just before the Addo Train Station grounds. This site is also significantly degraded.

Stormwater Detention Pond 3 is located approximately 300m to the south west of the Southwestern Detention Pond 2, situated on the west of Valencia (between the railway and Afdelingspad).

Figure 3. Valencia Infrastructure

Figure 4. Proposed Southwestern Detention Pond 1

Figure 5. Proposed Southwestern Detention Pond 2

Figure 6. Possible drainage route

Areas with less development impact was investigated closer to determine whether any sites of heritage value could still occur sub-surface, however no indications of such sites were evident (such as ash middens, disposed pot sherd etc.).

Where sites were identified it was documented photographically and plotted using GPS with the WGS 84 datum point as reference. The following image shows the GPS track paths for both the on-foot and car reconnaissance of the study area. The GPX files for these are available on request.

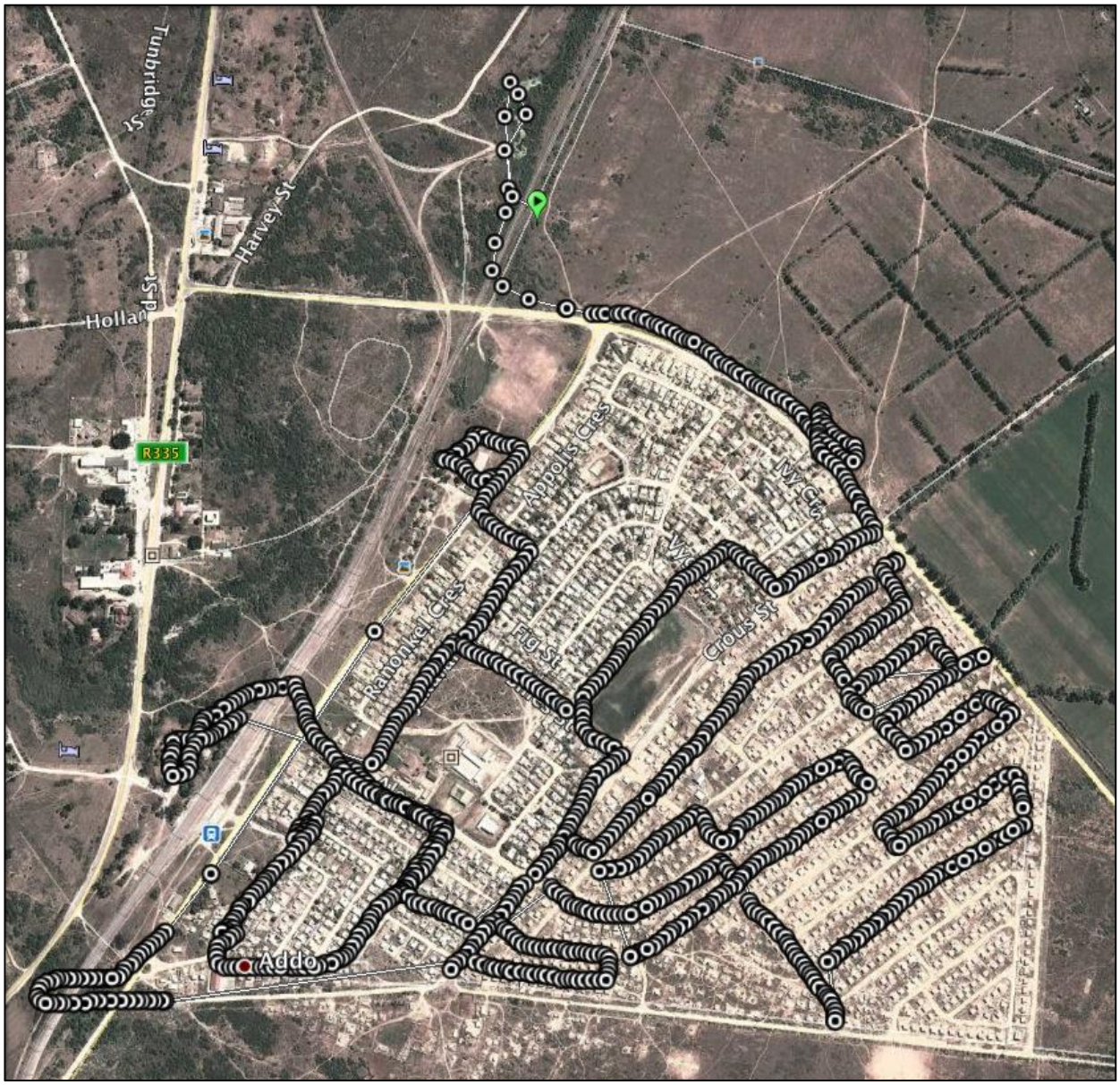


Figure 7. GPS Track Paths followed during field investigations

## Assessing Visual Impact

Visual impacts of developments result when sites that are culturally celebrated are visually affected by a development. The exact parameters for the determination of visual impacts have not yet been rigidly defined and are still mostly open to interpretation. CNdV and DEAP (2006) have developed some guidelines for the management of the visual impacts of wind turbines in the Western Cape, although these have not yet been formalized. In these guidelines they recommend a buffer zone of 1km around significant heritage sites to minimize the visual impact.

Due to the fact that the project will mainly involve sub-surface infrastructure it is not anticipated that any visual impacts will be encountered.

Chapter 2

# PROJECT RESOURCES

## HERITAGE INDICATORS WITHIN THE RECEIVING ENVIRONMENT

## REGIONAL CULTURAL CONTEXT

### STONE AGE AND PALEONTOLOGY

In 1929, archaeologists working in South Africa, devised a system of dividing the Stone Age into 3 periods, namely the Early Stone Age, the Middle Stone Age and the Later Stone Age.

The Early Stone Age (ESA) refers to stone tools made by Homo erectus groups and these tools date between 1,7 million and 125 000 thousand years ago. The most distinctive tool types of the ESA are handaxes, which are easy to identify and have been widely reported from the Eastern Cape. Handaxes were reported from the Gorah, but the site has recently been destroyed. None were discovered inside the study area during this survey, but they are known from the banks of the Bushmen's River. Large numbers of handaxes were excavated from around a spring at an important ESA site called Amanzi. It is located near Uitenhage.

The Middle Stone Age (MSA) refers to very different stone tools. They are often triangular shaped or long blades. They are frequently made on more fine-grained stone and show more controlled use of stone. These tools date between 125 000 and 30 000 years ago. At Klasies River Cave near Humansdorp, they are associated with Homo sapiens (i.e. modern people). It is quite rare to find MSA remains in caves associated with bone and other food remains. The majority of MSA sites are surface scatters. Scatters of MSA tools are reported all along the Sundays River Valley, and also inland at Addo Heights and Korhaansvlakte.

The Later Stone Age (LSA) people were ancestral to the San (Bushmen) and Khoekhoen (Hottentot) peoples who lived in Southern Africa between 30 000 years ago and colonial times. During most of the Holocene, South Africa was inhabited by small groups of mobile hunter-gatherers. When they lived at the coast, they exploited the marine resources such as shell fish, seal and sea birds. Many hundreds of shell middens are found along the coast in the Addo area. Inland groups frequently lived in caves and rock shelters and there are many sites in the Zuurberg which testify to this. Only a fraction of the caves sites in the area have been investigated but many have rock paintings and at least a shallow archaeological deposit.

Excavations at sites such as Melkhoutboom and Vygeboom (inside Addo Park) have uncovered graves with rich grave goods indicating a complex belief system. The rock art too indicates the San occupants took part in trance before painting. The sites contain well- preserved plant remains which indicate how they utilized their environment. The majority of hunter-gatherer groups had been pushed out of the Zuurberg by the 1820's and was forced to move further inland to escape European settlement on their lands.

**Khoekhoen settlement**

Sheep and pottery were first introduced to South Africa by pastoralists groups some 2000 years ago. By the 16th and 17th centuries, these tribal groups were spread all along the coastal forelands from Namibia to the Eastern Cape. They were known to the colonists as Hottentots. Today the term Khoikhoi (correct spelling Khoekhoen) is more acceptable. The earliest archaeological evidence for the Khoekhoen in the region comes from Cape St Francis and dates to 300AD. Many of the shell middens in the Addo Park contain pottery, confirming the presence of the Khoekhoen in the area.

There are numerous place names in the Addo Park which are derived from Khoekhoen. For example Kaba, Coerney (originally Koernoe), Nanaga (although this cannot be confirmed by

Nienaber & Raper 1997), Boknes, Gorah, Kabouga, Kariega, Sapkamma, etc. These names confirm that this part of the Eastern Cape was settled in the 17th and 18th centuries by various Khoekhoen tribal groupings such as the Inqua, Damasqua and Gonaqua. They were absorbed into the colonial lifestyle of the 18th century, becoming farm workers for the Dutch and British or clients of the Xhosa where they were engaged in elephant hunting. A few groups settled at missions such as Enon, Bethelsdorp and Theopolis (*edited from De Klerk, 2002*).

Although Addo is most commonly frequented for its rich array of fauna and flora, unbeknown to most is that the entire Sundays River Valley is extremely unique in both its formation and appearance. For millions of years the Sundays River Valley has evolved and transformed, primarily because its river system has been deeply influenced by past shifting sea levels, climate changes and neo-tectonic activity. From a geological, paleontological and archaeological standpoint this river valley has immense value.

As a 'window' through which we can gaze into the past, this valley allows one to see first-hand what the landscape would have looked like all those millions of years ago, and further, to see what remnants were left behind by those whom visited the region. With fossils abound, and even a dinosaur named after one of the valleys prominent regions and towns (Kirkwood), it is clear that the landscape has immense time depth. As one looks a bit closer and observes the ground itself a host of interesting finds begin to appear. Throughout the entire region is an abundance of stone tools which, to the untrained eye, may appear just to be rocks. Stone tools are common throughout the African continent, ranging in age from around 2.6 million years ago (Mya) to those used up until the historic period. The Sundays River Valley is rich in Earlier Stone Age (ESA) Acheulean material, dating from about 1.3 Mya to about 650kya. Both Middle Stone Age (MSA) and Later Stone Age (LSA) artefacts are also found throughout the region. This abundance of ESA material is significant as very little ESA research has been done in the Eastern Cape as a whole. These artefacts enable us to assess the palaeoenvironmental significance of the valley. In the past this region would have been extremely rich in resources (food, water and raw materials for making stone tools) so inhabitants at the time would have been attracted to the area. The sheer abundance of archaeological artefacts throughout this region attests to this. (*Kudu Ridge Website – Addo Archaeology)*

Figure 8. Sundays River Finds - *Kudu Ridge Website*

## Iron Age

The first phase of a project to determine the distribution of pre-colonial farming settlement through space and time in the former Transkei, Eastern Cape, was carried out during 1983-87. This archaeological reconnaissance, using a stratified random sampling method, located 15 Early Iron Age settlement sites within and two next to five of the 12 study areas searched. These findings have largely escaped subsequent attention. An additional site was found adjacent to the Great Kei River after the project finished. The distribution and altitude of these sites indicate that they are confined to localities in deeply incised river valleys (as predicted from the pattern in KwaZulu-Natal), but at decreasing distances from the sea and declining altitudes in a southwesterly direction across the Eastern Cape. This might reflect the operation of a human rather than a physical geographical factor. One possibility is the early presence of Khoekhoen herders, perhaps with seasonal camps along rivers, westward of about 29°E. The distribution of a) rivers with names derived from Khoekhoen, b) isiXhosa dialects with a strong Khoekhoen component, and c) herder pottery along the coastline, all strongly support this proposal. The geographic limit of Early Iron Age settlement southwestward of East London

remains to be determined. Woodland disturbance by early farmers in the larger, incised river valleys would have initiated processes of plant succession in a geographical patch-work in the later first millennium AD, that continue in places today, albeit with far greater intensity. This can be relevant to the management of such vegetation in protected areas (Feely, J. M.; Bell-Cross, S. M., 2011).

**Early Xhosa Settlement**
In addition to the Stone Age discussed above, archaeology can also inform us on the early contact period with black farmers in this area. While the majority of black farmers lived to the west of the Fish River, which forms an important ecological boundary between summer (eastern) and winter (western) rainfall, the *amaRharabe* were settled around Bedford/Fort Beaufort, while the *amaGcaleka* were living along the coastal areas around 1820.

Of particular interest in terms of this research, is the tantalizing possibility that the headquarters of two Xhosa chiefs were located in the Addo Park footprint. These two sites have not been explored, but they offer the opportunity of archaeological research, which may inform us of 19th century Xhosa kraals.

The first site is `*Congoskraal'*. It was reported to WHR Gess (an amateur archaeologist) in 1962. According to his accounts `we have the suspicion that this is a Bantu site, as the farm was ca. 1820 the home of a Bantu chief'. According to Skead (2002) this would have been *Chungwa's Kraal*. *Chungwa* was a *Gqunukhwebe* (a mixed *Khoekhoen/Xhosa* group) Chief. There is a small hill nearby which is now called Bailey's Kop, but which the local Xhosa calls *Ntaba kwaChungwa*.

The second Xhosa kraal is reputed to be that of Chief *Habona* of the `*Donge*' and was reported to have been near the Zuurberg Pass in the late 18th century. After coming across this reference, our attention was drawn by John Adendorff to some aerial photographs, which showed several circular stone features on the farm Bassons Kloof. These stone circles resemble stone kraals, which clearly need to be investigated to determine their age (*edited from De Klerk, 2002*).

### The Historic Era
Addo Drift was the first convenient natural crossing of the Sunday's River to be encountered inland from the sea, and was frequently used by visitors travelling from the coast into the South African interior. A military post was erected there in about 1815, and in 1823 its land was granted to William Wright, a land speculator who had arrived at the Cape Colony in 1820.

Sometime between 1823 and 1830 he used the site to build the Zondags River Inn, probably using the foundations of the old post. In 1832 he sold the inn to Joseph Hubbard who, in his turn, sold it to Samuel Webber in 1837.

Webber already owned the Wayside Inn on the opposite side of the river. The property then changed hands at least three more times until Edward Tunbridge purchased it in 1848. By this time it was known as the Elephant and Castle, and remained in the hands of the Tunbridge family until 1905. In time the inn became known as "*Tunbridge's*".

## Previous Studies
An extensive research into the SAHRIS database resulted in the identification of the following heritage related studies that have been performed over the last decade in the study area. Only studies within a radius of 50km from the study area were considered.

- Greater Addo Elephant National Park Cultural Mapping Pilot Project, Billy De Klerk**,** M Way-Jones**,** Lita Webley
- Agricultural Expansion on River Bend Citrus Farm, Binneman, 2002.
- PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT ON THE CONSTRUCTION OF 50 KM OF LOOP ROADS ON THE FARMS ADDO HEIGHTS [209], LISMORE [208], ZOUTE FONTEIN [210], NIEUJAARSKOP [300] AND OLIPHANTS PLAAT [214] WITHIN THE SOUTHERN SECTION OF THE ADDO ELEPHANT NATIONAL PARK, EASTERN CAPE, Webley, 2007.
- Addo Elephant National Park: Upgrading of Existing Tourist Road Network and Construction of Southern Access Road near Colchester - Phase 1 Archaeological Impact Assessment, Webley, 2003.
- Phase 1 Heritage Impact Assessment: Proposed Rezoning of the Farm 655 Portion 196, 197, 199 and 275 of Farm 113 (Stellenhof), Addo, Eastern Cape, Webley, 2005.

- Phase 1 Heritage Impact Assessment: Proposed Rezoning of the Farm 655 Portion 196, 197, 199 and 275 of Farm 113 (Stellenhof), Addo, Eastern Cape, Webley, 2007.
- A Phase 1 Archaeological Impact Assessment for the Proposed Subdivision of five adjoining properties (Willow Tree Country Estate) for a mixed use development near Addo, Sundays River Valley Municipality, Uitenhage District, Eastern Cape Province, Binneman, 2010.
- A Phase 1 Archaeological Impact Assessment for the Proposed Subdivision of five adjoining properties (Willow Tree Country Estate) for a mixed use development near Addo, Sundays River Valley Municipality, Uitenhage District, Eastern Cape Province, Van Ryneveldt, 2012.
- Phase 1 Heritage Impact Assessment of Disco Chicks Farm 2 (Farm 713), Sundays River Municipality, Ressouw, 2005.
- A Phase 1 Archaeological Heritage Impact Assessment for Zone 5, Coega. Binneman, 2010.

Several Paleontological studies have also been performed in this general area, however the paleontological impact will be the subject of a specialist report.

# Chapter 3 ANTICIPATED IMPACTS

## MEASURING AND EVALUATING THE CULTURAL SENSITIVITY OF THE STUDY AREA

In 2003 the SAHRA compiled the following guidelines to evaluate the cultural significance of individual heritage resources:

**TYPE OF RESOURCE**

- Place
- Archaeological Site
- Structure
- Grave
- Paleontological Feature
- Geological Feature

**TYPE OF SIGNIFICANCE**

1. HISTORIC VALUE
   It is important in the community, or pattern of history
   - Important in the evolution of cultural landscapes and settlement patterns
   - Important in exhibiting density, richness or diversity of cultural features illustrating the human occupation and evolution of the nation, province, region or locality.
   - Important for association with events, developments or cultural phases that have had a significant role in the human occupation and evolution of the nation, province, region or community.
   - Important as an example for technical, creative, design or artistic excellence, innovation or achievement in a particular period.

   It has strong or special association with the life or work of a person, group or organisation of importance in history
   - Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, province, region or community.

   It has significance relating to the history of slavery
   - Importance for a direct link to the history of slavery in South Africa.

2. AESTHETIC VALUE
   It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group.
   - Important to a community for aesthetic characteristics held in high esteem or otherwise valued by the community.
   - Importance for its creative, design or artistic excellence, innovation or achievement.
   - Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.
   - In the case of an historic precinct, importance for the aesthetic character created by the individual components which collectively form a significant streetscape, townscape or cultural environment.

3. SCIENTIFIC VALUE
   It has potential to yield information that will contribute to an understanding of natural or cultural heritage

- Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
- Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.
- Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.
- Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.
- It is important in demonstrating a high degree of creative or technical achievement at a particular period
- Importance for its technical innovation or achievement.

4. SOCIAL VALUE
   - It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
   - Importance as a place highly valued by a community or cultural group for reasons of social, cultural, religious, spiritual, symbolic, aesthetic or educational associations.
   - Importance in contributing to a community's sense of place.

**DEGREES OF SIGNIFICANCE**

1. RARITY

It possesses uncommon, rare or endangered aspects of natural or cultural heritage.

- Importance for rare, endangered or uncommon structures, landscapes or phenomena.

2. REPRESENTIVITY
   - It is important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects.
   - Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class.
   - Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.

The table below illustrates how a site's heritage significance is determined

| Spheres of Significance | High | Medium | Low |
|---|---|---|---|
| International | | | |
| National | | | |
| Provincial | | | |
| Regional | | | |
| Local | | | |
| Specific Community | | | |

# Assessment of Heritage Potential

## Assessment Matrix

### DETERMINING ARCHAEOLOGICAL SIGNIFICANCE

In addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (J) and Whitelaw (1997) for assessing archaeological significance has been developed for Northern Cape settings (Morris 2007a). These criteria include estimation of landform potential (in terms of its capacity to contain archaeological traces) and assessing the value to any archaeological traces (in terms of their attributes or their capacity to be construed as evidence, given that evidence is not given but constructed by the investigator).

### Estimating site potential

Table 1 (below) is a classification of landforms and visible archaeological traces used for estimating the potential of archaeological sites (after J. Deacon and, National Monuments Council).

Type 3 sites tend to be those with higher archaeological potential, but there are notable exceptions to this rule, for example the renowned rock engravings site Driekopseiland near Kimberley which is on landform L1 Type 1 – normally a setting of lowest expected potential. It should also be noted that, generally, the older a site the poorer the preservation, so that sometimes any trace, even of only Type 1 quality, could be of exceptional significance. In light of this, estimation of potential will always be a matter for archaeological observation and interpretation.

Table 1. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, NMC as used in Morris)

| Class | Landform | Type 1 | Type 2 | Type 3 |
|---|---|---|---|---|
| L1 | Rocky Surface | Bedrock exposed | Some soil patches | Sandy/grassy patches |
| L2 | Ploughed land | Far from water | In floodplain | On old river terrace |
| L3 | Sandy ground, inland | Far from water | In floodplain or near features such as hill/dune | On old river terrace |
| L4 | Sandy ground, coastal | >1 km from sea | Inland of dune cordon | Near rocky shore |
| L5 | Water-logged deposit | Heavily vegetated | Running water | Sedimentary basin |
| L6 | Developed urban | Heavily built-up with no known record of early settlement | Known early settlement, but buildings have basements | Buildings without extensive basements over known historical sites |
| L7 | Lime/dolomite | >5 myrs | <5000 yrs | Between 5000 yrs and 5 myrs |
| L8 | Rock shelter | Rocky floor | Loping floor or small area | Flat floor, high ceiling |
| Class | Archaeological traces | Type 1 | Type 2 | Type 3 |
| A1 | Area previously excavated | Little deposit remaining | More than half deposit remaining | High profile site |
| A2 | Shell of bones visible | Dispersed scatter | Deposit <0.5 m thick | Deposit >0.5 m thick; shell and bone dense |
| A3 | Stone artefacts or stone walling or other feature visible | Dispersed scatter | Deposit <0.5m thick | Deposit >0.5 m thick |

Table 2. Site attributes and value assessment (adapted from Whitelaw 1997 as used in Morris)

| Class | Landforms | Type 1 | Type 2 | Type 3 |
|---|---|---|---|---|
| 1 | Length of sequence /context | No sequence<br>Poor context<br>Dispersed distribution | Limited sequence | Long sequence<br>Favourable context<br>High density of arte / ecofacts |
| 2 | Presence of exceptional items (incl. regional rarity) | Absent | Present | Major element |
| 3 | Organic preservation | Absent | Present | Major element |
| 4 | Potential for future archaeological investigation | Low | Medium | High |
| 5 | Potential for public display | Low | Medium | High |
| 6 | Aesthetic appeal | Low | Medium | High |
| 7 | Potential for implementation of a long-term management plan | Low | Medium | High |

## Assessing site value by attribute

Table 2 is adapted from Whitelaw (1997), who developed an approach for selecting

sites meriting heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by ranking the relative strengths of a range of attributes (given in the second column of the table). While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

# Findings

No sites were observed.

# Impact Statement

## Paleontological sites

Paleontology will be evaluated in a separate specialist report.

## Pre-Contact Sites

It is not anticipated that any sites of the pre-contact phase will be endangered.

## Post-Contact Sites

No sites associated with the post-contact era will be affected by the proposed development.

## Built Environment

The Addo Train Station is located to the south and west of the study area. The station seems to be in disuse, as it is comprised of several dilapidated buildings and a crumbling platform. The inhabited area of the station further to the west (enclosed by a security fence) is in much better condition.

Building material scavengers have extensively damaged the structures directly adjacent to the station platform.

Figure 9. Dilapidated platform and station buildings

Although the station buildings are of historic importance it should be noted that the closest outflow pipeline proposed would bypass this area further than 100m away. It is therefore not anticipated that the station will suffer any negative impacts from the proposed development.

## Cultural Landscape

The following landscape types could possibly be present in the study area.

| Landscape Type | Description | Occurrence still possible? | Likely occurrence? |
|---|---|---|---|
| 1 Paleontological | Mostly fossil remains. Remains include microbial fossils such as found in Baberton Greenstones | Yes, sub-surface | To be evaluated by specialist |
| 2 Archaeological | Evidence of human occupation associated with the following phases – Early-, Middle-, Late Stone Age, Early-, Late Iron Age, Pre-Contact Sites, Post-Contact Sites | Yes | Unlikely |
| 3 Historic Built Environment | - Historical townscapes/streetscapes<br>- Historical structures; i.e. older than 60 years<br>- Formal public spaces<br>- Formally declared urban conservation areas<br>- Places associated with social identity/displacement | No | No |
| 4 Historic Farmland | These possess distinctive patterns of settlement and historical features such as:<br>- Historical farm yards<br>- Historical farm workers villages/settlements<br>- Irrigation furrows<br>- Tree alignments and groupings<br>- Historical routes and pathways<br>- Distinctive types of planting<br>- Distinctive architecture of cultivation e.g. planting blocks, trellising, terracing, ornamental planting. | Yes | Unlikely |
| 5 Historic rural town | - Historic mission settlements<br>- Historic townscapes | No | No |
| 6 Pristine natural landscape | - Historical patterns of access to a natural amenity<br>- Formally proclaimed nature reserves<br>- Evidence of pre-colonial occupation<br>- Scenic resources, e.g. view corridors, viewing sites, visual edges, visual linkages<br>- Historical structures/settlements older than 60 years<br>- Pre-colonial or historical burial sites<br>- Geological sites of cultural significance. | Yes | Unlikely |
| 7 Relic Landscape | - Past farming settlements<br>- Past industrial sites<br>- Places of isolation related to attitudes to medical treatment<br>- Battle sites<br>- Sites of displacement, | No | No |
| 8 Burial grounds and grave sites | - Pre-colonial burials (marked or unmarked, known or unknown)<br>- Historical graves (marked or unmarked, known or unknown)<br>- Graves of victims of conflict<br>- Human remains (older than 100 years)<br>- Associated burial goods (older than 100 years) | Yes | Unlikely |

| | | | |
|---|---|---|---|
| | - Burial architecture (older than 60 years) | | |
| 9 Associated Landscapes | - Sites associated with living heritage e.g. initiation sites, harvesting of natural resources for traditional medicinal purposes<br>- Sites associated with displacement & contestation<br>- Sites of political conflict/struggle<br>- Sites associated with an historic event/person<br>- Sites associated with public memory | No | No |
| 10 Historical Farmyard | - Setting of the yard and its context<br>- Composition of structures<br>- Historical/architectural value of individual structures<br>- Tree alignments<br>- Views to and from<br>- Axial relationships<br>- System of enclosure, e.g. defining walls<br>- Systems of water reticulation and irrigation, e.g. furrows<br>- Sites associated with slavery and farm labour<br>- Colonial period archaeology | No | No |
| 11 Historic institutions | - Historical prisons<br>- Hospital sites<br>- Historical school/reformatory sites<br>- Military bases | No | No |
| 12 Scenic visual | - Scenic routes | No | No |
| 13 Amenity landscape | - View sheds<br>- View points<br>- Views to and from<br>- Gateway conditions<br>- Distinctive representative landscape conditions<br>- Scenic corridors | No | No |

# Impact Evaluation

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts. The same approach is used duringthe evaluation of heritage resources.

## Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas Intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in the table below.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

## Impact Rating System

Impact assessment must take account of the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

## Rating System Used To Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

| | | |
|---|---|---|
| **NATURE** | | |
| Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity. | | |
| | | |
| **GEOGRAPHICAL EXTENT** | | |
| This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined. | | |
| 1 | Site | The impact will only affect the site |
| 2 | Local/district | Will affect the local area or district |
| 3 | Province/region | Will affect the entire province or region |
| 4 | International and National | Will affect the entire country |
| | | |
| **PROBABILITY** | | |
| This describes the chance of occurrence of an impact | | |
| 1 | Unlikely | The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence). |
| 2 | Possible | The impact may occur (Between a 25% to 50% chance of occurrence). |
| 3 | Probable | The impact will likely occur (Between a 50% to 75% chance of occurrence). |
| 4 | Definite | Impact will certainly occur (Greater than a 75% chance of occurrence). |
| | | |
| **REVERSIBILITY** | | |

| | | |
|---|---|---|
| This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity. | | |
| 1 | Completely reversible | The impact is reversible with implementation of minor mitigation measures |
| 2 | Partly reversible | The impact is partly reversible but more intense mitigation measures are required. |
| 3 | Barely reversible | The impact is unlikely to be reversed even with intense mitigation measures. |
| 4 | Irreversible | The impact is irreversible and no mitigation measures exist. |
| | | |
| **IRREPLACEABLE LOSS OF RESOURCES** | | |
| This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity. | | |
| 1 | No loss of resource. | The impact will not result in the loss of any resources. |
| 2 | Marginal loss of resource | The impact will result in marginal loss of resources. |
| 3 | Significant loss of resources | The impact will result in significant loss of resources. |
| 4 | Complete loss of resources | The impact is result in a complete loss of all resources. |
| | | |
| **DURATION** | | |
| This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity | | |
| 1 | Short term | The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years). |
| 2 | Medium term | The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years). |
| 3 | Long term | The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years). |
| 4 | Permanent | The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite). |
| | | |
| **CUMULATIVE EFFECT** | | |
| This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question. | | |
| 1 | Negligible Cumulative Impact | The impact would result in negligible to no cumulative effects |
| 2 | Low Cumulative Impact | The impact would result in insignificant cumulative effects |
| 3 | Medium Cumulative impact | The impact would result in minor cumulative effects |

| | | |
|---|---|---|
| 4 | High Cumulative Impact | The impact would result in significant cumulative effects |

| INTENSITY / MAGNITUDE | | |
|---|---|---|
| Describes the severity of an impact | | |
| 1 | Low | Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible. |
| 2 | Medium | Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity). |
| 3 | High | Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation. |
| 4 | Very high | Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation. |

**SIGNIFICANCE**

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

**(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.**

The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

| Points | Impact Significance Rating | Description |
|---|---|---|
| | | |
| 6 to 28 | Negative Low impact | The anticipated impact will have negligible negative effects and will require little to no mitigation. |
| 6 to 28 | Positive Low impact | The anticipated impact will have minor positive effects. |
| 29 to 50 | Negative Medium impact | The anticipated impact will have moderate negative effects and will require moderate mitigation measures. |
| 29 to 50 | Positive Medium impact | The anticipated impact will have moderate positive effects. |

| | | |
|---|---|---|
| 51 to 73 | Negative High impact | The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact. |
| 51 to 73 | Positive High impact | The anticipated impact will have significant positive effects. |
| 74 to 96 | Negative Very high impact | The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws". |
| 74 to 96 | Positive Very high impact | The anticipated impact will have highly significant positive effects. |

# Impact Assessment

No sites of any heritage value were identified during this study.

# Conclusion

This study focussed on the proposed upgrading of the stormwater infrastructure for the Valencia Township near the town of Addo in the Eastern Cape Province. The areas that are to be subject to this development is limited both in size as well as in heritage potential. The area has been significantly altered throughout the past and it is unlikely that any heritage sites would have survived intact or in such a state as to provide for their conservation.

It is still possible that excavation activities could uncover subterranean sites of heritage significance, however this is a very slight possibility. Similar research in the immediate area has uncovered few sites of heritage significance within this type of environment. Where sites were identified, they were usually associated either with rocky outcrops, permanent water sources or coastal subsistence activities. None of the geographical features indicated any likely scenarios for the occurrence of buried sites.

It is recommended that the construction crew is made aware of the slight possibility of encountering sites such as unmarked burial sites during construction and that if such sites are uncovered that work ceases immediately and that an appropriate specialists is notified.

With the evidence at hand there are no indications that the proposed development will impact on any sites of heritage significance.

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# APPENDIX A

## General 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)*.

## 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).*

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 ***Garmin Colorado*** 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).*

## 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 on-going 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.