FRANCES BAARD DISTRICT MUNICIPALITY: PROPOSED UPGRADING OF AN ANGLO BOER WAR BLOCKHOUSE ON A PORTION OF WARRENTON ERF 1, WARRENTON, NORTHERN CAPE PROVINCE

An EOH Company

Archaeological Impact Assessment

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HERITAGE IMPACT ASSESSMENT ON A PORTION OF WARRENTON ERF 1 FOR THE PROPOSED UPGRADING OF AN ANGLO BOER WAR BLOCKHOUSE, WARRENTON, NORTHERN CAPE PROVINCE

Conducted on behalf of:

Frances Baard District Municipality
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Exigo Sustainability promotes the conservation of sensitive archaeological and heritage resources and therefore uncompromisingly adheres to relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980). In order to ensure best practices and ethics in the examination, conservation and mitigation of archaeological and heritage resources, Exigo Sustainability follows the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment as set out by the South African Heritage Resources Agency (SAHRA) and the CRM section of the Association for South African Professional Archaeologists (ASAPA).

DECLARATION

I, Nelius Le Roux Kruger, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Warrenton Blockhouse Restoration Project in an objective manner, even if this results in views and findings that are not favourable to the client;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have the required expertise in conducting the specialist report and I will comply with legislation, including the relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980), the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment (SAHRA, AMAFA and the CRM section of ASAPA), regulations and any guidelines that have relevance to the proposed activity;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this declaration are true and correct.

_____

Signature of specialist
Company: Exigo Sustainability
Date: 25 March 2016

EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study for the proposed Warrenton Blockhouse Restoration Project on a portion of Erf1 at the Warrenton Cultural Resort in the Frances Baard District Municipality, Northern Cape Province. The AIA was conducted subject to requirements as set out by the National Environmental Management Act (Act 107 of 1998), the National Heritage Resources Act (NHRA - Act 25 of 1999). The report includes background information on the area's archaeology, its representation in southern Africa, and the history of the larger area under investigation, survey methodology and results as well as heritage legislation and conservation policies. A copy of the report will be supplied to the provincial heritage agency (Northern Cape-PHRA) and recommendations contained in this document will be reviewed.

A number of archaeological and historical studies have been conducted in the region around the Ghaap Plateau and Warrenton and many of these studies infer a varied heritage landscape. The general landscape around the project area is primarily well known for hominin heritage but sites dating to Anglo-Boer War are most also prevalent. As a remnant of this War, the Warrenton blockhouse is a protected heritage resource and a declared a National Monument in 1992. As such, the structure is of high heritage significance due to its scientific value, architectural attributers and general association with the Anglo-Boer War history of South Africa. The following recommendations are made based on the significance of the site, pertaining to the proposed Warrenton Blockhouse Upgrade Project.

- As noted above, the Warrenton blockhouse (**Site Exigo-WBH-ST01: S28.092168° E 24.871036°**) is a heritage resource of high heritage significance and the upgrade of the resource will add to the conservation of the historical fabric of the site. For this upgrade process it is recommended that as much of the structure be retain in its original state. Collapsed sections should be restored to resemble the original appearance of the building, according to historiographical information. It is essential that a qualified heritage architect provide input on the restoration in terms of materials used, structural integrity and historical accuracy. It is further recommended that original materials, such as stones from collapsed sections, be used as far as possible for the project. A heritage conservation buffer zone of at least 20m should be implemented around the heritage resource, the existing fence should be upgraded and access control should be applied during the project and after completion. It should be noted that the restoration of the structures for this purpose will be subject to the application of a destruction / alteration permit and approval of the relevant heritage agency.
- It is recommended that project planning assistance by Heritage Architect be provided in order to retain historical integrity of existing and upgraded sections of the structure. Monitoring of the project by the Heritage Architects, as well as regular examination of the site, possible trenches and excavations in order to detect and preserve previously undocumented heritage receptors.
- A site management plan for the conservation of the heritage resource during construction and conservation phases of the project should be compiled and implemented a a qualified heritage practitioner.
- Should any historical midden at the site are to be impacted by digging of trenches or any surface or subsurface earth moving a Phase 2 Specialist Study should be conducted. Such a study should carefully document these features by means of site sampling, artefacts analysis as well as site mapping and site surveying, a photographic record, and a desktop and archive study. This measure is subject to excavation and destruction permitting requirements, if and when required.

- Considering the localised nature of heritage remains, the general monitoring of the upgrade progress by an informed ECO or by the heritage specialist is recommended for all stages of the project. This should involve the inspection of the site on regular basis in order to monitor possible impact on previously undetected heritage resources. Should any subsurface palaeontological, archaeological or historical material or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately. Generally, it is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites.
- It should be noted that mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

The Warrenton Blockhouse is a heritage resource of high significance, forming the centre of the Warrenton Blockhouse Restoration Project. In the opinion of the author of this Archaeological Impact Assessment Report, the proposed Warrenton Blockhouse Restoration Project on a portion of Erf1 at the Warrenton Cultural Resort may proceed from a culture resources management perspective, provided that mitigation measures, endorsed by the relevant Heritage Resources authority, are implemented where applicable.

It is essential that cognisance be taken of the larger archaeological and historical landscape of Warrenton in order to avoid the destruction of previously undetected heritage sites. Should any previously undetected heritage resources be exposed or uncovered during construction phases of the proposed project, these should immediately be reported to Northern Cape-PHRA. Since the intrinsic heritage and social value of graves and cemeteries are highly significant, these resources require special management measures. Should human remains be discovered at any stage, these should be reported to the Heritage Specialist and relevant authorities (Gauteng-PHRA, SAHRA) and development activities should be suspended until the site has been inspected by the Specialist. The Specialist will advise on further management actions and possible relocation of human remains in accordance with the Human Tissue Act (Act 65 of 1983 as amended), the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the National Heritage Resources Act (Act no. 25 of 1999) and any local and regional provisions, laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.

NOTATIONS AND TERMS/TERMINOLOGY

Absolute dating: Absolute dating provides specific dates or range of dates expressed in years.

Archaeology:

The study of the human past through its material remains.

Archaeological record:

The archaeological record minimally includes all the material remains documented by archaeologists. More comprehensive definitions also include the record of culture history and everything written about the past by archaeologists.

Artefact:

Entities whose characteristics result or partially result from human activity. The shape and other characteristics of the artefact are not altered by removal of the surroundings in which they are discovered. In the southern African context examples of artefacts include potsherds, iron objects, stone tools, beads and hut remains.

Assemblage:

A group of artefacts recurring together at a particular time and place, and representing the sum of human activities.

^{14}C or radiocarbon dating:

The ^{14}C method determines the absolute age of organic material by studying the radioactivity of carbon. It is reliable for objects not older 70 000 years by means of isotopic enrichment. The method becomes increasingly inaccurate for samples younger than ±250 years.

Ceramic Facies:

In terms of the cultural representation of ceramics, a facies is denoted by a specific branch of a larger ceramic tradition. A number of ceramic facies thus constitute a ceramic tradition.

Ceramic Tradition:

In terms of the cultural representation of ceramics, a series of ceramic units constitutes as ceramic tradition.

Context:

An artefact's context usually consists of its immediate *matrix*, its *provenience* and its *association* with other artefacts. When found in *primary context*, the original artefact or structure was undisturbed by natural or human factors until excavation and if in *secondary context,* disturbance or displacement by later ecological action or human activities occurred.

Culture:

A contested term, "culture" could minimally be defined as the learned and shared things that people have, do and think.

Cultural Heritage Resource:

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural landscape:

A cultural landscape refers to a distinctive geographic area with cultural significance.

Cultural Resource Management (CRM):

A system of measures for safeguarding the archaeological heritage of a given area, generally applied within the framework of legislation designed to safeguard the past.

Ecofact:

Non artefactual material remains that has cultural relevance which provides information about past human activities. Examples would include remains or evidence of domesticated animals or plant species.

Excavation:

The principal method of data acquisition in archaeology, involving the systematic uncovering of archaeological remains through the removal of the deposits of soil and the other material covering and accompanying it.

Feature:

Non-portable artefacts, in other words artefacts that cannot be removed from their surroundings without destroying or altering their original form. Hearths, roads, and storage pits are examples of archaeological features

GIS:

Geographic Information Systems are computer software that allows layering of various types of data to produce complex maps; useful for predicting site location and for representing the analysis of collected data within sites and across regions.

Historical archaeology:

Primarily that aspect of archaeology which is complementary to history based on the study of written sources. In the South African context it concerns the recovery and interpretation of relics left in the ground in the course of Europe's discovery of South Africa, as well as the movements of the indigenous groups during, and after the "Great Scattering" of Bantu-speaking groups – known as the *mfecane* or *difaqane*.

Impact:

A description of the effect of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Iron Age:

Also known as "Farmer Period", the "Iron Age" is an archaeological term used to define a period associated with domesticated livestock and grains, metal working and ceramic manufacture.

Lithic:

Stone tools or waste from stone tool manufacturing found on archaeological sites.

Management / Management Actions:

Actions – including planning and design changes - that enhance benefits associated with a proposed development, or that avoid, mitigate, restore, rehabilitate or compensate for the negative impacts.

Matrix:

The material in which an artefact is situated (sediments such as sand, ashy soil, mud, water, etcetera). The matrix may be of natural origin or human-made.

Megalith:

A large stone, often found in association with others and forming an alignment or monument, such as large stone statues.

Midden:

Refuse that accumulates in a concentrated heap.

Microlith:

A small stone tool, typically knapped of flint or chert, usually about three centimetres long or less.

Monolith:

A geological feature such as a large rock, consisting of a single massive stone or rock, or a single piece of rock placed as, or within, a monument or site.

Oral Histories:

The historical narratives, stories and traditions passed from generation to generation by word of mouth.

Phase 1 CRM Assessment:

An Impact Assessment which identifies archaeological and heritage sites, assesses their significance and comments on the impact of a given development on the sites. Recommendations for site mitigation or conservation are also made during this phase.

Phase 2 CRM Study:

In-depth studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required. Mitigation / Rescue involves planning the protection of significant sites or sampling through excavation or collection (in terms of a permit) at sites that may be lost as a result of a given development.

Phase 3 CRM Measure:

A Heritage Site Management Plan (for heritage conservation), is required in rare cases where the site is so important that development will not be allowed and sometimes developers are encouraged to enhance the value of the sites retained on their properties with appropriate interpretive material or displays.

Prehistoric archaeology:

That aspect of archaeology which concerns itself with the development of humans and their culture before the invention of writing. In South Africa, prehistoric archaeology comprises the study of the Early Stone Age, the Middle Stone Age and the greater part of the Later Stone Age and the Iron Age.

Provenience

Provenience is the three-dimensional (horizontal and vertical) position in which artefacts are found. Fundamental to ascertaining the provenience of an artefact is *association,* the co-occurrence of an artefact with other archaeological remains; and *superposition,* the principle whereby artefacts in lower levels of a matrix were deposited before the artefacts found in the layers above them, and are therefore older.

Random Sampling:

A probabilistic sampling strategy whereby randomly selected sample blocks in an area are surveyed. These are fixed by drawing coordinates of the sample blocks from a table of random numbers.

Rock Art Research:

Rock art can be "decoded" in order to inform about cultural attributes of prehistoric societies, such as dress-code, hunting and food gathering, social behaviour, religious practice, gender issues and political issues.

Scoping Assessment:

The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an impact assessment. The main purpose is to focus the impact assessment on a manageable number of important questions on which decision making is expected to focus and to ensure that only key issues and reasonable alternatives are examined. The outcome of the scoping process is a Scoping Report that includes issues raised during the scoping process, appropriate responses and, where required, terms of reference for specialist involvement.

Sensitive:

Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains.

Site (Archaeological):

A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity. These include surface sites, caves and rock shelters, larger open-air sites, sealed sites (deposits) and river deposits. Common functions of archaeological sites include living or habitation sites, kill sites, ceremonial sites, burial sites, trading, quarry, and art sites,

Slag:

The material residue of smelting processes from metalworking.

Stone Age:

An archaeological term used to define a period of stone tool use and manufacture.

Stratigraphy:

This principle examines and describes the observable layers of sediments and the arrangement of strata in deposits

Stratified Sampling:

A probabilistic sampling strategy whereby a study area is divided into appropriate zones – often based on the probable location of archaeological areas, after which each zone is sampled at random.

Systematic Sampling:

A probabilistic sampling strategy whereby a grid of sample blocks is set up over the survey area and each of these blocks is equally spaced and searched.

Tradition:

Artefact types, assemblages of tools, architectural styles, economic practices or art styles that last longer than a phase and even a horizon are describe by the term *tradition*. A common example of this is the early Iron Age tradition of Southern Africa that originated ± 200 AD and came to an end at about 900 AD.

Trigger: A particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an *issue* and/or potentially significant *impact* associated with that proposed development that may require specialist input. Legal requirements of existing and future legislation may also trigger the need for specialist involvement.

LIST OF ABBREVIATIONS

Abbreviation	Description
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
CRM	Culture Resources Management
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
FBDM	Frances Baard District Municipality
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
K2/Map	K2/Mapungubwe Period
LFP	Later Farmer Period (also Later Iron Age)
LIA	Later Iron Age (also Later Farmer Period)
LSA	Later Stone Age
MIA	Middle Iron Age (also Early later Farmer Period)
MRA	Mining Right Area
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
PHRA	Provincial Heritage Resources Authorities
SAFA	Society for Africanist Archaeologists
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)

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1.1 Scope and Motivation

Exigo Sustainability was commissioned by Frances Baard District Municipality for an Archaeological Impact Assessment (AIA) study subject to an Environmental Impact Assessment (EIA) process for the proposed Warrenton Blockhouse Restoration Project on a portion of Erf1 at the Warrenton Cultural Resort in the Frances Baard District Municipality, Northern Cape Province. The rationale of this AIA is to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance in previously unstudied areas; to consider the impact of the proposed project on such heritage resources, and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

1.2 Project Direction

Exigo Sustainability's expertise ensures that all projects be conducted to the highest international ethical and professional standards. As archaeological specialist for Exigo Sustainability, Mr Neels Kruger acted as field director for the project; responsible for the assimilation of all information, the compilation of the final consolidated AIA report and recommendations in terms of heritage resources on the demarcated project areas. Mr Kruger is an accredited archaeologist and Culture Resources Management (CRM) practitioner with the Association of South African Professional Archaeologists (ASAPA), a member of the Society for Africanist Archaeologists (SAFA) and the Pan African Archaeological Association (PAA) as well as a Master's Degree candidate in archaeology at the University of Pretoria.

1.3 Project Brief

Tourism has been identified as a sector with massive potential for economic growth in the Frances Baard District. The District remains the most visited destination within the Northern Cape Province. Frances Baard District Municipality (FBDM) has a rich history and natural resources that can promote tourism development in the region. The District has access to a number of major routes, the N12 Treasure Route which runs from Johannesburg to Cape Town, the N8 from Bloemfontein to Upington leading up to the N10 towards Namibia and the N18 which runs from Mafikeng to Warrenton. The FBDM Tourism Strategy has identified route development as a significant opportunity for the region, as routes play a strategic role in linking different regions and products and can facilitate movement of tourists through a region. Therefore the FBDM decided to invest in a Route Feasibility study in 2013 to determine the viability of implementing route development in the Frances Baard District. The feasibility study highlighted amongst others the N18 as a potential route for development due to the assets it offers such as historical attractions, birding, agriculture and diamonds. As part of the N18 Tourism Route initiative the FBDM is planning the upgrading/ restoration of an Anglo-Boer War Blockhouse at Warrenton.

This action will include:

- Restoration of the building to its original design.
- Fencing of the blockhouse and the surrounding yard.
- General site cleaning and clearing around the building.
- The possible construction of a pathway to the building.

1.4 Terms of Reference

Heritage specialist input into the Environmental Impact Assessment (EIA) process is essential to ensure that through the management of change, developments still conserve our heritage resources. Heritage specialist input in EIA processes can play a positive role in the development process by enriching an understanding of the past and its contribution to the present. It is also a legal requirement for certain development categories which may have an impact on heritage resources (Refer to Section 2.5.2). Thus, EIAs should always include an assessment of Heritage Resources. The heritage component of the EIA is provided for in the **National Environmental Management Act, (Act 107 of 1998)** and endorsed by section 38 of the **National Heritage Resources Act (NHRA - Act 25 of 1999)** and the **KwaZulu-Natal Heritage Act (KZNHRA - Act of 2008)**. In addition, the NHRA and the KZNHRA protects all structures and features older than 60 years, archaeological sites and material and graves as well as burial sites. The objective of this legislation is to ensure that developers implement measures to limit the potentially negative effects that the development could have on heritage resources.

Based hereon, this project functioned according to the following **terms of reference for** heritage specialist input**:**

- *Provide detailed updated description of all additional archaeological artefacts, structures (including graves) and settlements which may be affected, if any.*
- *Assess the nature and degree of significance of such resources within the area.*
- *Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance.*
- *Assess any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities.*
- *Propose possible heritage management measures provided that such action is necessitated by the development.*
- *Obtain a comment from the NC-PHRA.*

1.5 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

1.5.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

a. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act of 1999 a historical site is any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years. This clause is commonly known as the "60-years clause". Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. "Tell" refers to the evidence of human existence which is no longer above ground level, such as building foundations and buried remains of settlements (including artefacts).

The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa including archaeological and palaeontological objects, meteorites and rare geological specimens
- visual art objects
- military objects
- numismatic objects
- objects of cultural and historical significance
- objects to which oral traditions are attached and which are associated with living heritage
- objects of scientific or technological interest
- any other prescribed category

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority-

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."

and

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."

b. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

1.5.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

The National Heritage Resources Act (Act No. 25 of 1999, section 38) provides guidelines for Cultural Resources Management and prospective developments:

*"**38.** (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as:*

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50m in length;

(c) any development or other activity which will change the character of a site:

(i) exceeding 5 000 m^2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."

And:

"The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and

(g) plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64)."

Consequently, section 35 of the Act requires Heritage Impact Assessments (HIAs) or Archaeological Impact Assessments (AIAs) to be done for such developments in order for all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic or technological value or

significance to be protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects.Heritage resources management and conservation

1.6 Assessing the Significance of Heritage Resources

Archaeological sites, as previously defined in the National Heritage Resources Act (Act 25 of 1999) are places in the landscape where people have lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and *non-renewable.* Many such sites are unfortunately lost on a daily basis through development for housing, roads and infrastructure and once archaeological sites are damaged, they cannot be re-created as site integrity and authenticity is permanently lost. Archaeological sites have the potential to contribute to our understanding of the history of the region and of our country and continent. By preserving links with our past, we may not be able to revive lost cultural traditions, but it enables us to appreciate the role they have played in the history of our country.

- Categories of significance

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

- *Aesthetic value:*

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses and also the aesthetic values commonly assessed in the analysis of landscapes and townscape.

- *Historic value:*

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually a place has historical value because of some kind of influence by an event, person, phase or activity.

- *Scientific value:*

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

- *Social value:*

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group.

It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of heritage resources; i.e. formally protected and generally protected sites:

Formally protected sites:

- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the provincial HRA (EC-PHRA).
- Grade 3 or local heritage sites.

Generally protected sites:

- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 70 years.
- Structures older than 60 years.

With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally ranked into the following categories.

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required 2b. Controlled sampling (shovel test pits, augering), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism

High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinterment [including 2a, 2b & 3]

Furthermore, the significance of archaeological sites was based on six main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

A fundamental aspect in assessing the significance and protection status of a heritage resource is often whether or not the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data / information, which would otherwise be lost.

2 REGIONAL CONTEXT

2.1 Area Location

The Warrenton Blockhouse Restoration Project is located directly north of the town of Warrenton on a portion of Erf1 at the Warrenton Cultural Resort in the Frances Baard District Municipality, Northern Cape Province. The project area is situated east of the N12 and it is bordered to the south by the Vaal River. The Warrenton CBD occurs approximately 3km south-west of the site.

The project areas appear on 1:50000 map sheet 2824BB (see Figure 2-1) and coordinates for the proposed project are as follows:

S28.090896° E24.871250°

2.2 Area Description: Receiving Environment

The development site lies within the Savanna biome which is the largest biome in Southern Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants (trees and shrubs). The environmental factors delimiting the biome are complex and include altitude, rainfall, geology and soil types, with rainfall being the major delimiting factor. Fire and grazing also keep the grassy layer dominant. The most recent classification of the area by Mucina & Rutherford shows that the site is classified as Ghaap Plateau Vaalbosveld. The landscape features of the Ghaap Plateau Vaalbosveld vegetation type are a flat plateau with well-developed shrub layer dominated by *Tarchonanthus camphoratus* underlied by surface limestone and dolomite. The conservation status of the Ghaap Plateau Vaalbosveld is Least Threatened with none conserved in statutory reserves and only 1% transformed (Mucina & Rutherford, 2006). This vegetation type covers most of the Ghaap Plateau, and is found on different types of soils, such as calcareous tufa, dark brown to red sands and acid gravels, all underlain by dolomite.

2.3 Site Description

The proposed Warrenton Blockhouse Restoration Project is situated on a portion of Erf 1 at the Warrenton Cultural Resort. The site is situated on the northern banks of the Vaal River which occurs no more than 200m from the blockhouse. As such, the site slopes down to the river. Occasional trees are encountered at the site with riparian vegetation prevalent at the River front. The Warrenton Cultural Centre buildings occur directly north of the site and the Transnet Railway line and bridge is situated approximately 500m east of the site. The site is located at an altitude of about 1150m above mean sea level. Drainage is in the form of hill wash[1] (see Figure 2-2).

[1] Grobler, T. 2016. Geotechnical Report for Township Development at Hartswater, Northern Cape

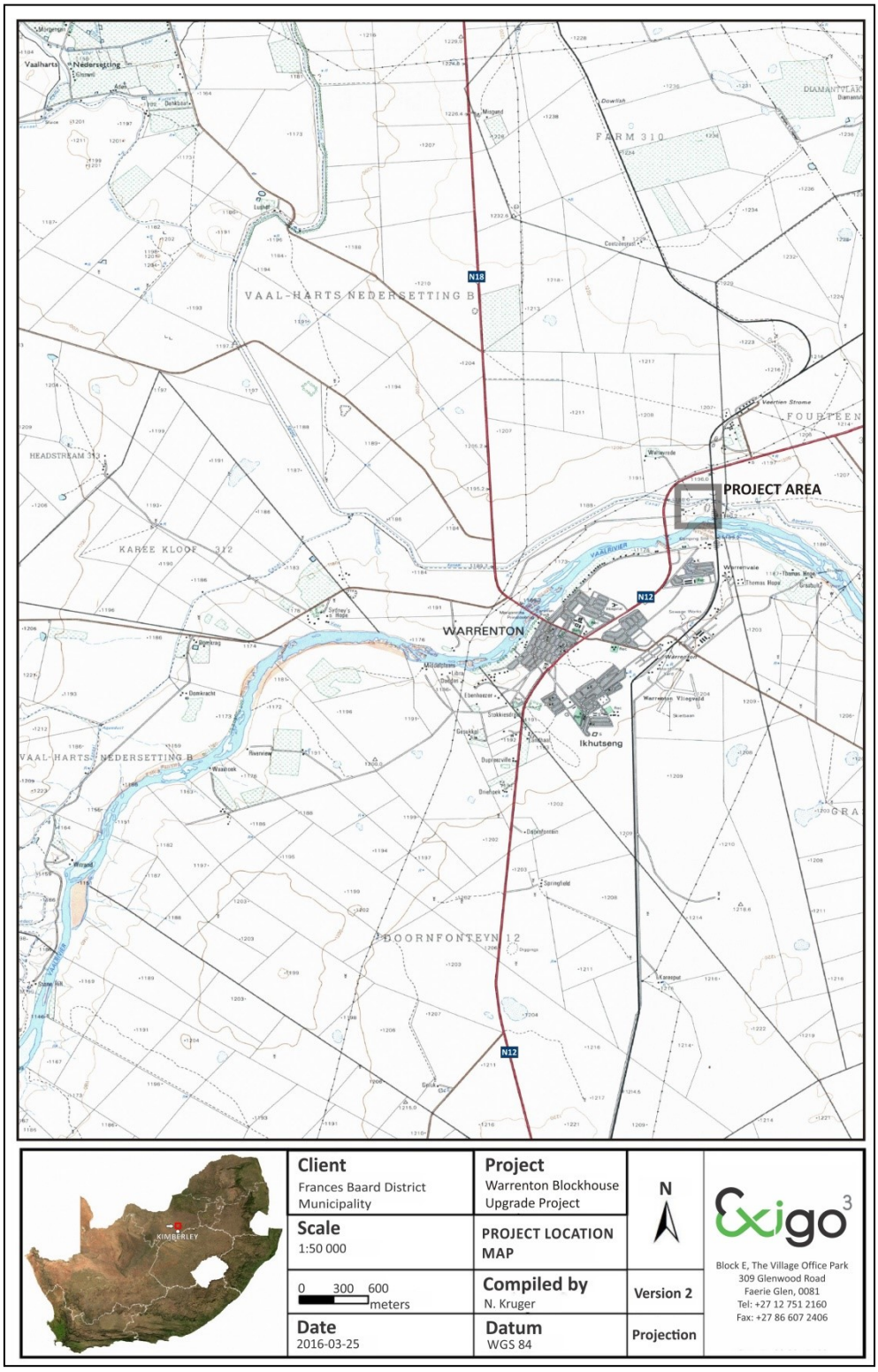


Figure 2-1: 1:50 00 Map representation of the location of the Warrenton Blockhouse Restoration Project Area (sheet 2824BB).

Figure 2-2: Aerial representation of the regional setting for the Warrenton Blockhouse Restoration Project area.

3 METHOD OF ENQUIRY

3.1 Sources of Information

Data from detailed desktop, aerial and field studies were employed in order to sample surface areas systematically and to ensure a high probability of heritage site recording.

3.1.1 Desktop Study

The larger landscape in and around Warrenton and Kimberley has been relatively well documented in terms of its archaeology and history. A desktop study was prepared in order to contextualize the proposed project within a larger historical milieu. The study focused on relevant previous studies, archaeological and archival sources, aerial photographs, historical maps and local histories, all pertaining to the Warrenton area as well as the Anglo-Boer war history of the Northern Cape Province. A large number of heritage studies have been conducted and most of these studies have emanated from Impact Assessment measures for EIA purposes commissioned by the private sector. These studies all point to a landscape of limited human ecology, probably the result of scarce water sources and the general absence of and hills or outcrops for shelter. Some of the studies include:

- Beaumont, P.B. 2002. Archaeological Report: Construction of a Temporary Bridge across the Vaal River at Windsorton, Erf 1, for Floodplain (Island) Diamond Reclamation.
- Birkholtz, P. 2011. Heritage Impact Assessment: Proposed Pering Mining Project, Located on the Farm Pering Mine 1023 HN, Reivilo, North West Province.
- Beaumont, P.B. 2006. Phase 1 Heritage Assessment Report on Portion 4 of the Farm Slypklip North 32, Frances Baard District Municipality, Northern Cape Province.
- Coetzee, F.P. 2008. Cultural Heritage Survey of the Proposed Kalplatz Mining Operations near Stella, North West Province.
- Dreyer, C. 2007. First Phase Archaeological and Cultural Heritage Assessment of the Proposed Garona-Mercury Transmission Power Line, Northern Cape, North-west Province & Free State.
- Dreyer, C. 2007. First Phase Archaeological and Cultural Heritage Assessment of the Proposed Developments of a New Cemetery at Stella, North West Province.
- Henderson, Z.L. 2003. Archaeological Survey of Van Aswegenshoek 134.
- Kruger, N. 2013. Archaeological Impact Assessment of the farm Kangkatjes 919 HN for the proposed Vidigenix 2 Solar Park, Dr Ruth Segomotsi Mompati District Municipality, North West Province
- Morris, D. 2001. Report on Historical Rubbish Midden at Kamfersdam.
- Morris, D. 2002. Report on an Inspection of Cemeteries at Sydney-on-Vaal.
- Morris, D. 2003a. Archaeological Survey of the Farm Koodoosberg No 141.
- Morris, D. 2003b. Archaeological Impact Assessment Rietputs 15, Windsorton.
- Morris, D. 2005g. Archaeological Impact Assessment on Windsorton, Erf 1, Northern Cape.
- Morris, D. 2006d. Archaeological and Heritage Impact Assessment on Portion 20 Mosesberg, near Schmidtsdrift, Northern Cape.
- Morris, D. 2009. Report on a Phase 1Archaeological Assessment of a proposed mining site at the Eddie Williams Oval, Kimberley, Northern Cape.
- Nel, J. (Archaic Heritage Project Management). 2008. Final Report: Heritage Resources Scoping and Preliminary Assessment. Transnet Freight Line EIA, Eastern Cape and Northern Cape.

- Rossouw, L. 2006. A Preliminary Evaluation of Archaeological and Palaeontological Impact with regard to the Application for Prospecting Rights on the Farms Doornfontein 12, Grasbult 5, Schoolplaats 3, Schoolplaats Annex 4 and Pontdrift 2 in the Warrenton District, Northern Cape.
- Rossouw, L. (National Museum, Bloemfontein). 2008. Phase 1 Archaeological Impact Assessment of Farm Fourteen Streams, Warrenton District, Northern Cape Province.
- Van Ryneveld, K. 2006c. Cultural Resources Management Impact Assessment:A 400ha Portion of Van Zoelen's Laagte 158, Windsorton District, Northern Cape, South Africa.
- Van Ryneveld, K. . 2007a. Archaeological Site Inspection – Mining Impact on Two Graveyard Sites, Schmidtsdrift Mining Area, Boomplaats 21, Schmidtsdrift District, Northern Cape, South Africa
- Van Ryneveld, K. . 2007c. Phase 1 Archaeological Impact Assessment – Sewer Purification Plant, Ikutseng Township, Warrenton, Northern Cape, South Africa.
- Van Schalkwyk, J.A. 2011. Heritage impact assessment for the proposed development of photovoltaic power plants on five different locations in Northwest and Northern Cape Provinces
- Van Schalkwyk, J. 2012. Heritage impact assessment for the proposed development of a photovoltaic power plant on a portion of the farm Waterloo 992, Vryburg region, Northwest Province

3.1.2 Aerial Representations and Survey

Aerial photography is often employed to locate and study archaeological sites, particularly where larger scale area surveys are performed. This method was applied to assist the foot site survey and site documentation where depressions, variation in vegetation, soil marks and landmarks were examined. Specific attention was given to shadow sites (shadows of walls or earthworks which are visible early or late in the day), crop mark sites (crop mark sites are visible because disturbances beneath crops cause variations in their height, vigour and type) and soil marks (e.g. differently coloured or textured soil (soil marks) might indicate ploughed-out burial mounds). Attention was also given to moisture differences, as prolonged dampening of soil as a result of precipitation frequently occurs over walls or embankments. By superimposing historical photographs, high frequency aerial photographs with images generated with Google Earth, potential sensitive areas were subsequently identified, geo-referenced and transferred to a handheld GPS device. These areas served as referenced points from where further vehicular and pedestrian surveys were carried out. From the aerial survey it is evident that certain surface areas subject to the Warrenton Blockhouse Restoration Project have been subjected to vast disturbances and impacts as a result of development and agriculture.

3.1.3 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. An archaeological survey of the Warrenton Blockhouse Restoration Project was conducted in March 2016. The process encompassed a systematic field survey in accordance with standard archaeological practice by which heritage resources are observed and documented. In order to sample surface areas systematically and to ensure a high probability of site recording, the project area was systematically surveyed on foot, GPS reference points were visited and random spot checks were made (see detail in previous section). Using a Garmin E-trex Legend GPS objects and structures of archaeological / heritage value were recorded and photographed with a Canon 450D Digital camera. Real time aerial orientation, by means of a mobile Google Earth application was also employed to investigate possible disturbed areas during the survey. As most archaeological material occur in single or multiple stratified layers beneath the soil surface, special attention was given to disturbances, both man-made such as roads and clearings, as well as those made by

natural agents such as burrowing animals and erosion. In addition, the blockhouse structure was documented by means of a photographic and cartographic record.

3.2 Limitations

3.2.1 Access

The Study Area is accessed directly via the N12 freeway. Access control is applied to the area relevant to this assessment but no access restrictions were encountered during the site visit as the author was accompanied by officials from FBDM.

3.2.2 Visibility

The surrounding vegetation in the Warrenton area is mostly comprised out of mixed grasslands and scattered trees with the occurrence of riparian vegetation along the Vaal River. Even though sections of the study area have been altered as a result of development the study area is generally somewhat overgrown by pioneering species and natural vegetation. Generally, the visibility at the time of the AIA site inspection (March 2016) was moderate (see Figure 3-1). In single cases during the survey sub-surface inspection was possible.

Figure 3-1: View of general surroundings around the Warrenton blockhouse in the project area.

3.2.3 Limitations and Constraints Summary

The foot survey for the Warrenton Blockhouse Restoration Project AIA primarily focused around areas tentatively identified as sensitive and of high heritage probability (i.e. those noted during the aerial survey) as well as areas of high human settlement catchment. The following constraints were encountered:

- **Visibility:** Visibility proved to be a constrain in areas with denser surface cover, as well as portions where vegetation is more pristine.

Even though it might be assumed that survey findings are representative of the heritage landscape of the project area, it should be stated that the possibility exists that individual sites could be missed due to the localised nature of some heritage remains as well as the possible presence of sub-surface archaeology. Therefore, maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should

be stated that the heritage resources identified during the study do not necessarily represent all the heritage resources present in the project area. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

3.3 Impact Assessment

For consistency among specialists, impact assessment ratings by Exigo Specialist are generally done using the Plomp[2] impact assessment matrix scale supplied by AGES. According to this matrix scale, each heritage receptor in the study area is given an impact assessment. A cumulative assessment for the proposed project is also included.

4 ARCHAEO-HISTORICAL CONTEXT

4.1 The archaeology of Southern Africa

Archaeology in southern Africa is typically divided into two main fields of study, the **Stone Age** and the **Iron Age** or **Farmer Period**. The following table provides a concise outline of the chronological sequence of periods, events, cultural groups and material expressions in Southern African pre-history and history.

Table 1 Chronological Periods across southern Africa

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: *Australopithecines* *Homo habilis* *Homo erectus*	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First *Homo sapiens* species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	*Homo sapiens sapiens* including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period 300 – 900 AD	Holocene	First Bantu-speaking groups	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Middle Iron Age (Mapungubwe / K2) / early Later Farmer Period 900 – 1350 AD	Holocene	Bantu-speaking groups, ancestors of present-day groups	Typically distinct ceramics, bead ware and iron / gold / copper objects, trade goods and grinding stones.
Late Iron Age / Later Farmer	Holocene	Various Bantu-speaking	Distinct ceramics, grinding stones, iron

[2] Plomp, H.,2004

Period 1400 AD -1850 AD		groups including Venda, Thonga, Sotho-Tswana and Zulu	objects, trade objects, remains of iron smelting activities including iron smelting furnace, iron slag and residue as well as iron ore.
Historical / Colonial Period ±1850 AD – present	Holocene	Various Bantu-speaking groups as well as European farmers, settlers and explorers	Remains of historical structures e.g. homesteads, missionary schools etc. as well as, glass, porcelain, metal and ceramics.

4.1.1 The Stone Ages

- **The Earlier Stone Age (ESA)**

The Earlier Stone Age from between 1.5 million and 250 000 years ago refers to the earliest that *Homo sapiens sapiens* predecessors began making stone tools. The earliest stone tool industry was referred to as the Olduwan Industry originating from stone artefacts recorded at Olduvai Gorge, Tanzania. The Acheulian Industry, the predominant southern African Early Stone Age Industry, replaced the Olduwan Industry approximately 1.5 million years ago, is attested to in diverse environments and over wide geographical areas. The hallmark of the Acheulian Industry is its large cutting tools (LCTs or bifaces), primarily handaxes and cleavers. Bifaces emerged in East Africa more than 1.5 million years ago but have been reported from a wide range of areas, from South Africa to northern Europe and from India to the Iberian coast. Earlier Stone Age deposits typically occur on the flood-plains of perennial rivers. These ESA open sites sometimes contain stone tool scatters and manufacturing debris ranging from pebble tool choppers to core tools such as handaxes and cleavers. These groups seldom actively hunted and relied heavily on the opportunistic scavenging of meat from carnivore fill sites. The most well-known Early Stone Age site in southern Africa is Amanzi Springs, situated about 10km north-east of Uitenhage, near Port Elizabeth (Deacon 1970). In a series of spring deposits a large number of stone tools were found in situ to a depth of 3-4m. Wood and seed material preserved remarkably very well within the spring deposits, and possibly date to between 800 000 to 250 000 years old.

- **The Middle Stone Age (MSA)**

The Middle Stone Age (MSA) spans a period from 250 000-30 000 years ago and focuses on the emergence of modern humans through the change in technology, behaviour, physical appearance, art and symbolism. Various stone artefact industries occur during this time period, although less is known about the time prior to 120 000 years ago, extensive systemic archaeological research is being conducted on sites across southern Africa dating within the last 120 000 years (Thompson & Marean 2008). The large handaxes and cleavers were replaced by smaller stone artefactscalled the MSA flake and blade industries. Surface scatters of these flake and blade industries occur widespread across southern Africa although rarely with any associated botanical and faunal remains. It is also common for these stone artefacts to be found between the surface and approximately 50-80cm below ground. Fossil bone may in rare cases be associated with MSA occurrences (Gess 1969). These stone artefacts, like the Earlier Stone Age handaxes are usually observed in secondary context with no other associated archaeological material. The MSA is distinguished from the ESA by the smaller-sized and distinctly different stone artefacts and chaine operatoire (method) used in manufacture, the introduction of other types of artefacts and evidence of symbolic behaviour. The prepared core technique was used for the manufacture of the stone artefacts which display a characteristic facetted striking platform and includes mainly unifacial and bifacial flake blades and points. The Howiesons Poort Industry (80 000-55 000 years ago) is distinguished from the other

MSA stone artefacts: the size of tools are generally smaller, the range of raw materials include finer-grained rocks such as silcrete, chalcedony, chartz and hornfels, and include segments, backed blades and trapezoids in the stone toolkit which were sometimes hafted (set or glued) onto handles. In addition to stone artefacts, bone was worked into points, possibly hafted, and used as tools for hunting (Deacon & Deacon 1999). Other types of artefacts that have been encountered in archaeological excavations include tick shell beads, the rim pieces of ostrich eggshell (OES) water flasks, ochre-stained pieces of ostrich eggshell and engraved and scratched ochre pieces, as well as the collection of materials for purely aesthetic reasons. The majority of MSA sites occur on flood plains and sometimes in caves and rock shelters. Sites usually consist of large concentrations of knapped stone flakes such as scrapers, points and blades and associated manufacturing debris. Tools may have been hafted but organic materials, such as those used in hafting, seldom remain preserved in the archaeological record. Limited drive-hunting activities are associated with the MSA.

- **The Later Stone Age (LSA)**

The Later Stone Age (LSA) spans the period from about 20 000 years ago until the colonial era, although some communities continue making stone tools today. The period between 30 000 and 20 000 years ago is referred to as the transition from the MSA to LSA; although there is a lack of crucial sites and evidence that represent this change. By the time of the Later Stone Age the genus Homo, in southern Africa, had developed into *Homo sapiens sapiens*, and in Europe, had already replaced *Homo neanderthalensis*. The LSA is marked by a series of technological innovations, new tools and artefacts, the development of economic, political and social systems, and core symbolic beliefs and rituals. The stone toolkits changed over time according to time-specific needs and raw material availability, from smaller microlithic Robberg, Wilton Industries and in between, the larger Albany/Oakhurst and the Kabeljous Industries. Bored stones used as part of digging sticks, grooved stones for sharpening and grinding and stone tools fixed to handles with mastic also become more common. Fishing equipment such as hooks, gorges and sinkers also appear within archaeological excavations. Polished bone tools such as eyed needles, awls, linkshafts and arrowheads also become a more common occurrence. Most importantly bows and arrows revolutionized the hunting economy. It was only within the last 2000 years that earthenware pottery was introduced, before then tortoiseshell bowls were used for cooking and ostrich eggshell (OES) flasks were used for storing water. Decorative items like ostrich eggshell and marine/fresh water shell beads and pendants were made. Hunting and gathering made up the economic way of life of these communities; therefore, they are normally referred to as hunter-gatherers. Hunter-gatherers hunted both small and large game and gathered edible plant foods from the veld. For those that lived at or close the coast, marine shellfish and seals and other edible marine resources were available for the gathering. The political system was mainly egalitarian, and socially, hunter-gatherers lived in bands of up to twenty people during the scarce resource availability dispersal seasons and aggregated according to kinship relations during the abundant resource availability seasons. Symbolic beliefs and rituals are evidenced by the deliberate burial of the dead and in the rock art paintings and engravings scattered across the southern African landscape. Sites dating to the LSA are better preserved in rock shelters, although open sites with scatters of mainly stone tools can occur. Well-protected deposits in shelters allow for stable conditions that result in the preservation of organic materials such as wood, bone, hearths, ostrich eggshell beads and even bedding material. By using San (Bushman) ethnographic data a better understanding of this period is possible. South African rock art is also associated with the LSA.

4.1.2 The Iron Age Farmer Period

- **Early Iron Age (Early Farming Communities)**

The Early Iron Age (also Early Farmer Period) marks the movement of Bantu speaking farming communities into South Africa at around 200 A.D. These groups were agro-pastoralists that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Artefact evidence from Early Farmer Period sites is mostly found in the form of ceramic assemblages and the origins and archaeological identities of this period are largely based upon ceramic typologies and sequences, where diagnostic pottery assemblages can be used to infer group identities and to trace movements across the landscape. Early Farmer Period ceramic traditions are classified by some scholars into different "streams" or trends in pot types and decoration that, over time emerged in southern Africa. These "streams" are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). More specifically, in the northern regions of South Africa at least three settlement phases have been distinguished for prehistoric Bantu-speaking agropastoralists. The first phase of the Early Iron Age, known as Happy Rest (named after the site where the ceramics were first identified), is representative of the Western Stream of migrations, and dates to AD 400 - AD 600. The second phase of Diamant is dated to AD 600 - AD 900 and was first recognized at the eponymous site of Diamant in the western Waterberg. The third phase, characterised by herringbone-decorated pottery of the Eiland tradition, is regarded as the final expression of the Early Iron Age (EIA) and occurs over large parts of the North West Province, Northern Province, Gauteng and Mpumalanga. This phase has been dated to about AD 900 - AD 1200. Early Farmer Period ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. The Early Iron Age continued up to the end of the first millennium AD.

- **Middle Iron Age / K2 Mapungubwe Period (early Later Farming Communities)**

The onset of the middle Iron Age dates back to ±900 AD, a period more commonly known as the Mapungubwe / K2 phase. These names refer to the well known archaeological sites that are today the pinnacle of South Africa's Iron Age heritage. The inhabitants of K2 and Mapungubwe, situated on the banks of the Limpopo, were agriculturalists and pastoralists and were engaged in extensive trade activities with local and foreign traders. Although the identity of this Bantu-speaking group remains a point of contestation, the Mapungubwe people were the first state-organized society southern Africa has known. A considerable amount of golden objects, ivory, beads (glass and gold), trade goods and clay figurines as well as large amounts of potsherds were found at these sites and also appear in sites dating back to this phase of the Iron Age. Ceramics of this tradition take the form of beakers with upright sides and decorations around the base (K2) and shallow-shouldered bowls with decorations as well as globular pots with long necks. (Mapungubwe). The site of Mapungubwe was deserted at around 1250 AD and this also marks the relative conclusion of this phase of the Iron Age.

- **Later Iron Age (Later Farming Communities)**

The late Iron Age of southern Africa marks the grouping of Bantu speaking groups into different cultural units. It also signals one of the most influential events of the second millennium AD in southern Africa, the difaqane. The difaqane (also known as "the scattering") brought about a dramatic and sudden ending to centuries of stable society in southern Africa. Reasons for this change was essentially the first penetration of the southern African interior by Portuguese traders, military conquests by various Bantu speaking groups primarily the ambitious Zulu King Shaka and the beginning of industrial developments in South Africa. Different cultural groups were scattered over large areas of the interior. These groups conveyed with them their customs that in the archaeological record manifest in ceramics, beads and other artefacts. This means that distinct pottery typologies can be found in the different late Iron Age groups of South Africa.

- **Bantu Speaking Groups in the South African interior**

It should be noted that terms such as "Nguni", "Sotho", "Venda" and others refer to broad and comprehensive language groups that demonstrated similarities in their origins and language. It does not imply that these Nguni / Sotho groups were homogeneous and static; they rather moved through the landscape and influenced each other in continuous processes marked by cultural fluidity.

Ethnographers generally divide major Bantu-speaking groups of southern Africa into two broad linguistic groups, the Nguni and the Sotho with smaller subdivisions under these two main groups. Nguni groups were found in the eastern parts of the interior of South Africa and can be divided into the northern Nguni and the southern Nguni. The various Zulu and Swazi groups were generally associated with the northern Nguni whereas the southern Nguni comprised the Xhosa, Mpondo, Thembu and Mpondomise groups. The same geographically based divisions exist among Sotho groups where, under the western Sotho (or Tswana), groups such as the Rolong, Hurutshe, Kwena, Fokeng and Kgatla are found. The northern Sotho included the Pedi and amalgamation of smaller groups united to become the southern Sotho group or the Basutho. Other smaller language groups such as the Venda, Lemba and Tshonga Shangana transpired outside these major entities but as time progressed they were, however to lesser or greater extend influenced and absorbed by neighbouring groups.

4.1.3 Pastoralism and the last 2000 years

Until 2000 years ago, hunter-gatherer communities traded, exchanged goods, encountered and interacted with other hunter-gatherer communities. From about 2000 years ago the social dynamics of the southern African landscape started changing with the immigration of two 'other' groups of people, different in physique, political, economic and social systems, beliefs and rituals. One of these groups, the Khoekhoe pastoralists or herders entered southern Africa with domestic animals, namely fat-tailed sheep and goats, travelling through the south towards the coast. They also introduced thin-walled pottery common in the interior and along the coastal regions of southern Africa. Their economic systems were directed by the accumulation of wealth in domestic stock numbers and their political make-up was more hierarchical than that of the hunter-gatherers.

4.1.4 Historical and Colonial Times and Recent History

The Historical period in southern Africa encompass the course of Europe's discovery of South Africa and the spreading of European settlements along the East Coast and subsequently into the interior. In addition, the formation stages of this period are marked by the large scale movements of various Bantu-speaking groups in the interior of South Africa, which profoundly influenced the course of European settlement. Finally, the final retreat of the San and Khoekhoen groups into their present-day living areas also occurred in the Historical period in southern Africa.

4.2 The Northern Cape Landscape and Warrenton

The history of the Northwest and the Northern Cape Province is reflected in a rich archaeological landscape, mostly dominated by Stone Age and Colonial Period occurrences. Numerous sites, documenting Earlier, Middle and Later Stone Age habitation occur across the landscape, mostly in open air locales or in sediments alongside rivers or pans. In addition, a wealth of Later Stone Age rock art sites, most of which are in the form of rock engravings are to be found in the larger landscape. These sites occur on hilltops, slopes, rock outcrops and occasionally in river beds. Sites dating to the Iron Age occur in the north eastern part of the Northwest Province but environmental factors delegated that the spread of Iron Age farming westwards from the 17th century was constrained mainly to the area east of the Langeberg Mountains.

However, evidence of an Iron Age presence as far as the Upington area in the eighteenth century occurs in the larger landscape area. Moving into recent times, the archaeological record reflects the development of a rich colonial frontier, characterised by, amongst others, a complex industrial archaeological landscape such as mining developments at Kimberley, which herald the modern era in South African history. Finally, the Northwest Province saw a number of war conflicts, particularly the Anglo Boer War (or the South African War) left behind the remnants of battlefields, skirmishes and concentration camps.

4.2.1 Early History and the Stone Ages

The Taung area is significant in terms of early human development. In 1924, the fossilized skull of an early human infant was discovered by a quarry-worker in the nearby Buxton-limestone quarry. The fossil remains were described by Raymond Dart in 1925 as the type specimen of Australopithecus africanus. Later *in-situ* excavations were conducted under the direction of Phillip Tobias of the University of the Witwatersrand, and although they failed to find additional hominid specimens they did recover many important fossil baboons. The Taung Child, as the hominin fossil became known, is among the most important early human fossils ever discovered. It was the first hominid to be discovered in Africa, a species later named *Australopithecus africanus*.

Figure 4-1: The Taung child hominin fossil (left) excavated from the Buxton limestone quarry (right) at Taung. (http://southafricanpalaeocaves.files.wordpress.com/)

Stone Age sites are not randomly scattered within the landscape and they occur either near water sources or close to local sources of two highly-prized raw materials, specularite and jaspilite. As such, tools dating to all phases of the Stone Age are mostly found in the vicinity of larger watercourses, e.g. the Vaal River or the Harts River and near pans. More recent surveys have documented Acheullian industries and continuity between ESA and MSA lithic technologies in the same area. Excavations at other well-known sites in the wider region attest to further ESA and MSA occupation, some of which have yielded have yielded significant Stone Age assemblages that all inform on our general understanding of the technological sequences of the Stone Age in the Northern Cape and the Northwest (e.g. see Beaumont 2008, 2009; Morris 2006; Morris 2007; Dreyer 2007). Further afield it is worth noting that a significant Stone Age site occurs in and around the town of Kathu, approximately 120km west of the study area. This site, known as Kathu Pan, is a shallow water pan about 30ha in extent. The site was extensively studied from 1974 to 1990 by Humpreys and Beaumont, amongst others. Kathu Pan is an extremely significant site as it represents the major industries of the Stone Age, more specifically two phases of the Earlier Stone Age, two phases of the Middle Stone Age, and more or less the entire Later Stone Age (Beaumont 1990). The site yielded large

amounts of hand axes and faunal remains, including the concentrated remains of large mammal remains. More recently, research by Jayne Wilkins revealed a hoard of stone points, each between 4 and 9 centimeters long, that they think belonged to the earliest stone-tipped spears yet found. The stone points are the right shape and size for the job, and some have fractured tips that suggest they were used as weapons. Since stone points used on spears had been found only at sites that date back no more than 300 000 years, these discoveries in the 500 000-year-old deposits at Kathu is greatly significant. The abundance of Stone Age material at Kathu Pan can probably be attributed to the presence of a permanent water source at the pan.

Figure 4-2: Early Stone Age (Acheul) handaxe from the Kathu Pan site (http://www.museumsnc.co.za).

4.2.2 Rock Markings

Rock engravings are mostly found in the interior plateau of South Africa for example in Kimberley and the Karoo. Evidence exists of rock art paintings occurring in caves and shelters at the Wonderwerk Caves, Kuruman Hills, Ghaap Escarpment and scattered sites in the Karoo. Rock engravings have also been identified at Driekopseiland that is positioned in the close vicinity of Kimberley Town. Driekopseiland is evident of more than ninety percent of geometric engraving sites (Morris 1988). Geometrics have been identified at the Kuruman valley and the middle Orange area (Morris 1988). Engravings tend to be found at rock walls, low outcrops, or clusters of surface stone. The Wildebeest Kuil 1 Rock Art site, a declared Provincial Heritage Site (2008), is characterized by a fairly prominent hill surrounded by a number of 'kuils' or non-perennial water holes and wetlands. The hill itself is host to more than 400 petroglyphs, including both naturalistic and abstract engravings, in fine-line and pecked technique. LSA deposits are scattered about the immediate terrain with deposits closer to the hill indicative of residential outlines and activity or knapping areas. Extensive LSA use of the landscape is evidenced by even more engravings on the glacial pavements of the farm Nooitgedacht, just north of Platfontein. Further afield the Driekopseiland site, one of the most prolific engraving sites in the country is host to more than 3,600 images, engraved into the glaciated andesite of the Riet River's banks (Morris 1990a). Closer to the Vaal River, at the Bushmans' Fountain site, Klipfontein, more than 4,500 engravings have been recorded across the approximate 9ha site (Morris 1990b). The many petroglyph sites across the Northern Cape signal an aesthetic and spiritual expression of a modern LSA cognition. The LSA archaeological record is directly associated with San history, dating conservatively back to around 40-27kya, whilst the Khoe is reported to have entered the country around 2kya (Mitchell 2002). Both groups are known to have traded with Later Iron Age communities and Colonial settlers. Rock engravings

are mostly situated in the semi-arid plateau with most of these engravings situated at the Orange – Vaal basin, Karoo and Namibia. The upper Vaal, Limpopo basin and eastern Free State regions have a small quantity of rock engravings as well. Generally, rock paintings exist at cave areas and rock engravings at open surface areas. The Cape interior consists of a technical, formal and thematic variation between and within sites (Morris 1988). Two major techniques existed namely the incised and pecked engravings. Morris (1988) indicated technical and formal characteristics through space and a sharp contrast exists between engravings positioned north of the Orange River that are mostly pecked and those in the Karoo where scraping was mostly used. According to Morris (1988) hairline engravings occur at the North and the South, but they are rare at the Vryburg region. Finger painting techniques mostly occur at the Kuruman Hills, Asbestos Mountains, Ghaap Escarpment, Langeberg, Koranaberg ranges, scattered sites at the Karoo and the Kareeberge (Morris 1988). The development petroglyphs (i.e. carving or line drawing on rock) were associated with three different types of techniques, namely incised fine lines, pecked engravings and scraped engravings. According to Peter Beaumont the pecked and scraped engravings at the Upper Karoo are coeval (i.e. having the same age or date of origin) (Beaumont P B et al. 1989). Dating of rock art includes the use of carbonate fraction dating of ostrich eggshell pieces, dating of charcoal and ostrich eggshell at various rock art shelters. Unifacial points, double segments and thin – walled sherds may indicate the presence of the Khoikhoi at the Northern Cape during 2500 BP (years Before the Present) (Beaumont 1989).

Figure 4-3: Rock engravings at the Wildebeest Kuil Rock Art Site.

4.2.3 Iron Age / Farmer Period

The beginnings of the Iron Age (Farmer Period) in southern Africa are associated with the arrival of a new Bantu speaking population group at around the third century AD. These newcomers introduced a new way of life into areas that were occupied by Later Stone Age hunter-gatherers and Khoekhoe herders. Distinctive features of the Iron Age are a settled village life, food production (agriculture and animal husbandry), metallurgy (the mining, smelting and working of iron, copper and gold) and the manufacture of pottery. Stone ruins indicate the occurrence of Iron Age settlements in the Northern Cape specifically at sites such as Dithakong where evidence exists that the Thlaping used to be settled in the Kuruman – Dithakong areas prior to 1800 (Humphreys 1976). Here, the assessment of the contact between the Stone

Age, Iron Age and Colonial societies are significant in order to understand situations of contact and assimilation between societies. As an example, Trade occurred between local Thlaping Tswana people and the Khoikhoi communities. It means that the Tswana traded as far south as the Orange River at least the same time as the Europeans at the Cape (Humphreys 1976).

4.2.4 Later History: Warrenton

The 18th century was defined as a period of conflict when the Griqua, Korana and white settlers were competing for the availability of land. This period is also known for the occurrence of the Mfecane or the so called Difaqane that resulted in a time period of instability that started in the middle 1820's. The conflict time period related to the Mfecane or Difaqane was the result of the influx of the then displaced people. The continuous conflict resulted in tribal groups migrating to hilltop areas in the need of finding safe environments. From early Colonial times interest in the Northern Cape was firmly vested in its mineral wealth; early settlers speculated about mountains rich in copper towards the north-west. The landscape around the study area was scarcely populated in Historical times and it was only towards the early 19th century that missionaries, hunters and traders access the region. These pioneers were followed by Colonial farmers who negotiated with local chiefs for land, or occupied areas that were perceived to be vacant. In some areas short-lived Boer Republics were established. With the influx of farmers came the establishment of a number of small towns, some of which include Vryburg, and Warrenton. In 1880, a syndicate bought the western portion of the farm Grasbult to irrigate the fertile land and produce vegetables for the diamond fields. The town of Warrenton which grew here was named after Sir Charles Warren. Diamonds were discovered here in 1888 and mining continued to 1926.

4.2.5 The Anglo-Boer War

Possibly the most prominent colonial remnants on the Highveld and in Mpumalanga can be attributed to the South African War or the Anglo-Boer War (1899-1902). The various battles and skirmishes resulting from this influential conflict left a legacy of heritage sites scattered across the Highveld where fortifications, war cemeteries and battlefields still remain. After their defeats in Natal and the Southern Free State during the first phase of the South Africa War, the Boers slowly adopted a new strategy whereby mobile mounted commandos would be used to wage war over large distances. The Anglo-Boer War saw the Kimberley area besieged by the *Boers* on the 14th of October 1899, with British forces suffering heavy losses. The Boers moved quickly to try to capture the British enclave when war broke out between the British and the two Boer republics in October 1899. The town was ill-prepared but the defenders organised an energetic and effective improvised defense that was able to prevent it from being taken. Cecil John Rhodes, who had made his fortune in the town, and who controlled all the mining activities, moved into the town at the onset of the siege. His presence was controversial, as his involvement in the Jameson Raid made him one of the primary protagonists behind war breaking out. Rhodes was constantly at loggerheads with the military, but he was nonetheless instrumental in organising the defense of the town. The Boers shelled the town with their superior artillery in an attempt to force the garrison to capitulate. Engineers of the De Beers company manufactured a one-off gun named Long Cecil, however the Boers soon countered with a much larger siege gun that terrified the residents, forcing many to take shelter in the Kimberley Mine. The British military had to change its strategy for the war as public opinion demanded that the sieges of Kimberley, Ladysmith and Mafeking be relieved before the Boer capitals were assaulted. The first attempt at relief of Kimberley under Lord Methuen was stopped at the battles of Modder River and Magersfontein. The 124-day siege was finally relieved on 15 February 1900 by a cavalry division under Lieutenant-General John French, part of a larger force under Lord Roberts. The battle against the Boer general Piet Cronjé continued at Paardeberg immediately after the town itself was relieved.

4.2.6 Burial Sites / Human Remains

Human remains and burials are commonly found close to archaeological sites; they may be found in "lost" graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Human remains are usually observed when they are exposed through erosion. In some instances packed stones or rocks may indicate the presence of informal pre-colonial burials. If any human bones are found during the course of construction work then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial they would need to be exhumed under a permit from either SAHRA (for pre-colonial burials as well as burials later than about AD 1500).

5 RESULTS: ARCHAEOLOGICAL SURVEY

In terms of heritage resources, the general landscape around the project area is primarily well known for hominin heritage but sites dating to Colonial warfare are also prevalent. Locally, the project area has been altered in places by recent and histro9ical activities. The Historical Period Warrenton blockhouse subject to the Warrenton Blockhouse Restoration Project was uniquely coded **EXIGO-WBH-ST01** (Exigo Warrenton Blockhouse Structure 1).

5.1 Historical / Colonial Period : The Warrenton Block House

5.1.1 A Background to Anglo Boer War Blockhouses

Possibly the most prominent colonial remnants on the Highveld and in Mpumalanga can be attributed to the South African War or the Anglo-Boer War (1899-1902). Lord Roberts, who was the British commander-in-chief in the field in South Africa from January to November 1900, believed that the war would end once be had captured the capital cities of the two Boer republics. However, long before be handed over the supreme command to Lord Kitchener in November 1900, it was already clear that the Boers were determined to continue their struggle by means of guerrilla warfare after the fall of their capitals. Consequently the war escalated geographically, the British supply lines were threatened and sometimes cut, and completely new demands were made on the conventionally-trained British soldiers. Furthermore, the British supply lines were seriously threatened: bridges were blown up, and trains were derailed or attacked. Initially the conventionally trained British soldiers had great difficulties in their efforts to curb the mobile Boers. In due course Kitchener implemented an elaborate anti-guerrilla warfare strategy, which included a scorched-earth policy, the removal of the Boer civilians (together with their black labourers and families) from the farms to concentration camps, and drives against the commandos. To safeguard the British supply lines, and to form barriers against which the Boer commandos could be driven, an elaborate blockhouse system was built across the length and breadth of the war zone, dividing the area into more manageable camps. The British in due course built some 8 000 blockhouses of various sizes over the length and breadth of the war zone. These blockhouses were manned by about 85 000 soldiers, including about 2S 000 black and coloured blockhouse guards. Initially the blockhouses were to be erected at strategic points such as bridges. However, the idea was expanded to both guard the railway line and the present barriers designed to limit the free movement of the Boers across the countryside. To achieve this, blockhouses were constructed at regular intervals along the railway lines. Troops were stationed in and around each blockhouse and the number of men garrisoned varied. Some blockhouse have been rather

fancifully custom-designed while others are simple constructions of sandbags, wood and corrugated iron – and generally riddled with old bullet holes.

5.1.2 The Placement of Blockhouses

Generally, blockhouses were erected at important points such as railway bridges over rivers.

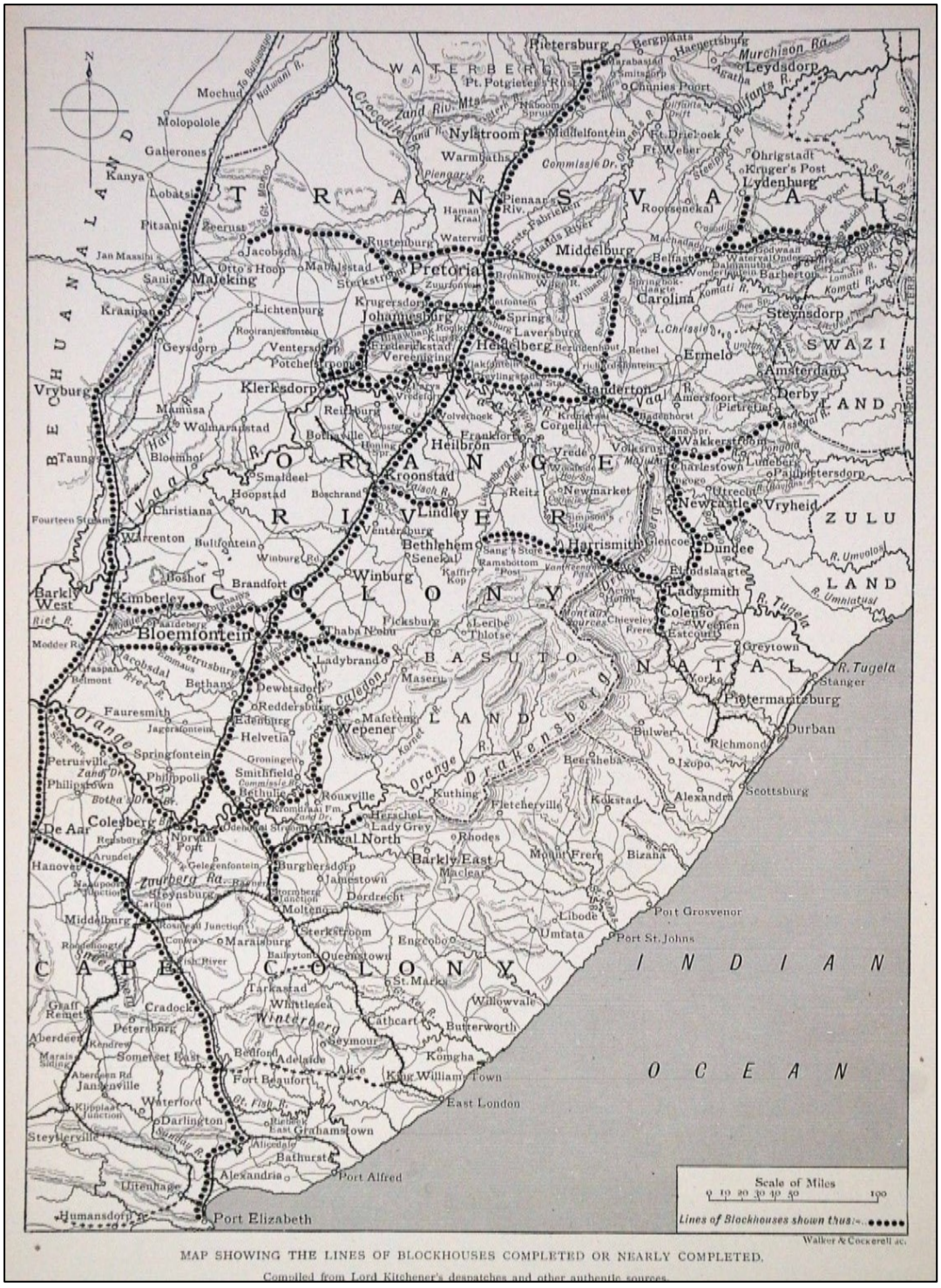


Figure 5-1: Map of lines of blockhouses completed towards the end of the Anglo-Boer War.

However, they were also to be found guarding railway stations, railway lines in open country, towns and passes and high points. The use of masonry blockhouses at railway bridges is consistent, but in the other locations cited, there seems to have been no firm rule and masonry and corrugated iron structures were interchangeable. The reason for this may be that many of the masonry examples were built at the end of 1900 and in the early months of 1901, before the mass-production of corrugated blockhouses began. Major Rice introduced an octagonal corrugated design in February 1901 and only invented his circular corrugated blockhouse later. By this time the Boers had lost most of their artillery and the double-skin corrugated iron wall with the shingle filling provided sufficient protection against rifle fire. The high cost and long construction period of the masonry blockhouses also probably swayed opinion in favour of the corrugated design. In spite of this, the advantage of the additional height of the three-storeyed masonry structure may have allowed further examples of this type of blockhouse to be built at a later date in flatter terrain. The distance between blockhouses was calculated to be able to extend the reach as far as possibly but at the same time to prevent the Boers from passing unnoticed between them. The average distance apart was about 910 m. Line of sight was vital and this required a greater density of blockhouses in some areas. The gap between blockhouses was filled by wire fences. These fences did not run along the shortest distance between the blockhouses but zig-zagged so that the troops from both blockhouses could fire at the enemy between themselves but without the chance of hitting the other blockhouse.

5.1.3 Construction

Not all of the approximately 8000 blockhouses built during the South African War look the same. The designer of the blockhouse, Major Rice and the men of the Royal Engineers set up the manufacturing units to make the component parts. These were then shipped to wherever they were needed. The standardisation of design meant the blockhouses could be constructed quickly and with parts from different manufacturing units if necessary. Construction of the blockhouses was the responsibility of the army with guidance and support provided by the Royal Engineers. The earliest masonry blockhouses appear to have been constructed during the early months of the guerrilla phase of the war, i.e. after the fall of Pretoria on 5 June 1900. Mortared stonework blockhouses were considered preferable to the concrete ones as less cement was used (90 casks for stonework and 160 for concrete), a harder face and neater appearance were achieved, and the quality of the work could be more easily checked. Concrete blockhouses were possibly constructed in areas which had no natural stone, or they may have been experimental. Stone for masonry blockhouses was generally quarried on site, but could also have been transported by train for those blockhouses situated near to a railway line. Masonry blockhouses of a design by Major-General Wood were erected at important points such as railway bridges over rivers. The use of masonry blockhouses at railway bridges is consistent, but in the other locations cited, there seems to have been no firm rule and masonry and corrugated iron structures were interchangeable. The reason for this may be that many of the masonry examples were built at the end of 1900 and in the early months of 1901, before the mass-production of corrugated blockhouses began. Major Rice introduced an octagonal corrugated design in February 1901 and only invented his circular corrugated blockhouse later. By this time the Boers had lost most of their artillery and the double-skin corrugated iron wall with the shingle filling provided sufficient protection against rifle fire. The high cost and long construction period of the masonry blockhouses also probably swayed opinion in favour of the corrugated design. In spite of this, the advantage of the additional height of the three-storeyed masonry structure may have allowed further examples of this type of blockhouse to be built at a later date in flatter terrain. The blockhouses were sometimes surrounded by trenches and connected to one another by wire defenses. The first fences were made from barbed wire but experience showed that this could be cut easily. Steel wire ¼ in (6mm) thick was imported to provide a more long-lasting deterrent. The fences were often connected to cans

containing stones or other devices that could alert the troops to movement or activity somewhere along the length of the fence. Some of the blockhouses were fined with alarm guns and protected by Indamines. The total cost of the blockhouse system was about £I000 000.

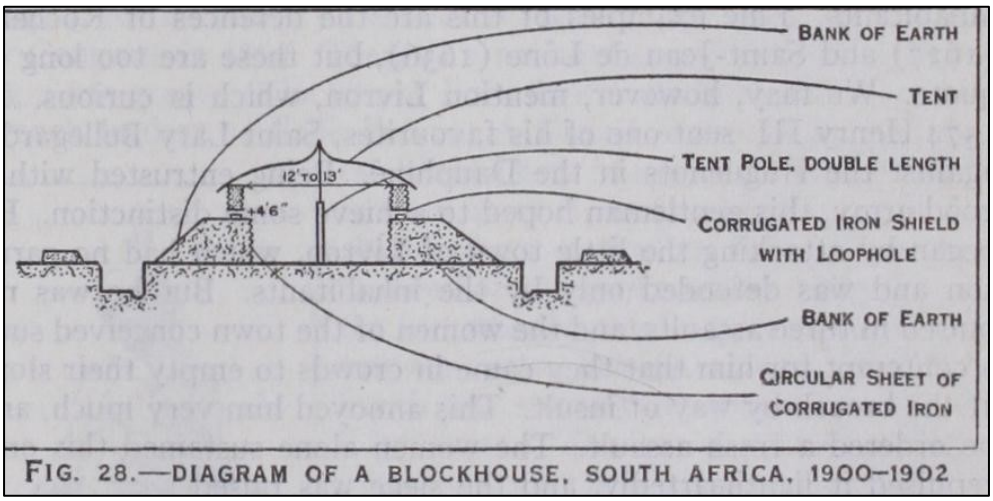


Figure 5-2: Section of a typical blockhouse design.

A wide variety of blockhouse designs, many of which formed distinct regional groups were constructed across South Africa:

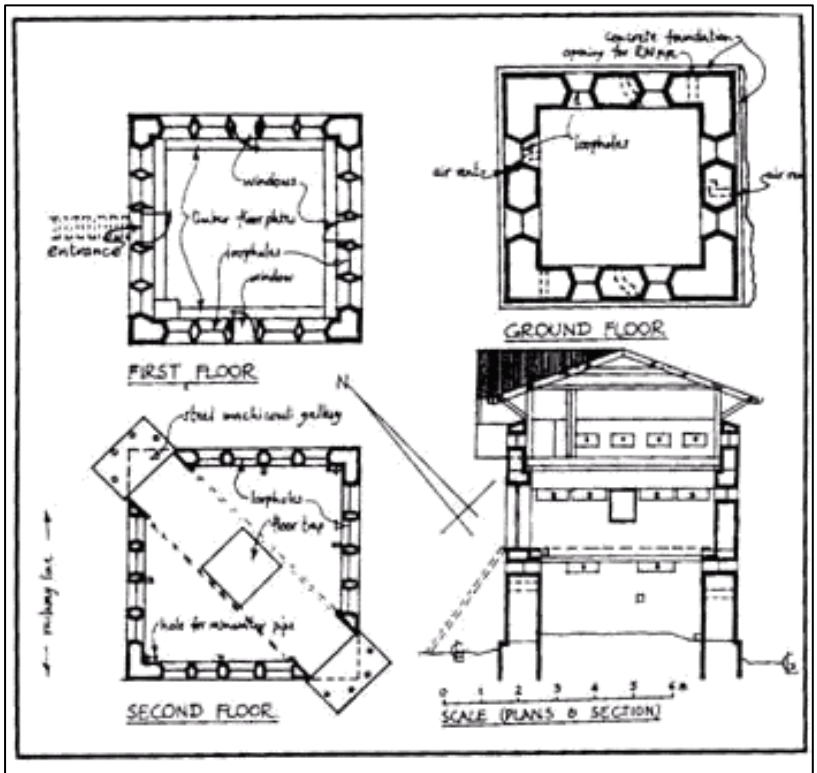
- **The standard pattern**

This type of blockhouse is based on Major-General Wood's standard design and is found extensively along the Cape Town-Warrenton railway line; on the East London-Aliwal North railway line at the Stormberg Junction and Burgersdorp; and defending the towns of Aliwal North and Harrismith. Along the railway lines, these standard pattern blockhouses defended major river bridges, while corrugated ones were found at intervals to cover the railway line itself. The standard pattern blockhouses were constructed of mortared stonework or reinforced concrete and measured 6.1 m square externally. They were almost always three storeys high, the ground floor typically being used as a storage area, the first floor as a living area and the second floor for observation over the countryside under a pyramid-shaped timber and corrugated iron roof, with small gabled extensions over the steel machicouli galleries. The latter were cantilevered out from the walls at two diagonally opposite corners to allow flanking fire along the wall faces in the case of an attack. The ground floor had two loopholes per wall. The entrance door was situated on the first floor, which also had three windows (one in the centre of each wall) and there were two loopholes on either side of these openings. The second floor had four loopholes at low level in each of the parapet walls, the gap between the top of the parapet and the eaves of the roof being closed by canvas 'drops', which could be rolled up in fine weather. The walls of the blockhouse were 900 mm thick on the ground floor, 600 mm on the first floor and 450 mm on the second floor, the internal offsets carrying the upper timber floors.

Access to the blockhouse was by a ladder to the first floor, which could be drawn up inside in the event of an attack. Similar ladders inside the building gave access to the floors above and below. The roof was fitted with galvanised gutters which discharged rainwater through internal downpipes to circular corrugated iron water tanks on the ground floor, in the two corners opposite those occupied by the machicouli galleries. The tanks were topped up regularly in dry weather, by train (in the case of railway blockhouses) or by

water carts brought in from adjacent garrison towns. Food, ammunition, mail, etc, was delivered in a similar manner. The stable-type door, window shutters, loophole plates and galleries were all made of 10-13 mm thick steel plate, each with a 100 x 75 mm, or a 100 mm circular, loophole through which to fire.

Figure 5-3: Orange River Station, a two-storeyed standard pattern blockhouse.



Plans and section of the typical standard pattern blockhouse at the Modder River Bridge.

Figure 5-4: Plan of a standard pattern blockhouse.

- **The Magaliesberg pattern**

A most distinctive type of masonry blockhouse is found defending the passes and high points of the Magaliesberg region to the west of Pretoria. Clearly designed by an engineer with an affinity for medieval military architecture, they feature crenellated parapets above a flat roof, a wide range of plan shapes and the chamfering of external angles above the loophole sills to accommodate additional loopholes at the angles. The flat roof of the Hekpoort blockhouse comprises steel I-beams supporting arched sections of corrugated iron, on which concrete has been poured to form a deck with a slope to direct rainwater to two outlet holes through the parapet walls on the inside faces of the chevron shape. The Kommandonek East lower and middle blockhouses and the Kommandonek West one were roofed in a similar manner, as witnessed by the fallen concrete rubble with impressions of corrugated iron upon them. The upper example at Kommandonek East and that at Broederstroom had flat roofs of lighter construction, probably timber and corrugated iron. These blockhouses each had the standard steel stable door, shuttered windows and loopholes; the windows in the short end walls at Hekpoort were positioned above the loopholes and were so high above the floor level that an iron strap step was built into the wall below the loophole to give access to the window. The floors were of boarded and joisted timber, carried on wall offsets, with extra sleeper walls in some instances and with openings for ventilation of the space beneath the floor.

Figure 5-5: The Magalieberg pattern blockhouse at Hekpoort.

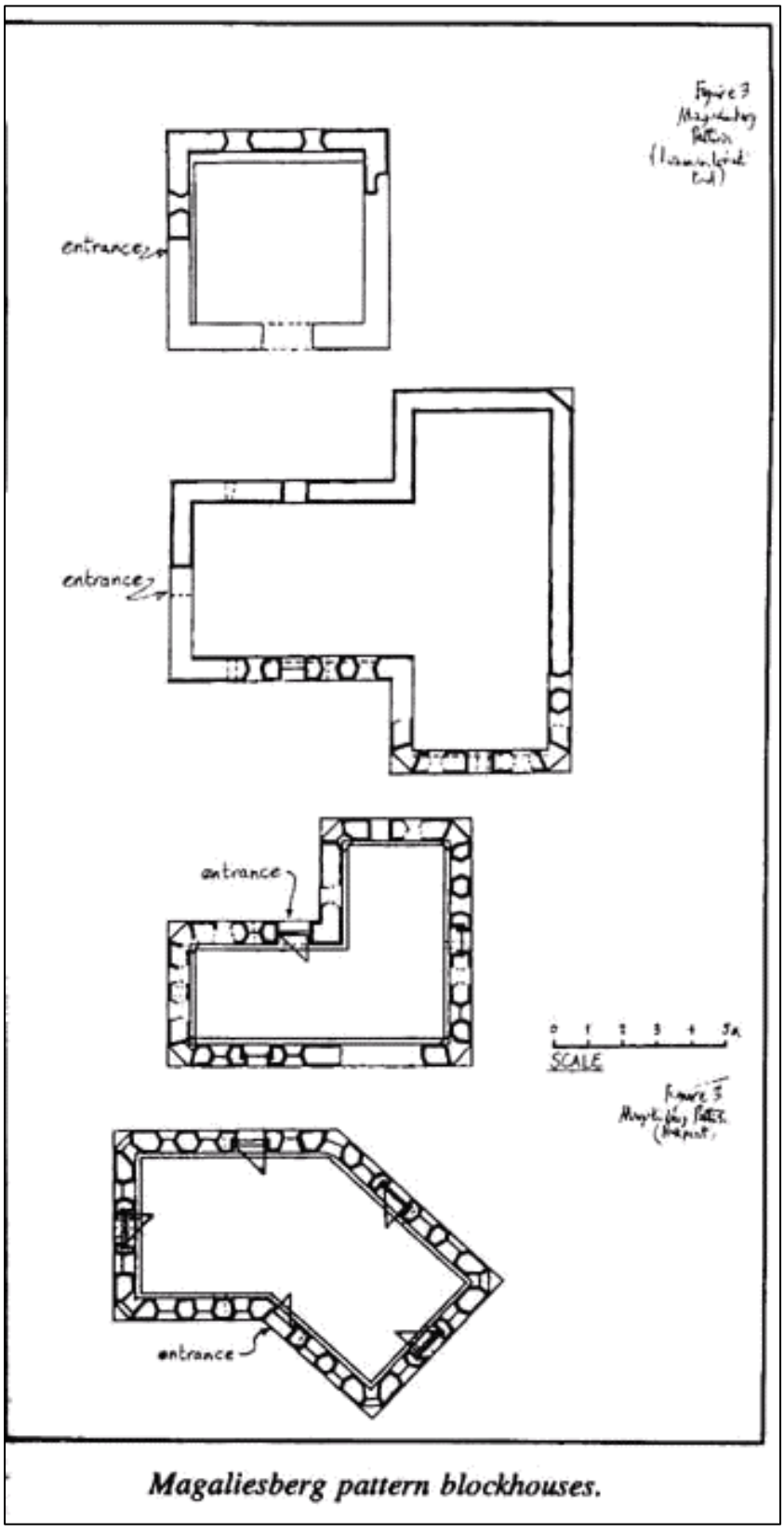
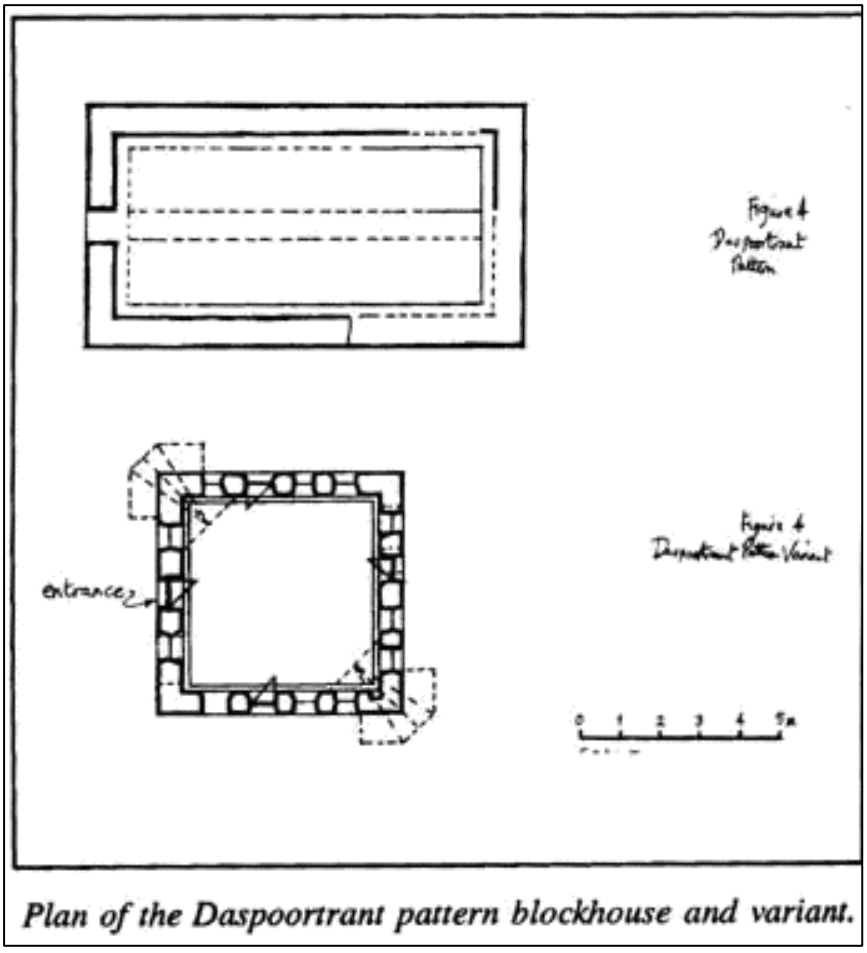


Figure 5-6: Plan of a The Magalieberg pattern blockhouse.

- **The Daspoortrant pattern**

This type is peculiar to the mountain ridges around Pretoria and is characterised by a regular rectangular plan (measuring 6,1-6,25 m wide and 11-11,3 m long outside) with wall offsets and a central sleeper wall running along the length of the interior to carry the timber floor. Most examples found have been destroyed above the level of the floor offset so that other features of the design are uncertain, but old photographs of what appear to be Daspoortrant pattern blockhouses show a preference for gabled corrugated or flat roofs, steel angle galleries and single-storeyed construction. The galleries on these examples are square in plan with the outer corner cut off, unlike the rectangular galleries of the standard pattern.



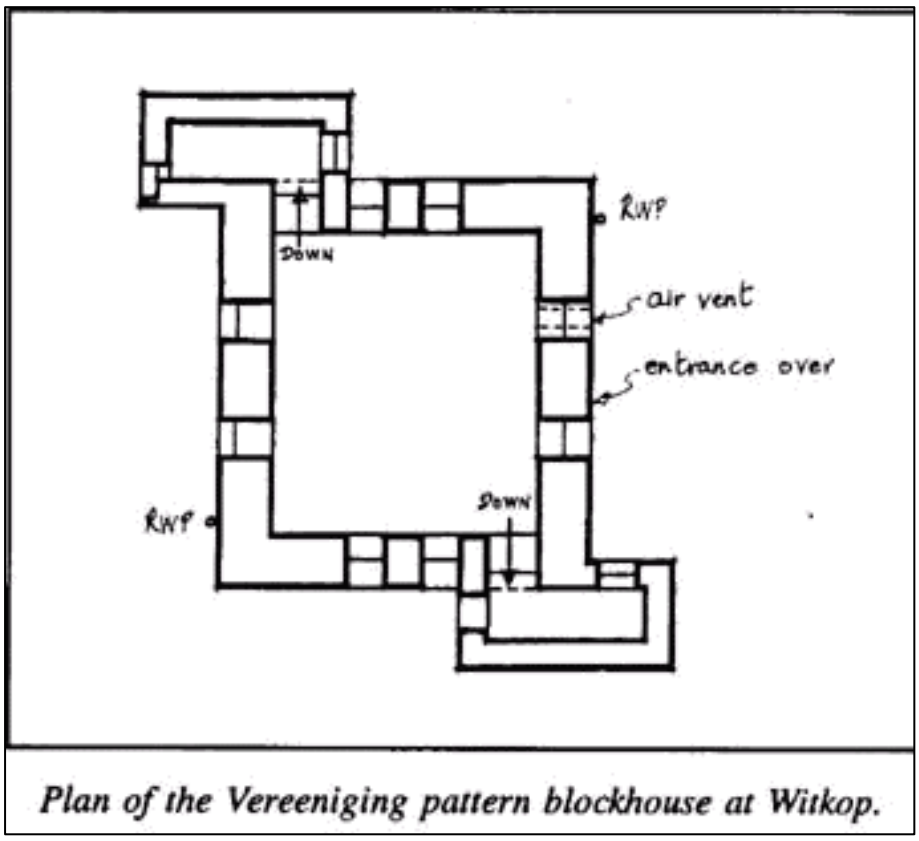
Plan of the Daspoortrant pattern blockhouse and variant.

Figure 5-7: Plan of a Daspoortrand pattern blockhouse.

- **Vereeniging pattern**

A very distinctive design is found along the railway line from Vereeniging to Elandsfontein (present-day Germiston). These came in two and three-storeyed versions (Witkop being three-storeyed) and were covered with a corrugated gabled roof with the gable and walls rising above the roof. A small turret of timber and corrugated iron is positioned near one end of the ridge of the roof and, approached by a ladder from inside, would have provided a clear view over the surrounding countryside. A most unusual feature of this type of blockhouse is the pair of angle bastions at diagonally opposite corners, which were designed to

provide for flanking fire along the walls, similar to the function of the machicouli galleries on other patterns, but at ground level. The bastions were flat-roofed, about one metre high an measured 2,5 x 0,9 m in size inside, so that each could only accommodate one man and must have been very cramped and claustrophobic. The Witkop tower measure 6,15 x 6,75 m externally end of the ridge of the roof and, approached by a ladder from inside, would have provided a clear view over the surrounding countryside. A most unusual feature of this type of blockhouse is the pair of angle bastions at diagonally opposite corners, which were designed to provide for flanking fire along the walls, similar to the function of the machicouli galleries on other patterns, but at ground level. The bastions were flat-roofed, about one metre high an measured 2,5 x 0,9 m in size inside, so that each could only accommodate one man and must have been very cramped and claustrophobic. The Witkop tower measure 6,15 x 6,75 m externally. The design has wall offsets at the upper levels to support the timber floors, two loopholes in each wall on the ground floor, and two in each bastion and three in each wall on the upper storeys, the entrance taking the position of the central loophole in the east wall on the first floor at Witkop. There were no windows in this pattern so it must have been very dark and hot in summer.



Plan of the Vereeniging pattern blockhouse at Witkop.

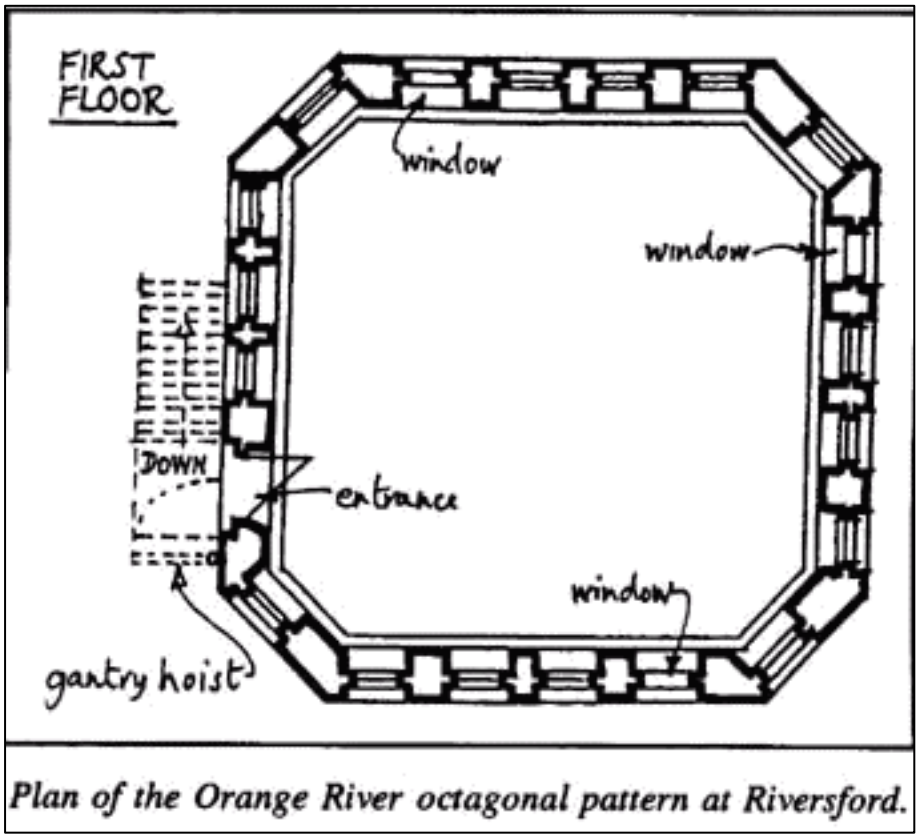
Figure 5-8: Plan of a Vereeniging pattern blockhouse.

Figure 5-9: The Vereeniging pattern blockhouse at Witkop.

- **The Orange River octagonal pattern**

This type of blockhouse is represented by at least two well-preserved examples, situated, respectively, to the south-east of the road and rail bridges over the Orange River at Norvals Pont and to the east of the railway line at Riversford, 40 km south of Bloemfontein. Three-storeyed, this pattern is in plan a square with the corners cut off, covered with a shallow-pitched corrugated roof which rises to a central ventilation turret. The ground floor has three loopholes in each main wall and one in each splayed corner. The first floor has the entrance door and three shuttered windows respectively at one end of each main wall, with three loopholes in each of the main walls and one at each corner. The top floor has a shuttered window in the middle of each main wall, which opens onto a rectangular machicouli gallery, with two loopholes on

either side of each window and, again, one in each corner. The entrance had, unusually, a steel landing outside, with the ladder running against the wall to ground level (blockhouses generally had a ladder at right angles to the wall). In both surviving examples, the door faced the railway and both still feature a steel gantry hoist fixed to the outside wall by the doorway, presumably to assist with the lifting of supplies into the blockhouse. Internally, the Riversford blockhouse has wall offsets to carry the upper floors, and the floors on both levels were unusual in that railway lines were used extensively in the timber floor construction, partly to support the cantilevered galleries on the top floor, although these are also present at the first floor level. From an architectural perspective, this is probably the most satisfying of the blockhouse designs.



Plan of the Orange River octagonal pattern at Riversford.

Figure 5-10: Plan of the Orange River octagonal pattern.

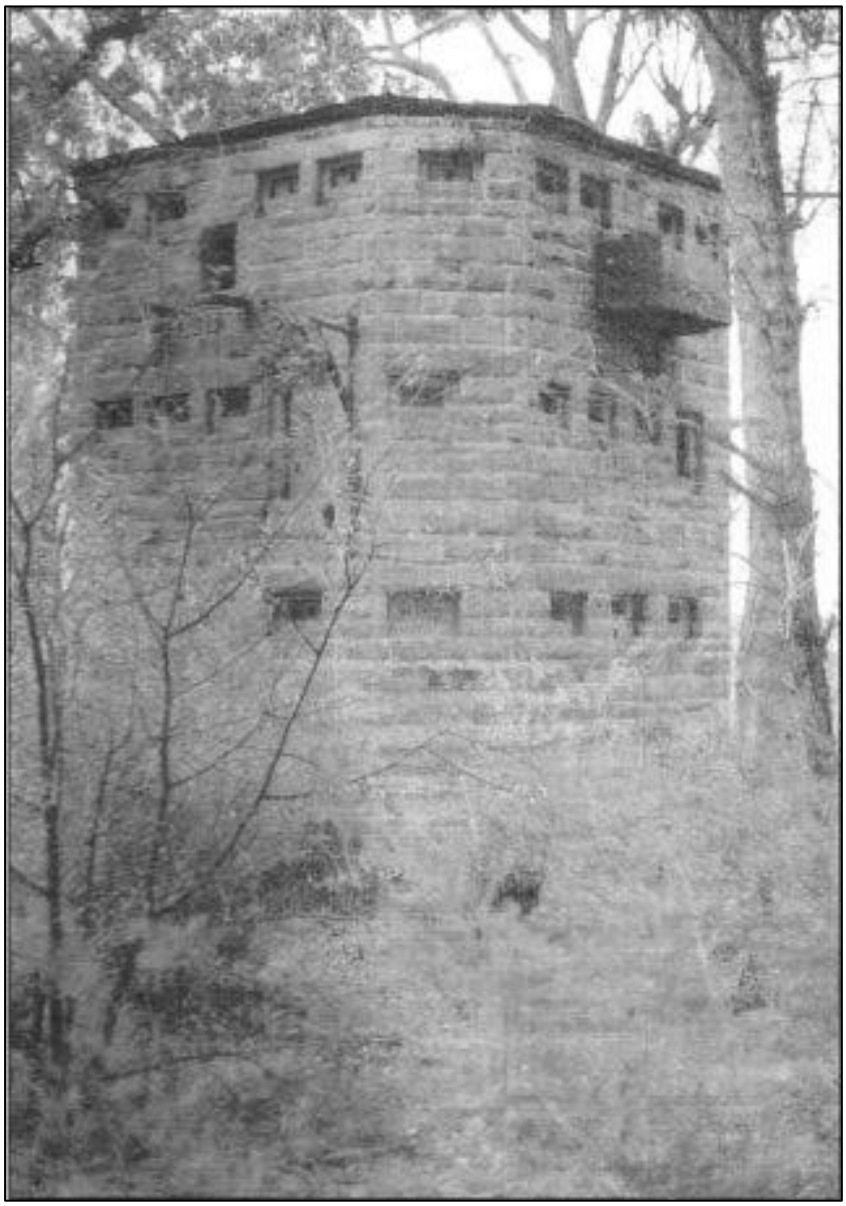


Figure 5-11: The Orange River octagonal pattern blockhouse at Riversford, with the gantry hoist to the right of the upper doorway.

- **The Aliwal hexagonal pattern**

Two examples of this pattern have survived in Aliwal North. Each blockhouse is two-storeyed, with the entrance in the middle of one side at ground level and with four loopholes in each wall. The curious feature of these loopholes is that they are three metres above the lower floor level so that, in the absence of any visual evidence, they must have been accessed by removable wooden banquettes placed against the wall. All steel loophole plates have survived in situ in both of these buildings and the stone 'cheeks' of the loopholes are widely splayed inside and out to give a good field of fire. The upper timber floor is positioned 850 mm above the loopholes, with a parapet one metre high. The shallow-pitched 'umbrella' roof of corrugated iron, which is present on the Dewetsville blockhouse, is raised some 600 mm above the parapet and oversails the outside wall face, thus providing an unobstructed view for observation and defence all around. The author was unable to gain access to the inside of the Dewetsville blockhouse in

order to view the upper floor and roof design, but the surviving wall posts, fixed to the inside of the parapet on the south-west blockhouse, suggest a similar arrangement to that of the standard pattern blockhouses. The absence of galleries or bastions and, indeed, the hexagonal plan itself, would have made it impossible to provide flanking fire along the base of the walls, placing this design into the category of blockhouses which were only suitable for a garrison town where military back-up was available immediately.

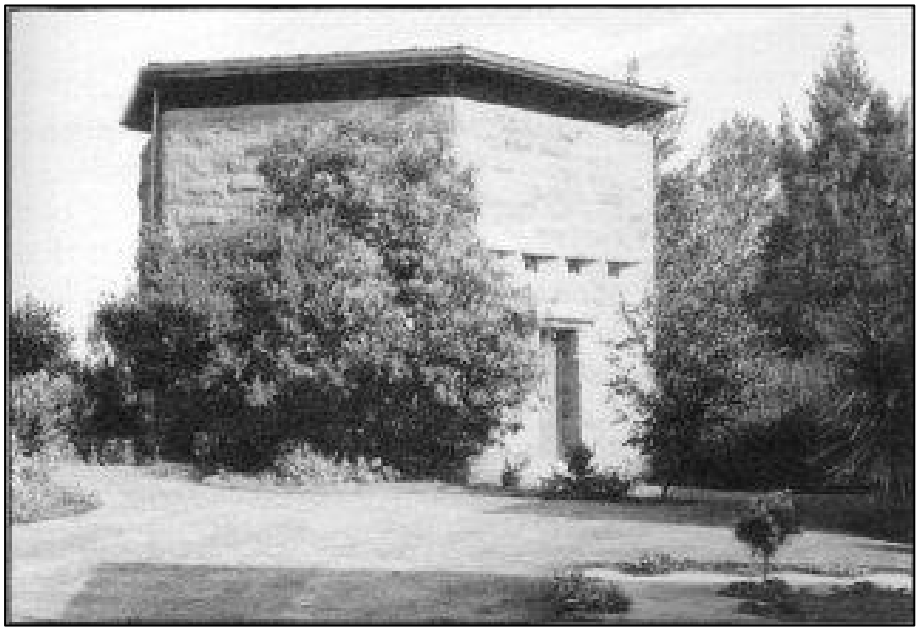


Figure 5-12: The hexagonal blockhouse at Dewetsville, Aliwal North.

- **A-typical designs**

In addition to the 'series patterns' described above, there is a wide variety of unique masonry blockhouses of which there appears to be only one surviving (or demolished) example. A blockhouse at Warmbaths measures 6.15 m square externally on plan, it was originally two-storeyed with two loopholes in each wall on the ground floor and a first floor entrance facing the railway line (as in the standard pattern). The first floor walls are pierced by two loopholes on each side of the entrance, four loopholes and a window in each of the other two walls (a standard pattern variant). At roof level, there was a somewhat flat, double-pitched roof, which would probably have been covered with corrugated iron, and crenellated parapets 1,8 m high (typical of a Magaliesberg pattern blockhouse). These arrangements were altered later when a doorway and window were inserted in existing loopholes on the ground floor, the lower part of the upper doorway was closed up to form a window, the parapets were extended upwards in plastered brickwork, and a pyramidal corrugated roof was added with a weathervane and matchboarded ceilings. The steep ladder staircases appear to be original and, for once, the central floor traps are absent.

At Krugersdorp Fort Harlech, a double-storeyed blockhouse is rectangular in plan (8,65 x 6,25 m externally) with the corners cut off. It is flanked by two single-storeyed angle bastions, also each with the outer corner cut off, though they are of a more generous size than those in the Vereeniging pattern. The roof of the main building appears to be a more recent addition, and those of the bastions are missing. The upper floor of the main building is also gone, although the wall offset is visible. The example at Prieska, is hexagonal in

plan and the most notable feature is the bulbous profile of its walls which are thickened by sloping offsets to a maximum of 1,4 m at the base. It is entered through a low arched passage at ground level, which is extended internally through a masonry sub-structure which had a vertical sliding door at its inner end and supports a square galvanised water tank to one side of the entrance passage. The Prieska blockhouse is defended by three loopholes in each wall at a height of 2,5 m, thus necessitating wooden banquettes for access. The loopholes are unusual in that they are formed of flat galvanised sheet metal fixed to a wooden frame right through the wall, 'waisted' in the middle on plan and angled steeply downwards The shallow-pitched timber 'umbrella' roof sits inside the parapets and is largely original, the corrugated iron covering and parapet walls with three upper loopholes per wall (for defence from the roof) having been carefully restored by the municipality, using old photographs and recollections from residents.

At Jacobsdal, the single-storeyed blockhouse, measuring 6,2 m square, is unusual because of the 300 mm wide and 700 mm high wall thickening, or firing step, around the inside wall, which gave access to the loopholes, the sills of which are 2,2 m above floor level. This blockhouse has three loopholes per wall in three of its walls, with an additional loophole at each corner. The loopholes are lined with wooden boards and the steel loophole plates are secured in place with wooden battens. Canvas flaps fixed to the timber lintels to reduce draughts are still visible. The building is spanned by a timber truss roof covered in corrugated iron, with a gable of similar construction incorporating a centre-pivoted ventilator over the rebuilt wall and a masonry gable at the other end.

The blockhouse at Noupoort is the most idiosyncratic and impractical building of its type in South Africa. Circular in plan, with an external diameter of 8.5 m at the base, tapering to about 7 m at the top, the whitewashed stone tower is approximately 7 m high and most resembles a tower windmill. The building is featureless up to a height of 4.9 m above ground level, at which point the wall sets back 100 mm and above which there are three 225 x 75 mm cast iron air vents. Around the middle of this top stage are five steel loopholes set vertically, and near the wall top, there are a further fifteen loopholes set horizontally. The loophole plates are unusual in that they are mounted on the outside wall face and not in the middle of the wall layer as is customary, and the apertures are much larger than usual. The tower is covered by an umbrella-shaped corrugated roof, which oversails the walls slightly, and has a gabled extension facing south-east which accommodates the entrance door in a vertical, corrugated wall.

5.1.4 Life In a Block House

There were probably at least 85 000 persons involved in guarding the blockhouse lines. A Rice-type (round) blockhouse was generally manned by a white corporal and six troops, as well as three or four black or colored persons. A lieutenant was generally in command of three or four blockhouses while a captain would be in command of ten to twelve blockhouses. In a Rice blockhouse, three men were required to be on guard at all times while the others were responsible for the cooking of food, the collection of rations and the provision of water. Water was transported to the blockhouses, but in cases where it could not be taken directly, the crew had to ensure that water was obtained for their particular blockhouse. For this purpose, a number of donkeys were kept at a central point from where the water could then be distributed. Black and colored soldiers were used as blockhouse guards, especially for the night shift. Generally they were required to perform guard duties between two adjacent blockhouses, and they were not required inside. Black guards were known as the Black Watch among white soldiers, and lived in separate tents next to the blockhouses. It is interesting to note that crews some limes placed dummies which looked just like guards outside the blockhouses in order to dissuade the Boers from attacking them.

From the available evidence, it is clear that life in the blockhouses was not always pleasant. Extreme temperature fluctuations in the interior of the country, as well as boring routine work, sometimes made life difficult. Even in the cramped blockhouse milieu, the custom of separating the ranks was maintained as far as possible. The privates of the blockhouse generally manned it during the day, while the officer in control of the section lived in a tent next to the blockhouse. The tent of the commanding officer was also placed in such a way that it was in a good position for him to have his section under close supervision. At night, for safety reasons, the officer would sleep in the blockhouse or in a shelter in a trench. However, this was not the case in all locations. Information on how the blockhouses were organised indoors is scarce. In order to improve lighting, the walls and the woodwork were whitewashed, and this gave the interior of the blockhouses a cleaner appearance. Furthermore, the openings that were found more often than not in the multiple storeyed blockhouses, were covered by a tarpaulin to keep the rain out. Flaps were also placed at the portholes so that these could be closed when they were not in use. The provision of water was a persistent problem, especially in the dry regions of South Africa. Attempts were made to provide boreholes for all blockhouses, but this was not always possible. The British also tried, as far as possible to place blockhouses close to fountains or waterholes. To the Boers this naturally created problems because their sources of water were then mostly in Britis h hands. Each blockhouse had its own water tank for fresh water. These tanks were generally located in the trench surrounding the blockhouse, or in the blockhouse itself. The crews of the blockhouses that were located next to railway lines experienced no problems in replenishing their water supplies as the trains supplied water at regular intervals. However, at the cross-country blockhouses, which were sometimes located far from the railway lines severe problems were experienced and they were dependent on water convoys for fresh water.

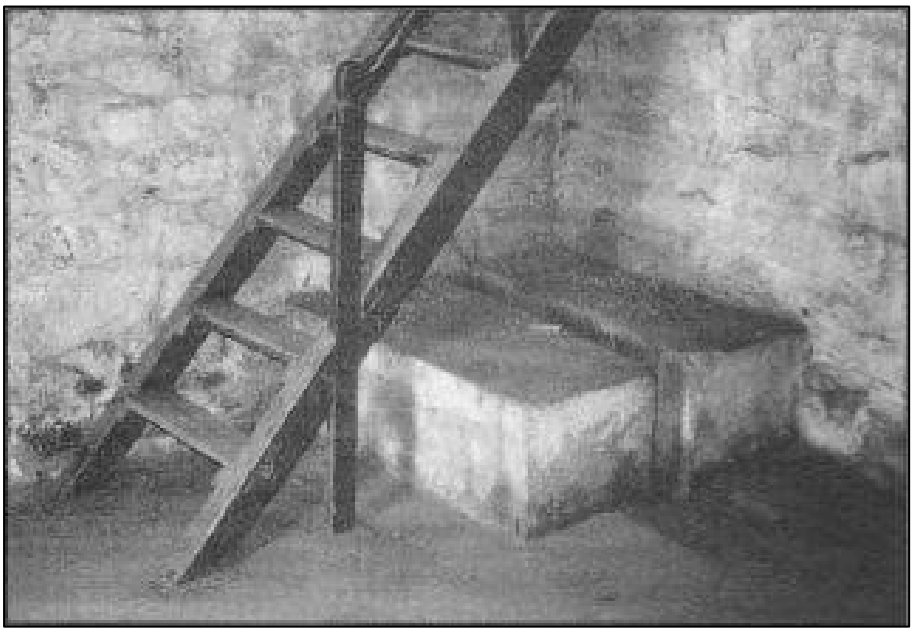


Figure 5-13: The Stormberg Junction South Blockhouse. Note the square water tank base.

Apart from the provision of water, food provision was of critical importance. Each blockhouse had food reserves for a week - in much the same way that reserve ammunition for one week had to be kept there. Food was provided regularly, and where it was possible for the crews, they also grew vegetables and kept animals for own consumption. Although food was never scarce, the diet was boring. For example, it consisted of ration biscuits, canned meat (bully beef) and canned stew. Sometimes tomato jam, bread and canned butter were provided to the troops. As the war progressed, other canned foodstuffs appeared on

the menu, such as canned bacon and eggs, sardines, pies and apple pudding. To provide for variety in their diet, the guards sometimes shot small game and various birds for the pot, and when possible they caught fish. The only formal drink that was distributed consisted of rum and lemon juice. The lemon juice was added to prevent scurvy, and dated back to the days when the drink was issued to crews on ships. Food was generally stored inside the blockhouses, while the canned food was placed under the dripping tap of the water tank so that it could remain cool. Food was transported either by rail or convoy. Blockhouses next to the railway line were dependent on provisions transported by train, while the provisioning of cross-country blockhouses was dependent on convoys. The blockhouses that were located on the Western front along the Orange River Station-Kimberley-Warrenton line are a typical example. The provisions train left Kimberley every Tuesday at 06:00. On Thursdays, it left Kimberley at 06: 15 for Warrenton, while, on Fridays, it left Kimberley at 05:40 for Orange River Station. Apart from the blockhouse guards, a large number of additional soldiers, wagon-drivers and others were required to provide essentials to and maintain the blockhouse system.

In general, the soldiers preferred life in the blockhouses to their existence while on hot-pursuit operations or when they were involved in manoeuvres in the countryside. The reason for this was that they were relieved of the tasks typical of the regiments they belonged to, and the relative freedom they experienced was a bonus. Their daily task generally consisted of improving existing defensive works and restoring the railway line. In various cases, patrol work formed an integral part of their daily routine. Wood was scarce, unless a blockhouse was situated near a river (where trees were often found) or near a wooden boundary fence that had wooden logs as anchors. Crews would then gather wood from the river banks, while the wooden fences and anchor poles would be used as firewood. In November 1901, an order was issued that no lights should burn inside the blockhouses because it was feared that these lights would attract the Boers' attention. Nor were fires allowed at night, which meant that all food had to be prepared before dark. Since a deadly routine with little variation adds to boredom, the officers instructed the crews to make improvements to the blockhouses and their immediate environment. Often the guards did so out of their own. There are photographs of blockhouses with gardens and/or with the regimental badge packed in lime-washed stones. Each day yielded its obligations. The persons who had been on guard during the night were required to get at least six to eight hours of sleep so that they could be fresh for the next shift. The reinforcement of the blockhouse, and in large measure the digging of trenches, received much attention from the garrison. The most significant event of the day at some blockhouses was the arrival of the daily provisions train. Apart from provisions, the train sometimes also carried books, newspapers and post to the blockhouses, and this was the only contact with the world outside the blockhouse lines. There were generally telephone links among the various blockhouses. Generally life in the blockhouses was a demoralizing experience. Apart from standing guard and other chores, there was often nothing else to do but talk, smoke and gamble. In an attempt to counter the boredom, they sometimes held picnics. The great variety of insect and animal life also offered those who were interested the opportunity to study some species. Moreover, various blockhouse crews kept two or more dogs as pets. It appears that sport was sometimes practised by the blockhouse crews. For example, there is a photographic record of a boxing match that took place in close proximity to a blockhouse. The spiritual life of the blockhouse guards was not neglected. Regular visits by the chaplains took place when conditions allowed. Christmas was as great an occasion for the men in the blockhouses as for those in the veld. If possible, the nearest chaplain held a service at a central point, while the blockhouse guards received an additional ration pack each.

To a large extent, blockhouse troops had to provide their own treatment when they fell ill. There was a medical officer who paid regular visits to the blockhouses to monitor the situation and to treat serious

illnesses. However, this medical officer was responsible not only for the blockhouse lines, but also had to attend to his particular regiment's soldiers. In his report, he also had to make recommendations to the officer in charge with regard to sanitation facilities at the blockhouses and recommend improvements.

5.1.5 The Blockhouse in Action

Since the work was boring, the guarding of railway lines and the manning of cross-country blockhouse lines required tough troops, both in a physical and a psychological sense. Especially when the Boers tried to break through the lines, the troops had to be able to bear the pressure. It happened on many occasions that for a three-month period there would be no action, and then, suddenly, the Boers would unexpectedly try to break through the lines. If the Boers were successful, this had serious repercussions for the surrounding blockhouse officers because they could even be court-martialled as a result. On various occasions the blockhouse crews had to be reinforced by other units. This generally happened during drives or hot-pursuit operations, when they succeeded in pursuing a large group of Boers, driving them in the direction of the railway line. The presence of Boers in the vicinity of a blockhouse line was always a significant event. All the blockhouses were then warned to remain in a state of alert, and in certain cases, the garrisons were even requested to leave their blockhouses and to seek out the Boers. In cooperation with the hot-pursuit columns, the blockhouse troops achieved successes at times. The drives trapped the Boers against the blockhouse lines, where they were then captured. There were also many false alarms. During one such false alarm, Fuller was first ordered to search for the Boers, and later, on the same day, he was ordered to position four men between the blockhouses to ward off the expected break-out by the Boers. The order meant that each blockhouse lost half its guards, and that the soldiers placed between the blockhouses would fire at anything as a result of their nervousness. It also meant that the troops in the blockhouses could not fire in their direction out of fear that that the soldiers in between the blockhouses would be hit. It seems that these kinds of senseless orders were often given, and indeed led to frustration among the officers in charge of the blockhouses

5.2 The Warrenton Block House: EXIGO-WBH-ST01 (S28.092168° E 24.871036°)

5.2.1 Background

Two masonry blockhouses were constructed along the railway line bridge across the Vaal River at Warrenton. The ruined remains of the first structure occur on the south-eastern bank of the river and were constructed as a variant of the standard pattern. Unfortunately little is left of this blockhouse which was once an imposing structure. Apparently, the date 'MDCCCCII' (1902) and the initials of the Royal Engineers Company and individual soldiers involved were incised into the plasterwork of one of the window sills.

The second blockhouse structure and the subject of this report, stands on the north-western bank of the Vaal River approximately 500m west of the railway bridge on the grounds of the Warrenton Cultural Resort. This blockhouse was also constructed as part of the Cape Town-Warrenton railway line in 1902. On the grounds of the Cultural Resort is also a Historical Period stone farmhouse contemporaneous (or possibly predating) the blockhouse. This the doors and windows of this house have been shut with steel plates as the house was used as Officers Quarters and stores during the Anglo-Boer War. An interesting feature of this house is the occurrence of Herder rock engravings on stones used to construct the building.

Figure 5-14: Aerial view of the project area.

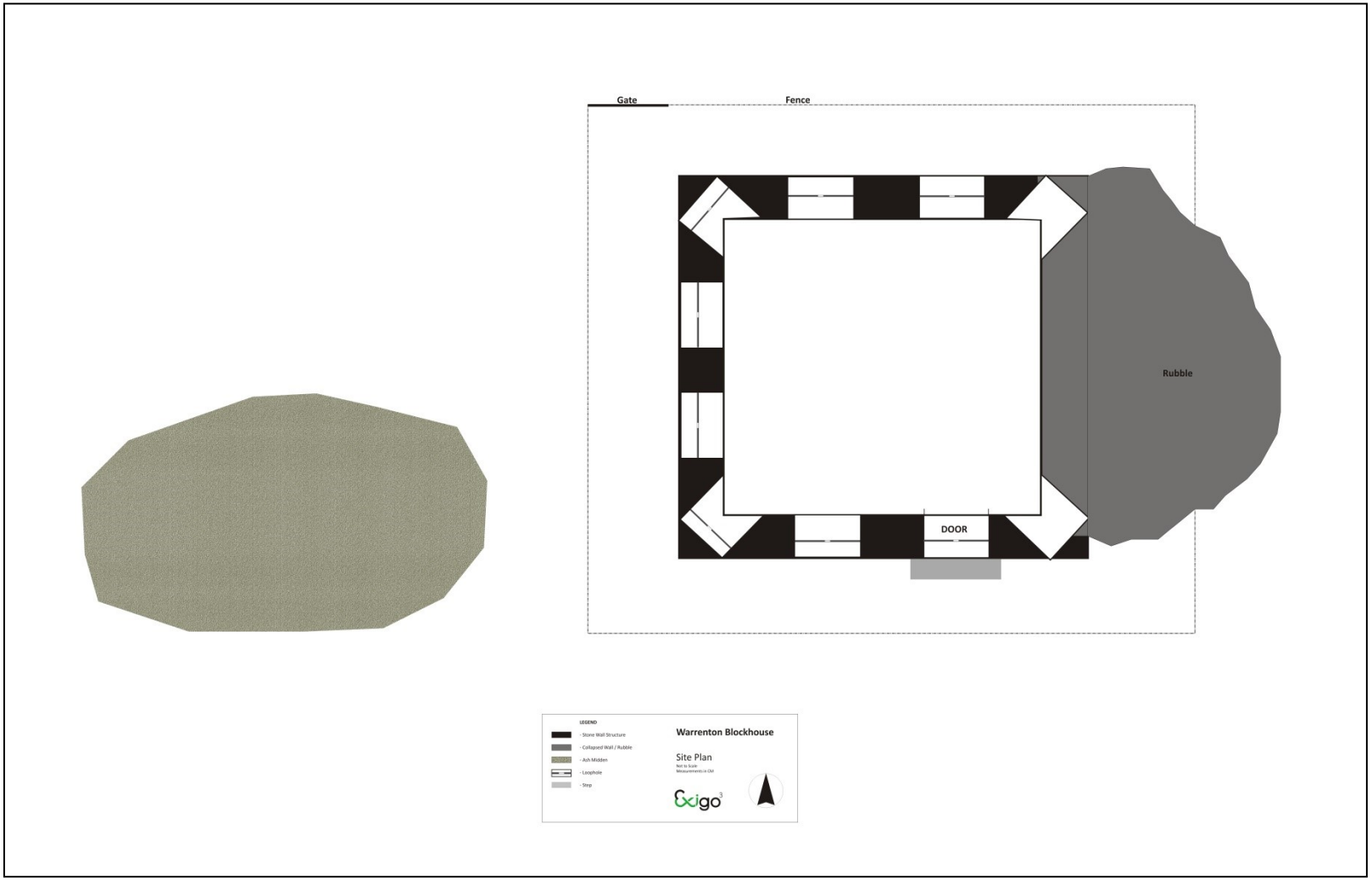


Figure 5-15: Site Plan for the Warrenton Blockhouse Restoration project area.

Figure 5-16: A reinforced Historical Period farmhouse east of the blockhouse.

Figure 5-17: Engraving of possibly a cow on a stone in the house wall structure.

Figure 5-18: View of the Warrenton blockhouse. Note the railway bridge to the far left.

Figure 5-19: The old Warrenton Railway Bridge Blockhouse, now dilapidated.

5.2.2 The Warrenton Blockhouse: General Description

Site Code: EXIGO-WBH-ST01
Location: S28.092168° E 24.871036°
Type: A-typical single storey.
Exterior wall Structure: Square stone walled, gabled.
Interior Wall Structure: Plastered concrete over red sand mortar, lime whited.
Floor Structure: Plastered concrete.
Roof Structure: Open plan timber trussed, approx. 30° pitch; corrugated iron.
Material: Dolerite, red sand mortar, wood, iron, corrugated iron.
Number of loopholes (current): 8
Number of loopholes (original): 12
Number of entrances: 1
Condition: Fair – top section of eastern wall (exterior & interior) collapsed.
Status: National Monument declared 1982

The Warrenton blockhouse subject to this report is an almost exact replica of a similar Anglo-Boer War fortification at Jacobsdal (See Figure 5-36). The square blockhouse is constructed out of dolerite rock with local red sand used instead of cement in the majority of the structure. The interior has been plastered up

and traces of lime white surfaces remain. The structure has two loopholes per wall with an additional loophole on each corner of the structure. Here, a vertical wooden support beam forms the corner of the structure. A thin wooden lintel runs along the entire structure at the height of the top of the loopholes and directly below the roof overhang. The loopholes are lined with wooden boards and the steel loophole plates are secured in place with wooden battens. An entrance occurs along the south-facing wall directly below a loophole where a modern metal door has been installed. The building is spanned by a timber truss roof covered in corrugated iron, with a masonry gable of similar construction and s small porthole facing west. A lookout turret on the roof of the Jacobsdal blockhouse is absent from this structure. A unique feature that this blockhouse shares with the Jacbosdal example is a 18cm wide and 75cm high wall thickening, or firing step, around the inside wall, which gave access to the loopholes, the sills of which are 2m above floor level. This firing step is too narrow to have been used on its own and would have required timber banquettes to supplement the width. This is illustrates a flaw in single-storeyed blockhouse on flat ground; it is built single-storeyed to save costs, but the loopholes had to be set high in the walls to give a good view over the countryside and to prevent attackers from firing through the loopholes from close range. Therefore, the necessary banquettes, which were at least 1.2 m wide, would have cluttered up the interior so that the clear floor space in the centre was only 2.5 m square. The banquettes probably also functioned as bunks. A section of wall above the door has collapsed and possible later restoration of this section with modern bricks is visible. The entire eastern-facing exterior wall of the blockhouse has collapsed, possibly as a result of water seeping into red sand mud used as mortar. Stones and mortar from this wall line the eastern section of the blockhouse. However, in the inside of this wall section a large part of the wall plaster remains. The blockhouse has been fenced off but the fence along the collapsed wall to the east has been destroyed by stones from the wall. An ash midden, containing Historical Period glass, porcelain, tin and fauna occurs directly west of the blockhouse. It seems that a substantial artefact depots occurs here.

The Warrenton blockhouse was constructed in 1902 and as such, it is be older than 60 years and thus a protected heritage resource. In addition, the site has been declared a National Monument in 1992. . As such, the structure is of high heritage significance due to its scientific value, architectural attributers and general association with the Anglo-Boer War history of South Africa. The site will be impacted on by the proposed upgrade but as this action will enhance and preserve the historical fabric of the site *in situ* the severity impact is considered to be low, provided that mitigation measures provided in this report be implemented.

Figure 5-20: The Warrenton Blockhouse on the northern banks of the Vaal River.

Figure 5-21: View of the western facing exterior wall of the blockhouse.

Figure 5-22: View of the southern facing exterior wall of the blockhouse.

Figure 5-23: View of the collapsed eastern facing exterior wall of the blockhouse.

Figure 5-24: View of the northern facing exterior wall of the blockhouse.

Figure 5-25: View of the interior of the blockhouse; loopholes, porthole and roof structure.

Figure 5-26: View of the roof structure and the porthole.

Figure 5-27: View of the southern, western and northern walls in the interior of the blockhouse. Note the firing step along the walls.

Figure 5-28: View of a corner loophole in the interior of the blockhouses.

Figure 5-29: Collapsed section of the blockhouse wall revealing stone and red sand mortar construction.

Figure 5-30: View of side wall loophole in the exterior of the blockhouse.

Figure 5-31: View of a corner loophole in the exterior of the blockhouse.

Figure 5-32: View of a side wall loophole above the door of the blockhouse.

Figure 5-33: Detail of collapsed southern wall section of the blockhouse.

Figure 5-34: A small midden containing Historical Period material culture, west of the blockhouse.

Figure 5-35: Historical Period glass, metal and porcelain visible on the surface at the midden.

Figure 5-36: The blockhouse at Jacbbsdal, similar to the Warrenton blockhouse.

5.2.3 The Warrenton Blockhouse: Dimensions

Measurements (refer to Figure 5-37 to Figure 5-42)

Surface Area	25.5m^2
Walls	
Length exterior wall North	5.1m
Length exterior wall West	5m
Length exterior wall South	4.95m
Length exterior wall East	5m
Length interior wall North	3.6m
Length interior wall West	3.6m
Length interior wall South	3.5m
Length interior wall East	3.6m
Height exterior wall North base to level of roof overhang	2.8m
Height exterior wall West base to top of gable	4.1m
Height exterior wall South base to level of roof overhang	2.9m
Height exterior wall East base to level of wall collapse	2.1m
Height exterior wall North base to level of wooden lintel & top of loopholes	2.5m
Height exterior wall West base to level of wooden lintel & top of loopholes	2.5m
Height exterior wall South base to level of wooden lintel & top of loopholes	2.5m
Height exterior wall East base to level of wooden lintel & top of loopholes	n/a
Height exterior wall North base to bottom of loopholes	2.1m
Height exterior wall West base to bottom of loopholes	2.15m
Height exterior wall South base to bottom of loopholes	2.25m
Height exterior wall East base to bottom of loopholes	n/a
Height interior wall North floor to level of roof	2.75
Height interior wall West floor to top of gable	405cm
Height interior wall South floor to level of roof	2.78
Height interior wall East floor to level of wall collapse	1.8m
Height interior wall north floor to bottom of loopholes	2.05m
Height interior wall west floor to bottom of loopholes	2m
Height interior wall south floor to bottom of loopholes	2.10
Height interior wall east floor to bottom of loopholes	n/a
Height interior wall north floor to top of loopholes	2.45
Height interior wall west floor to top of loopholes	2.4
Height interior wall south floor to top of loopholes	2.05
Height interior wall east floor to top of loopholes	n/a
Height interior wall north firing step	0.75m
Height interior wall west firing step	0.75m
Height interior wall south firing step	0.82m

Height interior wall east firing step	0.75m
Loopholes	
Loopholes: north facing wall	0.65m x 0.4m
Distance between loopholes: north facing wall	0.65m & 1m
Loopholes: west facing wall	0.6m x 0.4m
Distance between loopholes: west facing wall	0.9m & 0.73m
Loopholes: south facing wall	0.65m x 0.4m
Distance between loopholes: south facing wall	0.9m & 0.52m
General Loophole Size	0.4m x 0.6m

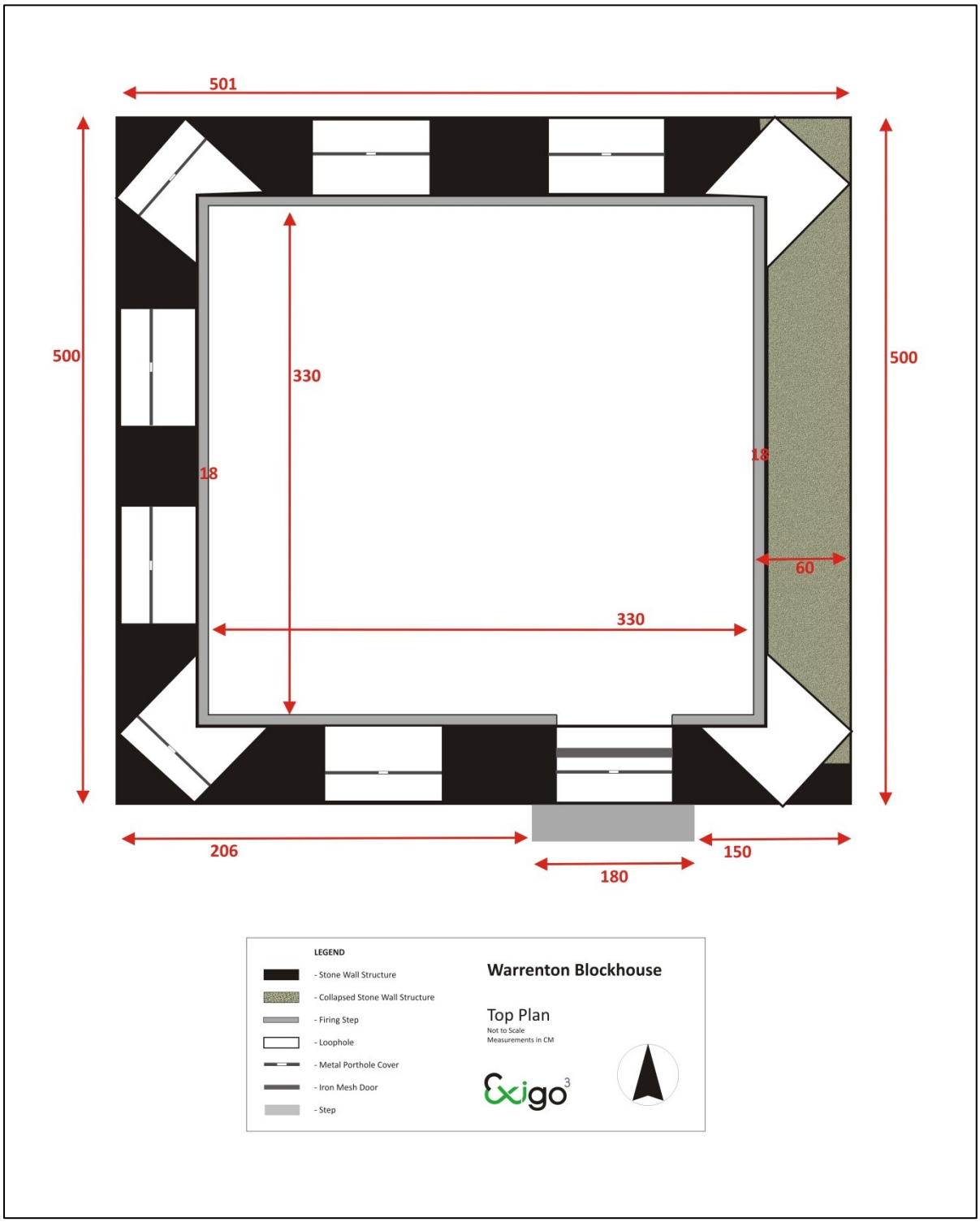


Figure 5-37: Top Plan of the Warrenton blockhouse structure.

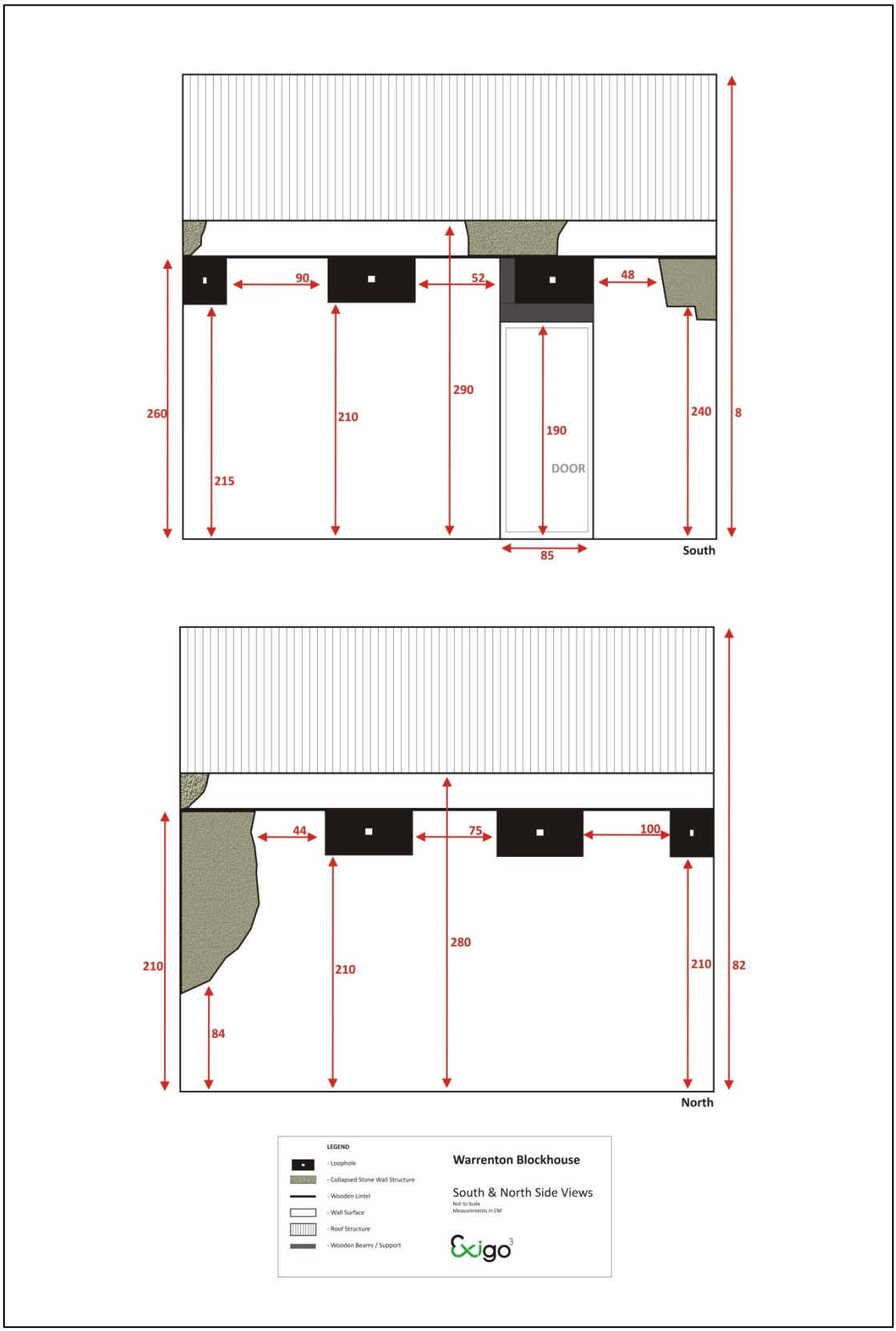


Figure 5-38: Plan of south and north views of the Warrenton blockhouse structure.

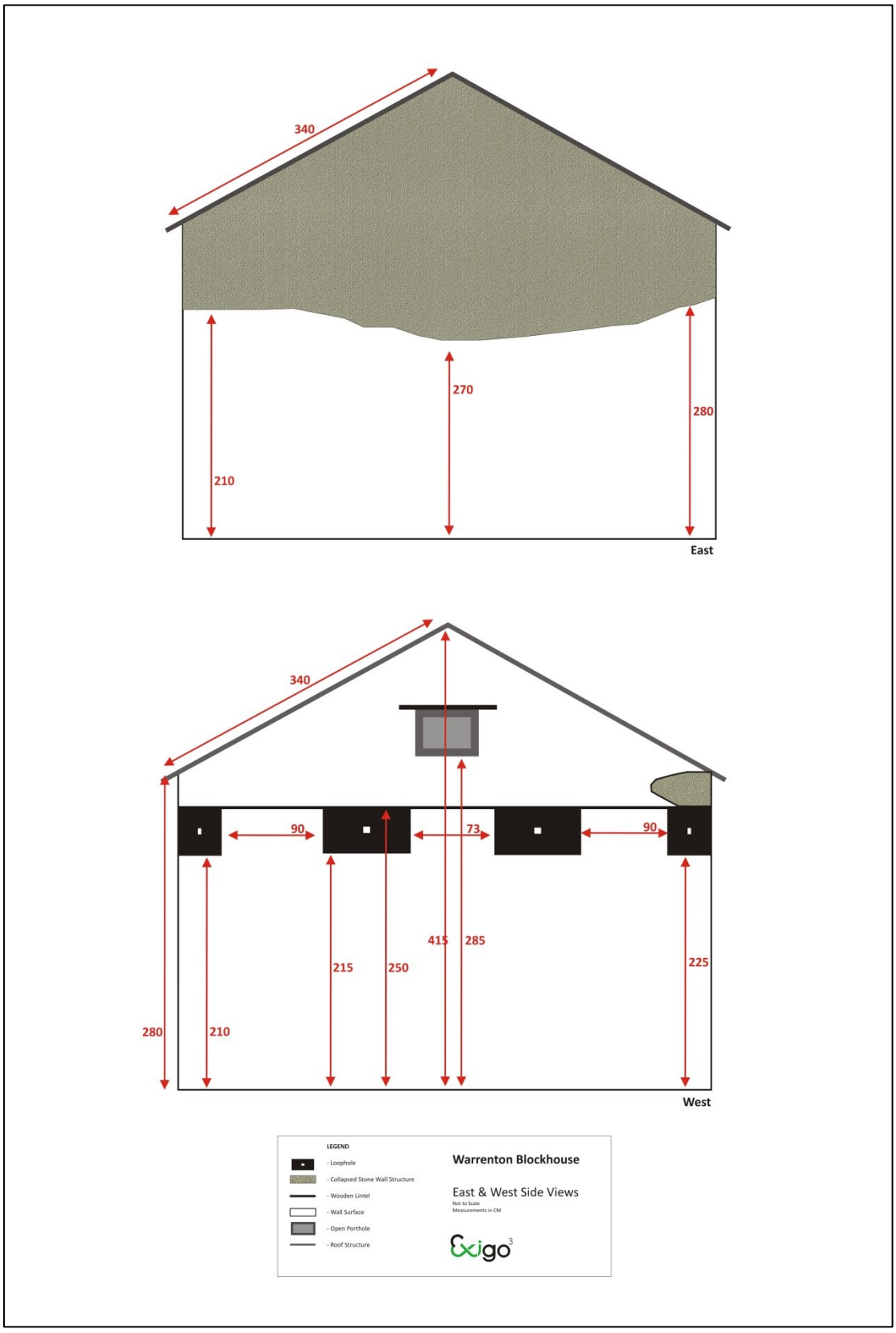


Figure 5-39: Plan of east and west views of the Warrenton blockhouse structure.

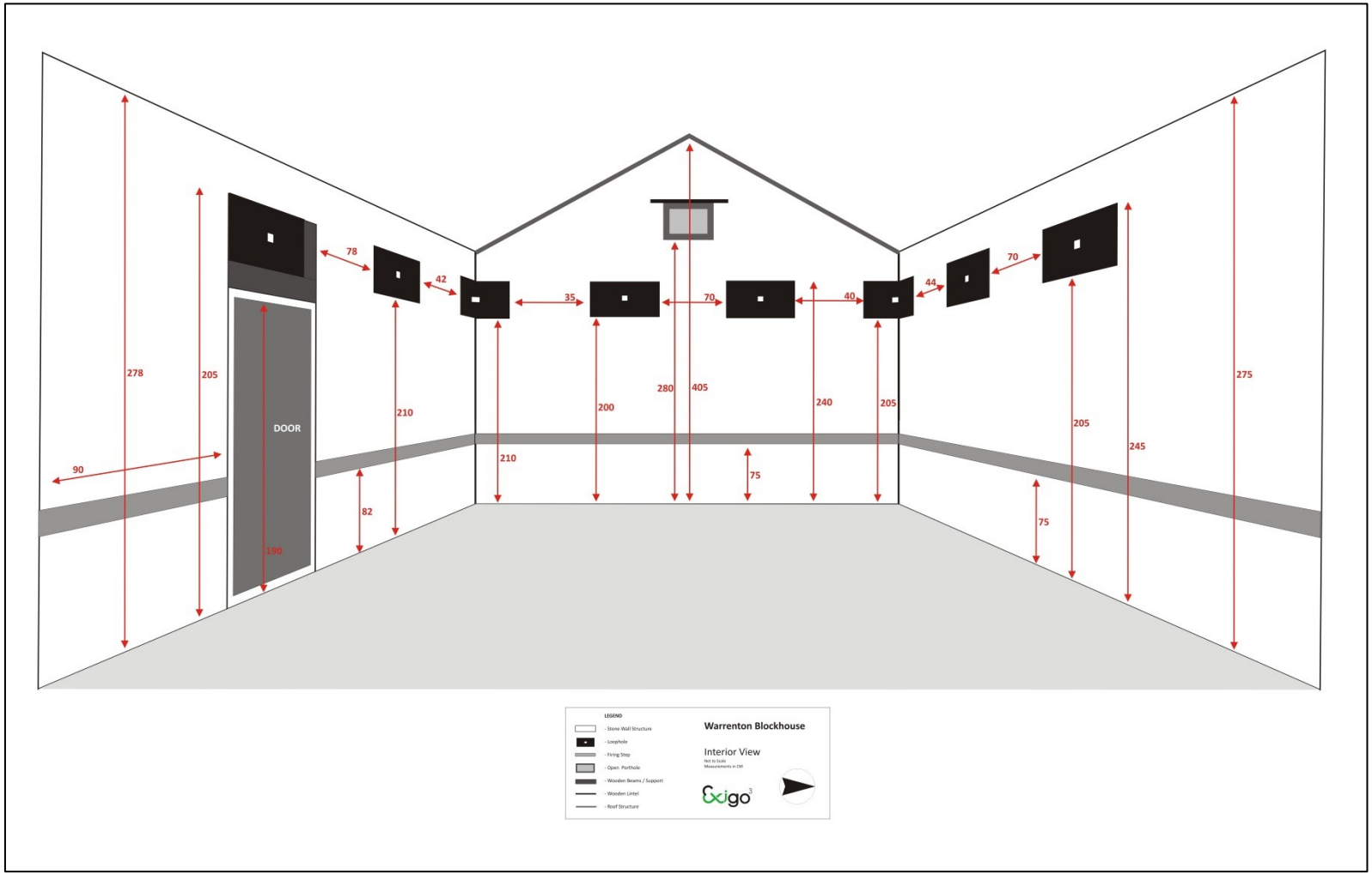


Figure 5-40: Plan of the interior (south, west, north) of the Warrenton blockhouse structure.

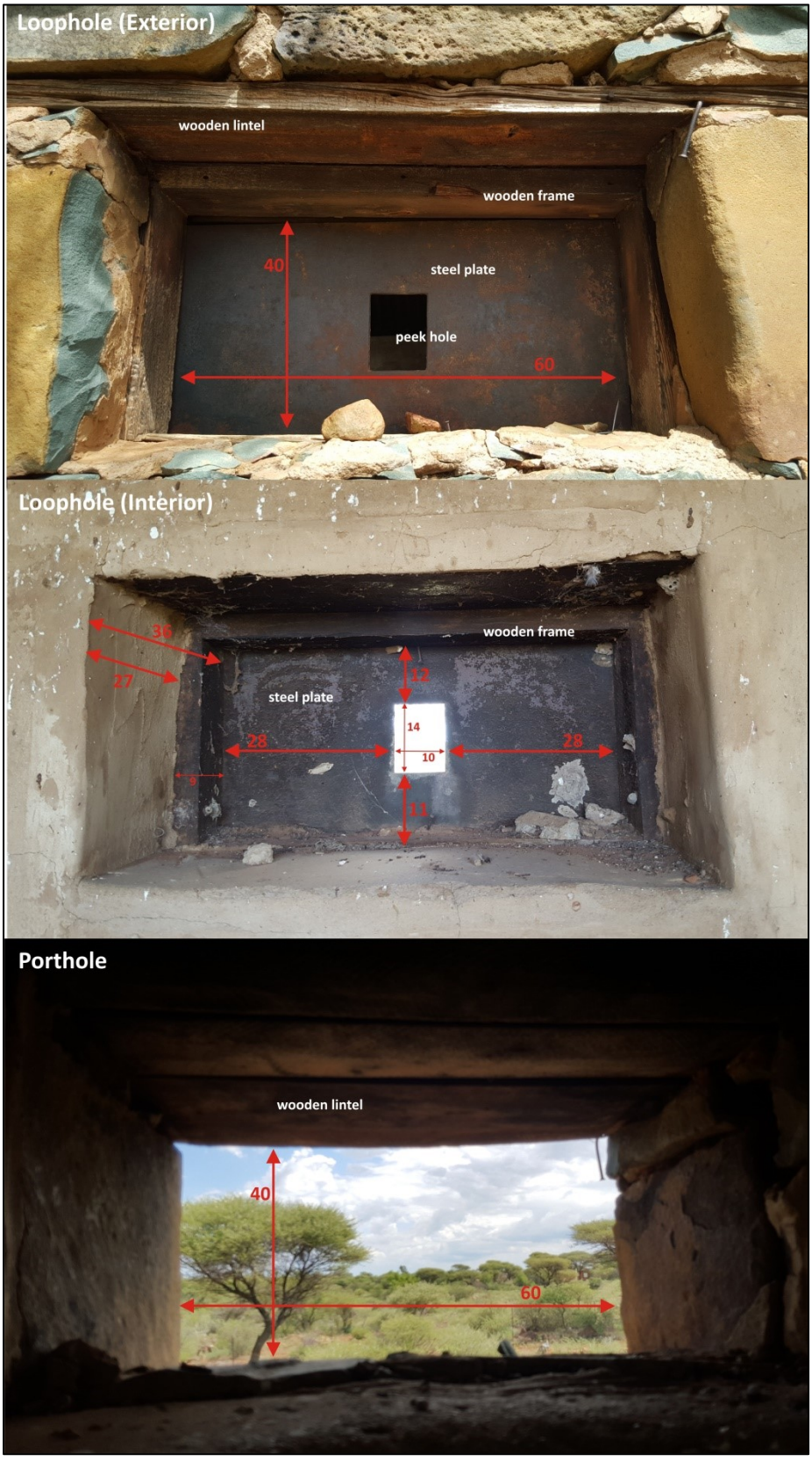


Figure 5-41: Schematic representations of loophole and porthole dimensions.

Figure 5-42: Schematic representations of loophole dimensions.

5.2.4 Renovation of the Warrenton Blockhouse structure

As part of the N18 Tourism Route initiative the FBDM is planning the upgrading/ restoration of the Anglo-Boer War Blockhouse at Warrenton. According to initial plans, this process will include:

- Restoration of the building to its original design.
- Fencing of the blockhouse and the surrounding yard.
- General site cleaning and clearing around the building.
- The possible construction of a pathway to the building.

Such an action will not only return the structure to its original state but it will also act to preserve and maintain the rapidly declining architectural integrity of the structure. It is essential that a Heritage Architect be consulted to inform on the historical and structural integrity of the blockhouse upgrade.

Planning the road ahead for the structural upgrade and possible associated construction, it might be helpful to refer back to a number of comments by Colonel Morris of the Cape Colony who made various recommendations for the construction of masonry blockhouses during the Anglo Boer war. These "recommendations" might be of value in considering the historically accurate rebuilding of some features of the blockhouse:

- "On alluvial sites it is better that the footings and floor should be cast together..."
- 'Water tanks should be inside the building and not buried outside. They are safer and more convenient and can be more easily washed out.'
- 'The doors and shutters should be fitted with steel and not teak jambs, the steel jambs should be of angle or channel section and set through the sills with the hinge pins and hasps rivetted to them.'
- 'Trap doors should be in diagonal corners, and not in the centre of the floor (2 ft 6 inches [760 mm] square is an ample size). Placed thus, the danger of falling through them is practically obviated and standards and chains for their protection rendered unnecessary.'
- 'The inside ladders should be of iron and fixed vertically. Wooden ladders are cumbersome, get broken and are apt to be used as fuel'
- 'Angle galleries should be built into the walls and not have the vertical plates butted against them...'
- 'The floor loopholes should be placed outside supporting railway irons, otherwise the latter tend to mask the fire.'
- 'The air space below the eaves of the roof should not be too large and should be masked by a canvas drop to keep out driving rain.'
- 'Interior walls and woodwork should be limewhited, this increases the light, preserves the timber and makes for cleanliness.'
- 'A protecting, sliding or swinging flap for loopholes is desirable, both as a protection against draughts and to prevent unused loopholes from being fired into by the enemy during an attack.'

In order to maintain the historical interiority of the blockhouse while enabling the long term preservation of the buildings, it will be essential to use as much of the original material used in the initial construction as possible. These construction materials include:

- **Dolomite stone** from the site, particularly chiselled and fashioned stones from the original collapsed segments of the structure to the east.

- **Red sand mortar** reinforced with concrete or “mixcrete” for used in wall construction and interior plastering. The sand can be sourced from the immediate surroundings along the Vaal River.
- **Steel Loophole Plates** possibly sourced from other collapsed / dilapidated blockhouses which are beyond repair, subject to necessary provisions and authorisations. Alternatively, new loophole plates can be manufactures according to dimensions of existing loophole plates at the site.
- **Steel Blockhouse Door** possibly sourced from other collapsed / dilapidated blockhouses which are beyond repair, subject to necessary provisions and authorisations. Alternatively, a new steel door can be manufactures according to dimensions of similar blockhouses on record.
- **Wooden Lintels** from locally available treated wood, fashioned according to dimensions of existing lintels at the site.
- **Corrugated Iron Plates** possibly sourced from other collapsed / dilapidated blockhouses which are beyond repair, subject to necessary provisions and authorisations. Alternatively, a new roof can be erected with galvanised corrugated iron according to dimensions of similar blockhouses on record.
- **Lime White** is readily available and can be used to white the interior of the blockhouse.

Figure 5-43: Graphic reconstruction of the Warrenton blockhouse indicating the possible appearance of the structure prior to the restouration.

6 RESULTS: STATEMENT OF SIGNIFICANCE AND IMPACT RATING

6.1 Potential Impacts and Significance Ratings[3]

The following section provides a background to the identification and assessment of possible impacts and alternatives, as well as a range of risk situations and scenarios commonly associated with heritage resources management. A guideline for the rating of impacts and recommendation of management actions for areas of heritage potential within the study area is supplied in Section 10.2 of the Addendum.

6.1.1 General assessment of impacts on resources

Generally, the value and significance of archaeological and other heritage sites might be impacted on by any activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). Thus, the destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. However, in the long run, the proximity of operations in any given area could result in secondary indirect impacts. The EIA process therefore specifies impact assessment criteria which can be utilised from the perspective of a heritage specialist study which elucidates the overall extent of impacts.

6.1.2 Direct impact rating

Direct or primary effects on heritage resources occur at the same time and in the same space as the activity, e.g. loss of historical fabric through demolition work. **Indirect effects or secondary effects** on heritage resources occur later in time or at a different place from the causal activity, or as a result of a complex pathway, e.g. restriction of access to a heritage resource resulting in the gradual erosion of its significance, which is dependent on ritual patterns of access (refer to Section 10.3 in the Addendum for an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected).

The Warrenton Blockhouse is a significant heritage receptor whgich will be impacted on by the proposed upgrade project. potential impacts to heritage resources is foreseen. The following table summarizes impacts to this site **(**EXIGO-WBH-ST01).

NATURE OF IMPACT: Impacts could involve displacement or destruction of structures or features resulting in the loss of the historical fabric of the site.		
	Without mitigation	**With mitigation**
EXTENT	Local	Local
DURATION	Permanent	Permanent
MAGINITUDE	Major	Minor

[3] Based on: W inter, S. & Baumann, N. 2005. *Guideline for involving heritage specialists in EIA processes: Edition 1.*

PROBABILITY	Definite	Negligible
SIGNIFICANCE	High	Low
STATUS	Negative	Neutral
REVERSIBILITY	Non-reversible	Non-reversible
IRREPLACEABLE LOSS OF RESOURCES?	Yes	No
CAN IMPACTS BE MITIGATED?	N.A	
MITIGATION: Monitoring and input from Heritage Architect, preservation of original materials, possible Phase 2 analysis of middens, general site monitoring by ECO / heritage officer.		
CUMULATIVE IMPACTS: No cumulative impact is anticipated.		
RESIDUAL IMPACTS: n/a		

6.1.3 Discussion: Evaluation of Results and Impacts

The Warrenton blockhouse was constructed in 1902 and as such, it is be older than 60 years and thus a protected heritage resource. In addition, the site has been declared a National Monument in 1992. . As such, the structure is of high heritage significance due to its scientific value, architectural attributers and general association with the Anglo-Boer War history of South Africa. The site will be impacted on by the proposed upgrade but as this action will enhance and preserve the historical fabric of the site *in situ* the severity impact is considered to be low, provided that mitigation measures provided in this report be implemented.

The Warrenton Blockhouse is a heritage resource of high significance, forming the centre of the Warrenton Blockhouse Restoration Project. In the opinion of the author of this Archaeological Impact Assessment Report, the proposed Warrenton Blockhouse Restoration Project on a portion of Erf1 at the Warrenton Cultural Resort may proceed from a culture resources management perspective, provided that mitigation measures, endorsed by the relevant Heritage Resources authority, are implemented where applicable.

6.2 Management actions

Recommendations for relevant heritage resources management actions are vital to the conservation of heritage resources. A general guideline for recommended management actions is included in Section 10.4 of the Addendum. The following management measures would be required during implementation of the proposed Warrenton Blockhouse Restoration Project.

OBJECTIVE: prevent unnecessary disturbance and/or destruction of previously undetected heritage receptors, preserve historical fabric of the site.

For the Warrenton Blockhouse (*Site EXIGO-WBH-ST01*) the following is recommended in terms of heritage management and mitigation:

PROJECT COMPONENT/S	All phases of construction.		
POTENTIAL IMPACT	Damage, destruction of structures of heritage significate. Loss of historical fabric of the site. Damage/disturbance of previously undetected heritage remains.		
ACTIVITY RISK/SOURCE	Demolishing of heritage structures Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To preserve the historic fabric of the site and heritage features, to locate and document previously undetected heritage remains as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		**RESPONSIBILITY**	**TIMEFRAME**
Mitigation Procedure: Blockhouse Upgrade			
Retain and Restore: Retain the original state of intact sections of the structure as far as possible. Restore collapsed sections to their original state based on historiographical information and subject to impact from a heritage architect. Attempt to used original materials as far as possible. Restoration of the structures for this purpose will be subject to the application of a destruction / alteration permit and approval of the relevant heritage agency. Implement a heritage conservation buffer of at least 20m around the heritage resource, upgrade the fence and apply access control. **Project Planning and Site Monitoring:** Project planning assistance by Heritage Architect in order to retain historical integrity of existing and upgraded sections of the structure. Monitoring of the project by the Heritage Architects, as well as regular examination of the site, possible trenches and excavations in order to detect and preserve previously undocumented heritage receptors. **Site Management Plan:** Compile a site management plan for the conservation of the heritage resource during construction and conservation phases of the project.		ECO HERITAGE ASSESSMENT PRACTITIONER HERITAGE ARCHITECT	Monitor as frequently as practically possible. Prior to the commencement of construction and earth-moving.
Mitigation Procedure: Historical Middens			
Phase 2 Site Investigation: If historical middens at the site are to be impacted by digging of trenches or any surface or subsurface earth moving, as Phase 2 Specialist Study should be conducted. Such a study should carefully document these features by means of site sampling, artefacts analysis as well as site mapping and site surveying, a photographic record, and a desktop and archive study. This measure is subject to		HERITAGE ASSESSMENT PRACTITIONER	Prior to the commencement of construction and earth-moving.

excavation and destruction permitting requirements, if and when required.		
PERFORMANCE INDICATOR	Preservation of the historic fabric of heritage resources. Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.	
MONITORING	Successful conservation of the historical fabric of the heritage resources. Location of previously undetected heritage sites by person/s monitoring.	

7 RECOMMENDATIONS

The Warrenton blockhouse is a protected heritage resource and a declared a National Monument in 1992. As such, the structure is of high heritage significance due to its scientific value, architectural attributers and general association with the Anglo-Boer War history of South Africa. The following recommendations are made based on the significance of the site, pertaining to the proposed Warrenton Blockhouse Upgrade Project.

- As noted above, the Warrenton blockhouse is a heritage resource of high heritage significance and the upgrade of the resource will add to the conservation of the hsit98fdal fabric of the site. For this upgrade process it is recommended that as much of the structure be retain in its original state. Collapsed sections should be restored to resemble the original appearance of the building, according to historiographical information. It is essential that a qualified heritage architect provide input on the restoration in terms of materials used, structural integrity and histor8cal accuracy. It is further recommended that original materials, such as stones from collapsed sections, be used as far as possible for the project. A heritage conservation buffer zone of at least 20m should be implemented around the heritage resource, the existing fence should be upgraded and access control should be applied during the project and after completion. It should be noted that the restoration of the structures for this purpose will be subject to the application of a destruction / alteration permit and approval of the relevant heritage agency.
- It is recommended that project planning assistance by Heritage Architect be provided in order to retain historical integrity of existing and upgraded sections of the structure. Monitoring of the project by the Heritage Architects, as well as regular examination of the site, possible trenches and excavations in order to detect and preserve previously undocumented heritage receptors.
- A site management plan for the conservation of the heritage resource during construction and conservation phases of the project should be compiled and implemented a a qualified heritage practitioner.
- Should any historical midden at the site are to be impacted by digging of trenches or any surface or subsurface earth moving a Phase 2 Specialist Study should be conducted. Such a study should carefully document these features by means of site sampling, artefacts analysis as well as site mapping and site surveying, a photographic record, and a desktop and archive study. This measure is subject to excavation and destruction permitting requirements, if and when required.
- Considering the localised nature of heritage remains, the general monitoring of the upgrade progress by an informed ECO or by the heritage specialist is recommended for all stages of the project. This should involve the inspection of the site on regular basis in order to monitor possible impact on previously undetected heritage resources. Should any subsurface palaeontological, archaeological or historical material or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately.

Generally, it is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites.

- It should be noted that mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

8 GENERAL COMMENTS AND CONDITIONS

This AIA report serves to confirm the extent and significance of the heritage landscape of the proposed Warrenton Blockhouse Restoration Project Development area. The larger heritage horizon encompasses rich and diverse archaeological landscapes and cognisance should be taken of heritage resources and archaeological material that might be present in surface and sub-surface deposits. If, during construction, any possible archaeological material culture discoveries are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include:

- Formal Earlier Stone Age stone tools.
- Formal Middle Stone Age stone tools.
- Formal Later Stone Age stone tools.
- Potsherds
- Iron objects.
- Beads made from ostrich eggshell and glass.
- Ash middens and cattle dung deposits and accumulations.
- Faunal remains.
- Human remains/graves.
- Stone walling or any sub-surface structures.
- Historical glass, tin or ceramics.
- Fossils.

If such sites or material remains were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by SAHRA, the National Resources Act and the CRM section of ASAPA will be required.

It must be emphasised that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, represent the area's complete archaeological legacy. Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately **(*cf*. NHRA (Act No. 25 of 1999)**, Section 36 (6)).

It must also be clear that Archaeological Specialist Reports will be assessed by the relevant heritage resources authority (SAHRA).

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10 ADDENDUM 1: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE

10.1 Site Significance Matrix

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these. The following matrix is used for assessing the significance of each identified site/feature.

2. SITE EVALUATION			
2.1 Heritage Value (NHRA, section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.			
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.			
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.			
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.			
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.			
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).			
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.			
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			
It has significance relating to the history of slavery in South Africa.			
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.			
2.2 Field Register Rating			
National/Grade 1 [should be registered, retained]			
Provincial/Grade 2 [should be registered, retained]			
Local/Grade 3A [should be registered, mitigation not advised]			
Local/Grade 3B [High significance; mitigation, partly retained]			
Generally Protected A [High/Medium significance, mitigation]			
Generally protected B [Medium significance, to be recorded]			
Generally Protected C [Low significance, no further action]			
2.3 Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Local			
Specific community			

10.2 Impact Assessment Criteria

The following table provides a guideline for the rating of impacts and recommendation of management actions for sites of heritage potential.

Significance of the heritage resource

This is a statement of the nature and degree of significance of the heritage resource being affected by the activity. From a heritage management perspective it is useful to distinguish between whether the significance is embedded in the physical fabric or in associations with events or persons or in the experience of a place; i.e. its visual and non-visual qualities. This statement is a primary informant to the nature and degree of significance of an impact and thus needs to be thoroughly considered. Consideration needs to be given to the significance of a heritage resource at different scales (i.e. sitespecific, local, regional, national or international) and the relationship between the heritage resource, its setting and its associations.

Nature of the impact

This is an assessment of the nature of the impact of the activity on a heritage resource, with some indication of its positive and/or negative effect/s. It is strongly informed by the statement of resource significance. In other words, the nature of the impact may be historical, aesthetic, social, scientific, linguistic or architectural, intrinsic, associational or contextual (visual or non-visual). In many cases, the nature of the impact will include more than one value.

Extent

Here it should be indicated whether the impact will be experienced:

- On a site scale, i.e. extend only as far as the activity;
- Within the immediate context of a heritage resource;
- On a local scale, e.g. town or suburb
- On a metropolitan or regional scale; or
- On a national/international scale.

Duration

Here it should be indicated whether the lifespan of the impact will be:

- Short term, (needs to be defined in context)
- Medium term, (needs to be defined in context)
- Long term where the impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention; or
- Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Of relevance to the duration of an impact are the following considerations:

- Reversibility of the impact; and
- Renewability of the heritage resource.

Intensity

Here it should be established whether the impact should be indicated as:

- Low, where the impact affects the resource in such a way that its heritage value is not affected;
- Medium, where the affected resource is altered but its heritage value continues to exist albeit in a modified way; and
- High, where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed.

Probability

This should describe the likelihood of the impact actually occurring indicated as:

- Improbable, where the possibility of the impact to materialize is very low either because of design or historic experience;
- Probable, where there is a distinct possibility that the impact will occur;
- Highly probable, where it is most likely that the impact will occur; or
- Definite, where the impact will definitely occur regardless of any mitigation measures

Confidence

This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.
- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation and socio-political context is fluid.
- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

Impact Significance

The significance of impacts can be determined through a synthesis of the aspects produced in terms of the nature and degree of heritage significance and the nature, duration, intensity, extent, probability and confidence of impacts and can be described as:

- Low; where it would have a negligible effect on heritage and on the decision
- Medium, where it would have a moderate effect on heritage and should influence the decision.
- High, where it would have, or there would be a high risk of, a big effect on heritage. Impacts of high significance should have a major influence on the decision;
- Very high, where it would have, or there would be high risk of, an irreversible and possibly irreplaceable negative impact on heritage. Impacts of very high significance should be a central factor in decision-making.

10.3 Direct Impact Assessment Criteria

The following table provides an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected

	TYPE OF DEVELOPMENT			
HERITAGE CONTEXT	**CATEGORY A**	**CATEGORY B**	**CATEGORY C**	**CATEGORY D**
CONTEXT 1 High heritage Value	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected	Very high heritage impact expected
CONTEXT 2 Medium to high heritage value	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected
CONTEXT 3 Medium to low heritage value	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected
CONTEXT 4 Low to no heritage value	Little or no heritage impact expected	Little or no heritage impact expected	Minimal heritage value expected	Moderate heritage impact expected
NOTE: A DEFAULT "LITTLE OR NO HERITAGE IMPACT EXPECTED" VALUE APPLIES WHERE A HERITAGE RESOURCE OCCURS OUTSIDE THE IMPACT ZONE OF THE DEVELOPMENT.				
HERITAGE CONTEXTS		**CATEGORIES OF DEVELOPMENT**		
Context 1: Of high intrinsic, associational and contextual heritage value		**Category A: Minimal intensity development** - No rezoning involved; within existing use rights.		

within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources **Context 2:** Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources. **Context 3:** Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources **Context 4:** Of little or no intrinsic, associational or contextual heritage value due to disturbed, degraded conditions or extent of irreversible damage.	- No subdivision involved. - Upgrading of existing infrastructure within existing envelopes - Minor internal changes to existing structures - New building footprints limited to less than 1000m2. **Category B: Low-key intensity development** - Spot rezoning with no change to overall zoning of a site. - Linear development less than 100m - Building footprints between 1000m2-2000m2 - Minor changes to external envelop of existing structures (less than 25%) - Minor changes in relation to bulk and height of immediately adjacent structures (less than 25%). **Category C: Moderate intensity development** - Rezoning of a site between 5000m2-10 000m2. - Linear development between 100m and 300m. - Building footprints between 2000m2 and 5000m2 - Substantial changes to external envelop of existing structures (more than 50%) - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 50%) **Category D: High intensity development** - Rezoning of a site in excess of 10 000m2 - Linear development in excess of 300m. - Any development changing the character of a site exceeding 5000m2 or involving the subdivision of a site into three or more erven. - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 100%)

10.4 Management and Mitigation Actions

The following table provides a guideline of relevant heritage resources management actions is vital to the conservation of heritage resources.

No further action / Monitoring Where no heritage resources have been documented, heritage resources occur well outside the impact zone of any development or the primary context of the surroundings at a development footprint has been largely destroyed or altered, no further immediate action is required. Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage\ remains are destroyed. **Avoidance** This is appropriate where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. Mitigation is not acceptable or not possible. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources. **Mitigation**

This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated to a degree of medium to low significance, e.g. the high to medium impact of a development on an archaeological site could be mitigated through sampling/excavation of the remains. Not all negative impacts can be mitigated.

Compensation

Compensation is generally not an appropriate heritage management action. The main function of management actions should be to conserve the resource for the benefit of future generations. Once lost it cannot be renewed. The circumstances around the potential public or heritage benefits would need to be exceptional to warrant this type of action, especially in the case of where the impact was high.

Rehabilitation

Rehabilitation is considered in heritage management terms as a intervention typically involving the adding of a new heritage layer to enable a new sustainable use. It is not appropriate when the process necessitates the removal of previous historical layers, i.e. restoration of a building or place to the previous state/period. It is an appropriate heritage management action in the following cases:

- The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.

- Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal

loss of historical fabric.

- Where the rehabilitation process will not result in a negative impact on the intrinsic value of the resource.

Enhancement

Enhancement is appropriate where the overall heritage significance and its public appreciation value are improved. It does not imply creation of a condition that might never have occurred during the evolution of a place, e.g. the tendency to sanitize the past. This management action might result from the removal of previous layers where these layers are culturally of low significance and detract from the significance of the resource. It would be appropriate in a range of heritage contexts and applicable to a range of resources. In the case of formally protected or significant resources, appropriate enhancement action should be encouraged. Care should, however, be taken to ensure that the process does not have a negative impact on the character and context of the resource. It would thus have to be carefully monitored