

DEPARTMENT OF WATER AFFAIRS AND FORESTRY
DIRECTORATE OPTIONS ANALYSIS

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OLIFANTS RIVER WATER RESOURCES DEVELOPMENT PROJECT (ORWRDP)

ENVIRONMENTAL IMPACT ASSESSMENT (12/12/20/553)

INFRASTRUCTURE COMPONENTS

CULTURAL HERITAGE ASSESSMENT SPECIALIST STUDY

Final

25 April 2005

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concerns / been led to understand that they won't employ such ratio d.d. phase 1

EXECUTIVE BRIEF

concerns - what is the situation & who do they intend to employ.

The Department of Water Affairs and Forestry (DWAF) commissioned the Olifants River Water Resources Development Project (ORWRDP) in the Mpumalanga and Limpopo Provinces. ACER (Africa) Environmental Management Consultants/ CSIR Environmentek, the environmental team responsible for the Environmental Impact Assessment (EIA) appointed Nzumbululo Heritage Solutions cc (South Africa) (HeSSA) to conduct a Cultural Heritage Assessment (CHA) study for the proposed project. The CHA study focus on heritage resources including archaeological, historical, ritual cultural sites, and burial grounds and graves associated with the ORWRDP's receiving environment. This is with the view to assess the potential impacts thereon.

The study identified more than a hundred cultural heritage resources sites including a hundred and five graves associated with the proposed ORWRDP project area. The impact of the project on identified cultural heritage resources on its path would be irreversible. Therefore, the heritage sites are classified, assessed for significance threshold and the necessary mitigation recommendations are made. The vast majority of the cultural heritage sites identified in the project area are archaeological. As such, representative samples of site types require mitigation baseline studies. Given the nature of the proposed development that would result in the inundation of the project area, all affected burial grounds and graves should be relocated to safe grounds. Mitigation recommendations herein made may be operationalised within the applicable sections of the National Heritage Resources legislation.

Furthermore, given the spatial extent of the project area, this study recommends that a cultural heritage resources-monitoring program be designed to deal with potential chance archaeological or historical finds, including unmarked human burials that may accidentally be found during development. This is particularly more important during bulk water supply pipeline construction.

Archaeological sites, particularly those that were previously unknown, are prone to illegal excavations by artefact looters. This more so when there is a chance that the sites are likely to be destroyed by proposed developments. Therefore, the information herein contained should be used for the expressed purposes by the relevant authorities. It may not be circulated for any other reason.

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ABBREVIATIONS

CHA	Cultural Heritage Assessment
DEAT	Department of Environmental Affairs and Tourism
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
HeSSA	Nzumbululo Heritage Solutions (South Africa)
LIA	Late iron Age
ORWRDP	Olifants River Water Resources Development Project
MSA	Middle Stone Age
PCMT	Project Co-ordination and Management Team
PI	Principal Investigator
PSP	Professional Service Provider
SAHRA	South African Heritage Resources Agency

DEFINITIONS

Archaeological

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

Chance Finds

Archaeological artifacts, features, structures or historical cultural remains such as human burials that are found accidentally in context previously not identified during cultural heritage scoping, screening and assessment studies. Such finds are usually found during earth moving activities such as water pipeline trench excavations.

Cultural Heritage Resources

Same as Heritage Resources as defined and used in the South African Heritage Resources Act (Act No. 25 of 1999). Refer to physical cultural properties such as archaeological and palaeontological sites; historic and prehistoric places, buildings, structures and material remains; cultural sites such as places of ritual or religious importance and their associated materials; burial sites or graves and their associated materials; geological or natural features of cultural importance or scientific significance. Cultural Heritage Resources also include intangible resources such as religion practices, ritual ceremonies, oral histories, memories and indigenous knowledge.

Cultural Significance

The complexities of what makes a place, materials or intangible resources of value to society or part of, customarily assessed in terms of aesthetic, historical, scientific/research and social values.

Excavation

Principal method of extracting data in archaeology, involving systematic recovery of archaeological remains and their context by removing soil and any other material covering them.

Grave

A place of interment (variably referred to as burial), including the contents, headstone or other marker of such a place, and any other structure on or associated with such place. A grave may occur in isolation or in association with others where upon it is referred to as being situated in a cemetery.

Historic

Material remains resulting from human activity, which are younger than 100 years, but no longer in use, including artefacts, human remains and artificial features and structures.

In Situ material

Material culture and surrounding deposits in their original location and context, for example an archaeological site that has not been disturbed by farming.

Iron Age

Prehistoric period and material culture associated with the iron working and farming communities dating to as early as AD 400 in Southern Africa. **Early Iron Age** refers to the first iron working farmers and their associated material culture that arrived in Southern Africa. The **Middle Iron Age** and the **Late Iron Age** at beginning of the second Millennium AD followed this period. This is the period associated with the development complex societies and state systems in Southern Africa.

Material culture

Buildings, structure, features, tools and other artefacts that constitute the remains from past societies.

Middle Stone Age (MSA)

Material remains resulting from human activity from ca 250 000 to 25 000 years ago. The MSA is associated first with archaic *Homo sapiens* and later *Homo sapiens sapien*. Material culture includes stone tools with prepared platforms and stone tools attached to wooden handles. Some of these hafted tools were used as spears for hunting.

Site

A distinct spatial cluster of artefacts, structures, organic and environmental remains, as residues of past human activity.

Stone Age (SA)

Material remains resulting from proto-human to human up to the emergence of the early *Homo sapiens*. The material culture from this period includes: stone tools; bone and wooden tools; personal ornamentation, such as beads and pendants made of ostrich eggshell, shells, ivory, wood and bone; rock art and formal burials. This period is divided into *Early*, *Middle* and *Late* Stone Ages.

1 INTRODUCTION

The Department of Water Affairs and Forestry (DWAF) commissioned the Olifants River Water Resources Development Project (ORWRDP). As part of this project, DWAF proposed to construct a dam on the Steelpoort River and associated water distribution infrastructure within the Olifants Water Management area. In order to obtain environmental authorisation from the Department of Environmental Affairs and Tourism (DEAT), DWAF appointed ACER (Africa) Environmental Management Consultants (ACER) and CSIR Environmentek (CSIR) to deal with environmental aspects relating to the proposed developments. In turn the ACER (Africa) Environmental Management Consultants (ACER) and CSIR Environmentek (CSIR) team appointed Nzumbululo Heritage Solutions (South Africa) (HeSSA) to provide professional specialist services in Cultural Heritage Assessment (CHA). The terms of reference are summarised and tabulated below (Table 1).

Table 1: Term of Reference for the Cultural Heritage Study for the ORWRDP

PURPOSE	ACTIVITIES
<input type="checkbox"/> To fulfil requirements of the National Heritage Resources Act, Act No. 25 of 1999, Section 38. In so doing -	<input type="checkbox"/> Identify, describe and map sites of archaeological, historical or cultural interest affected by the ORWRDP.
<input type="checkbox"/> Identify and describe (in terms of their conservation and / or preservation importance) sites of cultural and archaeological importance that may be affected by the proposed ORWRDP and associated activities. This study should include the identification of grave sites.	<input type="checkbox"/> Identify, where possible, the grave sites affected by the development. This should be done in liaison with the social impact assessment team. <input type="checkbox"/> Liaise with the local communities with regards to the impact of the development on the heritage resources.
<input type="checkbox"/> Identify and describe impacts on archaeological, cultural heritage, religious resources and practices associated with the proposed ORWRDP project area.	<input type="checkbox"/> Describe the importance or significance of these sites and whether these sites need to be conserved, protected or relocated.
<input type="checkbox"/> Make recommendations on mitigation measures.	<input type="checkbox"/> Describe the procedures for mitigation or relocation of sites and provide an indication of time required for these management measures to be implemented.
<input type="checkbox"/> Identify and describe management measures.	<input type="checkbox"/> Document findings and recommendations.

This is a stand-alone report, in terms of the above, and forms part of the specialist studies for the ORWRDP. This report should be read in conjunction with the Environmental Impact Report (EIR).

FACER (Africa) Environmental Management Consultants (ACER) and CSIR Environmentek (CSIR) team issued Terms of Reference with detailed guidelines on specific requirements. HeSSA submitted a project proposal detailing the work to be conducted under the ORWRDP heritage assessment. The HeSSA team nominated the Institute for Cultural Resources Management Archaeologist as the Principal Investigator (PI) for this CHA study.

At the commencement of this study, the HeSSA representative attended a site visit and orientation meeting. On the 17th of November 2004, the PI and the HeSSA Project Manager attended a team integration meeting where preliminary results of this study were presented.

The study was conducted in five segments. The first segment consists of a desktop study followed by three consecutive archaeological field studies and a social consultation exercise that was conducted alongside the Social Assessment Study.

2 AIMS OF THE CHA STUDY

This CHA study seeks to fulfil the requirements of South African Heritage Resources Act (Act No. 25 of 1999) Section 38. As heritage specialists, the HeSSA team was charged with the responsibility of:

- Identifying heritage resources affected by the proposed dam and the associated infrastructural development.
- Assess the significance of the resources.
- Evaluate the impact thereon with respect to the socio-economic opportunities and benefits that would be derived from the proposed ORWRDP.
- Consult with the affected and other interested parties in regard to the impact on the heritage resources in the ORWRDP receiving environment.
- Make recommendations on mitigation measures with the view to reduce specific adverse impacts and enhance specific positive impacts on the heritage resources.
- Identify and discuss with local communities on potential impacts of the proposed development on graves and burials sites within the development area and make the necessary recommendations on how to handle the matter.
- Take responsibility for communicating with the SAHRA and other authorities in order to obtain the relevant permits and authorization.

3 BACKGROUND SUMMARY

The proposed ORWRDP dam wall construction site is located on the Steelpoort River just below the confluence with the Klip River on the north slope of the Mampuru Hill. The dam will inundate the valley below the Sekhukhune Mountains that lie to the north, just on the boundary of Limpopo and Mpumalanga Provinces (Fig. 1). The southern banks would reach and flood the present R555 provincial road that runs to Burgersfort through Steelpoort. At present, the area is predominantly used for commercial cattle ranching, game farming and tourism. There are limited agricultural crop production activities on some portion of the farmlands. These are mainly dependant on irrigation. *Acacia* trees and bush dominate the vegetation of the area.

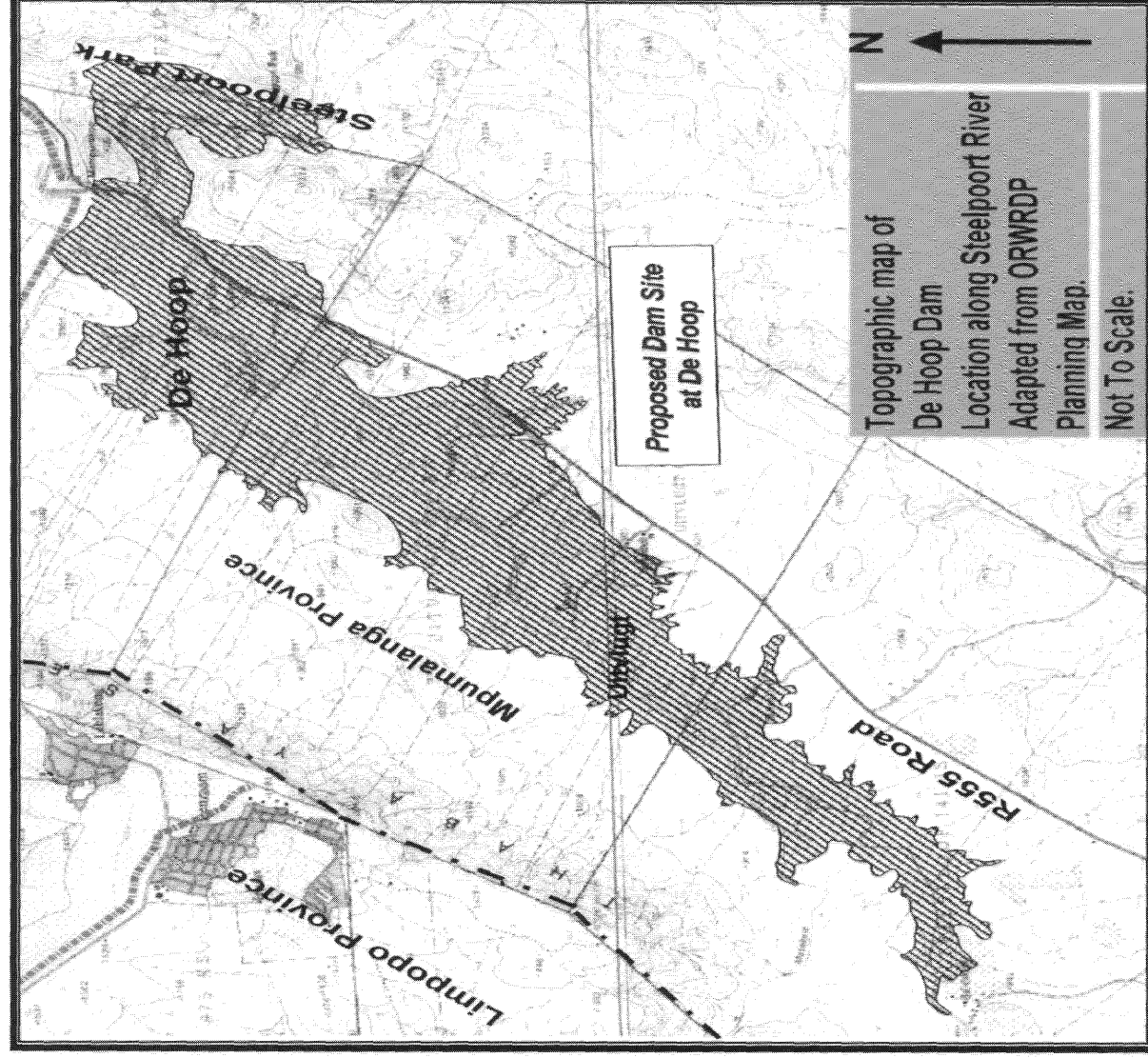
Historically, humans have occupied the Steelpoort River Basin for centuries, intermittently in some area and continuously in others. Before the area was turned into white commercial farms during the colonial periods, the predominantly Northern Sotho-speaking (Pedi) communities occupied it (see Mönning 1967; Hammond-Tooke 1993). It is also known from archaeological studies conducted in the regions, that the Early and Late Iron Age farming communities were present here since the beginning of the first Millennium AD (Inskip & Maggs 1975, Hall 1987, Whitelaw 1996). Archaeological studies also indicate that hunter-gather Stone Age communities were also present here for several millenniums before the farming communities moved in about two millenniums ago.

At present the African communities that reside within the project area are mainly commercial farm workers. The main African communities live outside the study area down stream starting from just outside the De Hoop Farm. The De Hoop farm upon which the dam wall is proposed for construction is owned the by Tshehla Trust under the local chieftain (Chief David Tshehla).

Prior to the present study, no systematic archaeological or cultural heritage assessment studies have been conducted covering the specific location of the proposed dam basin. However, from the developments already in the area and land use activities, it was anticipated that some archaeological and cultural heritage resources might have been affected previously.

The present study is concerned with the construction of the De Hoop Dam and associated infrastructure such as R555 road realignment; the construction of pipelines, pump stations, balancing dams, off-takes and storage reservoirs. The bulk water supply infrastructure would be developed along the R555 road to Steelpoort and the R37 (between Burgersfort and Lebowakgomo) past Atok Mine to the Olifantspoort Weir. Similar infrastructures would be constructed from Flag Boshielo Dam to Mokopane.

Fig. 1: Map showing the general location of the proposed De Hoop dam along the Steelpoort River Valley.



By their nature, these developments are expected to destroy any archaeological or cultural heritage sites that may be located on their path. In addition to destroying the heritage sites, the dam construction and subsequent inundation of the Steelpoort Valley would mean that the cultural landscape would permanently be inaccessible. In comparison, the construction of water pipelines can be expected to have relatively limited impact on heritage sites. This is because such developments are normally limited in spatial extent in comparison to the dam wall construction and the consequent valley inundation. It is also possible that pipeline routes could be moved to avoid sites if deemed necessary.

4 METHODS

The study began with a desktop survey of archaeological databases and inventories in search of available data on the heritage resources of the study area. The second, third and fifth segments involved archaeological and cultural heritage field studies. The main field study was an archaeological field survey that was conducted between 7 October and 18 October 2004. Due to the parallel nature of the overall project planning activities, the proposed road re-alignment route map, quarry and other on-site infrastructural development sites details were made available after the first field study. Therefore, two separate further field surveys were conducted from the 2nd to 4th and 18th to the 19th of November 2004. A separate field study, fourth segment, focused on consulting the local communities with regards to the impacts of the proposed development on the local heritage resources. However, the African communities that may be descendant to the producers of or directly associated with some of the cultural heritage resources in the project area no longer reside with the area since most of it has been under commercial ownership for generations now.

4.1 ARCHIVAL AND DATABASE SEARCH

In the first week of October 2004, we made inquiries to both the SAHRA and the Archaeology Department of the School of Geography, Archaeology and Environmental Studies of the University of the Witwatersrand. The Archaeology Department of the University of Witwatersrand maintains an Archaeological national database for sites recorded from the field research the Department conducts. SAHRA is the national repository for all heritage studies and assessment reports produced under various projects. Unfortunately, both sources did not yield any relevant data particularly on the proposed development area. However, the data from the Archaeology Department indicated that the Steelpoort Valley dam site falls in a region with high potential for archaeological resources.

4.2 FIELD SURVEY

We adopted a field research strategy of archaeological survey aimed at achieving total coverage of the affected landscape. Most archaeological and historical sites are found through systematic survey of the target landscapes. The survey also sought to identify other cultural heritage sites such as graves, burial and contemporary religious or sacred ceremonial sites in the area. A separate field study was conducted to collect data on intangible cultural heritage. This was particularly with the view to document concerns of the local communities with regards to cultural heritage resources and to identify custodians of graves and burials sites that are affected. Such data are relevant in mitigation planning.

First, using site maps and information provided by the Project Co-ordination and Management Team (PCMT), we contacted the affected landowners in order to gain access to the farms. We began by conducting a reconnaissance survey of the general landscape. We located and recorded previously known graves and cemeteries in the project area.

Next we began the archaeological surveys, with a team of five; we systematically transected the affected landscape on foot, moving slowly across the ground. We started from down stream roughly at the proposed site for the dam wall moving upstream towards headwaters

of the proposed dam. In order to better our survey coverage, we started by walking more transects close together through target areas. Transects were set running perpendicular to the Steelpoort River banks extending towards the estimated flood boundary of the dam. The survey, however, extended beyond the flood line because we also wanted to capture wider patterns that create the overall cultural landscape affected by the dam. The first two days of field survey highlighted the topography, the vegetation density, accessibility of the study area as well as preliminary indications of the distribution pattern of archaeological and historical sites in the area. Consequently, we made the necessary adjustments to field survey strategies also taking into consideration the project logistics and the extent of the study area.

4.3 ARCHAEOLOGICAL SURVEY SAMPLING

Distribution of archaeological sites across the landscape depends on a number of related factors, such as preservation conditions over time, the degree to which sites are exposed through erosion or lack of vegetation and the actual decisions of the people who created the sites and deposited the materials originally. Using preliminary findings from the reconnaissance study, we adopted a judgement surveying strategy (stratified sampling). We divided the area into geographical zones (hills, gully, ridge, stream or river valley, flood plain). We then targeted areas we believed had archaeological or historical sites. The advantage of our strategy is that areas with high likelihood of containing cultural heritage sites (such as those that are close and with access to water sources and potential agricultural land) were given preference. Areas where it is highly unlikely that sites would be found (such as steep slopes, extensively rocky landscapes, areas far away from potential water sources and agricultural land) were accorded less survey priority. This allowed time and resources to be focused on the potentially most productive areas while taking into consideration the geography of the study area. Naturally, we could not be a hundred percent certain whether portions of the project area that were less surveyed did not have cultural heritage sites. However, the results obtained are reliable and the survey coverage, by probabilistic and total spatial coverage, was high enough to derive an above average representative sample.

4.4 RECORDING INFORMATION IN THE FIELD

The basic operating unit of the field studies was the site: the surveys were geared towards identifying and recording as many sites as possible across the affected landscape. Apart from locating cultural heritage resources (such as archaeological or historical sites), we also recorded their complementary information essential for defining affected cultural landscape. All sites that were identified were recorded in field notes books. We also recorded their locations by GPS co-ordinates (see complete site list in Appendix A-E and Appendix F Map).

We also made a field survey decision to record all cultural materials, artefacts, features or structures that were identified in isolation. This means we documented any location that contained physical evidence of past human activity. We did not make any value judgement based on site extent because our aim was to record as much information as possible on the overall landscape affected by the proposed development. Although currently occupied farm workers homesteads and the modern commercial farmers' houses and related infrastructure were noted, they were given less attention during the cultural heritage site significance

assessment phases of the study. This was because, by virtue of them being post 1930 constructions and younger than sixty years, they were deemed to fall outside the scope of specific cultural heritage resources categories as covered in the National Heritage Resources legislation. Furthermore, these contemporary properties are particularly covered in other specialist studies such as social and economic impact assessments.

All site identified during the survey were allocated unique names. The process is based on a systematic combination of numbers and letters assigned by the field team to each site during the recording process. However, these site names or numbers are only applicable in this context and new national site numbers may be allocated to the sites when they are captured on the national heritage site database. To further differentiate the sites, each site was allocated a preliminary classification based on cultural category, their period: whether they are archaeological Late Iron Age (LIA), historical and or cultural site types such as grave or ritual site.

4.5 STUDY CONDITIONS

The Principal Investigator led the field survey team of five assistant archaeologists and field assistants. On different occasions, additional people from the local communities were recruited to assist in locating known cultural heritage sites, such as burials and graves.

Identification of archaeological or historical sites during surveying depends on visibility and accessibility. Areas that were sampled for the survey were readily accessible. Visibility was relatively high because the grass cover was low and in some cases non-existent. Some portions were eroded thereby exposing archaeological features and artefacts where they existed.

The survey of the proposed bulk water infrastructure (pipe lines, pump stations and reservoir sites) did not cover every bit of the areas affected on foot. Instead we focused on selected locations particularly those that are not currently developed. However, most of the bulk water infrastructure sites would be constructed through densely populated, disturbed or developed areas. The water pipe lines run along either existing pipelines; below power lines or along existing roads. This means most of the areas affected by the bulk water infrastructure were previously disturbed. Because of the extent of the pipeline infrastructure, parts of the sites were surveyed by looking at artefacts out of slowly moving vehicles. Although there are inherent problems with this strategy, it is an acceptable field survey procedure and more important we were able to conduct a complete spatial coverage the project area affected by the bulk water supply infrastructure.

4.6 SOCIAL CONSULTANCY

Cultural heritage resources are contextualised by the communities responsible for or associated with them. Relevant for this study were values attached to the heritage by the local communities. During the fourth field study phase, the HeSSA Ethnologist joined the Social Assessment team to liaise with the local communities regarding the impact of ORWRDP on the cultural heritage.

It is of critical importance to note that the project area particularly the dam basin is currently under commercial land use. The local communities presently there are commercial farmers who are not linked to archaeological, historical and other cultural heritage sites that were recorded during the survey. Furthermore, the local African communities in the area are mainly commercial farm workers who either migrated in for work reasons or are not directly related or linked to the communities that occupied the area during pre-colonial land redistribution processes. However, the Northern-Sotho SiPedi speaking communities in the neighbouring communal settlement villages just outside the Tshehla Trust De Hoop Farm have historical links with portions of the affected land. As such, they were consulted in this regard although they reside outside the project area.

4.7 SIGNIFICANCE ASSESSMENT PROCEDURES

Prior to presenting the results of the study it is vital that the cultural heritage site significance assessment process be defined. Cultural heritage resources are ranked into four categories of significance: none, low, medium and high. Sites with no significance do not require mitigation; low to medium may require mitigation; while sites with high significance should not be disturbed at all. Site significance is further defined according to type values. For example the significance values of archaeological sites are different from the values of contemporary ritual sites. The significance of an archaeological site is based on the amount of deposit, the integrity of the context (that is primary versus secondary context), the kind of deposit and the potential to help answer research questions. Other values include: aesthetic (presence of individual elements at a site in terms of scale, materials, texture, etc.); historical (generally relates to the last 100 years in terms of a set of themes which relate to historical figures, event, phase, activity, etc.); social (the site's association with a particular recognisable community, or parts a community, community esteem, etc.).

4.7.1 SOCIAL SIGNIFICANCE

Burial Sites and graves identified in the affected development area meet the highest threshold for social significance as explained above. Two sets of legislation protect human burials: the Human Tissues Act (Act No 65 of 1983) and the National Heritage Resources Act (Act No 25 of 1999). The former applies to graves younger than sixty years, whereas the latter protects graves in formal cemeteries older than a hundred years, graves outside formal cemeteries older than sixty years, as well as graves of cultural significance or victims of conflict. This study assesses all burials in accordance with these regulations.

Furthermore, the significance threshold of ritual sites border around the fact that they are considered sacred and they are used for rituals, for example annual initiation rituals for boys. Nonetheless, data on the ritual activities relating to their significance is not readily available. Access to these sites is normally strictly restricted. The sites are supposed to be located away from settlements or areas where the public may not have easy access.

4.7.2 SCIENTIFIC (ARCHAEOLOGICAL) SIGNIFICANCE

Scientific significance relates to the assessment of the research potential of a site and the relevance of any data that the site(s) might contain for the pursuit of academic research

questions. This also concerns the potential of a site(s) to address anticipated future trends, research capabilities and interests. There is no set threshold for archaeological significance in South Africa. However, archaeological significance may be measured against the site(s)'s values as unique sources of information; whether such information is not available from other sites; can it answer pertinent questions (Bickford and Sullivan 1977: 23-24).

The precolonial African history is dependant on archaeological resources. It is from archaeological resources that scholars build the precolonial African history. Archaeological resources provide evidence for the material culture, evidence for socio-economic and technological development. Archaeological sites also yield valuable evidence for the reconstruction of palaeoenvironment and palaeoclimate as well as evidence for reconstructing the human response and contribution to environmental changes. The Archaeological resources are non-renewable, and their original context is particularly important. The proposed development poses serious threats to any archaeological resources in its direct path.

4.7.3 AESTHETIC SIGNIFICANCE

This is one of the most subjective categories to evaluate because it deals with visual values. In this context the significance is classified by response derived from the experience of the environment and cultural attributes within the project area. Important in the context of this study is the observation that aesthetic significance is a product of emotional experience rather than a checklist of attributes. As such many archaeological sites are sub-surface and therefore will not be able to be assessed on aesthetic criteria. For this study, we decide on site to site basis whether aesthetic significance is a relevant category to assess, rather than taking this as a given.

4.7.4 HISTORICAL SIGNIFICANCE

Historical significance relates to exclusively to the last 100 years or a period of importance associated with events, developments, artistic excellence, outstanding achievement and evolution of a nation, group, region or locality.

5 RESULTS

The findings of the field study are presented in this section. A total of 109 cultural heritage sites, including burial grounds and graves, were recorded in the dam basin study area. (See Appendix A and Appendix F Site distribution Map). The sites are categorised into archaeological (Stone Age and Iron Age sites) and Historic periods. Thirty of these cultural heritage sites are either cemeteries or individual graves burial sites. Only two sites are recorded as ritual. Sites recorded along the water pipe line and the bulk water infrastructure sites routes are presented and assessed separately.

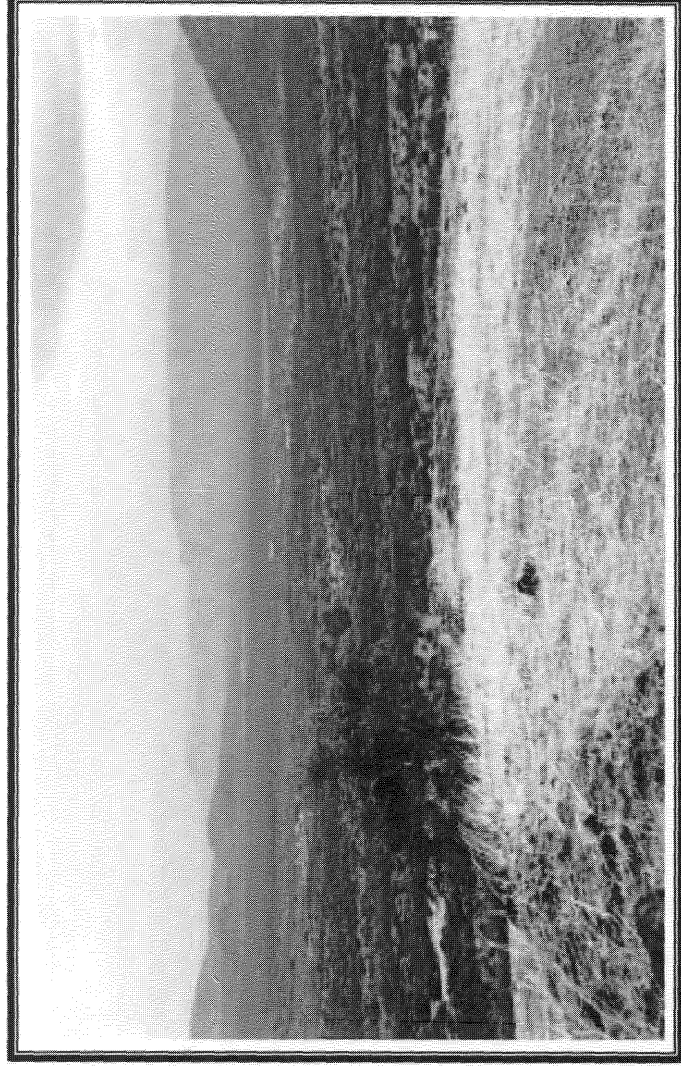


Plate 1: View from the east. The Steelpoort River Valley to be inundated by the dam. The Sekhukhune Mountains are in the background to the right.



Plate 2: Well-preserved archaeological sites with outstanding vitrified cow dung mounds such as this one in the center are rare in the region. The dam basin yielded a limited number of these such as this MM9 LIA site.

A total of 72 archaeological Iron Age sites were recorded within the dam basin (Plate 1). Iron Age sites are characterised by distribution of archaeological artefacts and features such as burnt *daga* structures and vitrified cattle dung. Twenty-one of these archaeological sites are recorded as Early Iron Age. These are characteristic open settlement sites marked by cattle kraals and pottery remains. Stonewalls and stone built central cattle kraals are characteristic features usually associated with Late Iron Age (LIA) farming communities in Southern Africa (Huffman 1996, 2000; Hammond-Tooke, 1993). Forty-seven such LIA sites are recorded in the dam basin area. Two Middle Stone Age (MSA) sites were recorded in De Hoop farm area. The MSA sites were identified on the sections of an erosion gully marked by exposed stones tools. These included a hand axe and scrapers (Plate 3).

5.1 DE HOOP DAM SITE

5.1.1 MIDDLE STONE AGE (MSA) – 250 000 TO 25 000 YEARS AGO

The occasional MSA artefacts such as triangular points probably lay scattered around stream channels. Only two clusters, however, were recorded during this survey. The cluster that lies on a small stream that starts near the present De Hoop Trust Farm entrance off the R 555 main road (S24°58'07.2" E29°56'41.1") yielded a good sample of stone tools (see Plate 3).

Significance

The MSA artefacts from the two sites within the dam basin have low archaeological (scientific) significance. The MSA sites did not yield any indications that they have high research potential or elements of representativeness within the wider suite of known MSA sites. The MSA material lacked context and seem to have been deposited from elsewhere by water erosion and attrition activities.

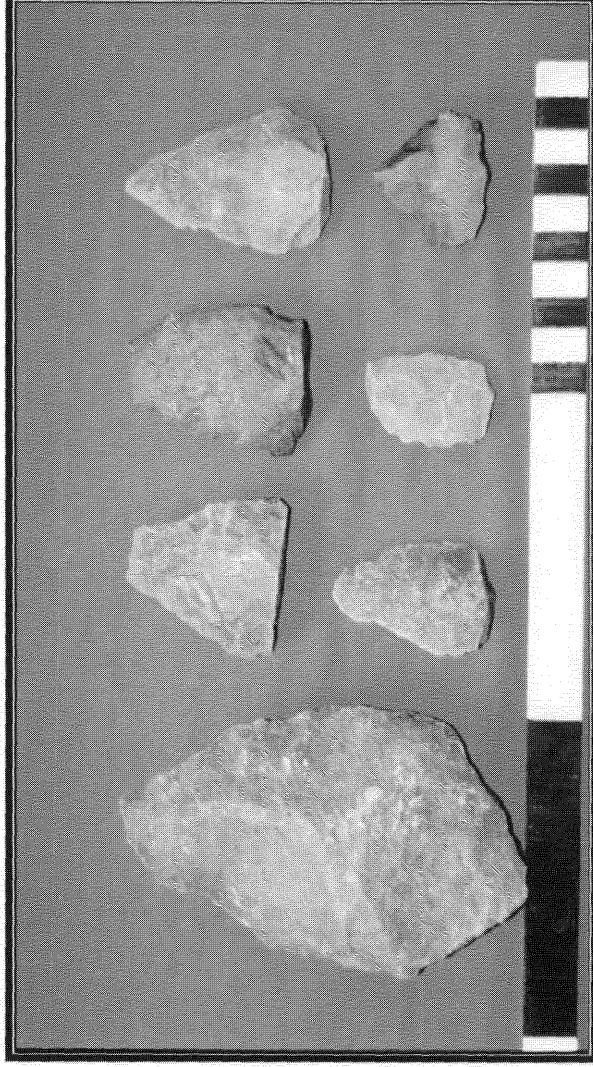


Plate 3: Examples of stone tools that were identified at an MSA site DH36 in De Hoop Farm.

5.1.2 EARLY IRON AGE – AD 400 TO 900

Early Iron Age pottery occurred in several places within the proposed dam basin. These lay on the flat plateaus between streams and within easy reach of the Steelpoort River. Decorations on some of the pottery (Plate 4) suggest that the settlements relatively date to the first (AD 400 to 700) or the second phase of the Early Iron Age Traditions (AD 700 to 900) (see Whitelaw 1996; Klapwijk and Huffman 1996 for detailed discussions).

A total of 21 Early Iron Age sites are recorded in the dam basin. Of these, six were assessed as having no scientific archaeological or any cultural heritage significance. Four have medium scientific archaeological significance. This means these have potential to contribute towards answering contemporary or future archaeological research questions in general and the history of African farming communities in particular (see Appendix A). The most outstanding cluster of Early Iron Age sites are aggregated in a complex (Sites UT 26; UT 24, MM01 & MM02 – see Appendix A and Appendix F for more site details) that lie immediately on the northern banks of the Steelpoort River in Megapa Nature Reserve in the area between the dam water line the road realignment. At least four ancient cattle kraals are marked by mounds of white vitrified cow dung (Plate 5) surrounded by scatterings of potshards in this area. The proposed road alignment will cut through this cluster while portion of sites will be inundated when the dam floods. Only three Early Iron Age sites (Sites DH04, DH13 and DH14 – see Appendix A) lie downstream in the area to be affected by the dam wall and site infrastructure development. The rest of the sites are spread across the valley and will be affected by the dam inundation.



Plate 4: Examples of pottery identified during the survey in the dam basin study area.



Plate 5: Vitrified cow dung found on well-preserved Iron Age Site MM02 in Uitvlugt.

Significance

The large Early Iron Age complex sites found in the dam basin have scientific (research) and educational significance. They have the potential to address questions related to the “Mpumalanga Early Iron Age Sequence” which is associated with the well known Lydenburg terracotta heads (see Inskeep & Maggs 1975; Evers 1980; Whitelaw 1996; Klapwijk and Huffman 1996). Carefully sampled, some of the sites have potential to address anticipated future trends in archaeological research interests. The Steelpoort River Valley forms part of an important archaeological cultural landscape that is central in the reconstruction of the arrival and distribution of the first food producing communities that replaced the hunter-gather communities. Data from such site may potentially help explain the farmer-hunter interactions that are critical in understanding the contact periods of the African prehistory.

Furthermore, the Early Iron Age sites have the potential to yield environmental scientific data through the recovery of pollen and charcoal samples from the sites. This data is valuable in explaining the early human contributions and interactions with the environment by the early farming communities. Nonetheless, this period represents what might be called a cultural and economic revolution in the sense that new cultural groups gradually moved in introducing a new type of economy based on food production. Since no other systemic archaeological studies have been conducted previously in the dam basin project area and its vicinity, the identified sites should be treated as representative sample of the complete range of archaeological sites in the area. Therefore, the Early Iron Age sites in the Steelpoort River valley are classified as within the range of low to medium on scientific significance scale.

Individual sites with a scientific threshold that warrants their mitigation are identified for further baseline studies in the recommendation section below.

5.1.3 LATE IRON AGE (LIA) – AD 900-1780 TO 1900

At least 47 LIA sites characterised by stonewall features (Plate 6) and structures, central cattle kraals and characteristic pottery lie within the dam basin. This site type represents the link between the prehistoric and the recent peopling of the Steelpoort River Basin. The LIA

sites also represents the development of complex societies in the region usually associated with the rise of African State systems.

Two dense clusters of LIA sites are found in the low Steelpoort River Valley area around the dam wall construction activity area (see Appendix F Map). Eight LIA sites would be affected by the dam wall construction phase (Sites DH16, DH17, DH18, DH19, DH01, MM12 and DH10). Only two LIA site (UT27 and UT29) are likely to be affected by the road realignment. The rest of the sites are distributed along the length of the dam basin and would be affected by the valley inundation process.

Special types of the LIA sites associated with the early Historic Northern Sotho Speaking Pedi people are included in the sites cluster. The most extensive deposits (Site DH17) are on the area to be affected by the wall construction and quarry activities. Typical Pedi pottery and large maize grindstones characterize the deposit (Plate 7).

Significance

All LIA archaeological sites recorded in the project area qualified for scientific/ research significance assessment. Of the 47 LIA sites, only 13 have a medium scientific significance threshold. Scientifically, these sites can help answer pertinent research questions and provide information potentially not available from other sources or other sites in the area (see Appendix A). Such information relate to spatial distribution data, socio-economic organisation of the prehistoric African societies and data on the evolution of the local prehistoric economies in the project area. They would provide scientific data that is relevant in constructing the chronology of the farming communities in the area. The sites may potentially contribute to the understanding of the population dynamic and migration patterns of communities that led to the current distribution of contemporary African cultural and tribal groups. Such data is critical in the reconstruction of the local African History. A total of 21 LIA sites were assessed to have no archaeological scientific value. This goes without saying, as a collective, the LIA sites provide invaluable spatial distribution data and forms part of the overall Steelpoort River Valley cultural landscape. The remaining 13 LIA sites that are recorded in the dam basin have low significance value. All sites with low and medium significance have been assessed for further studies and recommendations have been made in a separate section below.

Archaeological sites recorded in the project area did not exhibit any characteristics that qualifies them for other significance values such as social and historical. During social consultations the African communities that have historical ties with the project area did not make any claim that directly links them to the archaeological heritage sites recorded. This means the Iron Age archaeological site have limited and indirect contemporary social or spiritual significance that relate to the present communities. For example the Tshehla cemetery is currently located within an archaeological site. The Iron Age archaeological sites did not outstanding aesthetic characteristics that area visible enough to have visual effects to the community. This is especially so given the nature of archaeological sites as they are hidden in most part under ground. Only a limited number of LIA sites have visible stonewall structures. Even these are not of outstanding characteristic in comparison to other know stone wall structures in the region.

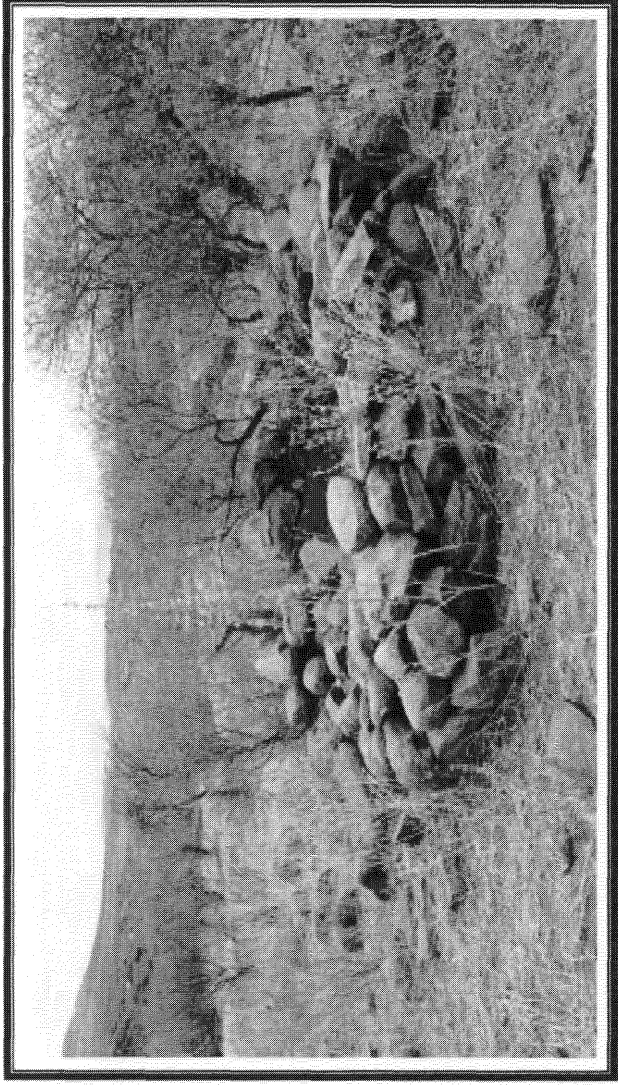


Plate 6: Stonewall structures in De Hoop farm are characteristic of LIA sites. This circular feature is found on MM12 site in De Hoop farm area near proposed dam wall site.

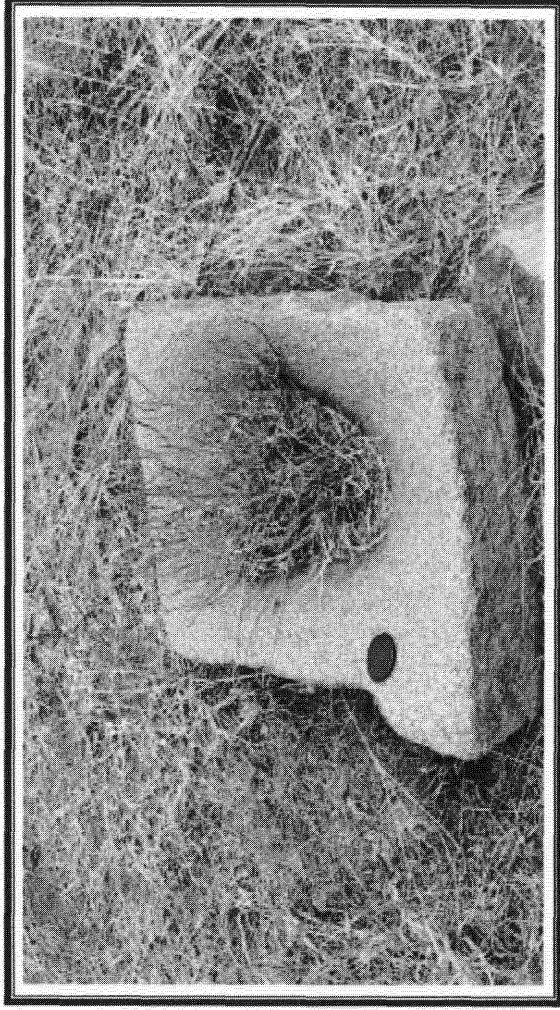


Plate 7: Grinding stone found on a Historic site near the proposed dam wall site. Maize grinding stones are associated with the Pedi farming communities that occupied the area during the early historic periods (See Mönning 1967 about the Pedi history in the area).



Plate 8: Remains of a historic mud house found *in situ* on site DH46 in De Hoop Farm.

5.1.4 HISTORICAL SITES

Nine historical sites were recorded during the survey of the dam basin project area. These are characterised by remains of mud house structures, house refuse middens that contain items dating to the last 100 years (Plates 8). Some of the sites have rectangular structural remains, which are a product of Western influence (Hammond-Tooke 1993). Some African communities and some commercial farm workers occupied some of these sites till as late as the 1960s. Some of these historical sites are associated with cemeteries and individual grave sites.

In addition to these historic sites, we identified two contemporary ritual initiation school sites in Steelpoort Park Farm. One is situated on the northeast of the proposed dam wall sites just outside the De Hoop Farm. This does not seem to have been used in recent years. The second site, situated on the Steelpoort Pak farm is marked by remains of ritual fireplaces and initiation alters. We were unable to confirm whether the site is currently being used for the annual initiation schools. However, the material remains and the state of preservation of the site features suggests that it was used more recently. The subject of ritual sites is difficult to research on because the related information is regarded as sacred and not a topic of open discussion and therefore, it was difficult to get additional information from the local farm workers currently residing at Steelpoort Park Farm.

Significance

Historical sites have both scientific/ research and social significance threshold. They provide scientific data on the recent peopling of the study area. The sites are a vital link between the prehistoric and the contemporary African communities. Some of the historic sites that yield materials dating to the last hundred years have the potential to provide information on continuity of occupation from the late prehistoric period to the historic times. The value of

such data in addressing local history themes may not be overstated. Some of the sites such as DH46 shown in Pate 8 above will yield data on the early influences of the western culture on African material culture such as in architecture. Such sites may also yield scientific data, for example, on traditional construction mud conservation characteristics that makes some indigenous structures survive nearly a century in their original contexts *in situ*. Historical sites are also valuable in providing inter- and intra-site spatial distribution of features. As such, only two historic sites are classified as of medium significance threshold worthy of further mitigation studies (refer to Appendix C for). The remaining historical sites did not meet the pre-discussed categories of significance threshold.

However, although most of the historical sites recorded did not meet high cultural significance thresholds, they are associated with burial sites and graves, which have a different social significance threshold, discussed separately below.

With regards to the ritual site on Steelpoort Park Farm, the site is of high cultural significance. Rituals conducted on such site, assuming the site is still being used, are an integral part of the local socio-cultural life of African communities. There are sacred and its taboo for any members of the public to access them or casually visit the site. However, such sites are linked to individual initiation school conveners and are subject to relocation should the school master deem it necessary.

5.2 CEMETERIES AND BURIAL SITES

Burial grounds and grave sites are especially considered unique and important cultural heritage resources. They have both historical and social significance threshold and are considered sacred. The National Heritage Resources Act (No 25 of 1999) Section 36 and the Human Tissues Act (Act No 65 of 1983) specially protect these sites. A total of 30 burial sites are recorded in the dam basin area. Fifteen cemeteries contain 90 graves (Table 2). A total of fifteen graves were identified in isolation outside cemetery sites bring the total of known graves to a hundred and five.

Table 2: The Cemeteries identified and confirmed during the study including the number of graves in each cemetery.

Name of Cemetery	GPS Location	Number of Graves
1DH07	S24°58'11. 0" E29° 56'41. 3"	2
3DH11	S24°56'32. 0" E29° 57'20. 1"	14
8DH29	S24°57'71. 1" E29° 55'74. 8"	2
1DH34	S24°57'98. 6" E29° 56'87. 3"	16
3SP01	S24°57'35. 9" E29° 58'06. 9"	13
5SP07	S25°00'50. 7" E29° 53'58. 6"	2
6UT01	S24°59'48. 6" E29° 56'16. 0"	16
7UT02	S24°59'48. 6" E29° 56'17. 5"	7
8UT12	S24°59'76" E29° 54'41. 1"	3
5DH15	S24°59'54. 8" E29° 54'34. 4"	3
3DH39	S24°58'08. 6" E29° 56'45. 5"	5

7DH49	S24°59'52. 6" E29 ° 56'74. 3"	2
9DH51	S24°58'46. 9" E29 ° 56'84. 2"	2
1DH52	S24°58'47. 6" E29 ° 56'75. 5"	3
TOTAL OF GRAVES IN CEMETERIES		90

Most of the graves are fairly small, averaging approximately 1 x 1.8 meters in size. Most of the graves are aligned in a general west-east direction. This is in line with the local belief systems and traditions of most Bantu-speaking communities. Some of the graves have a traditional outlook consisting of oval mounds covered with rocks with or without head stones (Plate 9). Other graves are marked with simple stone outlines. However, relatively large numbers of the graves are built up with either granite tombstones or concrete slabs (Plates 9 and 10). The majority of the graves within marked cemeteries are well maintained the cemeteries were originally fenced but parts of the fences have been falling apart or destroyed due to neglect.

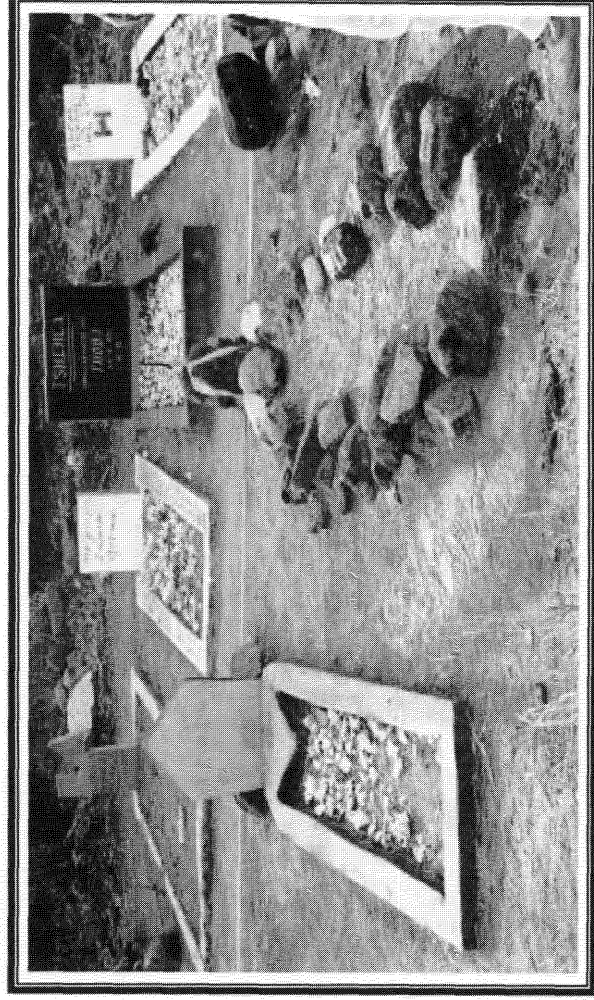


Plate 9: The graves differ in their material. Some are traditional oval stone structures while others are western in format.

Significance

Burial grounds and grave sites identified in the project area meet the highest social significance threshold. Two sets of legislation protect human burials: the Human Tissues Act (Act No 65 of 1983) and the National Heritage Resources Act (Act No 25 of 1999). The former applies to graves younger than sixty years, whereas the latter protects graves in formal cemeteries older than a hundred years, graves outside formal cemeteries older than sixty years, as well as graves of cultural significance or victims of conflict.

Some of the burials and graves in the dam basin particularly in formal historical cemeteries are well known to the local communities and are highly valued. They are places people

identify with, recognise as social landmarks or community signatures. They are an indication of their history of occupation of the particular locations. The cemeteries and graves also are sites of traditional ceremonies and rituals, which are esteemed by the local African communities (Plate 10).

Although most of the graves identified in cemeteries in the project area have traditional custodians, not all graves were readily linked to family descendants. In fact, a total of sixty graves in cemeteries were previously marked, claimed and acknowledged by the custodians before we conducted this study. Ironically, the local communities did not acknowledge some graves that are clearly visible. During the study we learnt that the communities that have historic links to the project area are not the sole group that have these links to the area. The other groups that are potential custodians of the other graves were not identified during this study. However, social and historical links or claims thereof by different community groups are issues best dealt with in other specialist studies such as Social Assessment and Public Participation co-ordination for the project area. What is clear at this point is, not all graves are linked to custodians that are currently on record as traditional occupants of the affected land portions.

One cemetery and one isolated grave are affected by the dam wall construction phase (Sites 3DH11 with 14 clearly marked graves and 4DH12 - see Appendix A for more details). The rest of the burials and cemeteries are spread along the dam basin and are affected by the dam inundation process.

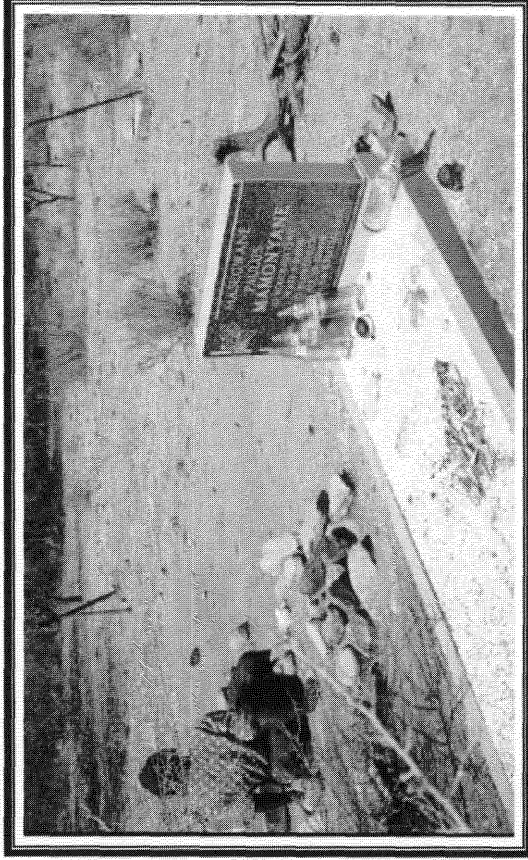


Plate 10: Burial sites are sacred to the local African communities and they are also site of traditional ceremonies and ancestral rituals. This grave is located within the Steepoort Farm Cemetery.

5.3 BULK WATER INFRASTRUCTURE

5.3.1 DE HOOP DAM BULK WATER SUPPLY INFRASTRUCTURE

The survey of the proposed water pipe line routes, pump stations and command reservoirs sites identified fewer cultural heritage resources sites that are likely to be affected by the ORWRDP development. The pipelines pass through generally developed areas and run parallel to existing roads that in most parts bound by electricity power lines and telephone lines, in some instances next to already existing underground water pipelines. Between the proposed De Hoop dam wall site and the Steel Bridge/Jane Furse turn-off, four burial sites, with one or more graves, were identified on the pipeline route (Table 3). The proposed pipeline would run mostly on the left hand side of the R555 provincial road to Steelpoort.

No cultural heritage sites were identified on the pipeline route or the pump station sites between Steel Bridge and Jane Furse.

From Steelpoort the proposed pipelines pass through rugged hilly terrain with exposed rock outcrops and gravel quarry sites. The roadside along which the pipeline would follow has high voltage carrier power lines, telephone lines, mining settlements and infrastructure. The line joins the R37 main road whose roadsides are similarly developed and built up with villages and agricultural land. In between the pipeline would pass through some community activity areas in Makgemeng Village (see Table 3). No archaeological sites were identified in these areas up to the Olifantspoort Weir. The level of disturbance on the proposed pipeline route made it difficult to locate any sites that may have existed. However, one other burial site was identified along the R37 towards Olifantspoort Weir.

Table 3: Cultural heritage sites identified along the proposed De Hoop Bulk Water Infrastructure project area and the recommendation of mitigation actions.

Sites	Location details	Type	Significance level	Recommendation
SPJF01	24° 55' 58.1" S 29° 58' 06.0" E, about 4.5 km from De Hoop dam site towards Steelpoort on the left hand side of the road in the field	Grave marked Modumatau Makanyane,	High	Avoid
SPJF02	24° 55' 59.5" S 29° 58' 06.0" E, close to SPJF01, left hand side of R555 road adjacent to 62.1 Km road marker.	Cemetery with 16 graves	High social significance and currently under use	Align pipeline to avoid the grave yard

SPJF03	24° 55' 59.5" S 29° 58' 06.0" E, same as SPJF02	LIA site, SPJF2 cemetery is located middle of site	None	Site already disturbed by farming and cemetery. No further action necessary.
SPJF04	24° 55' 02.1" S 29° 59' 00.0" E, located close to the R555 road on the left hand side about 6 km from De Hoop dam wall site to Steelpoort	2 Historic graves	High	Avoid if possible. Relocated if necessary because graves are within the road reserve area.
SPJF05	24° 54' 40.1" S 29° 59' 41.1" E,	Historic Grave	High	Avoid
SPOW01	24° 38' 20.1" S 30° 10' 59.1" E,	Traditional meeting place	Low	May be relocated if need and the effect is temporary until construction is complete.
SPOW02	24° 25' 01.0" S 30° 04' 51.0" E, edge of Mochiweng Village, left hand side of R37 road to Polokwane.	Historic contemporary cemetery	High	Avoid

Significance

Sites of significance along the pipeline routes include individual graves and cemeteries. As already highlighted above, all graves have high social significance and the same applies to the graves affected by the bulk water infrastructure.

5.3.2 FLAG BOSHILO DAM BULK WATER SUPPLY INFRASTRUCTURE

The survey of the proposed pipeline route from Flag Boshielo to Mokopane did not yield cultural heritage sites of any significance. The Flag Boshielo on-site dam infrastructure is already in place and construction to raise the wall has only recently commenced. From Flag Boshielo dam, the pipeline runs along existing roads passing through Elandskraal Villages towards the Aglimes Mine and Immerpan along the D885 road. The line would be laid in already disturbed land portions previously used in most part for agricultural purposes. The D885 roadsides have ESKOM power lines and Telkom lines in addition to mining infrastructure or farmlands leaving little chance to identify any archaeological sites on the surface.

The proposed pipeline follows the R518 main road towards Mokopane stopping about eight kilometres from the town. This stretch of land through which the proposed pipeline would run is mountainous. The nature of the terrain on this stretch of land is unlikely to yield archaeological sites. No other cultural heritage sites were recorded.

6 DISCUSSION

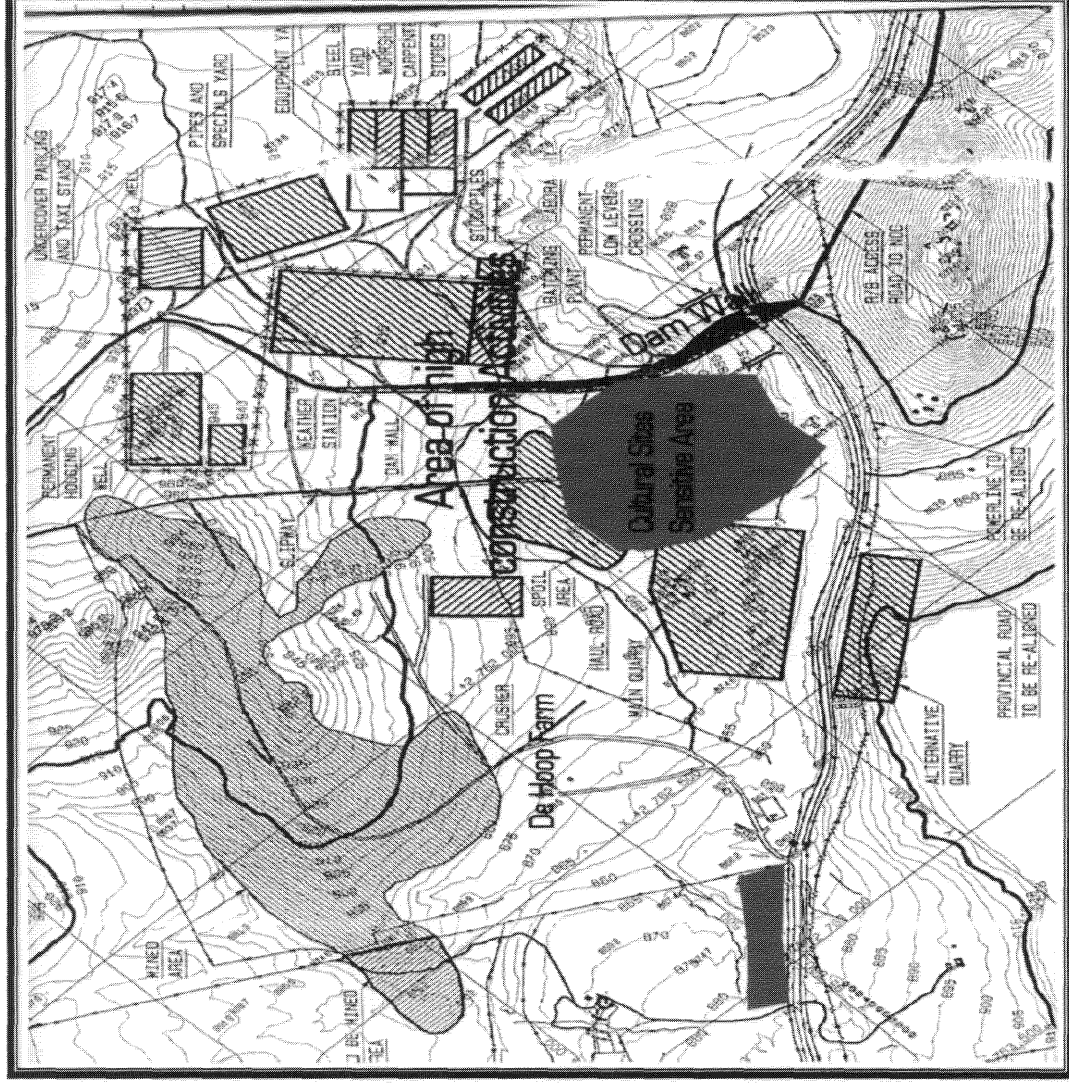
The survey of the dam basin yielded a large volume of archaeological and cultural sites. Preliminary assessments of the identified sites indicate that human communities occupied the Steelpoort River Valley area at least as far back as the Middle Stone Age, between 250,000 and 25,000 years ago. The sites identified also indicate that the Early, Middle and Late Iron Age farming communities occupied the valley area since the beginning of the first Millennium AD (Inskoop and Maggs, 1975; Evers 1980; Klapwijk & Huffman, 1996). The communities were relatively large. All the evidence at hand suggests that this area is archaeologically important and has the potential to contribute towards understanding the history of African farmers in the area.

Based on archaeological studies in the region, the prehistoric African farming communities' sites are organised in a systematic way. Within each homestead there is a residential zone with houses and grain bins – the residential zones associated with women. This zone surrounded a cattle kraal - male domain. The cattle kraals are also used for the burial of the patriarchy and high status women. Other women and children were historically buried in the residential zones. On the other hand, if one considers this spatial lay out - all burials, middens, animal kraals, houses, storage pits and grain bins- only about a quarter of any homestead contains features: the rest is open space Huffman 2001. Therefore, it is not possible to predict the location of burials except those anticipated to be somewhere in the cattle kraal.

The proposed dam would inundate several identified sites; the quarrying would dig up at least three concentrations of archaeological sites (Fig. 2 & 5). The proposed road realignment route appears to transect two visible kraals in the Early Iron Age complex and is close to other Iron Age sites (Fig. 3 below).

Remains of several historic houses stand in the proposed dam basin area. Two different structure types are represented. Rectangular ruins made from brick and cement mark the old European homesteads. None of these structures were recorded in any details. African (probably farm workers) lived in the second type, made from daga (a mixture of mud and dung). Several clusters lie within the dam basin. Some lie directly in areas earmarked as main quarry sites near the proposed dam wall site (see Fig. 3 & 4 below). Some of the historic settlements identified in the basin are associated with burial sites dating back to the early 1900s.

Fig 2: Map showing planned Phase 1 of dam wall construction activity area. Schematic representation of the location of a cluster of archaeological sites concentrated in this area (also see Fig. 5 below).



Furthermore, two ritual sites used for contemporary male initiation schools are affected by the proposed development. One site is located in the Klip River Valley in Steelpoort Park Farm and the other is located in De Hoop Farm in the area where the proposed road realignment would pass through. These sites are important in the local cultural practices. However, due to the sacred nature of the ritual practices associated with the sites, information regarding them was not readily available. However, ethnographic information from some villagers suggests that the initiation schoolmasters have the authority to relocate the schools whenever they see fit or when circumstances dictate.

Fig. 3: Tail end of the proposed dam. The marked area shows the route through which the proposed road re-alignment would pass. A cluster of relative large Early Iron Age sites is affected road.

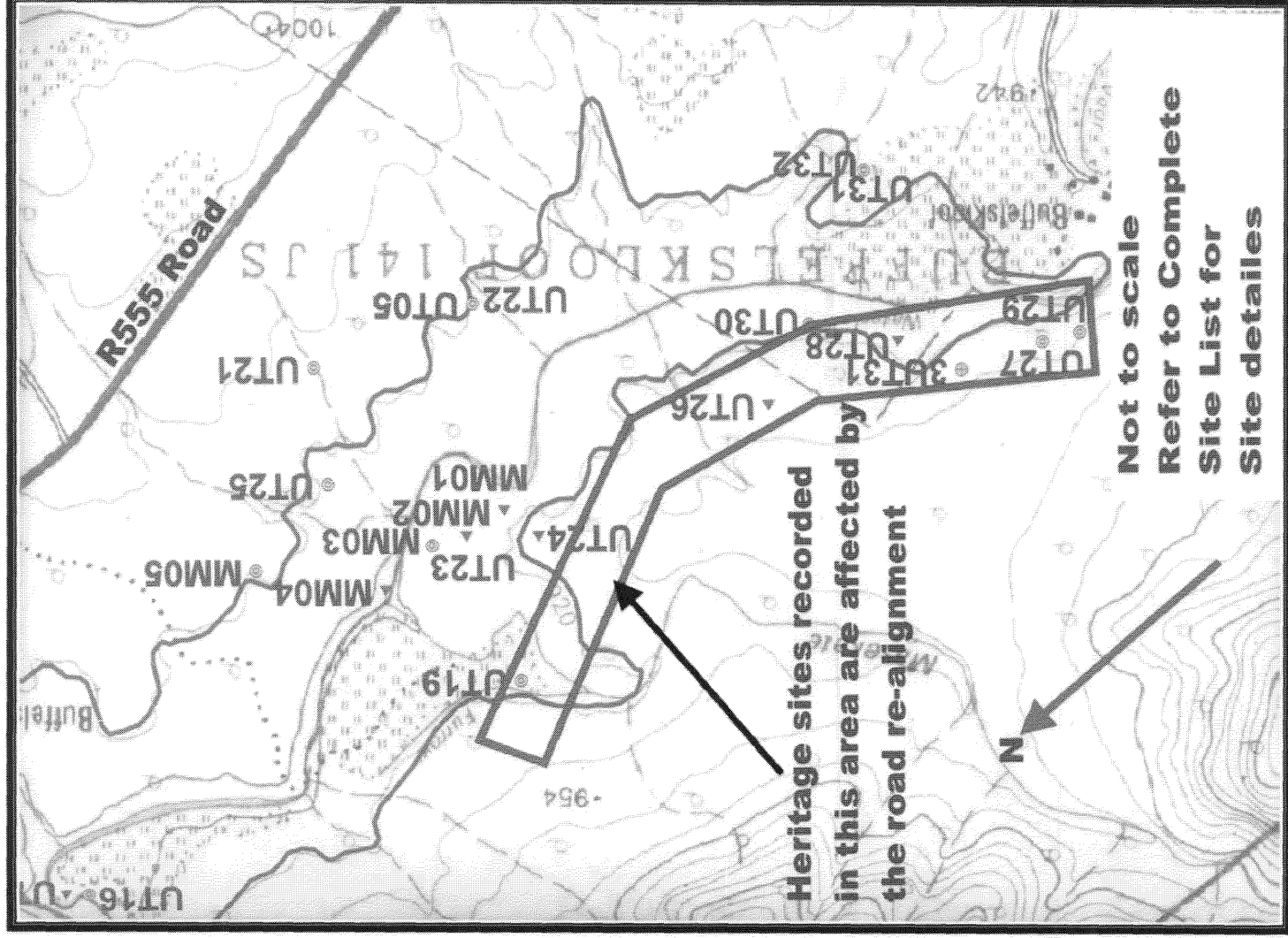
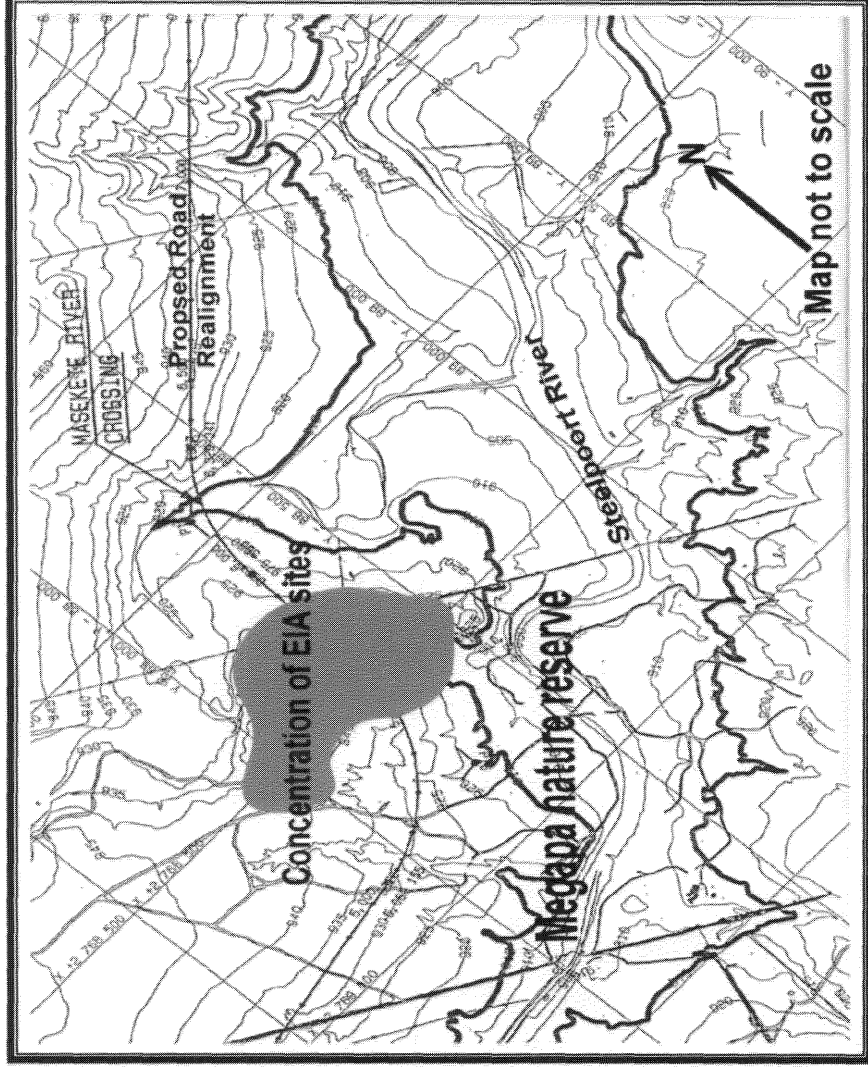


Fig. 4: The road realignment route transects through one of the prime archaeological areas in Megapa Nature Reserve with a high concentration of pre Early Iron Age (EIA) settlements (Map adapted from ORWRDP Planning Maps). Also see Fig. 3 above.



7 STATEMENT OF OVERALL IMPACTS

The proposed ORWRDP will destroy any cultural heritage resources including graves, historical and archaeological resources in its direct path. The impact will be permanent in nature, extent and duration. Cultural heritage resources are fixed in space. Any activity that threatens to alter the status quo is an immediate and direct threat to these resources.

Flooding will cover all cultural heritage resources in the dam basin. Dam wall construction, road construction, quarrying or any other surface or sub-surface altering activity will destroy the heritage resources. There is no measure for frequency or probability of occurrence of impacts on heritage resources in this case. Once the basin is flooded, nothing more could be done with regards to the heritage resources under water. From a heritage perspective, the identified impacts may not be measured in probabilities or intensity and it is not necessary to measure or predict duration of impacts.

Secondly, as highlighted above, the prehistoric and historic African settlement sites were organised in a systematic way. Within each homestead there is a residential zone with houses and grain bins – the residential zones associated with women. This zone surrounded a cattle kraal - male domain. The cattle kraals are also used for the burial of the patriarchy and high status women. Other women and children were historically buried in the residential zones. On the other hand, if one considers this spatial lay out - all burials, middens, animal kraals, houses, storage pits and grain bins- only about a quarter of any homestead contains features: the rest is open space. Therefore, it is not possible to predict the location, for example, of all burials except those clearly marked and those probably somewhere in the cattle kraal, nor is it possible to identify the extent of the sites from surface observations.

8 RECOMMENDATIONS

All archaeological cultural heritage baseline studies such as, surface collection, test excavations and excavations herein recommended may be operationalised under the guidelines and permits issued by the South African Heritage Agency (SAHRA). The relocation of affected burial grounds and graves is subject to agreements between the developer and the local communities whose graves are affected. However, under section 36 of the National Heritage Resources Act, Act 25 of 1999, heritage permits are also required to effect the relocation of particular graves. Generally, most burials would be relocated in line with the applicable Ordinances and the Human Tissue Act of 1983 as amended.

8.1 BURIALS AND GRAVE SITES

Should the proposed project proceed as planned we recommend that known burial sites and graves within the path of the proposed development should be relocated as stipulated by the applicable legislation (s).

The SAHRA has not yet determined a firm policy on graves too old to establish descendants. We suggest that community representatives should voice their opinions on this issue. From a traditional perspective, all human remains should be accorded the respect and sanctity of the grave. Therefore, known or unknown human remains should be reburied. From the viewpoint of the archaeologists, they may like to have the remains studied, and then kept in the collections of reputable medical and research institutions. Legally the matter may be decided by the South African Heritage Resources Agency when they issue the permit to either excavate or exhume and relocate affected human remains covered under the National Heritage Resources Act.

To fulfil the legal requirements with regards to mitigation of burial grounds and graves, we recommend the following steps be implemented before human remains are removed:

- Notification of the impending removals;
- Consultation with individuals or communities related to the deceased;
- Calling on relatives to claim the remains;
- Notices at the grave sites and other local media;
- Satisfactory arrangements for the exhumation and re-interment;
- Satisfactory arrangements for curation where applicable.

Two sets of legislation protect human burials: the Human Tissues Act (Act No 65 of 1983) and the National Heritage Resources Act (Act No 25 of 1999). The former applies to graves younger than sixty years, whereas the latter protects graves in formal cemeteries older than a hundred years, graves outside formal cemeteries older than sixty years, as well as graves of cultural significance or victims of conflict.

The National Heritage Resources Act (No 25 of 1999) states that:

- 36 (3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority;
- Destroy damage, alter, exhume or 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.

The National Heritage Resources Act (No 25 of 1999) also specifies the steps to be taken before the development. The Act also sets conditions for the approval of permits to interfere with burial grounds and graves protected under the Act:

- 36 (5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection (3)(b) unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority-
- (a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such graves or burial ground; and
 - (b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.

If permission is granted for development, and after the exhumation from the identified graves have taken place and further burials are found, the National Heritage Resources Act (No 25 of 1999) states that:

- (36)(6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority-
- (a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and
 - (b) if such a grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

Furthermore, the South African Heritage Resources Agency should be notified if human remains falling under the National Heritage Resources Act (Act No 25 of 1999) are accidentally uncovered during development. An archaeologist must supervise exhumations conducted under this Act. The removal must be conducted with due respect for the customs and beliefs of the affected relatives, and where requested, in the presence of relatives or community representatives.

8.1.1 MITIGATION SCHEDULE FOR GRAVE SITES

The ORWRDP will be implemented in two phases: (1) road re-alignment and dam wall construction and (2) dam inundation. The mitigation work may also be implemented in two phases.

Phase 1

Two burial sites, Site 3DH11 (cemetery with 14 graves) and Site 4DH14 (one isolated grave) are affected by the Phase 1 dam wall construction program (total of 15 graves). The graves are historical, therefore, for them to be relocated agreements should be secured with the affected families, who in this case are already aware of the developments and are currently participating in the project impact assessment activities. As such we recommend that agreements and compensations that might be associated with the proposed relocation of the graves should be processed along side other compensation claims associated with the ORWRDP.

If the necessary agreements to relocate the affected graves are secured, we recommend that eight (8) weeks be set aside to give the required notices and apply for the relevant burial grounds and graves permits and clearances to interfere or relocate the graves. Every grave should be treated individually. Another three (3) weeks should be set aside for the actual exhumation, relocation and re-interment processes. Therefore, the relocation of the graves affected by the dam wall construction activities would take an estimated eleven (11) weeks excluding the time required to secure the consent from the families affected.

Phase 2

Phase 2 of the ORWRDP would affect and would involve relocating ninety (90) individual graves from the dam basin. Once again, agreements and consent to relocate the affected graves should be secured before the relocation program can be implemented. We recommend that a total of eight (8) weeks be set aside to issue the relevant notices and secure applicable burial and grave permits from SAHRA. It should be noted that consent to relocate graves form part of the permit application documentation. With the necessary permits and clearances obtained, an estimated ten (10) weeks should be reserved for the actual excavation, exhumation, relocation and re-interment exercises. This of course depends on adequate resources being allocated for the necessary procedures. More details on the schedule and estimated cost estimates for the whole program are presented in Table 6 below.

8.1.2 MONITORING AND CONTINGENCY FOR GRAVES MITIGATION

In situations where earth moving and excavations would occur, there is a probability of digging up previously unidentified human remains particularly if the earth moving works take place on previously occupied landscapes. The De Hoop dam construction work will be done on a cultural landscape with long history of human occupation. As such we recommend that a contingency plan be put in place for an Archaeologist to monitor some construction sites for possible burials that may potentially be uncovered accidentally during earthmoving. However, the Archaeologist does not necessarily need to be on site permanently. The contractors and their labour force on sites should be conscientised about the probability of disturbing previously unknown cultural materials. Should these remains be unearthed, the Archaeologist would then be called in to conduct the Site Condition Survey and take the necessary salvage measures. No fixed time schedule is possible in this context. The operations would be on response basis.

8.2 ARCHAEOLOGICAL AND HISTORICAL HERITAGE RESOURCES

There are three basic recommendations applicable to archaeological and historical heritage resources affected by the ORWRDP:

- No further action for sites assessed as being of limited or no scientific/research significance threshold.
- Sites herein assessed as of low-medium scientific/research significance threshold should be preserved on record by documentation through mapping, surface collections and test excavations.
- A representative sample of sites herein assessed as of medium-high archaeological/historical significance value should be selected for detailed archaeological baseline studies.

All of the above recommendations may be operationalised through permits obtainable from the South African Heritage Agency. Such permits are particularly issued to qualified Archaeologist with relevant experience.

The recommended mitigation procedures may be implemented in two phases following the two development phases of the ORWRDP.

8.2.1 PHASE 1 DEVELOPMENT

This phase consists of the construction of the dam wall and associated infrastructure and the re-alignment of the R555 provincial Road. Sites affected by this phase of development are presented in Table 4 below (also see Fig. 5 below).

Two archaeological sites affected by the Phase 1 dam wall construction activities are recommended for rescue archaeological excavations. Two more are recommended for test excavations including a historic site. Two sites are recommended for surface collection and mapping exercises each. Archaeological heritage permits are required for these mitigation procedures to be carried out. The other eight sites are of low archaeological value and therefore no further action is recommended.

Table 4: Heritage sites affected by the ORWRDP Phase 1 dam wall construction activities and the mitigation recommendation for each site.

Site	Type	Significance Level	Mitigation Recommendation
MM13	Historic	Medium	Obtain excavation permit from SAHRA; Test Excavate and Map site features and structures
DH16	LIA	Low	No further action necessary
4DH12	Historic Grave	High	Relocate
DH13	EIA	Medium-low	Permit to collect surface artefacts
DH14	EIA	None	No further action

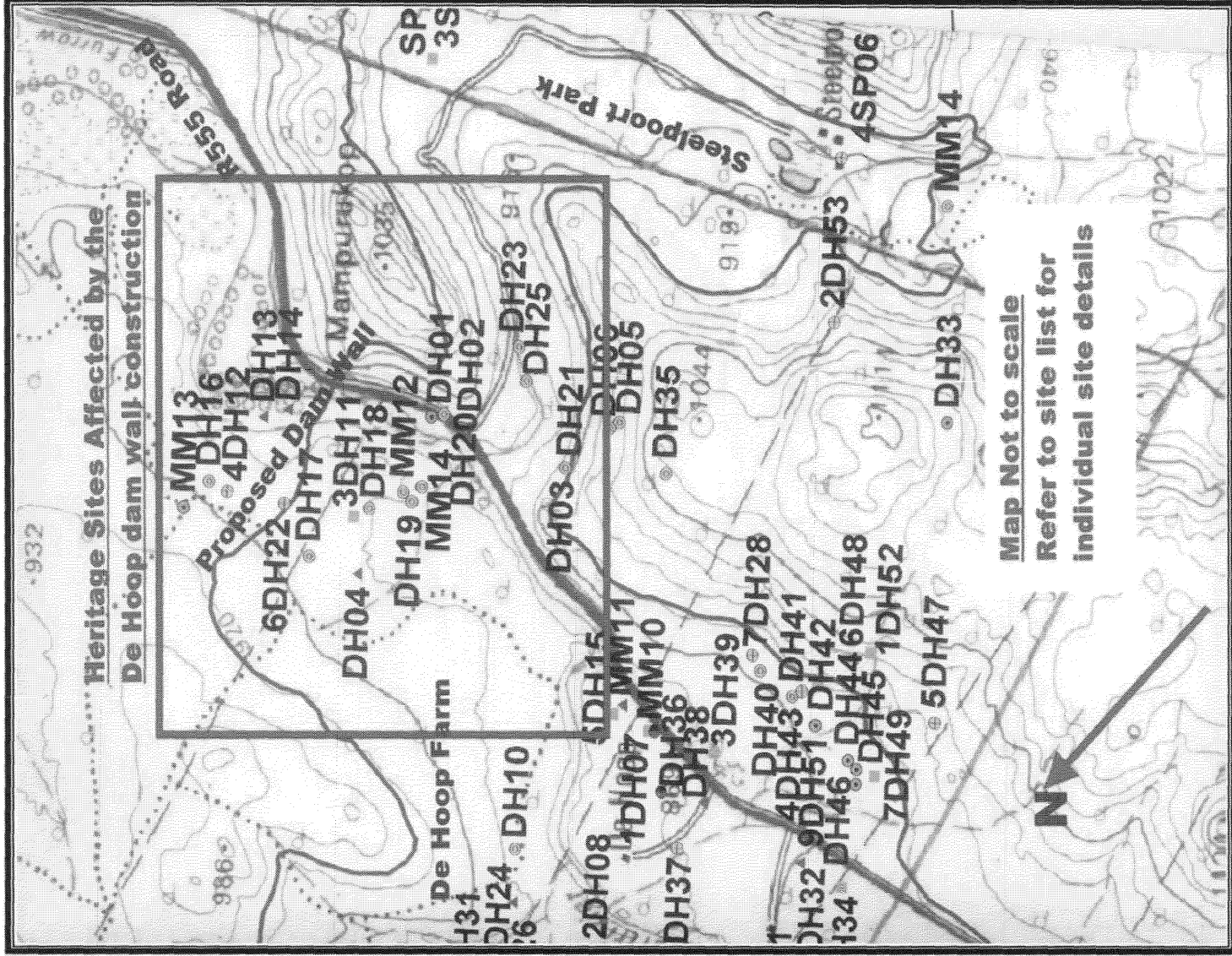
6DH22	Historic grave?	High	Relocate
DH17	LIA	Medium	Obtain excavation permit from SAHRA; test excavate; possibly rescue human burial
3DH11	Historic Cemetery	High	Relocate
DH04	EIA	Low	No further action
DH18	LIA	Low	No further action
MM12	LIA	Medium	Map surface features, structures
DH19	LIA	Medium-high	Obtain excavation permit; rescue excavate site
DH01	Historic	Medium-low	No further action
MM14	LIA	Medium-high	Obtain excavation permit; rescue excavate site
DH20	LIA	Low	No action
DH02	LIA	Medium-low	No action

8.2.2 MITIGATION SCHEDULE FOR PHASE 1

We recommend that eight weeks be set aside to conduct both the rescue and test excavation programs on four selected sites. Surface sample material collections and mapping exercises may be conducted within the same time period parallel to the excavations. As part of best archaeological practice, it is recommended that for every day spent in the field excavating, two more should be set aside for the material catalogue and analysis processes. This means 16 more weeks should be set aside for the material processing to allow for the production of the complete excavation reports as is required by SAHRA. Permission or clearance to begin construction work on site may be issued after the excavation report has been produced.

However, it is permissible to produce a Preliminary Excavation Report to be used to obtain the necessary permits or clearance from SAHRA to begin construction work on site. Such a report is acceptable by SAHRA for the application of a Destructive Permit. In the context of the ORWRDP Phase 1, such a report may be produced within six weeks following the completion of the excavation program. The complete Final Excavation Report will then be produce ten weeks later.

Fig. 5: Heritage sites that are affected by Phase 1 of the De Hoop Dam wall construction. This area is also affected by the construction of on site infrastructure for the dam wall construction teams. This includes the area just outside the dam wall down the river.



8.2.3 PHASE 2 DEVELOPMENT

Phase 2 of the ORWRDP involve the inundation the Steelpoort River Valley which will occur a couple of years following the completion of the Phase 1 dam wall construction. Because of the density of the sites found in the dam basin, it is not feasible nor is it necessary for archaeologists to rescue-excavate all sites prior to inundation. As such, in line with best practice principles, we recommended that a representative sample of the sites be considered for further studies. However, there is adequate time to implement Phase 2 mitigation for the affected archaeological sites.

Out of more than 60 archaeological sites that are affected by the dam inundation, only four have medium-high archaeological significance value and therefore are recommended for rescue excavation. Another 20 sites are assessed as medium-low in significance value. These are archaeologically significant enough (scientific value) to warrant further baseline studies such as surface collections, test excavations and mapping (see Table 5). The rest of the archaeological sites have low or no archaeological significance, and therefore, no further action is recommended.

Table 5: Heritage sites recommended for further mitigation before the dam is inundated.

Sites	Type	Significance Level	Mitigation Recommendation
MM08; UT12	LIA	Medium-high	SAHRA permit for detailed excavation
DH32; UT23	Early Iron Age	Medium-high	SAHRA permit for detailed excavation
DH21; DH31	LIA	Medium-low	Map, SAHRA permit to test excavate for possible burials
DH02; DH03; DH20; DH33; DH40; UT05; UT10; UT27	LIA	Medium Medium-low	Map surface features
DH26; DH27; DH09;	LIA	Medium	SAHRA permit to test excavate
DH35; UT09; UT13; UT30	LIA	Medium	SAHRA permit to test excavate
DH38; UT03; MM03; MM09; UT28; MM04; MM02; MM01	Early Iron Age	Medium	SAHRA permit to test excavate
UT11	Early Iron Age	Medium-low	SAHRA permit to surface collect samples
DH36	MSA	Low	Permit to surface collect

8.2.4 PHASE 2 MITIGATION SCHEDULE

Detailed excavations are conducted, in archaeological terms, under the guidance of sampling procedures. It is a mammoth task to attempt to excavate a site completely in order to recover both the vertical stratigraphy and the horizontal spatial extent particularly if the site is large. Archaeologists always sample in their studies (Hester et. al. 1997: 30). The present recommendations should not be viewed any different. Therefore, for the selected four sites recommended for detailed excavation, two weeks per site should be allocated for the excavation exercise. Two more weeks should added on as contingency, giving a total of ten weeks, since detailed rescue excavations may take longer than anticipated especially if the material on site have a deep profile.

A total of 16 more weeks should be scheduled for post-field documentation, cataloguing and pre-repository packaging work. In line with the principle of good practice, all excavated materials should be catalogued and analysed at a basic minimum level agreeable and set by the heritage institution that will permanently curate the materials. Meeting basic pre-storage documentation is usually mandatory as a condition of issue for excavation permits. If this recommendation is acceptable, it is possible during Phase 2 to conduct the necessary excavations and produce the full Excavation Reports before applying for the Destructive Permits from SAHRA and still be on schedule for the dam inundation.

Furthermore, there are 20 sites recommended for test excavations, mapping and surface collections. It is archaeologically possible to complete this mitigation segment within twelve weeks. However, the details of the test excavations would require a more refined sampling strategy that would carefully target sites that are more likely to yield better results.

8.3 CULTURAL HERITAGE MONITORING PROGRAMME

Theoretically, there is always a probability of uncovering previously unidentified archaeological or historical cultural materials in most cases where there are earth-moving activities such as digging borrow pits, underground pipeline construction, building structure foundations or road construction. The probability is even higher when the project area is located on a landscape previously known to have been occupied by human communities such as the ORWRDP project area. For example, from our previous experience in development projects such road construction¹, it is highly possible that previously unknown or unmarked burial sites may be discovered in areas previously declared devoid of cultural materials during the pre-development cultural assessment studies. These may have to be removed to safety through salvage operations (Murimbika et. al. 2004).

Therefore, since it is not possible to predict with certainty where previously unidentified archaeological materials, or any other category of cultural heritage material remains including human burials, may be uncovered. We recommend that an archaeologist should be retained to monitor the construction sites during the ORWRDP development. All previously unidentified significant archaeological or historical material remains exposed during the

¹ In 2003 -2004 RAL road upgrade projects, HeSSA rescued and relocated several previously unknown human burials. This situation is made difficult by the previous relocation of African communities from areas that were turned into commercial farming or mining lands. Developments such as the proposed bulk water infrastructure for the ORWRDP may cut through such areas where graves are accidentally discovered and may have to be relocated to safe sites.

construction should be recorded or be documented through salvage excavations. Technically, salvage excavations are meant to rescue affected cultural heritage material remains in construction or development-in-progress contexts. This does not necessarily need to stop the construction activities on entire project site because they may be conducted as the construction proceeds. Thus it will be important from the construction scheduling phases that the archaeological monitoring activities be planned and budgeted for.

In addition, prior to the beginning of construction work, the contractors should be trained to highlight to them the potential archaeological and cultural heritage material including human remains that they may potentially encounter during construction on sites. The training may be in the form of workshops. The contractors and their labour force are usually the ones who encounter chance archaeological and other cultural finds. Therefore, it is crucial for them to be aware and conscious of what to expect and the procedures to be followed when cultural resources are accidentally found.

8.4 ARCHAEOLOGICAL MATERIAL CURATION

It is taken as axiomatic here that the authority to excavate (including rescue and salvage programs) carries with it the responsibility to conserve and publish the results of the excavation. This is more so if considered in line with the principle that archaeological material remains are part of the national patrimony. Should these be negatively handled during and after excavation, it thus negatively contributes to scientific knowledge and national history, since valuable information may be lost forever.

Before archaeological excavations are sanctioned, usually the SAHRA excavation permits carry with them minimum requirements of heritage material handling. First artefacts resulting from pre-development excavations should be catalogued and packaged properly according to minimum set standards. Secondly, a permanent repository should be identified before the materials are removed from site. In fact, it is mandatory that before the excavation permits are issue, the applicant (Archaeologist) must satisfactorily guarantee that a national, provincial museum or an accredited research institution will adequately house the materials and adequate resources have been allocated for that purpose.

Although it not legally obligatory, as best practise we recommend that post-excavation measures should be put in place to ensure that the materials recovered from rescue excavations from the ORWRDP project area are adequately recorded and catalogued before storage. This would help to avoid the usual mishandling, loss and deterioration of scientific and cultural evidence that occurs when large volumes of archaeological materials are suddenly deposited at repositories that are usually over-stretched for handling resources.

As an alternative to sending all archaeological materials to outside repositories, a sample of the material remains may be retained for possible display in a site museum or interpretive facility. This may be constructed to form part of visitor or educational facilities associated with the dam site infrastructure. The developer may obtain a permit from the heritage authorities to be allowed to retain the cultural materials for the purpose of display on site. This alternative is considered acceptable and is in line with contemporary concept of sustainability and local development approaches. This allows the local communities to take control of part of their cultural heritage resources and may benefit from them directly if they are in a local museum compared to when they are sent away to big institutions that are usually far way

and far removed from the local communities. In fact national institutions are in accessible to the ordinary rural communities in the countryside.

Furthermore, the buffer zone surrounding the dam basin should be surveyed for possible archaeological and cultural heritage sites. These may be preserved as representative samples of the cultural landscape that existed in the area. The survey may only cover the limited area surrounding the dam that would be managed as part of the dam site property. This would mean a limited survey around the area to be inundated.

8.5 THE LEGAL REQUIREMENTS

All archaeological baseline studies here-in recommended such as surface collection, test excavations and rescue excavations are conducted only after a permit has been issued by SAHRA. The National Heritage Resources Act, Act No. 25 of 1999, forms the basis of the heritage management. Related Provincial Heritage legislations are also applicable. However, the principles are the same: heritage permits are legally required before any heritage site is interfered with, altered or destroyed. The recommended mitigation should be adequate enough to the satisfaction of the heritage authorities before a clearance to destroy the remaining site(s) is issued. Nonetheless, both Limpopo and Mpumalanga Provincial Heritage Authorities are not fully operational and they both lack the capacity to handle projects of the extent covered by the ORWRDP. Therefore, focus here in is in line with the national regulations.

Archaeological heritage permits are issued to archaeologists of varying classifications. However, in practice the level of mitigation work herein recommended requires heritage permits that are usually issued to a suitably qualified and experienced Archaeologist. Such professionals are incidentally accredited as Principal Investigators (PI) by the Association of Southern African Professional Archaeologists. While on one hand the PI would be legally responsible for directing, managing and meeting all conditions set in terms of reference and in heritage permits for mitigation programs, on the other hand the developers are legally bound to ensure that necessary resources are available for to fully comply with the mitigation requirement.

9 CONCLUDING REMARKS

From a heritage perspective, when taking into consideration the socio-economic and other values of the proposed development against the cultural heritage significance, it is not always possible to recommend an alternative site for proposed development. Therefore, the cultural landscape under threat from development may be rescued through detailed and well-planned baseline studies in line with the principle of preservation by documentation. Detailed monitoring procedures should be scheduled in order to adequately respond to chance finds that may be found accidentally during development activities and be able to rescue or salvage any such resources.

With the constraints herein discussed and appropriate mitigation measures adopted, there are no cultural heritage resources reasons why or barriers to the proposed development project.

Table 6: Summary of main findings, impacts and possible mitigation measures, time and estimated cost for the cultural heritage mitigation program.

Findings	Impact	Mitigation	Time Estimate	Estimated Total Costs
Dam Wall Construction Area Phase 1: 15 burials, 14 in a cemetery.	Will be destroyed by dam wall construction activities and consequent inundation.	Negotiate with communities; Meet legal requirements acquire permits; Map cemeteries; Relocate as agreed by all stakeholders and according to legislation.	8 weeks mandatory legal notices / relocation consents from families & Permits processing and legal clearances; 3 weeks exhumation, rescue excavations, relocation and re-burial program	R75,000.00 @R2500/grave excluding compensation claims
Dam Wall Construction Area Phase 1: High density of Archaeology sites.	Will be destroyed by dam wall construction activities	Preserve by documentation; sample 4 sites for surface collection, map important sites; select 2 representative sites sample for detailed archaeological excavation.	8 weeks mapping and surface collection & excavation of 2 sample sites, intensive program	R224,000.00 @ R4000/day
Dam Site Inundation Phase 2 90 graves identified in and out of cemeteries; Anticipate more as project get underway.	Will be inundated by dam flooding; Area not accessible any more; Might dig up during construction; Unidentified burials may be discovered in course development	Negotiate with communities; Meet legal requirements acquire permits; Map cemeteries; Relocate as agreed by all stakeholders and according to legislation.	8 weeks for mandatory legal notices / relocation consents from families; permits processing and legal clearances; 10 weeks for exhumation, rescue excavations, relocation and re-burial program.	R277,500.00 @ R2500 per grave excluding compensation claims
Dam Site Inundation Phase 2 High density of Archaeology/cultural sites.	All sites on path of ORWRDP will be destroyed completely by flooding and dam infrastructure construction.	Preserve by documentation; Full rescue excavation for 4 sites & sample 20 sites for surface sample collection, mapping and test excavation.	8 weeks of full excavation program running parallel to 10 weeks for mapping and surface collection and Test excavation of 20 sample sites.	R280,000.00 @ R4000/day cost for 70 work days.

<p>Pipeline Construction Phase 2 5 burial sites located along pipeline route</p>	<p>Excavation for pipeline will destroy the known or previously unknown archaeological heritage materials that may be buried under ground.</p>	<p>Avoid known graves and cemeteries.</p>	<p>Monitor construction sites through out project.</p>	<p>See Overall monitoring costing.</p>
<p>Dam Site inundation Phase 2 Steelpoort Valley is an important cultural and archaeological landscape</p>	<p>Cultural landscape will be destroyed and parts will be inaccessible; permanent loss of archaeological and cultural resources.</p>	<p>Study surrounding areas to identify alternative/ similar cultural landscape; detailed documentation of the archaeological sites in the proximity s a tread-off of lost landscape.</p>	<p>4 weeks of surveying and mapping cultural sites.</p>	<p>R84,000.00 @ R3000 per day cost for 28 days.</p>
<p>Dam and infrastructure Construction Phase 1 & 2 High possibility for encountering chance archaeological find during construction phases.</p>	<p>Construction will destroy sites and their contexts. Archaeological information will be lost due to unreported chance finds.</p>	<p>Develop monitoring plan to deal with chance finds; Rescue and salvage excavations; Workshop contractors about value of cultural heritage they might encounter during construction.</p>	<p>7 days of workshops for construction contracting teams; 260 total days of construction sites monitoring spread over 4 years of construction period.</p>	<p>R21, 000.00 @ R3000 per day of workshops. R390, 000.00 @ R78 000 per year of monitoring multi-construction sites.</p>
<p>Post-Field work analysis Large-scale rescue archaeological excavations will generate large volumes of cultural materials.</p>	<p>Archaeological artefacts will be removed and relocated outside the affected areas where it will not be accessible to the local communities. Large volumes of archaeological material from the rescue excavations will be beyond local heritage institution's holding capacities on short notice.</p>	<p>Consider developing on site museum or interpretive centre to allow local community and visitors access to the rescued cultural materials; Publish data in specialist and public medias.</p>	<p>16 weeks post-field material analysis and report production for compliant authorities; artefacts curation; Radiocarbon dating; Produce Archaeological Reports; Materials sample specialist analysis; material catalogues Possible display planning.</p>	<p>R160,000.00 @ R2000 per day cost estimate.</p>

10 REFERENCES

- Bickford, A and Sullivan, S. 1977. "Assessing the research significance of historic sites" in S Sullivan and s. Bowdler (eds), *Site Surveys and Significance assessment in Australian Archaeology*. Canberra: ANU.
- Ever, T. M. 1980. Klingbell Early Iron Age sites. Lydenburg, eastern Transvaal, South Africa. *The South African Archaeological Bulletin*. 46 – 57.
- Hammond-Tooke, D. 1993. *The roots of Lack South Africa*. Johannesburg: Jonathan Ball Publishers.
- Hester, T.R., Shafer H.J. and Feder, K.L. 1997. *Field Methods in Archaeology*, 7th edn, Mountain View California: Mayfield Publishing Co,
- Huffman, T.N. 1996. *Snakes and Crocodiles. Power and symbolism in ancient Zimbabwe*. Johannesburg: Witwatersrand University Press.
- Inskoop R.R and T. M. Maggs. 1975. Unique art objects in the Iron Age of the Transvaal, South Africa. *The South African Archaeological Bulletin* 114- 138.
- Klapwijk, M. and T.N. Huffman. 1996. Excavations at Silver Leaves: a final report. *The South African Archaeological Bulletin*. 84-93.
- Murimbika, M. 2004. Human burials and graves rescue operations for Road Agency Limpopo Road Upgrade 2003-2004 projects. Unpublished Heritage Impact Assessment Reports submitted to RAL and SAHRA Limpopo Province. Polokwane.
- Mönnig, H.O. 1967. *The Pedi*. Pretoria: J.L. Van Schaik.
- Whitelaw, G. 1996. Lydenburg revisited: another look at the Mpumalanga Early Iron Age Sequence. *The South African Archaeological Bulletin*. 75-83.
- The Human Tissues Act (Act No 65 of 1983).
- The National Heritage Resources Act (Act No 25 of 1999).

Appendix A: Complete List of Heritage sites identified during the ORWRDP CHA.

Site Name	GPS Co-ordinates	Site Type	Site Description
1DH07	S24°58'04.5" E29°56'48.0"	Cemetery	2 graves, well marked with concrete bricks
2DH08	S24°58'00.0" E29°56'19.9"	Grave	4yr old boy (White) upright slab, Botha/Beetge family
3DH11	S24°57'28.5" E29°57'12.1"	Cemetery	14 well marked graves, Tshehla family
4DH12	S24°57'13.7" E29°57'14.0"	Grave	Historic well marked grave, Surname-Kwena
5DH15	S24°58'00.6" E29°56'50.3"	Cemetery	3 graves
6DH22	S24°57'20.5" E29°57'13.2"	Grave	Possible grave
7DH28	S24°58'16.6" E29°56'58.1"	Grave	Grave marked by stone cairn
8DH29	S24°57'44.1" E29°55'50.0"	Cemetery	2 graves, well marked with concrete slab, Botha farm
9DH31	S24°57'44.5" E29°56'12.2"	Grave	Stone wall, grave
1DH34	S24°58'29.1" E29°56'29.5"	Cemetery	16 identified graves, Possibility of more
2DH37	S24°58'08.6" E29°56'34.4"	Grave	isolated grave, marked by stones
3DH39	S24°58'13.4" E29°56'45.5"	Cemetery	5 marked graves, Tau and Tshehla families
4DH43	S24°58'22.5" E29°56'54.1"	Grave	Grave with concrete slab ,Surname-Ngoako
5DH47	S24°58'38.6" E29°56'51.0"	Grave	Grave with upright slab, Surname-Moxanedi
6DH48	S24°58'28.5" 29°56'57.5"	Grave	Grave with concrete slab, Surname-Mashilo
7DH49	S24°58'31.6" 29°56'44.3"	Cemetery	2 graves, marked with stones
8DH50	S24°59'36.5" E29°56'14.8"	Grave	Grave marked with concrete slab
9DH51	S24°58'24.5" E29°56'54.5"	Cemetery	2 graves, marked by stones
1DH52	S24°58'30.6" E29°56'58.5"	Cemetery	3 Graves, Surnames-Mohlalhu, Tau,Leshera
2DH53	S24°58'25.0" E29°57'38.1"	Grave	Grave marked with packed stones
3SP01	S24°57'35.9" E29°58'06.9"	Cemetery	13 Graves, 8 old cement slab,2 granite,3 stones
4SP06	S24°58'24.7" 29°57'58.0"	Grave	3 large stones, Name-Johannes, previous SP farmer
5SP07	S24°57'46.7" E29°58'18.6"	Cemetery	2 well marked graves, Mamonyane family, SPpark farm
6UT01	S24°59'31.6" E29°56'04.0"	Cemetery	16 Graves, Surnames- Makabane & Mahlala, SPpark farm
7UT02	S24°59'28.3" E29°56'05.0"	Cemetery	7 graves, Tau family
8UT12	S24°59'17.6" E29°54'41.1"	Cemetery	Stonewall, cairns, Grain bin, kraal, pottery,3 graves

9UT13	S24°59'18.4" E29°54'34.0"	Cemetery	Possible graves
1UT14	S24°59'14.2" E29°54'38.0"	Grave	Graves
2UT15	S24°59'54.8" E29°54'34.4"	Grave	Isolated grave, marked by stones
3UT31	S25°01'28.0" E29°51'44.1"	Grave	Grave marked by oval shaped stone mound
DH01	S24°57'38.6 E29°57'23.7"	LIA/Historic	Historic village, Cattle kraal, Stone wall enclosures
DH02	S24°57'38" E29°57'23"	LIA	Stone wall enclosures, Grinding stones, Cattle kraal
DH03	S24°57'53.5 E29°57'18.7"	LIA/Historic	Mud houses remains, Stone wall enclosures
DH04	S24°57'29.9" E29°57'04.7"	EIA	Open eroded site, potsherds, Grinding stones
DH05	S24°57'59.6" E29°57'25.4"	LIA,	Stone circles, Grinding stones, Cattle kraal
DH06	S24°57'59.1 E29°57'24.4"	LIA	Stone walls, Stone circles, Ash midden
DH09	S24°57'52.8" E29°56'01.9"	LIA	Stone foundation, grain bin, stonewalls
DH10	S 24°57'49.8" E 29°56'33.4"	LIA	Stone wall remains, pot sheds, Grinding stones
DH13	S24°57'17.9" E29°57'23.4"	EIA	Potsherds
DH14	S24°57'21.1" E29°57'23.5"	EIA	<i>Achatina</i> shells, potsherds
DH16	S24°57'11.5" E29°57'15.2"	LIA/Historic	Stone circle, Grinding stone, Cattle kraal, Stone wall
DH17	S24°57'24.0" E29°57'07 1"	LIA	Stone walls, Grinding stones, broken glass, snail shell
DH18	S24°57'30.7" E29°57'12.5"	LIA	Stone circle
DH19	S24°57'35.7 E29°57'14.1"	LIA	Stone circle, Grinding stone, Stone wall
DH20	S24°57'38.6" E29°57'23.7"	LIA	Stone Walls
DH21	S24°57'53.5" E29°57'18.7"	LIA	Stone Wall, cattle enclosures, Mud structures
DH23	S24°57'48.3" E29°57'33.0"	LIA	Stone circle, House foundation
DH24	S24°57'49 8" E29°56'25.6"	EIA	Open site, Grinding stones
DH25	S24°57'49.4 E29°57'29.1"	LIA	Stone wall
DH26	S24°57'52.2" E29°56'11.2"	LIA	Stone circle, Grinding stone, potsherds, floor remains
DH27	S24°57'57.0" E29°56'06.3"	LIA	Stonewalls, Grinding stones, floor remains, Grooved stones
DH30	S24°57'30.2" E29°56'04.5"	LIA	Stone cairns, Grinding stones
DH31	S24°57'58.5" E29°56'12.2"	LIA	Stone wall
DH32	S24°57'48.2" E29°55'56.0"	EIA	Cattle kraal, Vitrified cow dung
DH33	S24°58'01.0" E29°56'01.1"	LIA/Historic	Stone walls, Cattle kraal, Mud house remains

DH35	S24°58'06.0" E29°57'19.3"	LIA	Stone wall, Pot sheds, Grinding stones, Grain bin
DH36	S24°58'07.2" E29°56'41.1"	MSA	Scatters of stone tools and hand axe
DH38	S24°58'11.6" E29°56'40.3"	EIA	Open site, low vegetation cover, Scatters of pottery
DH40	S24°58'17.9" E29°56'55.6"	LIA	Stone wall, Grinding stone, Stone cairns, Grain bin
DH41	S24°58'22.1" E29°56'52.8"	LIA	Stone wall,
DH42	S24°58'24.8" E29°56'49.9"	Historic	Daga mounds
DH44	S24°58'29.0" E29°56'46.4"	Historic	Daga mounds, collapsed yard wall
DH45	S24°58'30.0" E29°56'44.6"	Historic	Collapsed stone wall, Grinding stones, Daga mounds
DH46	S24°58'30.1" E29°56'43.1"	Historic	Grinding stone, House remains, historic midden
SP03	S24°57'34.0" E29°58'06.7"	Farm village	Remains of mud house floors
SP04	S24°58'52.3" E29°57'80.5"	LIA	Stone wall, Potsherds, Grinding stones,
SP05	S24°58'24.7" E29°57'59.5"	Farm house	Old farm house,
UT03	S24°59'09.8" E29°54'46.0"	EIA	Open lowland site, cattle kraal, Highly vitrified dung
UT04	S24°59'06.3" E29°55'13.6"	LIA	Stone circle, mud house foundation
UT05	S25°00'49.1" E29°52'45.1"	LIA	Collapsed stone wall
UT06	S24°58'58.2" E29°55'08.1"	LIA	Stone wall, Grinding stones, Stone terraces
UT07	S24°59'05.7" E29°54'55.1"	LIA	Stone cairns, remains of house foundation
UT08	S24°59'05.8" E29°55'02.7"	LIA	Stone cairns, Grinding stones
UT09	S24°59'06.3" E29°55'13.1"	LIA	Collapsed stone wall, stone wall terraces
UT10	S24°59'09.1" E29°54'46.1"	LIA	Collapsed stonewall, Grain bin,
UT11	S24°59'13.1" E29°54'51.4"	EIA	Open site, pottery, Cattle kraal, floor remains
UT12	S24°59'17.6" E29°54'41.1"	LIA	Stonewall, cairns, Grain bin, kraal, pottery,
UT13	S24°59'29.4" E29°55'00.1"	LIA	Collapsed stone walls, Possible graves
UT14	S24°59'29.2" E29°54'08.1"	LIA	Collapsed stone walls,
UT16	S25°00'28.1" E29°53'32.9"	LIA	Scatter of stone cairns in field
UT17	S25°00'28.2" E29°53'35.5"	EIA	Open site, Cattle kraal, Vetrified dung,
UT18	S25°00'51.7" E29°53'58.3"	EIA	Open fields stretching east to west, stone cairns
UT19	S25°00'52.9" E29°52'38.5"	LIA	Remains of stone wall
UT20	S25°00'59.2" E29°53'59.5"	EIA	Scattered potsherds

UT21	S25°01'27.9" E29°53'04.7"	LIA	Stone wall
UT22	S25°01'34.6" E29°52'45.1"	LIA	Collapsed stone wall, Stone circle,
UT23	S25°01'08.1" E29°52'49.8"	LIA	Stone wall circle
UT24	S25°01'09.0" E29°52'36.8"	EIA	Open site, grinding stones, Cattle Kraal, pottery remains
UT25	S25°01'15.0" E29°53'02.5"	LIA	Collapsed stone wall, Cattle kraal
UT26	S25°01'24.3" E29°52'08.4"	EIA	Open site, Cattle kraal, Scatter of pottery remains
UT27	S25°01'30.5" E29°51'33.6"	LIA	Stone wall, Stone circle, Grinding stones,
UT28	S25°01'31.2" E29°51'51.8"	EIA	Grinding stones, Pottery scatter, Grain bin
UT29	S25°01'31.5" E29°51'28.9"	LIA	Lines of perimeter walls
UT30	S25°01'33.4" E29°52'03.2"	LIA	Collapsed stonewall, stone cairns, Grain bin foundation, stone circle
UT32	S25°01'50.4" E29°51'55.9"	LIA	Isolated grinding stone in thick thorn bush
MM01	S25°01'15.6 E29°52'38.0"	EIA	Open site, pottery remains
MM02	S25°01'12.0 E29°52'40.5"	EIA	Cattle kraal
MM03	S25°01'08.6 E29°52'46.0"	EIA	Open site, grinding stones, Cattle Kraal, pottery remains
MM04	S25°01'02.6 E29°52'56.0"	EIA	Pottery scatter
MM07	S24°59'34.0 E29°54'02.5"	EIA	Open site, grinding stones, pottery remains
MM09	S24°57'53.0 E29°56'03.5"	EIA	Cattle kraal, pottery
MM11	S24°58'02.0 E29°56'50.5"	EIA	Pottery remains
MM05	S25°01'05.0 E29°53'12.0"	LIA	Collapses stonewall, stone cairns
MM06	S25°00'10.0 E29°53'34.0"	LIA	Collapsed stone wall, Cattle kraal
MM08	S24°57'55.5 E29°55'58.5"	LIA	Cattle kraal, Collapsed stone wall
MM12	S24°57'34.5 E29°57'15.0"	LIA	Collapsed stone wall
MM14	S24°57'36.5 E29°57'16.0"	LIA	Collapsed stone wall
MM10	S24°58'05.5 E29°56'48.0"	MSA	Stone tool flakes and a hand axe and scrapers
MM13	S24°57'08.5 E29°57'11.5"	Historic	Dense Pottery remains, Mud moulds remains
MM15	S24°58'28.4 E29°57'56.1"	Ritual	4 small vertical ritual alters, long fire place

Appendix B: List of Early Iron Age Sites & MSA Sites information

Site Name	GPS Co-ordinates	Type	Site Description	Recommendation
DH04	S24°57'29.9" E29°57'04.7"	EIA	Open eroded site, potsherds, Grinding stones	No further action
DH13	S24°57'17.9" E29°57'23.4"	EIA	Potsherds	Surface collection
DH14	S24°57'21.1" E29°57'23.5"	EIA	Fresh water shell, Pottery	No further action
DH24	S24°57'49.8" E29°56'25.6"	EIA	Open site, Grinding stones	No further action
DH32	S24°57'48.2" E29°55'56.0"	EIA	Extensive, well preserved cattle kraal, Vitrified dung	Full rescue excavation
DH38	S24°56'11.6" E29°56'40.3"	EIA	Open site, low vegetation cover, Scatters of pottery	Test excavation, Locate probable prehistoric burial
UT03	S24°59'09.8" E29°54'46.0"	EIA	Open lowland site, cattle kraal, Highly vitrified dung	Test excavation
UT11	S24°59'13.1" E29°54'51.4"	EIA	Open site, pottery, Cattle kraal, floor remains	Surface collection
UT17	S25°00'28.2" E29°53'35.5"	EIA	Open, Cattle kraal, Vitrified dung,	Test excavation
UT18	S25°00'51." 7"E29°53'58.3"	EIA	Open fields stretching east to west	No further action
UT20	S25°00'59.2" E29°53'59.5"	EIA	Scattered potsherds	No further action
UT24	S25°01'09.0" E29°52'36.8"	EIA	Open site, grinding stones, Cattle Kraal, pottery	Full rescue excavation
UT26	S25°01'24.3" E29°52'08.4"	EIA	Open low vegetation site, Cattle Kraal, Scatter of pottery	No further action
UT28	S25°01'31.2" E29°51'51.8"	EIA	Grinding stones, Pottery scatter, Grain bin foundation	Full rescue excavation
DH36	S24°58'07.2" E29°56'41.1"	MSA	Scatters of stone tools and hand axe	Surface collection
MM01	S25°01'15.6" E29°52'38.0"	EIA	Open site	Test excavation
MM02	S25°01'12.0" E29°52'40.5"	EIA	Potsherd scatter, cattle kraal	Test excavation

MM03	S25°01'08.6" E29°52'46.0"	EIA	Open site, grinding stones, cattle kraal, pottery remains	Test excavation
MM04	S25°01'02.6" E29°52'56.0"	EIA	Pottery scatter	Test excavation
MM07	S24°59'34.0" E29°54'02.5"	EIA	Open site, grinding stones, pottery remains	Surface collection
MM09	S24°57'53.0" E29°56'03.5"	EIA	Cattle kraal, highly vitrified cattle dung, pottery remains	Test excavation
MM11	S24°58'02.0" E29°56'50.5"	EIA	Pottery remains	No further action
MM10	S24°58'05.5" E29°56'48.0"	MSA	Stone tool flakes, a hand axe and scrapers	Surface collection

Appendix C: Historic heritage sites database

Site Name	GPS Co-ordinate	Site Type	Site Description	Recommendation
DH01	S24°57'38.6"E29°57'23.7"	Historic	Historic village, Cattle kraal, Stone wall enclosures	Test excavate, map
DH03	S24°57'53.5"E29°57'18.7"	Historic	Mud houses remains, Stone wall enclosures	Map
DH16	S24°57'11.5"E29°57'15.2"	Historic	Stone circle, Grinding stone, Cattle kraal, Stone wall	No further action, rescue nearby cemetery
DH33	S24°57'98.6"E29°56'87.3"	Historic	Stone walls, Cattle kraal, Mud house remains	Map
DH42	S24°58'24.8"E29°56'49.9"	Historic	Daga mounds, mud houses remains	No further action, rescue nearby cemetery
DH44	S24°58'29.0"E29°56'46.4"	Historic	Daga mounds, collapsed yard wall	No further action, rescue nearby cemetery
DH45	S24°58'30.0"E29°56'44.6"	Historic	Collapsed stone wall, Grinding stones, Daga mounds	No further action, rescue nearby cemetery
DH46	S24°58'30.1"E29°56'43.1"	Historic	Grinding stone, House remains, historic midden	No further action, rescue nearby cemetery
SP03	S24°57'34.0"E29°58'06.7"	Farm village	Remains of village, middens, domestic refuse	No further action, rescue nearby cemetery
SP05	S24°58'24.7"E29°57'59.5"	Farm house	Old farm house, western	Salvage original Wagon wheel windows
MM13	S24°57'08.5"E29°57'11.5"	Historic	Dense pottery remains, mud moulds remains	Test excavate and map site
MM15	S24°58'38.0"E29°57'52.5"	Ritual	4 vertical alters, Long fireplace, pit with ritual medicines	Notify community about dam inundation.

Appendix D: Late Iron Age heritage sites database

S/Name	GPS Co-ordinates	Type	Site Description	Recommendation
DH01	S24°57'38.6"E 29°57'23.7"	LIA	Historic village, Cattle kraal, Stone wall enclosures	Test excavation, map, Further documentation
DH02	S24°57'38.6"E 29°57'23.7"	LIA	Stone wall enclosures, Grinding stones, Cattle kraal	Map, document, Permit to surface collect
DH03	S24°57'53.5"E 29°57'18.7"	LIA	Mud houses remains, Stone wall enclosures	Map, document, Permit to surface collect
DH05	S24°57'59.6"E 29°57'25.4"	LIA	Stone circles, Grinding stones, Cattle kraal	Rescue/sample excavate, map
DH06	S24°57'59.1"E 29°57'24.4"	LIA	Stone walls, Stone circles, Ash midden	No further action
DH09	S24°57'52.8"E 29°56'01.9"	LIA	Stone foundation, grain bin, stonewalls	Rescue excavate, map
DH10	S24°57'49.8"E 29°56'33.4"	LIA	Stone wall remains, pot sheds, Grinding stones	No further action
DH16	S24°57'11.5"E 29°57'15.2"	LIA	Stone circle, Grinding stone, Cattle kraal, Stone wall	No further action
DH17	S24°57'24.0"E 29°57'07.1"	LIA	Stonewalls, Grinding stones, Broken glass, shell, graves?	Test excavation, rescue possible graves
DH18	S24°57'30.7"E 29°57'12.5"	LIA	Stone circle	No further action
DH19	S24°57'35.7"E 29°57'14.1"	LIA	Stone circle, Grinding stone, Stone wall	Test excavate, map, further documentation
DH20	S24°57'38.6"E 29°57'23.7"	LIA	Stone Walls	Map, record surface features
DH21	S24°57'53.5"E 29°57'18.7"	LIA	Stone Wall, cattle enclosures, Mud structures	Map, test possible burials
DH23	S24°57'48.3"E 29°57'33.0"	LIA	Stone circle, House foundation	No further action
DH25	S24°57'49.4"E 29°57'29.1"	LIA	Stone wall	No further action

DH26	S24°57'52.2" E29°56'11.2"	LIA	Stone circle, Grinding stone, potsherd, floor remains	Test excavate, map, further documentation
DH27	S24°57'57.0" E29°56'06.3"	LIA	Stonewalls, Grinding stones, floor remains, Grooved stones	Test excavate
DH30	S24°57'30.2" E29°56'04.5"	LIA	Stone cairns, Grinding stones	No further action
DH31	S24°57'58.5" E29°56'12.2"	LIA	Stone wall, grave marked by stone cairn	Test excavate to confirm grave, relocate,
DH33	S24°58'01.0" E29°56'01.1"	LIA	Stone walls, Cattle kraal, Mud house remains	Map, document, test for graves on site, relocate
DH35	S24°58'06.0" E29°56'79.3"	LIA	Stone wall, Pot sheds, grinding stones, Grain bin	Test excavate
DH40	S24°58'17.9" E29°56'55.6"	LIA	Stone wall, Grinding stone, Stone cairns, Grain bin, grave	Map, test for historic grave, relocate
DH41	S24°58'22.1" E29°56'52.8"	LIA	Stone wall,	No further action
UT04	S24°59'06.3" E29°55'13.6"	LIA	Stone circle, mud house foundation,	No further action
UT05	S25°00'49.1" E29°52'45.1"	LIA	Collapsed stone wall	Map, document surface features
UT06	S24°58'98.2" E29°55'08.1"	LIA	Stone wall, Grinding stones, Stone terraces	No further action
UT07	S24°59'05.7" E29°54'55.1"	LIA	Stone cairns, remains of house foundation	No further action
UT08	S24°59'05.8" E29°55'02.7"	LIA	Stone cairns, Grinding stones	No further action
UT09	S24°59'06.3" E29°55'13.1"	LIA	Collapsed stone wall, stone wall terraces	Map, test excavate
UT10	S24°59'09.1" E29°54'46.1"	LIA	Collapsed stonewall, Grain bin,	Map, document surface features
UT12	S24°59'17.6" E29°54'41.1"	LIA	Stonewall, cairns, Grain bin, kraal, pottery, 3 graves	Full rescue excavation
UT13	S24°59'29.4" E29°55'00.1"	LIA	Collapsed stone walls, associated graves	Map, test excavate to identify possible graves
UT14	S24°59'29.2" E29°54'08.1"	LIA	Collapsed stone walls,	No further action

UT16	S25°00'28.1" E29°53'32.9"	LIA	Scatter of stone cairns in field	No further action
UT19	S25°00'52.9" E29°52'38.5"	LIA	Remains of stone wall	No further action
UT21	S25°00'87.9" E29°52'64.7"	LIA	Stone wall	No further action
UT22	S25°00'94.6" E29°52'45.1"	LIA	Collapsed stone wall, Stone circle,	No further action
UT23	S25°01'08.1" E29°52'49.8"	LIA	Stone wall circle	No further action
UT25	S25°01'15.0" E29°52'62.5"	LIA	Collapsed stone wall, Cattle kraal, in Megapa reserve	No further action
UT27	S25°01'30.5" E29°51'33.6"	LIA	Stone wall, Stone circle, Grinding stones,	Map, document surface features
UT29	S25°01'31.5" E29°51'28.9"	LIA	Lines of perimeter walls	No further action
UT30	S25°01'33.4" E29°52'03.2"	LIA	Collapsed stonewall, cairns, Grain bin, stone circle	Test excavation, map, further documentation
UT32	S25°01'50.4" E29°51'55.9"	LIA	Isolated grinding stone in thick thorn bush	No further action
MM05	S25°01'05.0" E29°53'12.0"	LIA	Collapsed stonewall, stone cairns	Map
MM06	S25°00'10.0" E29°53'34.0"	LIA	Collapsed stone wall, cattle kraal	Test excavate
MM08	S24°57'55.5 E29°55'58.5"	LIA	Cattle kraal, collapsed stone wall	Detailed excavation
MM12	S24°57'34.5" E29°57'15.0"	LIA	Collapsed stone wall	Map surface features
MM14	S24°57'36.5" E29°57'16.0"	LIA	Collapsed stone wall	Rescue excavation

Appendix E: Burials and Grave sites database

S/Name	GPS Co-ordinates	Site Type	Site Description	Recommendation
1DH07	S24°58'04.5" E29°56'48.0"	Cemetery	2 graves, well marked with concrete bricks	Relocate, identify family custodians
2DH08	S24°58'00.0" E29°56'19.9"	Grave	4yr old boy (White), upright slab, Botha/Beetge family	Relocate, Discuss with Mr Botha, Farmer
3DH11	S24°57'28.5" E29°57'12.1"	Cemetery	14 well marked graves, Tsheha family	Map, Negotiate with families, Relocate
4DH12	S24°57'13.7" E29°57'14.0"	Grave	Historic well marked grave, Surname-Kwena	Identify family custodians, Relocate
5DH15	S24°58'00.6" E29°56'50.3"	Cemetery	3 graves	Identify family custodians, Relocate
6DH22	S24°57'20.5" E29°57'13.2"	Grave	Possible grave	Confirm, discuss with community, Relocate
7DH28	S24°58'16.6" E29°56'58.1"	Grave	Grave marked by stone cairn	Confirm, discuss with community, Relocate
8DH29	S24°57'44.1" E29°55'50.0"	Cemetery	2 graves, well marked with concrete slab, Botha farm	Identify family custodians, Relocate
9DH31	S24°57'44.5" E29°56'12.2"	Grave	Stone wall, grave	Confirm, discuss with community, Relocate
1DH34	S24°56'29.1" E29°56'29.5"	Cemetery	16 identified graves, Possibility of more	Map, Negotiate with families, Relocate
2DH37	S24°58'08.6" E29°56'34.4"	Grave	Isolated grave, marked by stones	Confirm, discuss with community, Relocate
3DH39	S24°58'13.4" E29°56'45.5"	Cemetery	5 marked graves, Tau and Tsheha families	Map, Negotiate with families, Relocate
4DH43	S24°58'22.5" E29°56'54.1"	Grave	Grave with concrete slab, Surname-Ngoako	Identify family custodians, Relocate
5DH47	S24°58'38.6" E29°56'51.0"	Grave	Grave with upright slab, Surname-Moxamedi	Identify family custodians, Relocate

6DH48	S24°58'28.5" E29°56'57.5"	Grave	Grave with concrete slab, Surname-Mashilo	Identify family custodians, Relocate
7DH49	S24°58'31.6" E29°56'44.3"	Cemetery	2 graves, marked with stones	Identify family custodians, Relocate
8DH50	S24°59'36.5" E29°56'14.8"	Grave	Grave marked with concrete slab	Identify family custodians, Relocate
9DH51	S24°58'24.5" E29°56'54.5"	Cemetery	2 graves, marked by stones	Identify family custodians, Relocate
1DH52	S24°58'30.6" E29°56'58.5"	Cemetery	3 Graves, Surnames-Mohlahlu, Tau, Leshera	Identify family custodians, Relocate
2DH53	S24°58'25.0" E29°57'38.1"	Grave	Grave marked with packed stones	Identify family custodians, Relocate
3SP01	S24°57'35.9" E29°58'06.9"	Cemetery	13 Graves, 8 old cement slab, 2 granite, 3 stones	Map, Negotiate with families, Relocate
4SP06	S24°58'24.7" E29°57'58.0"	Grave	3 large stones, Name-Johannes, previous SP farmer	Identify family custodians, Relocate
5SP07	S24°57'46.7" E29°58'18.6"	Cemetery	2 well marked graves, Mamonyane family, Spark farm	Identify family custodians, Relocate
6UT01	S24°59'31.6" E29°56'04.0"	Cemetery	16 Graves, Surnames- Makabane & Mahlala, SPark farm	Map, Negotiate with families, Relocate
7UT02	S24°59'28.3" E29°56'05.0"	Cemetery	7 graves, Tau family	Map, Negotiate with families, Relocate
8UT12	S24°59'17.6" E29°54'41.1"	Cemetery	Stonewall, cairns, Grain bin, kraal, pottery, 3 graves	Discuss with community, Relocate
9UT13	S24°59'18.4" E29°54'34.0"	Cemetery	Possible graves	Confirm, discuss with community, Relocate
1UT14	S24°59'14.2" E29°54'38.0"	Grave	Graves	Confirm, discuss with community, Relocate
2UT15	S24°59'54.8" E29°54'34.4"	Grave	Isolated grave, marked by stones	Discuss with community, Relocate
3UT31	S25°01'28.0" E29°51'44.1"	Grave	Grave marked by oval shaped stone mound	Identify family custodians, Relocate

