

2922 DD 2005 Keikamspoor 71, Portion 16

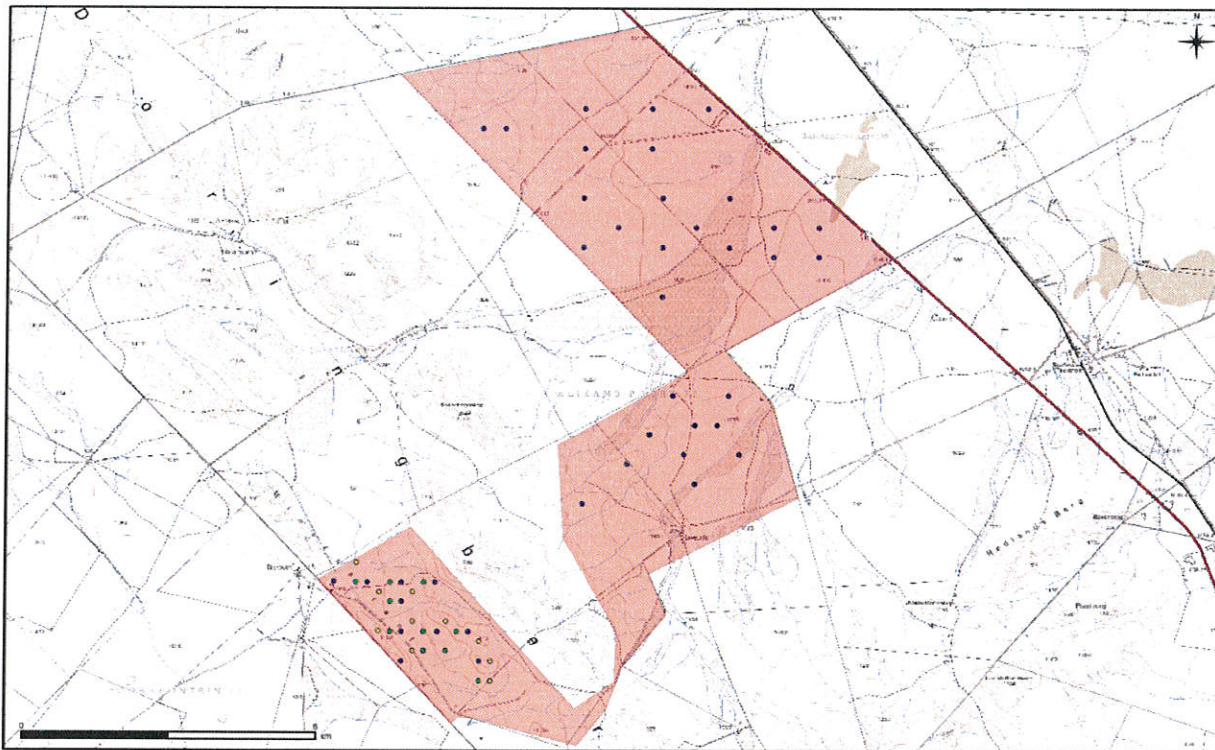


Figure 36. 2922 DD 2005

None of the historic maps shows any developments of any heritage significance.

4. FINDINGS

All the areas investigated displayed characteristics of typical Karroo veldt. Low growing shrubs predominate with isolated Witgat and Quiver trees. Some areas have been subject to erosion and excavation in the past. Some prospecting areas were encountered.

Each of the indicated borehole prospecting sites were investigated for evidence of heritage sites. An area of 20m around each site was investigated on foot.

4.1 FIELDWORK RESULTS

All the proposed borehole locations were investigated on foot. The heritage potential of an area between 10m and 20m radius around the proposed borehole and trench were investigated for any signs of heritage significance. The site was photographed and where stone tools occurred, representative samples were taken for referencing. Stone tools were also photographed *in situ* where they occurred at some sites.

4.1.1 STONE TOOLS

The locations at Keikamspoor 71 Portion 16 showed low scatters of Middle- and Late Stone Age tools in certain areas. Although relatively common, none of these areas showed any sign of being an occupational or manufacturing site. The common substrate in these areas is alluvial sand that has been disturbed through geological and meteorological processes making most of these finds out of context and of little heritage value. The expected impact of these boreholes is very small due to their small footprint.



Figure 37. LSA Tools *in situ*



Figure 38. MSA cores and LSA tools of iron stone



Figure 39. Examples of natural banded iron stone



Figure 40. Examples of natural banded iron stone



Figure 41. LSA Flakes and reworked cores



Figure 42. LSA iron stone microliths

4.1.2 STONE WALLS

Located at 29°54'34.24"S 22°48'44.86"E.

On the south western corner of the study are the remains of several stone kraals can be found close to the current site of the windpump at the back of the ridge from the homestead.

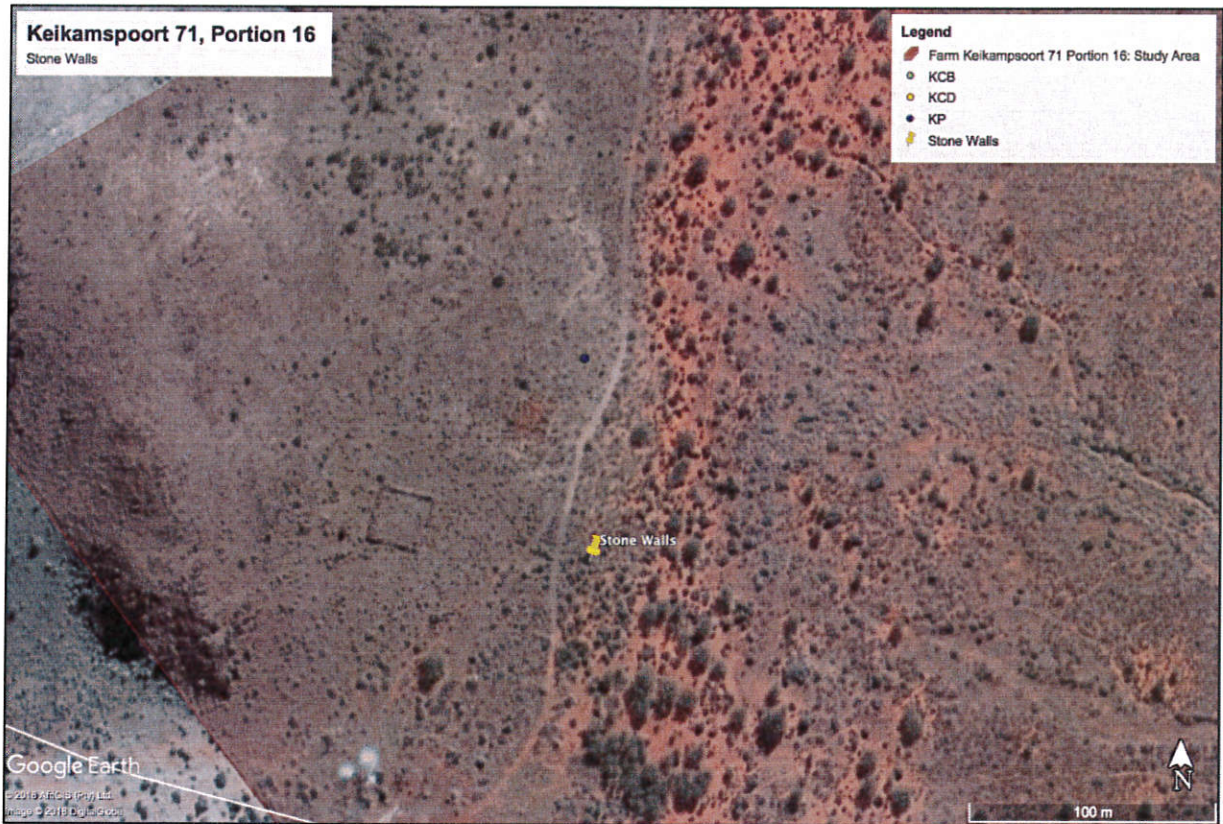


Figure 43. Aerial view of enclosures



Figure 44. Dry stone walled enclosures close to homestead

The stone walls are built from the locally occurring iron stone as well as slate that were packed on top of each other without any bonding material (dry stone walling). The structures are all square or elongated and originates from the colonial period. Due to its shape, size and location the structures show strong indications of being livestock enclosures or some kind. According to the farmer, this was their function before they installed wire enclosures next to the wind pump. The age of these structures is uncertain, however they will not be affected by the proposed development and are only mentioned here to ensure that they are not damaged by secondary activities.

4.1.3 FOUNDATIONS

Located at 29°54'2.48"S

22°52'34.96"E

These are rock foundations of either a homestead or livestock enclosure of uncertain age. They will not be influenced by the proposed prospecting activities.

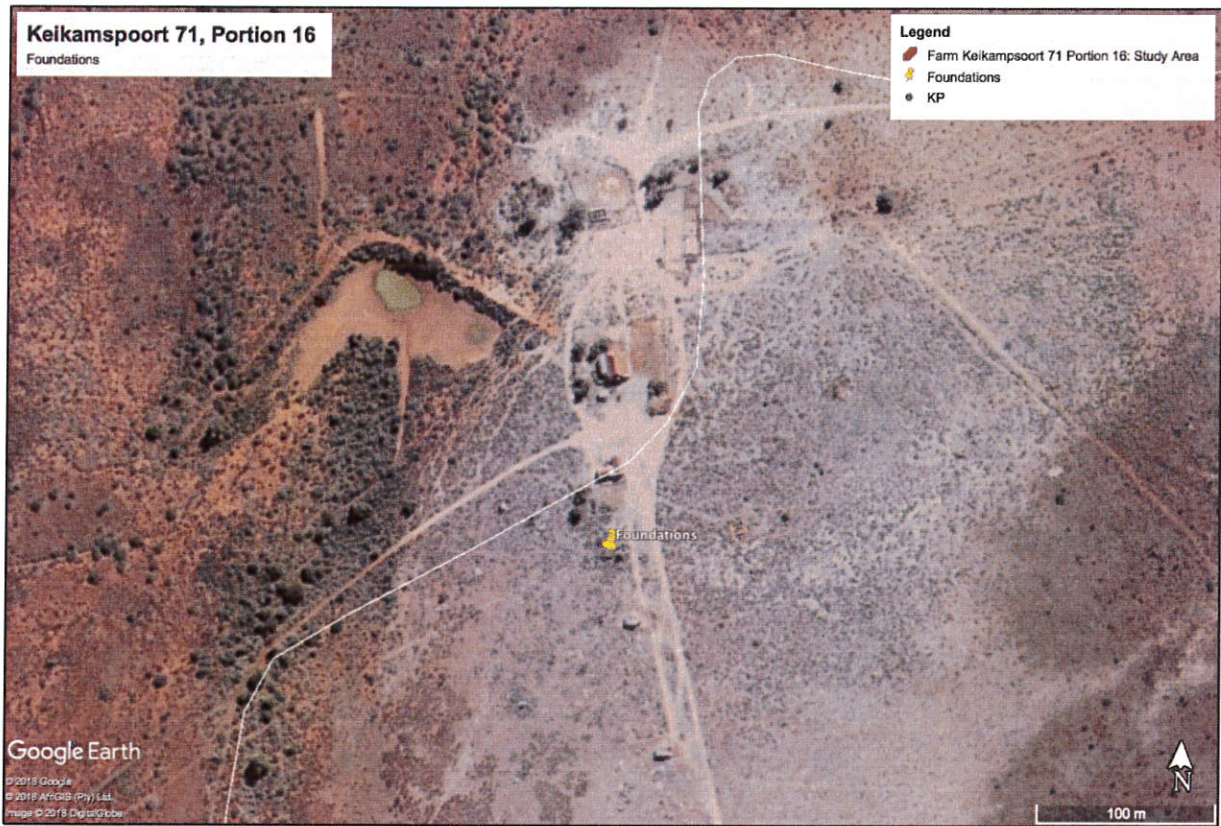


Figure 45. Farm homestead



Figure 46. Stone foundations

4.2 LOCATION OF BOREHOLES: KEIKAMSPOORT 71, PORTION 16

No.	Identification No.	Percussion Boreholes: Phase 1	
1	KP1	29°54'31.59"S	22°49'51.86"E
2	KP2	29°54'31.56"S	22°49'29.49"E
3	KP3	29°54'31.53"S	22°49'07.12"E
4	KP4	29°54'44.55"S	22°49'29.47"E
5	KP5	29°54'31.50"S	22°48'44.76"E
6	KP6	29°55'04.03"S	22°49'29.43"E
7	KP7	29°55'04.07"S	22°49'53.65"E
8	KP8	29°55'04.09"S	22°50'14.17"E
9	KP9	29°55'23.52"S	22°49'29.40"E
10	KP10	29°55'23.59"S	22°50'21.59"E
11	KP11	29°53'39.74"S	22°51'28.85"E
12	KP12	29°52'54.32"S	29°52'54.32"S
13	KP13	29°52'28.35"S	22°52'28.57"E
14	KP14	29°52'28.39"S	22°53'5.84"E
15	KP15	29°52'47.85"S	22°52'43.46"E
16	KP16	29°52'47.87"S	22°52'58.36"E
17	KP17	29°53'07.33"S	22°52'35.98"E
18	KP18	29°53'07.36"S	22°53'13.25"E
19	KP19	29°53'26.82"S	22°52'43.41"E
20	KP20	29°50'37.99"S	22°53'35.77"E
21	KP21	29°50'38.02"S	22°54'05.57"E
22	KP22	29°50'57.50"S	22°54'05.55"E
23	KP23	29°50'57.48"S	22°53'35.75"E
24	KP24	29°50'18.48"S	22°53'05.99"E
25	KP25	29°50'18.44"S	22°52'21.29"E
26	KP26	29°50'18.39"S	22°51'29.13"E
27	KP27	29°50'50.86"S	22°51'29.09"E
28	KP28	29°50'50.92"S	22°52'21.24"E
29	KP29	29°50'50.96"S	22°53'05.95"E
30	KP30	29°51'23.39"S	22°52'21.20"E
31	KP31	29°49'20.01"S	22°52'51.16"E
32	KP32	29°49'19.98"S	22°52'13.91"E
33	KP33	29°49'19.93"S	22°51'29.22"E
34	KP34	29°49'32.86"S	22°50'37.05"E
35	KP35	29°49'32.84"S	22°50'22.16"E
36	KP36	29°49'45.91"S	22°51'29.18"E
37	KP37	29°49'45.96"S	22°52'13.88"E
38	KP38	29°53'13.79"S	22°51'58.70"E

39	KP39	29°50'37.90"S	22°51'51.46"E
40	KP40	29°50'37.95"S	22°52'43.61"E
No.	Identification No.	Core Boreholes: Phase 2	
1	KCB1	29°54'31.52"S	22°48'59.67"E
2	KCB2	29°54'31.55"S	22°49'22.03"E
2	KCB3	29°54'31.58"S	22°49'44.40"E
4	KCB4	29°54'44.54"S	22°49'22.01"E
5	KCB5	29°55'04.02"S	22°49'21.98"E
6	KCB6	29°55'04.05"S	22°49'44.35"E
7	KCB7	29°55'04.08"S	22°50'06.71"E
8	KCB8	29°55'17.04"S	22°49'44.32"E
9	KCB9	29°55'17.06"S	22°49'59.24"E
10	KCB10	29°55'36.58"S	22°50'21.57"E
No.	Identification No.	Core Drilling: Phase 3	
1	KCD1	29°55'36.59"S	22°50'29.03"E
2	KCD2	29°55'23.60"S	22°50'29.05"E
3	KCD3	29°54'57.58"S	22°49'59.27"E
4	KCD4	29°54'57.55"S	22°49'36.90"E
5	KCD5	29°55'17.03"S	22°49'36.87"E
6	KCD6	29°54'38.06"S	22°49'36.93"E
7	KCD7	29°54'38.03"S	22°49'14.57"E
8	KCD8	29°55'10.60"S	22°50'21.62"E
9	KCD9	29°55'04.01"S	22°49'14.52"E
10	KCD10	29°54'18.53"S	22°48'59.69"E

5. METHODOLOGY

5.1 INVENTORY

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

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

5.2 EVALUATING HERITAGE IMPACTS

A combination of document research as well as the determination of the geographic suitability of areas and the evaluation of aerial photographs determined which areas could and should be accessed.

After plotting of the site on a GPS the areas were accessed using suitable combinations of vehicle access and access by foot.

Sites were documented by digital photography and geo-located with GPS readings using the WGS 84 datum.

Further techniques (where possible) included interviews with local inhabitants, visiting local museums and information centers and discussions with local experts. All this information was combined with information from an extensive literature study as well as the result of archival studies based on the SAHRA (South African Heritage Resource Agency) provincial databases.

This Heritage Impact Assessment relies on the analysis of written documents, maps, aerial photographs and other archival sources combined with the results of site investigations and interviews with effected people. Site investigations are not exhaustive and often focus on areas such as river confluence areas, elevated sites or occupational ruins.

The following documents were consulted in this study;

- South African National Archive Documents
- SAHRIS (South African Heritage Resources Information System) Database of Heritage Studies
- Internet Search
- Historic Maps
- 1965, 1988 and 2005 Surveyor General Topographic Map series
- 1952 1:10 000 aerial photo surveys
- Google Earth 2018 imagery
- Published articles and books
- JSTOR Article Archive

5.3 FIELDWORK

Fieldwork for this study was performed on the 18th of July 2018. Most of the areas were found to be accessible by vehicle. Areas of possible significance were investigated on foot. The survey was tracked using GPS and a track file in GPX format is available on request.

The study was focused on the specific borehole and trench positions and their direct surroundings.

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

Where sites were identified it was documented photographically and plotted using GPS with the WGS 84 datum point as reference.

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

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

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

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

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

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

5.4 PUBLIC PARTICIPATION

The surface owners and other interested and affected parties of the proposed prospecting activities to be undertaken by Tsebepix will be informed to ensure that the rights and needs of all parties are taken into account.

Interviews were undertaken with the farm owners and some farm labourers to ascertain if they had any knowledge of heritage sites within the study areas. Many of the landowners have lived on the properties for their whole life and proved to be a valuable source of information.

Registering as an I&AP will ensure that interested individuals are placed on a database of persons to be informed of any progress regarding the proposed activity. Copies of all relevant documentation will be made available to registered I&AP's.

6. MEASURING IMPACTS

In 2003 the SAHRA (South African Heritage Resources Agency) compiled the following guidelines to evaluate the cultural significance of individual heritage resources:

6.1 TYPE OF RESOURCE

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

6.2 TYPE OF SIGNIFICANCE

6.2.1 HISTORIC VALUE

It is important in the community, or pattern of history.

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

It has strong or special association with the life or work of a person, group or organization of importance in history.

- o Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, province, region or community.

It has significance relating to the history of slavery.

- o Importance for a direct link to the history of slavery in South Africa.

6.2.2 AESTHETIC VALUE

It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group.

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

6.2.3 SCIENTIFIC VALUE

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

- o Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
- o Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.
- o Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.

- Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.
- It is important in demonstrating a high degree of creative or technical achievement at a particular period
- Importance for its technical innovation or achievement.

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

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

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

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

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

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

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

6.2.4 SOCIAL VALUE

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

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

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

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

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

6.2.5 ETHNIC SIGNIFICANCE

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

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

6.2.6 ECONOMIC SIGNIFICANCE

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

- visitors' willingness-to-pay
- visitors' travel costs

6.2.7 SCIENTIFIC SIGNIFICANCE

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

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

6.2.8 HISTORIC SIGNIFICANCE

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

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

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

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

6.2.9 PUBLIC SIGNIFICANCE

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

- visibility and accessibility to the public
- ability of the site to be easily interpreted
- opportunities for protection against vandalism
- economic and engineering feasibility of reconstruction, restoration and maintenance
- representativeness and uniqueness of the site
- proximity to established recreation areas
- compatibility with surrounding zoning regulations or land use
- land ownership and administration
- local community attitude toward site preservation, development or destruction
- present use of site

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

6.2.10 OTHER

- (a) Is the site a commonly acknowledged landmark?
- (b) Does, or could, the site contribute to a sense of continuity or identity either alone or in conjunction with similar sites in the vicinity?
- (c) Is the site a good typical example of an early structure or device commonly used for a specific purpose throughout an area or period of time?
- (d) Is the site representative of a particular architectural style or pattern?

6.3 DEGREES OF SIGNIFICANCE

6.3.1 SIGNIFICANCE CRITERIA

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

Site integrity, or the degree to which a heritage site has been impaired or disturbed as a result of past land alteration, is an important consideration in evaluating site significance. In this regard, it is important to recognize that although an archaeological site has been disturbed, it may still contain important scientific information.

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

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

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

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

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

6.3.2 RARITY

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

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

6.3.3 REPRESENTIVITY

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

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

Table 4. Determination of Heritage Significance

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

7. ASSESSMENT OF HERITAGE POTENTIAL

7.1 ASSESSMENT MATRIX

7.1.1 DETERMINING ARCHAEOLOGICAL SIGNIFICANCE

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

Estimating site potential

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

Table 5. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, NMC as used in Morris)

Class	Landform	Type 1	Type 2	Type 3
L1	Rocky Surface	Bedrock exposed	Some soil patches	Sandy/grassy patches
L2	Ploughed land	Far from water	In floodplain	On old river terrace
L3	Sandy ground, inland	Far from water	In floodplain or near features such as hill/dune	On old river terrace

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

Table 6. Site attributes and value assessment (adopted from Whitelaw 1997 as used in Morris)

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

7.2 ASSESSING SITE VALUE BY ATTRIBUTE

The table above is adapted from Whitelaw (1997), who developed an approach for selecting sites meriting heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by ranking the relative strengths of a range of attributes (given in the second column of the table). While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

7.3 IMPACT STATEMENT

7.3.1 ASSESSMENT OF IMPACTS

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

Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource. For example, development may have a beneficial effect by preventing or lessening natural site erosion. Similarly, an action may serve to preserve a site for future investigation by covering it with a protective layer of fill. In other cases, the public or economic significance of an archaeological site

may be enhanced by actions, which facilitate non-destructive public use. Although beneficial impacts are unlikely to occur frequently, they should be included in the assessment.

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

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

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

Indirect impacts result from activities other than actual project actions. Nevertheless, they are clearly induced by a project and would not occur without it. For example, project development may induce changes in land use or population density, such as increased urban and recreational development, which may indirectly impact upon heritage sites. Increased vandalism of heritage sites, resulting from improved or newly introduced access, is also considered an indirect impact. Indirect impacts are much more difficult to assess and quantify than impacts of a direct nature.

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

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

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

7.4 INDICATORS OF IMPACT SEVERITY

Magnitude

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

Severity

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

Duration

The length of time an adverse impact persists. Impacts may have short-term or temporary effects, or conversely, more persistent, long-term effects on heritage sites.

Range

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

Frequency

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

Diversity

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

Cumulative Effect

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

Rate of Change

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

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

7.5 HISTORIC SIGNIFICANCE

No	Criteria	Significance Rating
1	Are any of the identified sites or buildings associated with a historical person or group? No	N/A
2	Are any of the buildings or identified sites associated with a historical event? No	N/A
3	Are any of the identified sites or buildings associated with a religious, economic social or political or educational activity? No	N/A
4	Are any of the identified sites or buildings of archaeological significance? No	N/A
5	Are any of the identified buildings or structures older than 60 years? No	N/A

7.6 ARCHITECTURAL SIGNIFICANCE

No	Criteria	Rating
1	Are any of the buildings or structures an important example of a building type? No	N/A
2	Are any of the buildings outstanding examples of a particular style or period? No	N/A
3	Do any of the buildings contain fine architectural details and reflect exceptional craftsmanship? No	N/A
4	Are any of the buildings an example of an industrial, engineering or technological development? No	N/A

5	What is the state of the architectural and structural integrity of the building? No	N/A
6	Is the building's current and future use in sympathy with its original use (for which the building was designed)? N/A	N/A
7	Were the alterations done in sympathy with the original design? N/A	N/A
8	Were the additions and extensions done in sympathy with the original design? N/A	N/A
9	Are any of the buildings or structures the work of a major architect, engineer or builder? No.	N/A

7.7 SPATIAL SIGNIFICANCE

Even though each building needs to be evaluated as a single artefact the site still needs to be evaluated in terms of its significance in its geographic area, city, town, village, neighborhood or precinct. This set of criteria determines the spatial significance.

No	Criteria	Rating
1	Can any of the identified buildings or structures be considered a landmark in the town or city? No	-
2	Do any of the buildings contribute to the character of the neighborhood? No	-
3	Do any of the buildings contribute to the character of the square or streetscape? No	-
4	Do any of the buildings form part of an important group of buildings? No	-

8. IMPACT EVALUATION

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

8.1 DETERMINATION OF SIGNIFICANCE OF IMPACTS

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

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