8.2 Impact Rating System

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

- planning
- construction
- operation
- decommissioning

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

8.2.1 Rating System Used to Classify Impacts

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

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

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

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

SIGNIFICANCE

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

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

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

Points	Impact Significance Rating	Description
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.

51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

9. Anticipated Impact of the Development

9.1 All Heritage Significant Sites

9.1.1 Obscured or Buried Heritage Site of Significance, Including Palaeontology

IMPACT TABLE FORMAT		
Heritage component	*Heritage sites of significance*	
Issue/Impact/Heritage Impact/Nature	*Keikamspoort 71, Portion 16: Obscured or Buried Heritage Sites of Significance, Including Palaeontology.*	
Extent	*Local*	
Probability	*Unlikely*	
Reversibility	*Totally Reversible*	
Irreplaceable loss of resources	*Insignificant loss of resources*	
Duration	*Medium term*	
Cumulative effect	*Low cumulative effect*	
Intensity/magnitude	*Low*	
Significance Rating of Potential Impact	*8 points. The impact will have a low negative impact rating.*	
	Pre-mitigation impact rating	*Post mitigation impact rating*
Extent	*2*	*2*
Probability	*2*	*1*
Reversibility	*3*	*2*
Irreplaceable loss	*3*	*1*
Duration	*1*	*2*
Cumulative effect	*1*	*1*
Intensity/magnitude	*3*	*1*
Significance rating	*36 (medium negative)*	*8 (low negative)*
Mitigation measure	*Should any sites be encountered the appropriate heritage practitioner should be informed.*	

9.1.2 Stone Tools

IMPACT TABLE FORMAT		
Heritage component	*Heritage sites of significance*	
Issue/Impact/Heritage Impact/Nature	*Stone Tools*	
Extent	*Local*	
Probability	*Unlikely*	
Reversibility	*Totally Reversible*	
Irreplaceable loss of resources	*Insignificant loss of resources*	
Duration	*Medium term*	
Cumulative effect	*Low cumulative effect*	
Intensity/magnitude	*Low*	
Significance Rating of Potential Impact	*8 points. The impact will have a low negative impact rating.*	
	Pre-mitigation impact rating	*Post mitigation impact rating*
Extent	*2*	*2*
Probability	*2*	*1*
Reversibility	*3*	*2*
Irreplaceable loss	*3*	*1*
Duration	*1*	*2*
Cumulative effect	*1*	*1*
Intensity/magnitude	*3*	*1*
Significance rating	*36 (medium negative)*	*8 (low negative)*
Mitigation measure	*Should any sites be encountered the appropriate heritage practitioner should be informed.*	

9.1.3 Stone Walls

IMPACT TABLE FORMAT		
Heritage component	*Heritage sites of significance*	
Issue/Impact/Heritage Impact/Nature	*Stone Walls*	
Extent	*Local*	
Probability	*Unlikely*	
Reversibility	*Totally Reversible*	
Irreplaceable loss of resources	*Insignificant loss of resources*	
Duration	*Medium term*	
Cumulative effect	*Low cumulative effect*	
Intensity/magnitude	*Low*	
Significance Rating of Potential Impact	*8 points. The impact will have a low negative impact rating.*	
	Pre-mitigation impact rating	*Post mitigation impact rating*

Extent	*2*	*2*
Probability	*1*	*1*
Reversibility	*2*	*2*
Irreplaceable loss	*1*	*1*
Duration	*2*	*2*
Cumulative effect	*1*	*1*
Intensity/magnitude	*1*	*1*
Significance rating	*8 (low negative)*	*8 (low negative)*
Mitigation measure	*It is not anticipated that the site will be affected. Should the proposed development site change to such an extent that they might be affected, relevant mitigation measures should be developed.*	

9.1.4 Old Homestead

IMPACT TABLE FORMAT		
Heritage component	*Heritage sites of significance*	
Issue/Impact/Heritage Impact/Nature	*Old Homestead*	
Extent	*Local*	
Probability	*Unlikely*	
Reversibility	*Totally Reversible*	
Irreplaceable loss of resources	*Insignificant loss of resources*	
Duration	*Medium term*	
Cumulative effect	*Low cumulative effect*	
Intensity/magnitude	*Low*	
Significance Rating of Potential Impact	*8 points. The impact will have a low negative impact rating.*	
	Pre-mitigation impact rating	*Post mitigation impact rating*
Extent	*2*	*2*
Probability	*1*	*1*
Reversibility	*2*	*2*
Irreplaceable loss	*1*	*1*
Duration	*2*	*2*
Cumulative effect	*1*	*1*
Intensity/magnitude	*1*	*1*
Significance rating	*8 (medium negative)*	*8 (low negative)*
Mitigation measure	*It is not anticipated that the site will be affected. Should the proposed development site change to such an extent that they might be affected, relevant mitigation measures should be developed.*	

9.1.4 Foundations

IMPACT TABLE FORMAT		
Heritage component	*Heritage sites of significance*	
Issue/Impact/Heritage Impact/Nature	*Foundations*	
Extent	*Local*	
Probability	*Unlikely*	
Reversibility	*Totally Reversible*	
Irreplaceable loss of resources	*Insignificant loss of resources*	
Duration	*Medium term*	
Cumulative effect	*Low cumulative effect*	
Intensity/magnitude	*Low*	
Significance Rating of Potential Impact	*8 points. The impact will have a low negative impact rating.*	
	Pre-mitigation impact rating	*Post mitigation impact rating*
Extent	*2*	*2*
Probability	*1*	*1*
Reversibility	*2*	*2*
Irreplaceable loss	*1*	*1*
Duration	*2*	*2*
Cumulative effect	*1*	*1*
Intensity/magnitude	*1*	*1*
Significance rating	*8 (medium negative)*	*8 (low negative)*
Mitigation measure	*It is not anticipated that the site will be affected. Should the proposed development site change to such an extent that they might be affected, relevant mitigation measures should be developed.*	

9.2 Assessing Visual Impact

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

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

9.3 Assumptions and Restrictions

- It is assumed that the South African Heritage Resources Information System (SAHRIS) database locations are correct
- It is assumed that the paleontological information collected for the project is comprehensive.

- It is assumed that the social impact assessment and public participation process of the Basic Assessment will result in the identification of any intangible sites of heritage potential.

10. Assessment of Impacts

10.1 Impact Statement

10.1.1 Paleontological sites

"The Precambrian igneous and metamorphic basement rocks underlying the Vogelstruisbult 104 study area (Blue Rock Quarry site) at depth are entirely unfossiliferous. The overlying Permo-Carboniferous glacially-related sediments of the Dwyka Group (Karoo Supergroup) are, at most, sparsely fossiliferous, with occasional transported stromatolitic carbonate erratics. However, these Karoo sediments are unlikely to be directly impacted by the proposed shallow borrow pit and quarry developments. The Kalahari Group sediments (calcretes, alluvium and aeolian sands) mantling the older bedrocks that will be exploited in the Red Sand Quarry site as well as Borrow Pits 1 and 2 sites are generally of low palaeontological sensitivity. Quaternary fossil mammal bones and teeth have been recorded from similar rocks elsewhere in Bushmanland but are very scarce. They are most likely to be found in association with subsurface alluvial gravels and perhaps also stone artefacts concentrated along ancient water courses (Red Sand Quarry Site)." (Almond, 2015).

10.1.2 Built Environment

Some structures associated with rural living were identified;

- Brick outbuildings (modern and historic)
- Livestock enclosures (modern)
- Barb-wire fences (modern)
- Mud-brick huts (modern)
- Farm Homestead
- Dirt roads (modern)
- Footpaths

Dam
Located at 29°54'37.71"S 22°48'41.45"E

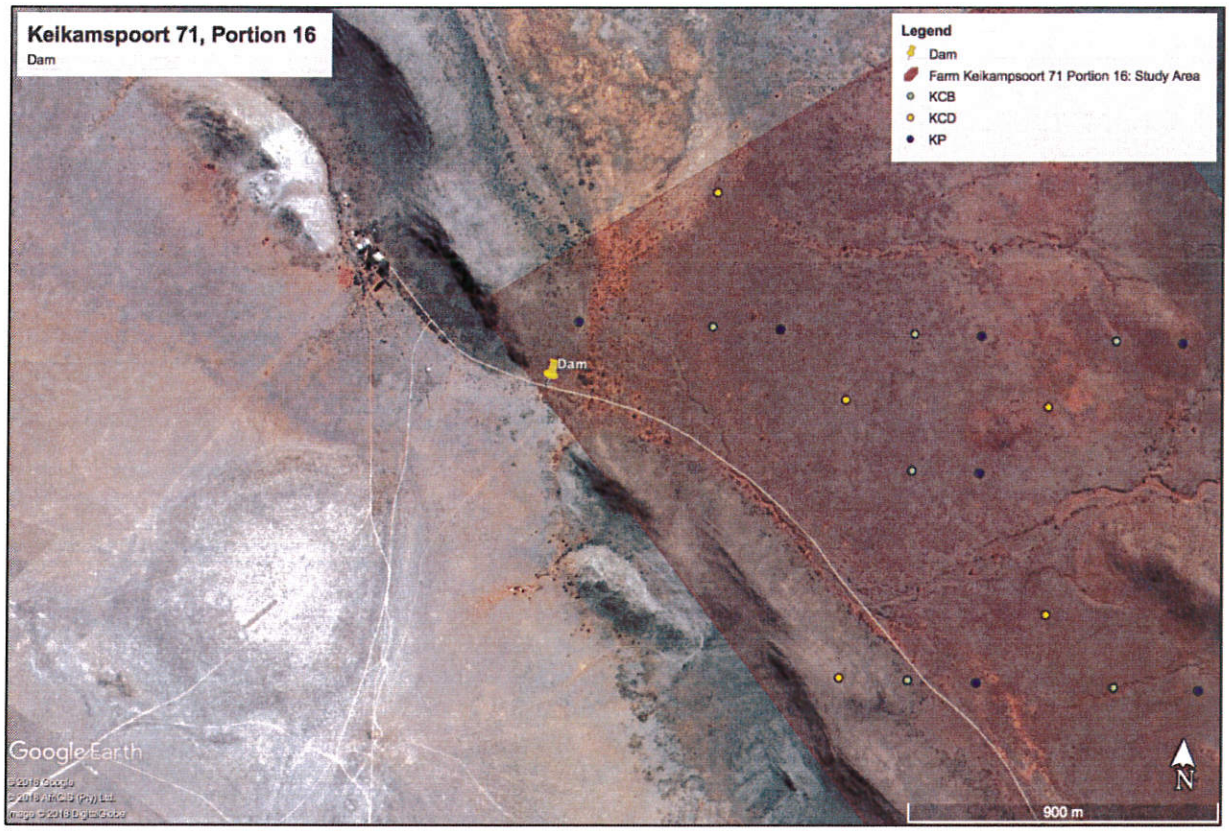

Figure 47. Concrete and brick dam

Figure 48. Concrete dam and wind pump

Figure 49. Concrete dam

Old Homestead:
Located at 29°53'59.14"S 22°52'34.26"E

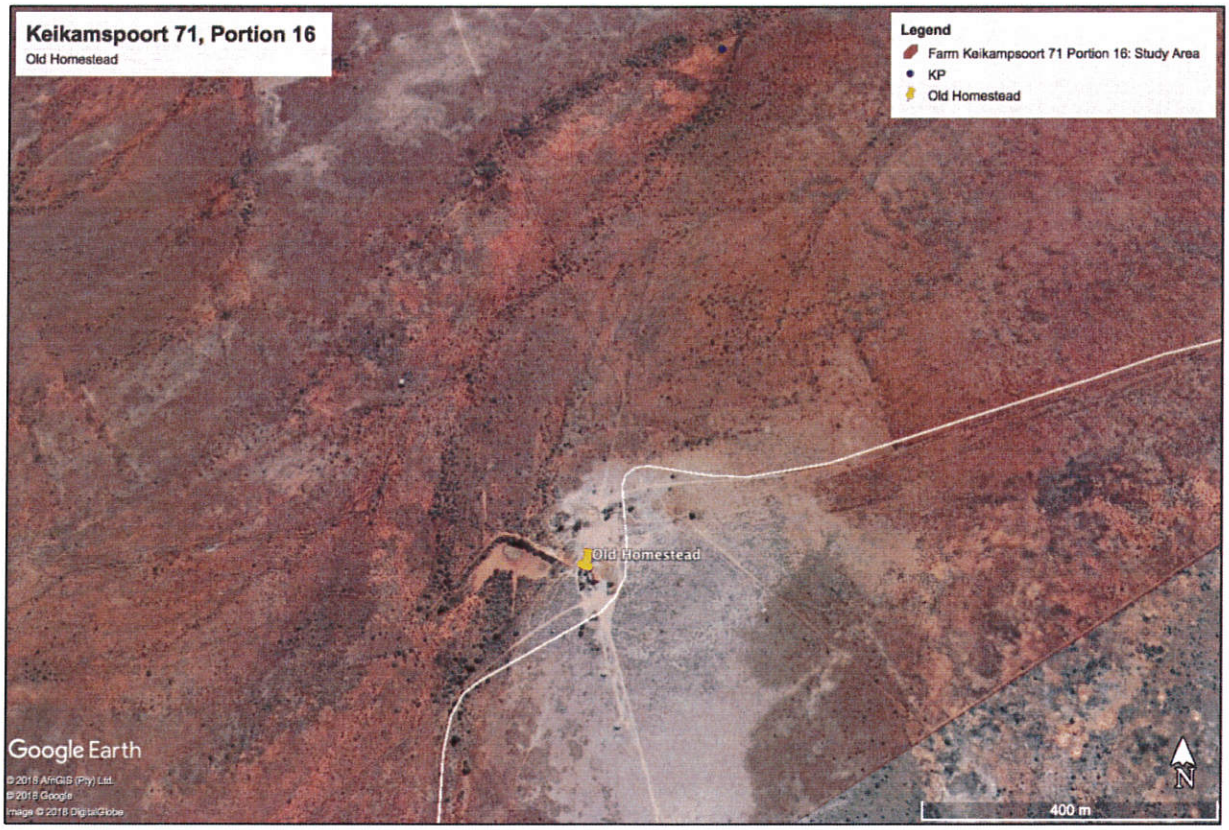

Figure 50. Aerial view of old homestead

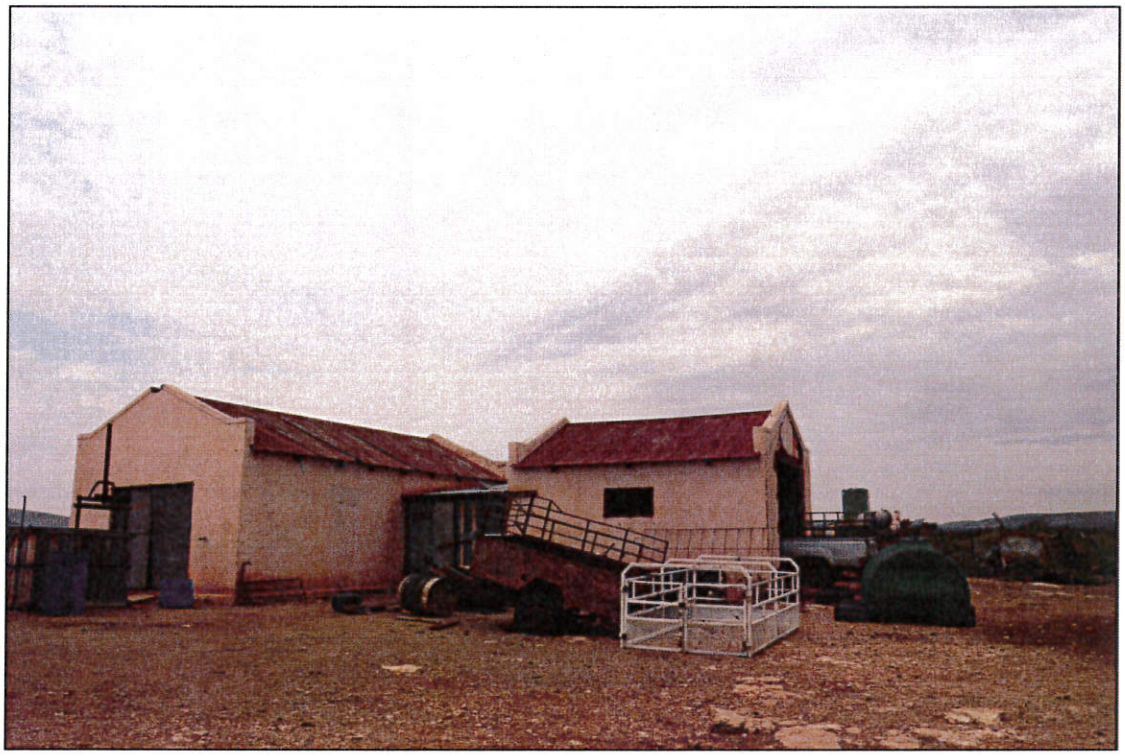

Figure 51. Old homestead outbuildings

Figure 52. Old homestead with kitchen lean-to

Figure 53. Homestead

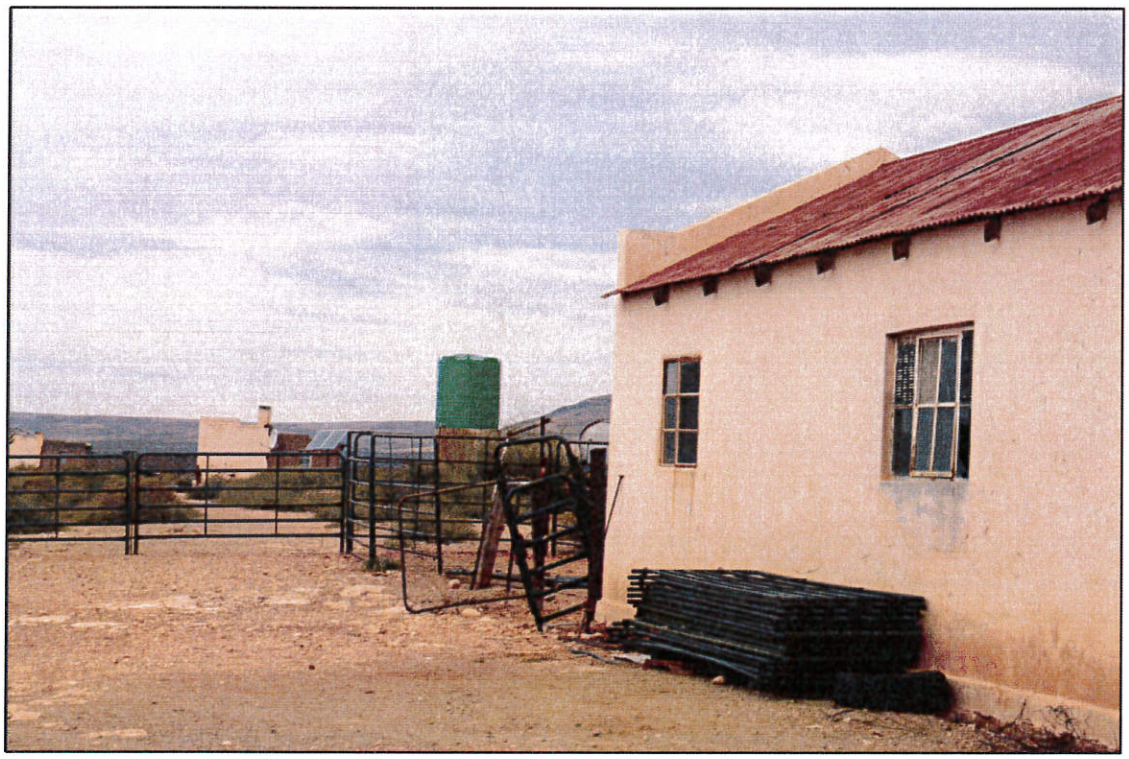

Figure 54. Out buildings

Figure 55. Front facade of homestead

Figure 56. Dam close to homestead

Figure 57. Dam with homestead in background

Mitigation
None of the structures will be affected by the proposed drilling activities.

10.1.3 Pre-Contact Sites
The study area contained a few areas with isolated stone tools. None of these represented an occupational or manufacturing site.

10.1.4 Post-Contact Sites
No post contact sites were identified.

10.1.5 Cultural Landscape
The following landscape types were identified during the study.

Landscape Type	Description	Occurrence still possible?	Likely occurrence?
1 Paleontological	Fossil remains	Yes, sub-surface	Unlikely
2 Archaeological	Evidence of human occupation associated with the following phases – Early-, Middle-, Late Stone Age, Early-, Late Iron Age, Pre-Contact Sites, Post-Contact Sites	Yes	Unlikely
3 Historic Built Environment	- Historical townscapes/streetscapes - Historical structures; i.e. older than 60 years - Formal public spaces - Formally declared urban conservation areas - Places associated with social identity/displacement	No	No

4 Historic Farmland	These possess distinctive patterns of settlement and historical features such as: - Historical farm yards - Historical farm workers villages/settlements - Irrigation furrows - Tree alignments and groupings - Historical routes and pathways - Distinctive types of planting - Distinctive architecture of cultivation e.g. planting blocks, trellising, terracing, ornamental planting.	No	No
5 Historic rural town	- Historic mission settlements - Historic townscapes	No	No
6 Pristine natural landscape	- Historical patterns of access to a natural amenity - Formally proclaimed nature reserves - Evidence of pre-colonial occupation - Scenic resources, e.g. view corridors, viewing sites, visual edges, visual linkages - Historical structures/settlements older than 60 years - Pre-colonial or historical burial sites - Geological sites of cultural significance.	No	Unlikely
7 Relic Landscape	- Past farming settlements - Past industrial sites - Places of isolation related to attitudes to medical treatment - Battle sites - Sites of displacement,	No	No
8 Burial grounds and grave sites	- Pre-colonial burials (marked or unmarked, known or unknown) - Historical graves (marked or unmarked, known or unknown) - Graves of victims of conflict - Human remains (older than 100 years) - Associated burial goods (older than 100 years) - Burial architecture (older than 60 years)	No	No
9 Associated Landscapes	- Sites associated with living heritage e.g. initiation sites, harvesting of natural resources for traditional medicinal purposes - Sites associated with displacement & contestation - Sites of political conflict/struggle - Sites associated with an historic event/person - Sites associated with public memory	No	No
10 Historical Farmyard	- Setting of the yard and its context - Composition of structures - Historical/architectural value of individual structures - Tree alignments - Views to and from - Axial relationships - System of enclosure, e.g. defining walls - Systems of water reticulation and irrigation, e.g. furrows	No	No

	- Sites associated with slavery and farm labour - Colonial period archaeology		
11 Historic institutions	- Historical prisons - Hospital sites - Historical school/reformatory sites - Military bases	No	No
12 Scenic visual	- Scenic routes	No	No
13 Amenity landscape	- View sheds - View points - Views to and from - Gateway conditions - Distinctive representative landscape conditions - Scenic corridors	No	No

10.1.6 Mitigation

It is recommended that the development designs consider the positive and negative characteristics of the existing cultural landscape type and that they endeavor to promote the positive aspects while at the same time mitigating the negative aspects.

11. Resource Management Recommendations

This study analysed the documented data available as well as investigated the surface occurrences of heritage sites for Keikamspoort 71, Portion 16 in the Northern Cape Province, near the town of Prieska.

Stone age tools were observed on the surface of all the properties.

Although unlikely, sub-surface remains of heritage sites could still be encountered during the construction activities associated with the project. Such sites would offer no surface indication of their presence due to the high state of alterations in some areas as well as heavy plant cover in other areas. The following indicators of unmarked sub-surface sites could be encountered:

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

The following recommendations are given should any sub-surface remains of heritage sites be identified as indicated above:

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

12. CONCLUSION

Although Stone Age tools were noted within the study area, none of these deposits were located on any of the borehole sites or within the 50m safety reserve. No impacts on heritage resources are expected through the prospecting process. Should the area be designated for mining rights application a full heritage impact assessment of the whole property needs to be undertaken.

None of the historic structures noted will be impacted upon by the proposed prospecting.

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