

**Debe Water Supply Scheme Upgrade: Phase 2,  
Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape**

---

- 16 October 2015 -

**Report to:**

**Sello Mokhanya (Eastern Cape Provincial Heritage Resources Authority – EC PHRA, APM Unit)**

E-mail: smokhanya@ecphra.org.za; Tel: 043 745 0888; Postal Address: N/A

**Amy Hunter (EOH-Coastal & Environmental Services)**

E-mail: amy.hunter@eoh.co.za; Tel: 043 726 7809; Postal Address: P.O. Box 8145, Nahoon, 5210



**Prepared by:**

**Karen van Ryneveld (ArchaeoMaps)**

E-mail: karen@archaeomaps.co.za; Tel: 084 871 1064; Postal Address: Postnet Suite 239, Private Bag X3, Beacon Bay, 5205

### **Specialist Declaration of Interest**

I, Karen van Ryneveld (Company – ArchaeoMaps; Qualification – MSc Archaeology), declare that:

- I am suitably qualified and accredited to act as independent specialist in this application;
- I do not have any financial or personal interest in the application, its' proponent or any subsidiaries, aside from fair remuneration for specialist services rendered; and
- That work conducted has been done in an objective manner – and that any circumstances that may have compromised objectivity have been reported on transparently.



**Signature –**

- 16 October 2015 -

## **Debe Water Supply Scheme Upgrade: Phase 2, Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape**

---

### Executive Summary

#### **Terms of Reference –**

EOH-CES have been appointed as independent EAP by Element Consulting Engineers, on behalf of Amatola Water, to apply for EA, including a BAR, to the DEA for the proposed *Debe Water Supply Scheme Upgrade: Phase 2* development. The development is situated at general development co-ordinate S32°52'06.3"; E27°06'05.1" (Debe Village), between the towns of Alice and King Williams Town in the Nkonkobe Local Municipal area of the Amathole District Municipality, Eastern Cape. Amatola Water is proposing to upgrade the existing water supply scheme to a bulk water infrastructure that can supply 750L/household/day, accommodating an estimated 0.5% population growth with envisaged future water demand of 5.67ML/day by 2044. The Debe Water Supply Scheme development is planned in 2 phases; Phase 1 being the upgrade of the Water Treatment Works (WTW) and Phase 2 being the upgrade of the bulk water conveyance (approximately 20km line route development and 3 pump stations) and storage systems (3 reservoirs), including the installation of telemetry systems and the upgrade of electrical systems associated with the bulk water and conveyance systems. The current EA application and associated BAR is for the *Debe Water Supply Scheme Upgrade: Phase 2* component of the development.

ArchaeoMaps was appointed by EOH-CES to compile the Phase 1 AIA for the development, as specialist component to the application's HIA, and with findings and recommendations thereof to be included in the BAR.

#### **The Phase 1 Archaeological Impact Assessment –**

**Project Area:** *Debe Water Supply Scheme Upgrade: Phase 2* development, Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape [1:50,000 Map Ref – 3226DD, 3227CC, 3326BB, 3327AA].

**Coverage & Gap Analysis:** Pre-feasibility and field assessment.

**Field Methodology:** Three (3) day field assessment; GPS co-ordinates – Garmin GPSmap 62s; Photographic documentation – Pentax K20D. Site significance assessment – SAHRA 2007 system.

#### **Summary:**

- No archaeological or cultural heritage developmental 'fatal flaws' identified;
- Thirteen (13) archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, identified during fieldwork. Four (4) of the identified sites are Colonial Period sites, 9 are LIA / contemporary grave and cemetery sites.
- Current layout indicates cognizance to heritage resources during the planning phase of development – recommendations for site conservation made in this report are primarily to ensure no accidental impact on identified sites during the construction phase.
- [Should any incidental archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, be encountered during the course of development the process described in the 'Heritage Protocol for Incidental Finds during the Construction Phase' should be followed.]

#### **Recommendations –**

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the proposed *Debe Water Supply Scheme Upgrade: Phase 2* development, Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape, proceeds as applied for provided the developer comply with the listed heritage management recommendations (see table on next page).

**The EC PHRA (APM Unit) HIA Comment will state legal requirements for development to proceed, or reasons why, from a heritage perspective, development may not be further considered.**

Map Code	Site	Co-ordinates	Recommendations
<b>Debe Water Supply Scheme Upgrade: Phase 2, Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape</b>			
<b>Gravity Main 1</b>			
D-GM1-S1	Colonial Period, Residence	S32°58'46.4"; E26°59'33.0"	1. Temporary conservation fence & temporary signage (Construction phase)
D-GM1-S2	Later Iron Age / Contemporary, Cemetery	S32°58'47.7"; E26°59'43.1"	1. Realignment of line route in vicinity of site to allow minimum 20m conservation barrier; 2. Permanent conservation fence; 3. Temporary signage (Construction phase)
<b>Gravity Main 2</b>			
N/A	N/A	N/A	N/A
<b>Gravity Main 3</b>			
N/A	N/A	N/A	N/A
<b>Gravity Main 4</b>			
N/A	N/A	N/A	N/A
<b>Rising Main 5</b>			
D-RM5-S1	Later Iron Age / Contemporary, Cemetery	S32°51'43.4"; E27°02'35.3"	1. Temporary conservation fence & temporary signage (Construction phase)
D-RM5-S2	Later Iron Age / Contemporary, Cemetery	S32°51'55.2"; E27°02'06.8"	N/A (based on proximity from the study site)
D-RM5-S3	Later Iron Age / Contemporary, Cemetery	S32°51'57.3"; E27°02'01.7"	1. Temporary conservation fence & temporary signage (Construction phase)
D-RM5-S4	Later Iron Age / Contemporary, Grave	S32°51'58.5"; E27°02'02.0"	1. Temporary conservation fence & temporary signage (Construction phase)
D-RM5-S5	Later Iron Age / Contemporary, Cemetery	S32°51'57.4"; E27°01'59.1"	1. Temporary conservation fence & temporary signage (Construction phase)
D-RM5-S6	Later Iron Age / Contemporary, Grave	S32°52'01.9"; E27°02'04.1"	1. Temporary conservation fence & temporary signage (Construction phase)
<b>Rising Main 6</b>			
D-RM6-S1	Colonial Period, Church	S32°52'02.1"; E27°02'49.0"	N/A (based on proximity from the study site)
D-RM6-S2	Colonial Period, Building	S32°52'03.2"; E27°02'52.9"	N/A (based on proximity from the study site)
D-RM6-S3	Later Iron Age / Contemporary, Cemetery	S32°52'08.1"; E27°03'00.8"	1. Temporary conservation fence & temporary signage (Construction phase)
<b>Rising Main 7</b>			
N/A	N/A	N/A	N/A
<b>Rising Main 8</b>			
D-RM8-S1	Later Iron Age / Contemporary, Cemetery	S32°52'58.6"; E27°05'49.1"	1. Temporary signage
D-RM8-S2	Colonial Period, Residence	S32°51'39.0"; E27°07'33.1"	1. Temporary signage
<b>Pump Station 1 (PS1)</b>			
N/A	N/A	N/A	N/A
<b>Pump Station 2 (PS2)</b>			
N/A	N/A	N/A	N/A
<b>Pump Station 3 (PS3)</b>			
N/A	N/A	N/A	N/A
<b>Western Reservoir (WR)</b>			
N/A	N/A	N/A	N/A
<b>Eastern Reservoir (ER)</b>			
N/A	N/A	N/A	N/A
<b>Far Eastern Reservoir (FER)</b>			
N/A	N/A	N/A	N/A

## Contents

<b>1 - Terms of Reference</b> .....	<b>7</b>
1.1.1) Development Location, Details and Impact .....	7
<b>2 - The Phase 1 Archaeological Impact Assessment</b> .....	<b>11</b>
2.1.1) Archaeological Legislative Compliance.....	11
2.1.2) Methodology & Gap Analysis .....	11
2.1.3) Assessor Accreditation.....	12
Pre-feasibility Assessment .....	13
2.2.1) Pre-feasibility Summary .....	13
2.2.2) The SAHRA 2009 MPD & SAHRIS.....	13
2.2.3) SAHRA Provincial Heritage Site Database – Eastern Cape .....	14
2.2.4) General Discussion.....	16
Field Assessment.....	18
2.3.1) Field Assessment Results.....	18
2.3.2) Gravity Main 1 .....	19
2.3.2.1) Site D-GM1-S1: Colonial Period, Residence (S32°58'46.4"; E26°59'33.0") .....	19
2.3.2.2) Site D-GM1-S2: Later Iron Age / Contemporary, Cemetery (S32°58'47.7"; E26°59'43.1").....	19
2.3.3) Gravity Main 2.....	24
2.3.4) Gravity Main 3.....	26
2.3.5) Gravity Main 4 .....	28
2.3.6) Rising Main 5, the Pump Station 1 (PS1) and Pump Station 2 (PS2) Study Sites .....	30
2.3.6.1) Site D-RM5-S1: Later Iron Age / Contemporary, Cemetery (S32°51'43.4"; E27°02'35.3") .....	30
2.3.6.2) Site D-RM5-S2: Later Iron Age / Contemporary, Cemetery (S32°51'55.2"; E27°02'06.8") .....	30
2.3.6.3) Site D-RM5-S3: Later Iron Age / Contemporary, Cemetery (S32°51'57.3"; E27°02'01.7").....	30
2.3.6.4) Site D-RM5-S4: Later Iron Age / Contemporary, Grave (S32°51'58.5"; E27°02'02.0").....	31
2.3.6.5) Site D-RM5-S5: Later Iron Age / Contemporary, Cemetery (S32°51'57.4"; E27°01'59.1").....	31
2.3.6.6) Site D-RM5-S6: Later Iron Age / Contemporary, Grave (S32°52'01.9"; E27°02'04.1") .....	31
2.3.7) Rising Main 6 and the Pump Station 3 (PS3) / Eastern Reservoir (ER) Site.....	37
2.3.7.1) Site D-RM6-S1: Colonial Period, Church (S32°52'02.1"; E27°02'49.0") .....	37
2.3.7.2) Site D-RM6-S2: Colonial Period, Building (S32°52'03.2"; E27°02'52.9").....	37
2.3.7.3) Site D-RM6-S3: Later Iron Age / Contemporary, Cemetery (S32°52'08.1"; E27°03'00.8").....	37
2.3.8) Rising Main 7 and the Western Reservoir (WR) Site .....	43
2.3.9) Rising Main 8 and the Far Eastern Reservoir (FER) Site .....	45
2.3.9.1) Site D-RM8-S1: Later Iron Age / Contemporary, Cemetery (S32°52'58.6"; E27°09'49.1") .....	45
2.3.9.2) Site D-RM8-S2: Colonial Period, Residence (S32°51'39.0"; E27°07'33.1").....	45
<b>3 - Environmental Impact Assessment Rating</b> .....	<b>49</b>
<b>4 - Recommendations</b> .....	<b>51</b>
<b>5 - Acronyms and Abbreviations</b> .....	<b>53</b>
<b>6 - References</b> .....	<b>54</b>

### Appendix A:

Schematic Outline of the Pre-Colonial and Colonial Periods

### Appendix B:

Introduction to the Archaeology of South Africa

### List of Maps:

Map 1: General locality of the Debe area, between Alice and King Williams Town, south of the R63, Amathole District Municipality, Eastern Cape .....	8
Map 2: Layout of the Debe Water Supply Scheme Upgrade: Phase 2 development.....	9
Map 3: General locality of the Debe Water Supply Scheme Upgrade: Phase 2 development, [1:50,000 Map Ref – 3226DD, 3227CC, 3326BB & 3327AA].....	18
Map 4: Spatial distribution of geo-referenced PHS in the Eastern Cape in relation to the proposed Debe Water Supply Scheme Upgrade: Phase 2 development .....	16
Map 5: Gravity Main 1 – Results of the field assessment.....	21
Map 6: Proposed realignment in the vicinity of Site D-GM-S2 (Blue-Gravity Main 1 alignment; Red – proposed realignment) .....	21
Map 7: Gravity Main 2 – Results of the field assessment .....	24
Map 8: Gravity Main 3 – Results of the field assessment.....	26
Map 9: Gravity Main 4 – Results of the field assessment.....	28
Map 10: Rising Main 5, the PS1 and PS2 study sites – Results of the field assessment .....	33
Map 11: Close up of the spatial distribution of Sites D-RM5-S2 to D-RM5-S6.....	33
Map 12: Rising main 6 and the PS3 / ER site – Results of the field assessment .....	39
Map 13: Close-up of the localities of heritage resources identified along the Rising Main 6 alignment with proposed fence of Site D-RM6-S3 indicated in red.....	39
Map 14: Rising Main 7 and the WR site – Results of the field assessment.....	43
Map 15: Rising Main 8 and the Far Eastern Reservoir (FER) – Results of the field assessment .....	46

### List of Plates:

Plate 1: Beginning of the Gravity Main 1 alignment in Ncabasa Village .....	22
Plate 2: General view of the Gravity Main 1 alignment .....	22
Plate 3: Gravity Main 1 alignment with Site D-GM1-S1 in the background .....	22
Plate 4: Close-up of the Colonial Period site, Site D-GM1-S1.....	22
Plate 5: View of the Site D-GM1-S2 cemetery [1].....	23
Plate 6: View of the Site D-GM1-S2 cemetery [2].....	23
Plate 7: View of the Site D-GM1-S2 cemetery [3].....	23
Plate 8: End of the Gravity Main 1 line route with Site D-GM1-S2 in the background .....	23
Plate 9: General view of Gravity Main 2 (from north to south) [1].....	25
Plate 10: General view of Gravity Main 2 (from north to south) [2].....	25
Plate 11: General view of Gravity Main 2 (from north to south) [3] .....	25
Plate 12: General view of Gravity Main 2 (from north to south) [4].....	25
Plate 13: General view of Gravity Main 3 (from north to south) [1] .....	27
Plate 14: General view of Gravity Main 3 (from north to south) [2].....	27
Plate 15: General view of Gravity Main 3 (from north to south) [3].....	27
Plate 16: General view of Gravity Main 3 (from north to south) [4] .....	27
Plate 17: General view of the Gravity Main 4 (from north to south) [1] .....	29
Plate 18: General view of the Gravity Main 4 (from north to south) [2].....	29
Plate 19: General view of the Gravity Main 4 (from north to south) [3] .....	29
Plate 20: General view of the Gravity Main 4 (from north to south) [4] .....	29
Plate 21: View of Site D-RM5-S1, situated adjacent to the main access road to Rising Main 5 .....	34
Plate 22: View of cemetery site D-RM5-S2 .....	34
Plate 23: Graves continuing from the D-RM5-S2 locality north-eastwards [1].....	34
Plate 24: Graves continuing from the D-RM5-S2 locality north-eastwards [2] .....	34
Plate 25: View of Site D-RM5-S3.....	35
Plate 26: View of Site D-RM5-S4 .....	35
Plate 27: General view of Site D-RM5-S5 [1] .....	35
Plate 28: General view of Site D-RM5-S5 [2] .....	35
Plate 29: View of Site D-RM5-S6 .....	36
Plate 30: General view over the Rising Main 5 alignment towards PS1.....	36
Plate 31: Existing infrastructure at the PS1 study site .....	36
Plate 32: View of the PS2 study site .....	36
Plate 33: General view of the Rising Main 6 alignment [1].....	40
Plate 34: View of the Site D-RM6-S1 Colonial Period church.....	40
Plate 35: View of the Site D-RM6-S2 Colonial Period building .....	40
Plate 36: Selected graves from the Site D-RM6-S3 cemetery [1] .....	40
Plate 37: Selected graves from the Site D-RM6-S3 cemetery [2] .....	41
Plate 38: Selected graves from the Site D-RM6-S3 cemetery [3].....	41
Plate 39: Selected graves from the Site D-RM6-S3 cemetery [4].....	41
Plate 40: Selected graves from the Site D-RM6-S3 cemetery [5].....	41
Plate 41: General view of the Rising Main 6 alignment [2].....	42
Plate 42: General view of the Rising Main 6 alignment [3] .....	42

Plate 43: General view of the Rising Main 6 alignment [4].....	42
Plate 44: View of the PS3 / ER study site.....	42
Plate 45: General view of Rising Main 7 [1].....	44
Plate 46: General view of Rising Main 7 [2].....	44
Plate 47: General View of Rising Main 7 [3].....	44
Plate 48: View of the WR site.....	44
Plate 49: View of the PS3 / ER.....	47
Plate 50: Graves comprising Site D-RM8-S1 situated within the fenced agricultural plot.....	47
Plate 51: General view of the Gravity Main 8 alignment [1].....	47
Plate 52: General view of the Gravity Main 8 alignment [2].....	47
Plate 53: General view of the Gravity Main 8 alignment [3].....	48
Plate 54: View of Site D-GM8-S2 Colonial Period residence.....	48
Plate 55: The Gravity Main 8 alignment from the FER.....	48
Plate 56: View of the FER study site.....	48

### List of Tables:

Table 1: Extracts from the NHRA 1999, Section 38.....	11
Table 2: SAHRA archaeological and cultural heritage site significance assessment ratings and associated mitigation recommendations.....	12
Table 3: Archaeological and basic cultural probability assessment.....	13
Table 4: Declared Provincial Heritage Sites in relation to the study site.....	16
Table 5: Colonial Period sites that will be conserved without additional conservation measures.....	50
Table 6: Colonial Period and LIA / contemporary sites that will be conserved by means of additional temporary conservation measures.....	50
Table 7: LIA / contemporary sites that will be conserved by means of permanent conservation measures.....	50
Table 8: Archaeological and cultural heritage compliance summary for the proposed <i>Debe Water Supply Scheme Upgrade: Phase 2</i> development, Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape.....	52

## 1 - Terms of Reference

---

EOH Coastal & Environmental Services (EOH-CES) have been appointed as independent Environmental Assessment Practitioner (EAP) by Element Consulting Engineers, on behalf of Amatola Water, to apply for Environmental Authorization (EA), including a Basic Environmental Assessment (BAR), to the Department of Environmental Affairs (DEA) for the proposed *Debe Water Supply Scheme Upgrade: Phase 2* development. The development is situated at general development co-ordinate S32°52'06.3"; E27°06'05.1" (Debe Village), between the towns of Alice and King Williams Town in the Nkonkobe Local Municipal area of the Amathole District Municipality, Eastern Cape. Amatola Water is proposing to upgrade the existing water supply scheme to a bulk water infrastructure that can supply 750L/household/day, accommodating an estimated 0.5% population growth with envisaged future water demand of 5.67ML/day by 2044. The Debe Water Supply Scheme development is planned in 2 phases; Phase 1 being the upgrade of the Water Treatment Works (WTW) and Phase 2 being the upgrade of the bulk water conveyance (approximately 20km line route development and 3 pump stations) and storage systems (3 reservoirs), including the installation of telemetry systems and the upgrade of electrical systems associated with the bulk water and conveyance systems. The current EA application and associated BAR is for the *Debe Water Supply Scheme Upgrade: Phase 2* component of the development.

ArchaeoMaps was appointed by EOH-CES to compile the Phase 1 Archaeological Impact Assessment (AIA) for the development, as specialist component to the application's Heritage Impact Assessment (HIA), and with findings and recommendations thereof to be included in the BAR. Terms of Reference (ToR) for the Phase 1 AIA, with specific reference to archaeological and basic cultural heritage compliance requirements are summarized as:

- Undertake a desktop study and field assessment to identify important archaeological and cultural heritage resources in the area. In particular identify:
  - Potential sites of archaeological and cultural heritage significance (GPS co-ordinates to be provided for planning purposes);
- Identify any potential 'fatal flaws' linked to the proposed development;
- Describe the findings of the study and their potential implications for the proposed project. This should include a description and assessment of the significance of the impacts of the proposed activities on the heritage resources; and
- Provide detailed guideline measures to manage any impacts, particularly during the construction phase but including the implementation phase, and an assessment of their likely effectiveness.

### 1.1.1) Development Location, Details and Impact

The *Debe Water Supply Scheme Upgrade: Phase 2* development is situated at general development co-ordinate S32°52'06.3"; E27°06'05.1" (Debe Village), south of the R63 in the Dimbaza-Middledrift-Mooihoek area, between the towns of Alice and King Williams Town in the Nkonkobe Local Municipal area of the Amathole District Municipality, Eastern Cape [1:50,000 Map Ref – 3226DD, 3227CC, 3326BB, 3327AA] (EOH-CES 2015).

The Debe Water Supply Scheme was originally designed and constructed to accommodate short term daily water supply of 25L/c/day. Amatola Water, the bulk services provider within the Amathole District Municipality, is proposing the upgrade of the scheme to achieve the long term goal of providing 750L/household/day, accommodating an estimated 0.5% population growth with envisaged future water demand of 5.67ML/day by 2044. The Debe Water Supply Scheme development is planned in 2 phases; Phase 1 being the upgrade of the Water Treatment Works (WTW) and Phase 2 being the upgrade of the bulk water conveyance (approximately 20km line route development and 3 pump stations) and storage systems (3 reservoirs), including the installation of telemetry systems and the upgrade of electrical systems associated with the bulk water and conveyance systems. The current EA application and associated BAR is for the *Debe Water Supply Scheme Upgrade: Phase 2* component of the development (EOH-CES 2015).



The Debe Water Supply Scheme Upgrade: Phase 2 development comprises of the following development aspects (EOG-CES 2015):

- Gravity Main 1 – ~1.75km pipeline development;
- Gravity Main 2 – ~3.2km pipeline development;
- Gravity Main 3 – ~1.2km pipeline development; and
- Gravity Main 4 – ~0.8km pipeline development.

[Upgrade or the pipelines will involve the construction of new pipelines adjacent to the existing pipelines with a 3-5m gap to minimize risk damages during the construction phase. Trenches will be dug the length of each pipeline upgrade, approximately 0.5m in width and more or less 1m deep.]

- Rising Main 5 – From Pump Station 1 (PS1) to Pump Station 2 (PS2) – ~0.7km pipeline development;
- Rising Main 6 – From Pump Station 2 (PS2) to the Eastern Reservoir (ER) – ~6.3km pipeline development;
- Rising Main 7 – From Pump Station 2 (PS2) to the Western Reservoir (WR) – ~2.6km pipeline development; and
- Rising main 8 – From Pump Station 3 (PS3) to the Far Eastern Reservoir (FER) – ~5.3km pipeline development.

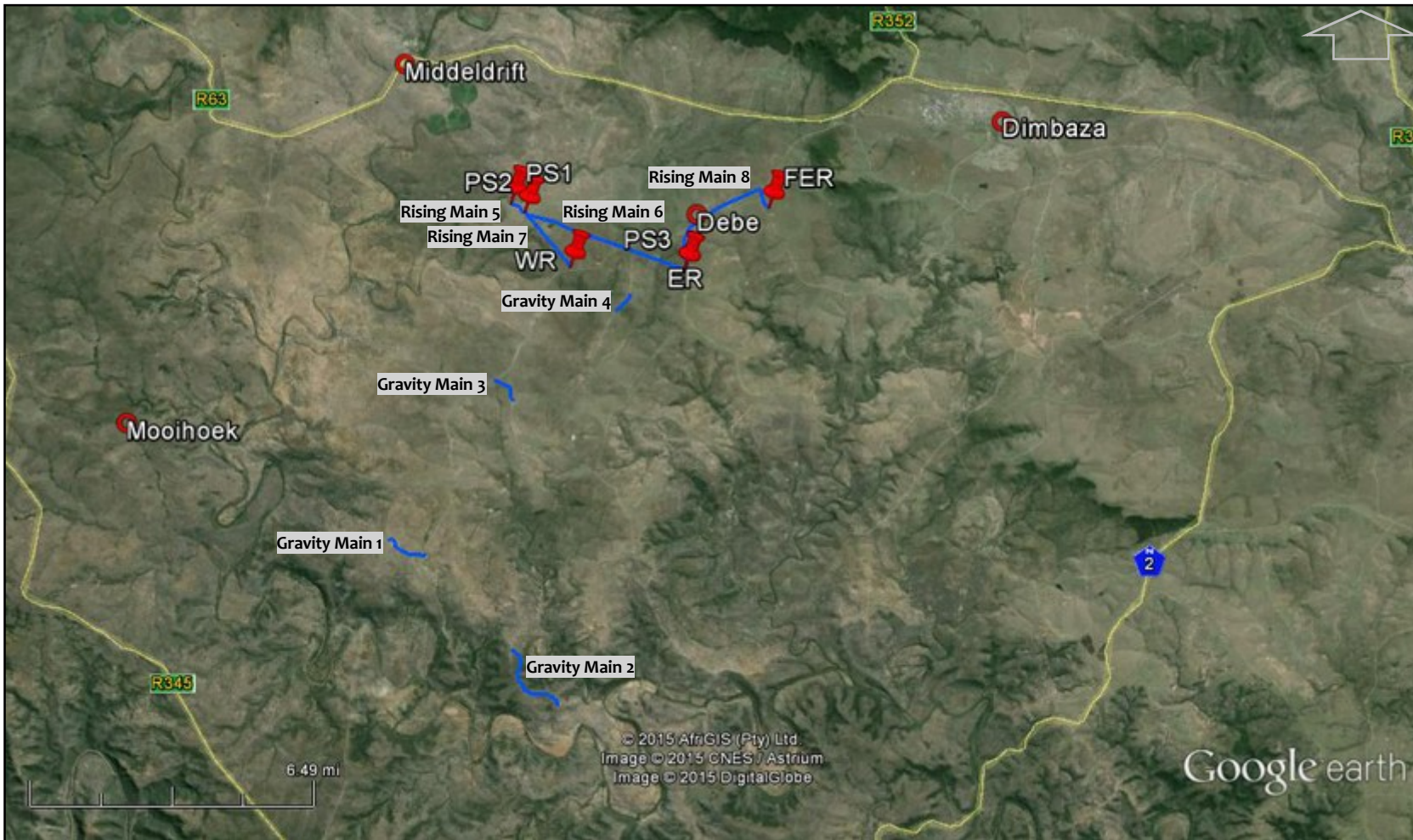
[Upgrade or the pipelines will involve the construction of new pipelines adjacent to the existing pipelines with a 3-5m gap to minimize risk damages during the construction phase. Trenches will be dug the length of each pipeline upgrade, approximately 0.5m in width and more or less 1m deep.]

Pump Station 1 (PS1), Pump Station 2 (PS2) and Pump Station 3 (PS3) will be upgraded, but with the upgrades having little development footprint impact, being primarily technological upgrades.

The Western Reservoir (WR) will be upgraded from a 1ML to a 3ML reservoir and the Far Eastern Reservoir (FER) from a 0.5ML to a 1.8ML capacity reservoir.

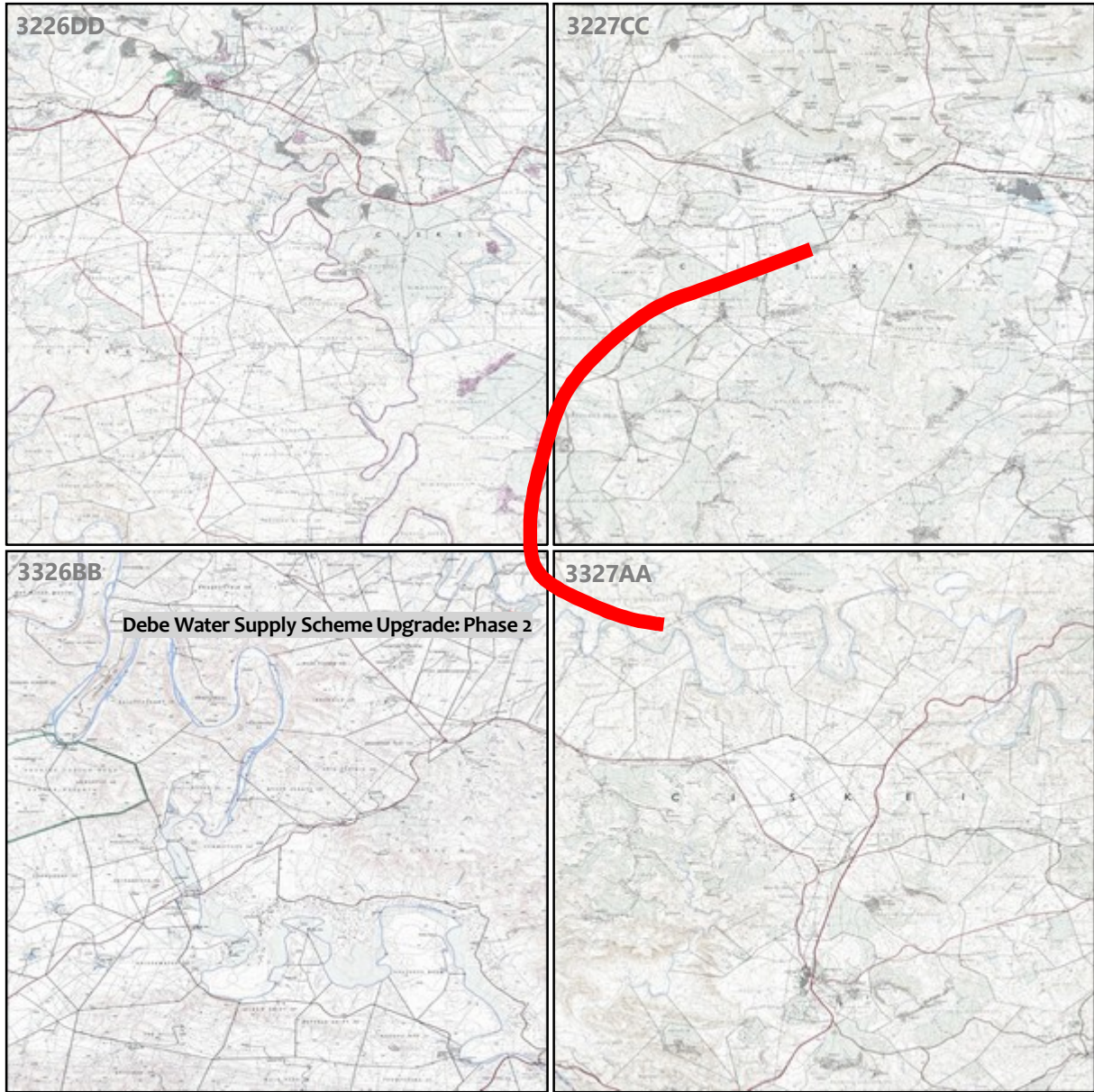


**Map 1:** General locality of the Debe area, between Alice and King Williams Town, south of the R63, Amathole District Municipality, Eastern Cape



Map 2: Layout of the Debe Water Supply Scheme Upgrade: Phase 2 development





**Map 3:** General locality of the Debe Water Supply Scheme Upgrade: Phase 2 development, [1:50,000 Map Ref – 3226DD, 3227CC, 3326BB & 3327AA]

## 2 - The Phase 1 Archaeological Impact Assessment

### 2.1.1) Archaeological Legislative Compliance

The Phase 1 Archaeological Impact Assessment (AIA) for the proposed *Debe Water Supply Scheme Upgrade: Phase 2* development, Nkonkobe Local Municipal area, Amathole District Municipality, Eastern Cape, was requested to meet the Eastern Cape Provincial Heritage Resources Authority's (EC PHRA) requirements with reference to archaeological and basic cultural heritage resources in terms of the National Heritage Resources Act, No 25 of 1999 (NHRA 1999), with specific reference to Section 38(1)(a) and 38(1)(c)(i). This report is submitted in partial fulfillment of the NHRA 1999, Section 38(3) requirements, for purposes of a NHRA 1999, Section 38(4) / Section 38(8) Heritage Impact assessment (HIA) comment by the EC PHRA.

<b>NHRA 1999, Section 38</b>	
1)	Subject to the provisions of subsections 7), 8) and 9), any person who intends to undertake a development categorized as –
a)	<b>the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;</b>
b)	the construction of a bridge or similar structure exceeding 50 m in length;
c)	any development or other activity which will change the character of a site –
	i. <b>exceeding 5 000 m<sup>2</sup> in extent;</b> or
	ii. involving three or more existing erven or subdivisions thereof; or
	iii. involving three or more erven or subdivisions thereof which have been consolidated within the past five years; or
	iv. the costs which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
d)	the rezoning of a site exceeding 10 000 m <sup>2</sup> in extent; or
e)	any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,
	must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

**Table 1:** Extracts from the NHRA 1999, Section 38

The Phase 1 AIA aimed to locate, identify and assess the significance of cultural heritage resources, inclusive of archaeological deposits / sites, built structures older than 60 years, burial grounds and graves, graves of victims of conflict and basic cultural landscapes or views as defined and protected by the NHRA 1999, that may be affected by the development.

This report comprises a Phase 1 AIA, including a basic pre-feasibility study and field assessment only.

Additional relevant legislation pertaining to the Phase 1 AIA is listed as:

- o National Environmental Management Act, No 107 of 1998 (NEMA 1998) and associated Regulations (2014).

### 2.1.2) Methodology & Gap Analysis

The Phase 1 AIA includes a basic pre-feasibility study and field assessment:

- o The pre-feasibility assessment is based on the Appendices A and B introductory archaeological literature. In addition the SAHRA 2009 Mapping Project Database (MPD), SAHRIS and the SAHRA Database on declared Provincial Heritage Sites (PHS) – Eastern Cape, were consulted. The study excludes consultation of museum and university databases.
- o The field assessment was done over a 3 day period (2015-09-23, 09-28 and 10-02) with fieldwork conducted by the author and assisted by Julius Nkoma. The assessment was done by foot and limited to a Phase 1 surface survey. GPS co-ordinates were taken with a Garmin Montana 650 (Datum: WGS84). Photographic documentation was

done with a Pentax K20D camera. A combination of Garmap and Google Earth software was used in the display of spatial information.

Archaeological and cultural heritage site significance assessment and associated mitigation recommendations were done according to the system prescribed by SAHRA (2007).

<b>SAHRA Archaeological and Cultural Heritage Site Significance Assessment</b>			
<b>Site Significance</b>	<b>Field Rating</b>	<b>Grade</b>	<b>Recommended Mitigation</b>
High Significance	National Significance	Grade I	Site conservation / Site development
High Significance	Provincial Significance	Grade II	Site conservation / Site development
High Significance	Local Significance	Grade III-A	Site conservation or extensive mitigation prior to development / destruction
High Significance	Local Significance	Grade III-B	Site conservation or extensive mitigation prior to development / destruction
High / Medium Significance	Generally Protected A	Grade IV-A	Site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B	Grade IV-B	Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C	Grade IV-C	On-site sampling, monitoring or no archaeological mitigation required prior to or during development / destruction

**Table 2:** SAHRA archaeological and cultural heritage site significance assessment ratings and associated mitigation recommendations

### 2.1.3) Assessor Accreditation

Karen van Ryneveld (ArchaeoMaps):

- o Qualification: MSc Archaeology (2003) WITS University, Johannesburg / Certificate GIS (2007) NMMU University, Port Elizabeth.
- o Accreditation: Association of Southern African Professional Archaeologists (ASAPA) accredited Cultural Resources Management (CRM) practitioner [member nr – 163]
  1. 2004 – Association of Southern African Professional Archaeologists (ASAPA) – Professional Member.
  2. 2005 – ASAPA CRM Section: Accreditation – Field Director (Stone Age, Iron Age, Colonial Period).
  3. 2010 – ASAPA CRM Section: Accreditation – Principle Investigator (Stone Age).

Karen van Ryneveld is a SAHRA / AMAFA / EC PHRA / HWC listed CRM archaeologist.

Karen has been involved in CRM archaeology since 2003 and has been the author (including selected co-authored reports) of more than 350 Phase 1 AIA studies. Phase 1 AIA work is centered in South Africa, focusing on the Northern and Eastern Cape provinces and the Free State. She has also conducted Phase 1 work in Botswana (2006/2007). In 2007 she started ArchaeoMaps, an independent archaeological and heritage consultancy. In 2010 she was awarded ASAPA CRM Principle Investigator (PI) status based on large scale Phase 2 Stone Age mitigation work (De Beers Consolidated Mines – Rooipoort, Northern Cape – 2008/2009) and has also been involved in a number of other Phase 2 projects including Stone Age, Shell Middens, Grave / Cemetery projects and Iron Age sites.

In addition to CRM archaeology she has been involved in research, including the international collaborations at Maloney's Kloof and Grootkloof, Ghaap plateau, Northern Cape (2005/2006). Archaeological compliance experience includes her position as Head of the Archaeology, Palaeontology and Meteorites (APM) Unit at AMAFA aKwa-Zulu Natali (2004).

### 2.2.1) Pre-feasibility Summary

Based on a basic introductory literature assessment of South African archaeology (See Appendices A and B) and background heritage database research, the probability of archaeological and cultural heritage sites situated within or in direct proximity to the *Debe Water Supply Scheme Upgrade: Phase 2* development, Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape, can briefly be described as:

Archaeological and Basic Cultural Probability Assessment – <i>Debe Water Supply Scheme Upgrade: Phase 2</i>			
Primary Type / Period	Sub-Period	Sub-Period Type Site	Probability
EARLY HOMININ / HOMINID	-	-	None
	Graves / Human remains: High scientific significance		
STONE AGE	Earlier Stone Age (ESA)		Low
	Middle Stone Age (MSA)		Low-Medium
	Later Stone Age (LSA)		Medium
		Rock Art	None
		Shell Middens	None
	Graves / Human remains: ESA & MSA – High scientific significance; LSA – High scientific & social significance		
IRON AGE	Early Iron Age (EIA)		None
	Middle Iron Age (MIA)		None
	Later Iron Age (LIA)		High
	Graves & Human remains: EIA – High scientific & medium social significance; MIA & LIA: High scientific & social significance		
COLONIAL PERIOD	Colonial Period		Medium-High
		LSA – Colonial Period Contact	None
		LIA – Colonial Period Contact	Medium
		Industrial Revolution	Low
		Apartheid & Struggle	Low
	Graves / Human Remains: Medium-high scientific & high social significance		

Table 3: Archaeological and basic cultural probability assessment

### 2.2.2) The SAHRA 2009 MPD & SAHRIS

A limited number of archaeological Cultural Resources Management (CRM) reports are recorded in the SAHRA 2009 Mapping Project Database (MPD), situated within an approximate 40km radius from the *Debe Water Supply Scheme Upgrade: Phase 2* development study site, listed as:

- Becker, E. (Knight Piesold Consultants). 2008. *Phase 1 Heritage Impact Assessment for the Cato / Mnyameni Area, East London, Eastern Cape.*
- Van Ryneveld, K. (ArchaeoMaps). 2008a. *Phase 1 Archaeological Impact Assessment – The Albany Regional Water Supply Scheme, Eastern Cape, South Africa.*
- Van Ryneveld, K. (ArchaeoMaps). 2008b. *Phase 1 Archaeological Impact Assessment – Proposed Construction of Commercial Offices and Retail Space, Erf 9582, Sweetwaters, King Williams Town, Eastern Cape, South Africa.*
- Van Schalkwyk, J.A. (National Cultural History Museum). 2008. *Heritage Impact Survey Report for the Proposed Development Southeast of Bisho, King Williams Town Magisterial District, Eastern Cape.*
- Van Schalkwyk, L.O. & Wahl, E. (eThembeni). 2008. *Heritage Impact Assessment of Four Borrow Pits, Ndlambe and Makana Municipalities, Greater Cacadu Region, Eastern Cape Province, South Africa.*
- Webley, L.E. (Albany Museum). 2008. *Phase 1 Archaeological Impact Assessment: Dairy Development at Ann Shaw, Middledrift, Eastern Cape.*

A number of additional cases are recorded on SAHRIS, situated within the approximate 40km radius from the Debe study site, including SAHRIS CaseID 2339, a gravel mining application without any heritage studies submitted, SAHRIS CaseID 2821, application for the King Williams Town Bulk Water Sewerage Scheme, associated with only a Palaeontological Impact assessment (PIA) as component part of the Heritage Impact Assessment (HIA) and the SAHRIS CaseID 7842, the application for the King Williams Town Bypass, a recent application, still in draft format, without any heritage studies as yet associated therewith. SAHRIS CaseID's 453, 1109, 7631 and 7846 are associated with archaeological CRM studies or Phase 1 Archaeological Impact Assessment (AIA) reports, with relevant reports referenced as:

- Anderson, G. (Umlando). 2011. *Heritage Survey of the Proposed Peddie Energy 19MW Photovoltaic Facility, Eastern Cape.*
- Anderson, G. (Umlando). 2015. *Heritage Survey of the Ndlambe Bulk Water Supply Scheme – Sandile Dam to Cannon Rocks, Eastern Cape.*
- Booth, C. (Booth Heritage Consulting). 2015. *Addendum: Archaeological and Heritage Investigation of Proposed Deviations and Repeater Sites for an Environmental Authorization Amendment for Fibreco Route 4 (George to Port Elizabeth) and 5 (Port Elizabeth to Durban).*
- Van Ryneveld, K. (ArchaeoMaps). 2012. *Phase 1 Archaeological Impact assessment – Ripplemead Packshed, Portion of Groot Plaats 4, (near Peddie), Nqusha Municipality, Eastern Cape, South Africa.*

### 2.2.3) SAHRA Provincial Heritage Site Database – Eastern Cape

A number of georeferenced declared Provincial Heritage Sites (PHS) are recorded in the SAHRA – Eastern Cape database, situated within an approximate 40km radius from the *Debe Water Supply Scheme Upgrade: Phase 2* development study site ([en.wikipedia.org/wiki/List\\_of\\_heritage\\_sites\\_in\\_Eastern\\_Cape](http://en.wikipedia.org/wiki/List_of_heritage_sites_in_Eastern_Cape)), the bulk of which are situated in King Williams Town and telling of the early Colonial Period history thereof, but declared sites are also recorded in Alice and further south of the proposed development. No georeferenced declared PHS's will be impacted by the proposed development.

Georeferenced declared PHS situated within an approximate 40km radius from the Debe study site can be listed and spatially displayed as:

Declared Provincial Heritage Sites – Eastern Cape					
Map Ref	Identifier	Site Name	Town	NHRA status	Coordinates
BE-EC1	4/K/King/1	Fort Murray, Zwelitsha District [After the 6 <sup>th</sup> Xhosa War (1834–1835) Sir Benjamin D'Urban annexed all the land between the Keiskamma and the Kei Rivers as part of the Cape Colony and called it the Province of Queen Adelaide. To protect this territory he started to build a network of forts.]	Zwelitsha	Provincial Heritage Site	S32°57'00"; E27°28'00"E
BE-EC2	4/K/Ped/2	Cavalry Barracks and Stables, Peddie [Military building complex erected circa. 1840-1862 served as NB centre of among others, the Cape Mounted Riflemen. Thereafter some buildings were used as the Residency and postmaster's dwelling.]	Peddie	Provincial Heritage Site	S33°11'00"; E27°15'24"
BE-EC117	9/2/050/0007	Old Residency, Reserve Road, King William's Town [Erected circa. 1846 and situated on the spot where the London Missionary Society's mission station was built by John Brownlee after his arrival in 1826.]	King William's Town	Provincial Heritage Site	S32°57'48"; E27°27'45"
BE-EC118	9/2/050/0008	Holy Trinity Church, Prince Alfred's Square, King William's Town [Current use: Anglican Church.]	King William's Town	Provincial Heritage Site	S32°59'20"; E27°28'33"
BE-EC120	9/2/050/0010/002	Old Powder Magazine, Military Reserve, King William's Town [One of largest and best preserved examples of its kind in South Africa.]	King William's Town	Provincial Heritage Site	S32°57'48"; E27°27'45"

		Probably erected in two stages; between 1852 - 1862 and between 1864 - 1875.]			
BE-EC126	9/2/050/0014/001	Daines Wing, Kaffrarian Museum, Alexandra Road, King William's Town [The Kaffrarian Museum originated from the Natural History Society, founded in King William's Town in 1884. Designed by the architect P. E. Treeby of Johannesburg. Current use: Museum.]	King William's Town	Provincial Heritage Site	S32°52'37"; E27°23'29"
BE-EC127	9/2/050/0014/002	Natural History Wing, Kaffrarian Museum, Albert Road, King William's Town	King William's Town	Provincial Heritage Site	S32°52'36"; E27°23'32"
BE-EC128	9/2/050/0015	Lonsdale Chambers, Taylor Street, King William's Town [Architectural style: neo-Classical. Designed and built in 1924 by the architects Cordreaux, Farrow & Stocks. Named after James Faunce Lonsdale.]	King William's Town	Provincial Heritage Site	S32°52'42"; E27°23'24"
BE-EC129	9/2/050/0016	British Kaffrarian Savings Bank, MacLean Square, King William's Town [Erected in 1908.]	King William's Town	Provincial Heritage Site	S32°52'43"; E27°23'23"
BE-EC131	9/2/050/0018	Victoria Drill Hall, Queens Road, King William's Town [Victorian building with neo-Classical features. Designed by J. Laughton and named after Queen Victoria. Cornerstone laid on 21 June 1897.]	King William's Town	Provincial Heritage Site	S32°52'39"; E27°23'34"
BE-EC134	9/2/050/0022	Old Blacksmiths shop, Oak Street, King William's Town [Current use: Correctional services: Logistics.]	King William's Town	Provincial Heritage Site	S32°57'13"; E27°26'44"
BE-EC136	9/2/050/0024	Dale College Boys' Primary School, Albert Road, King William's Town [Cornerstone designed by architect Sir Herbert Baker and laid on 20 March 1907. Officially opened on 26 February 1908 by Dr Thomas Muir, Superintendent-General of Education.]	King William's Town	Provincial Heritage Site	S32°52'34"; E27°23'35"
BE-EC137	9/2/050/0025	Town Hall, MacLean Street, King William's Town [Foundation stone laid in 1866. Officially opened on 4 December 1867. During the 9 <sup>th</sup> Frontier War (1877-1878) used as a waiting-room for the Civil Defence Force.]	King William's Town	Provincial Heritage Site	S32°52'38"; E27°23'19"
BE-EC138	9/2/050/0026	Grey Hospital, King William's Town [Erected 1856 - 1859 at the instruction of Sir George Grey and intended mainly for the Black population of British Kaffraria. Designed by Edward Pilkington. Opened on 11 June 1859.]	King William's Town	Provincial Heritage Site	S32°52'47"; E27°23'39"
BE-EC139	9/2/050/0027	South African Missionary Museum, Berkley Street, King William's Town [Methodist Church built in 1855 in neo-Gothic style. Later used by local German Baptist Congregation and now the home of the South African Missionary Museum.]	King William's Town	Provincial Heritage Site	S32°52'26"; E27°23'15"
BE-EC140	9/2/050/0028	Old Methodist Manse, 25 Berkley Street, King William's Town [Built in circa. 1855. Current use: Residence.]	King William's Town	Provincial Heritage Site	S32°52'25"; E27°23'17"
BE-EC141	9/2/050/0029	Old Synagogue, Berkley Street, King William's Town [Neo-Gothic building probably dates from 1850's, was used for several decades as a school by the Wesleyans. Used as a synagogue since 1908.]	King William's Town	Provincial Heritage Site	S32°52'27"; E27°23'14"
BE-EC143	9/2/050/0038	Steve Biko's House, 698 Ngxata Street, Ginsberg, King William's Town	King William's Town, Ginsberg	Provincial Heritage Site	S32°53'41"; E27°23'12"
BE-EC208	9/2/502/0007	University of Fort Hare Collections, University of Fort Hare, Alice	Alice	Heritage Object	S32°47'00"; E26°53'00"
BE-EC210	BE-EC210	9/2/502/0016	Watch	Peddie	Provincial Heritage Site



			Tower, Peddie		
BE-EC213	CiskeiTemp8	Domira, Lovedale, Victoria East District [Educational institution situated at Block Drift on bank of Tyumie River. Old stone house with a thatched roof on grounds of the institution. Built in 1837, but history goes back to Rev. John Brownlee who started missionary work in the Tyumie valley in 1820. Missionaries of the Glasgow Society joined him and a mission station was established. Was also the residence of Charles Lennox Stretch, diplomatic agent to the Gaiikas (1836-1846) and served as fortress, storm-centre and originally as the headquarters of Sir Andries Stockenström during the War of the Axe.]	CiskeiTemp8	Domira, Lovedale, Victoria East District	CiskeiTemp8

**Table 4:** Declared Provincial Heritage Sites in relation to the study site



**Map 4:** Spatial distribution of geo-referenced PHS in the Eastern Cape in relation to the proposed Debe Water Supply Scheme Upgrade: Phase 2 development

### 2.2.4) General Discussion

Stone Age records of the greater Debe area include comment by Webley (2008) of reported accounts of Earlier (ESA), Middle (MSA) and Later Stone Age (LSA) occurrences from the vicinity of the Ann Shaw, Middeldrift, whilst Anderson (2011) reported on both MSA and LSA low density deposits from the Peddie Solar study site and seeming repeated occurrences of Stone Age artefacts encountered in association with fossil remains from the Ndlambe water project study site (Anderson 2015). Of significance is the excavated LSA pastoralist remains of a Gonaqua Khoekhoen settlement site near Middeldrift, firmly establishing the presence of this group in the area prior to the 18<sup>th</sup> Century (Webley 2008).

Reported on Iron Age remains are restricted to accounts of the Later Iron Age (LIA), including a number of LIA, and

including contemporary cemeteries (Anderson 2011, 2015; Van Ryneveld 2008a, 2012). Anderson (2015), however, also recorded a number of farm laborer residences and stone walled settlement remains. Of particular significance is the Makana National Monument, the Milkwood tree being an intangible heritage site reflecting on the 1835 agreement between the Fingo and Reverend John Ayliff, when the Fingo agreed to obey the Queen, accept Christianity and educate their children (Anderson 2011).

Colonial Period resources seem ample across the greater Debe terrain. Booth (2015) mentions the rich presence of both historical buildings and memorials along the Fibreco line routes, specifically along route 5, from Port Elizabeth to Durban; sites are however not specified with reference to the development alignment. Colonial Period cemeteries are reported on by Anderson (2011, 2015) and Van Ryneveld (2008a), often found in association with old farmstead remains and Historical farmsteads. The Ripplemead assessment recorded old farmstead remains in association with an early fuel station, testimony to early technological development in the former Ciskei (Van Ryneveld 2012), while Colonial Period churches, residences, shops and structure remains attests to Colonial Period life and interaction with Iron Age communities in the area (Anderson 2011, 2015; Van Ryneveld 2008a), including a number of war remains such as barracks remnants and a war memorial (Anderson 2015).

### 2.3.1) Field Assessment Results

Thirteen (13) archaeological and cultural heritage resources, as defined and protected by the NHRA 1999, were identified during the archaeological field assessment for the *Debe Water Supply Scheme Upgrade: Phase 2* development. Of the identified sites 4 are Colonial Period sites and 9 Later Iron Age (LIA) / contemporary grave and cemetery sites. Identified sites are centred along 4 line routes, being Gravity Main 1 [Sites D-GM1-S1 and D-GM1-S2], Rising Main 5 [D-RM5-S1, D-RM5-S2, D-RM5-S3, D-RM5-S4, D-RM5-S5 and D-RM5-S6], Rising Main 6 [D-RM6-S1, D-RM6-S2 and D-RM6-S3] and Rising Main 8 [D-RM8-S1 and D-RM8-S2]. Overall layout of the development indicates cognisance to archaeological and cultural heritage resources during the planning phase of the development: No identified sites will be directly impacted on by development and conservation recommendations contained in this report are primarily made to ensure no accidental impact on the heritage resources during the course of construction. Recommendations are largely restricted to temporary conservation fencing and sign-posting, with recommendations pertaining to Site D-GM1-S2 being the exception. Here recommendations for slight realignment of the line route in the vicinity of the site aim to address heritage practice standards with reference to conservation buffers around cemetery sites.

No archaeological or cultural heritage resources were identified at the Pump Station or Reservoir localities.

### 2.3.2) Gravity Main 1

Gravity Main 1 comprises an approximate 1.75km line route development, running primarily north along the main access route of Ncabasa and Dhlawu villages, from roughly S32°58'30.9"; E26°58'53.3" in the west to S32°58'46.3"; E26°59'44.4" in the east. Two (2) archaeological and cultural heritage resources, as defined and protected by the NHRA 1999, were identified along the line route, namely Site D-GM1-S1 and Site D-GM1-S2. Aside from the identified resources, general heritage sensitivity is present in the villages, primarily comprising of grave sites, with noted graves along the line route being situated within homestead yards, routinely fenced as such. Individual graves and small family cemeteries situated within fenced homestead yards were not recorded for purposes of this assessment – none of these graves or small family cemeteries will be negatively impacted by development.

#### 2.3.2.1) Site D-GM1-S1: Colonial Period, Residence (S32°58'46.4"; E26°59'33.0")

Site D-GM1-S1 comprises an old Colonial Period residence. The vernacular structure can reasonably be inferred to well pre-date 60 years of age, based on architectural style, implying that the structure is formally protected by the NHRA 1999. The conservation level of the structure can be described as fair, primarily due the fact that the site is still in use, as a residence. No formal conservation measures (permanent fence with access gate) are in place. The site will not be impacted by development, being situated approximately 20m north of the development alignment. Proximity of the site to the development alignment necessitates additional conservation measures during the course of construction. It is recommended that a temporary conservation fence (construction netting or a similar visually clear demarcation) be placed along the southern boundary of the site together with temporary signage, indicating the site as a 'No Entry – Heritage Site' zone during the construction phase. All temporary conservation measures should be removed upon completion of construction.

- Heritage site significance rating: The Site D-GM1-S1 structure receives automatic SAHRA / EC PHRA protection as a site of *High Significance* with a *Provincial Grade II Field Rating*. However, from a general heritage point of view the site is assigned a *Medium Significance* with a *Generally Protected Grade IV-B Field Rating*.

#### 2.3.2.2) Site D-GM1-S2: Later Iron Age / Contemporary, Cemetery (S32°58'47.7"; E26°59'43.1")

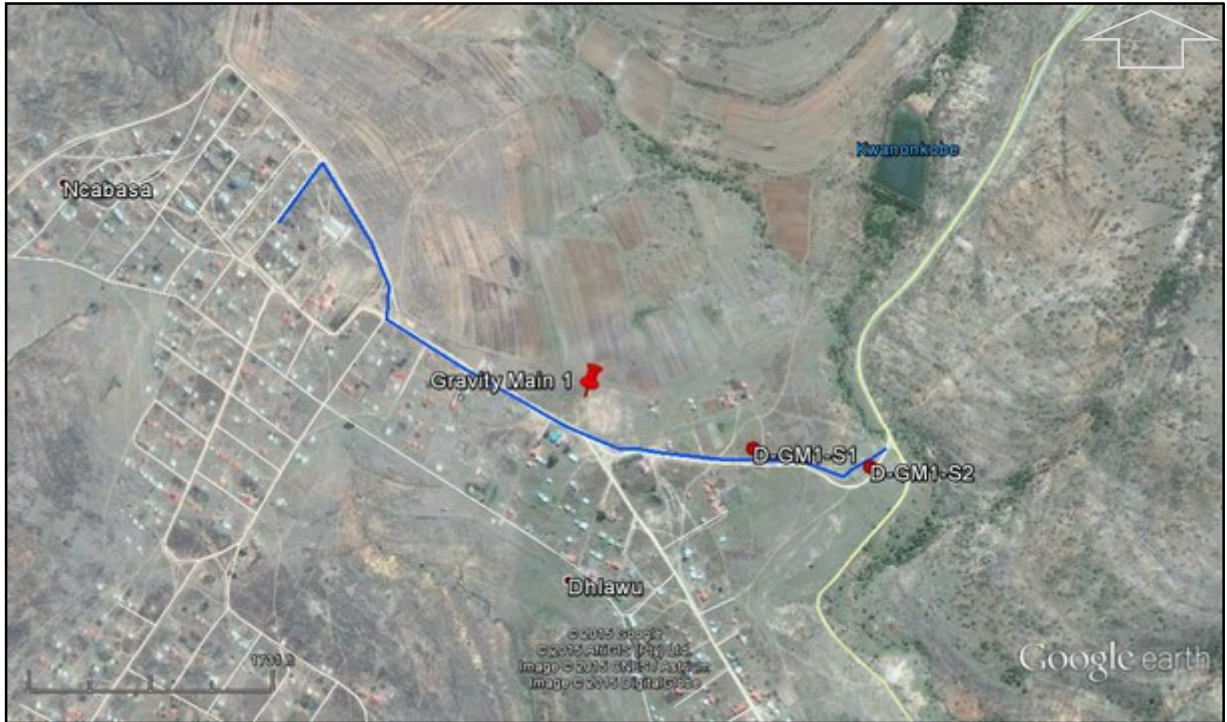
Site D-GM1-S2 comprises a fairly large, informal cemetery of approximately 300 graves, with the site culturally assigned to the Later Iron Age tradition, but being primarily of contemporary age. Grave style varies significantly within the cemetery, ranging from modern style graves to stone outlined graves, with a few stone cairn style graves present. Unmarked graves or graves where demarcations have disappeared as well as settled earth mounds may indicate significant age, at least of selected of the graves. The cemetery is bordered along its general southern boundary by the access route to Ncabasa and Dhlawu villages, with the current development alignment planned immediately north along the boundary of the site, within the general erosion gully area. Proximity of the current proposed alignment to the site is problematic – heritage compliance standards as a norm include a significant conservation barrier around any cemetery or grave site. Topographic and existing development features at Site D-GM1-S1 however need to be considered; the cemetery cannot expand southwards, because of the road and it is unlikely that it will expand significantly north, into the erosion gully, but cognizance will still need to be taken of standards of heritage conservation. It is recommended that the development line along the northern boundary of the site be moved at least 20m north and north of the gully to ensure a minimum 20m conservation barrier between the cemetery site and development impact. Standard heritage compliance requirements would include that the site be permanently fenced with an access gate and at least temporarily sign-posted as a 'No Entry – Heritage Site' for the duration of construction in the vicinity thereof. Temporary signage should be removed after construction.

- Heritage site significance rating: Cemetery site D-GM1-S2 is assigned a *High / Medium Significance* with a *Generally Protected IV-A Field Rating*.

**RECOMMENDATIONS:**

1. It is recommended that development of Gravity Main 1 proceed, provided the developer ensures conservation requirements with reference to identified Sites D-GM1-S1 and D-GM1-S2 are complied with:
  - Site D-GM1-S1: Temporary conservation fence and temporary signage during the course of construction; and
  - Site D-GM1-S2: Realignment of the line route to ensure approximate 20m conservation buffer between development and the site, permanent fencing of the site and temporary sign posting during the course of construction.





Map 5: Gravity Main 1 – Results of the field assessment



Map 6: Proposed realignment in the vicinity of Site D-GM1-S2 (Blue-Gravity Main 1 alignment; Red – proposed realignment)



**Plate 1:** Beginning of the Gravity Main 1 alignment in Ncabasa Village



**Plate 3:** Gravity Main 1 alignment with Site D-GM1-S1 in the background



**Plate 2:** General view of the Gravity Main 1 alignment



**Plate 4:** Close-up of the Colonial Period site, Site D-GM1-S1





Plate 5: View of the Site D-GM1-S2 cemetery [1]



Plate 7: View of the Site D-GM1-S2 cemetery [3]



Plate 6: View of the Site D-GM1-S2 cemetery [2]



Plate 8: End of the Gravity Main 1 line route with Site D-GM1-S2 in the background

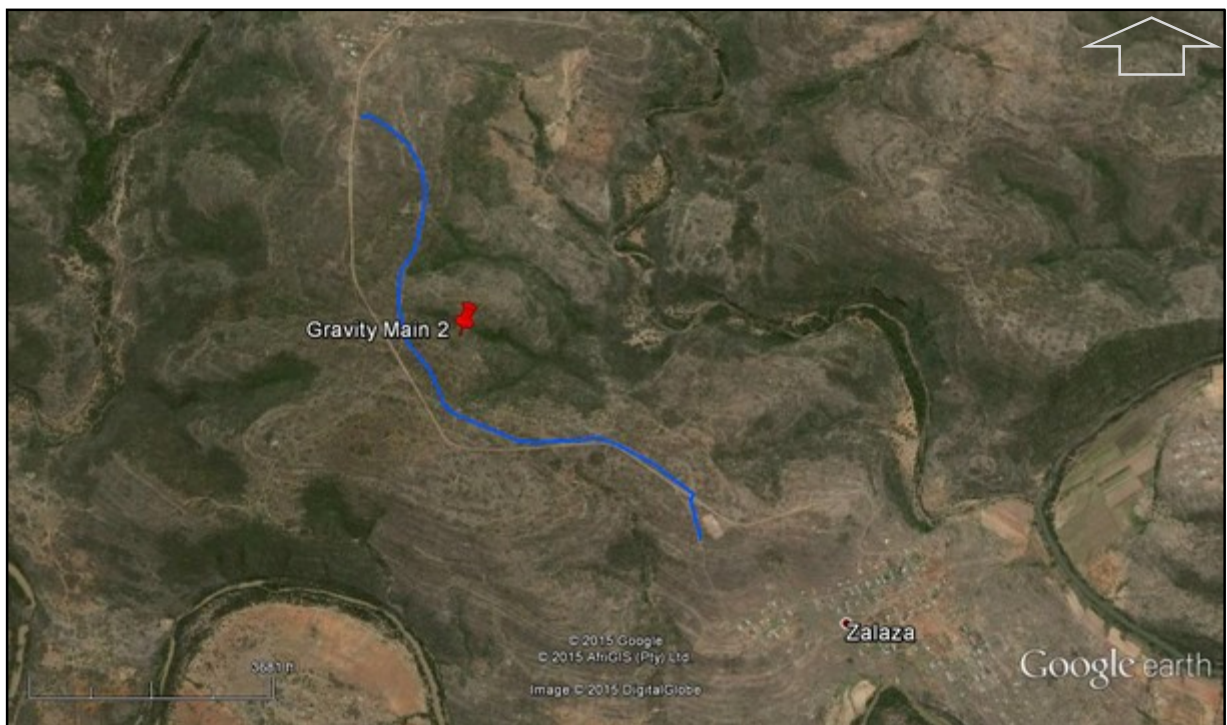


### 2.3.3) Gravity Main 2

Gravity Main 2 comprises an approximate 3.2km line route development, from roughly S33°00'40.5"; E27°01'44.4" in the north to S33°01'47.1"; E27°02'49.5" in the south, situated just north-west of Zalaza Village. No archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, were identified during field assessment of the Gravity Main 2 study site.

#### **RECOMMENDATIONS:**

1. It is recommended that development of Gravity Main 2 proceed as applied for without the developer having to comply with additional heritage compliance requirements.



**Map 7:** Gravity Main 2 – Results of the field assessment



Plate 9: General view of Gravity Main 2 (from north to south) [1]



Plate 11: General view of Gravity Main 2 (from north to south) [3]



Plate 10: General view of Gravity Main 2 (from north to south) [2]



Plate 12: General view of Gravity Main 2 (from north to south) [4]

### 2.3.4) Gravity Main 3

The Gravity Main 3 component of the Debe Water Supply Scheme Upgrade development comprises an approximate 1.2km line route development, from S32°55'21.1"; E27°01'20.2" in the north to S32°55'44.4"; E27°01'48.1" in the south, situated north of the village of Qibira. No archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, were identified during the field assessment of the Gravity Main 3 alignment.

#### **RECOMMENDATIONS:**

1. It is recommended that development of Gravity Main 3 proceed as applied for without the developer having to comply with additional heritage compliance requirements.



**Map 8:** Gravity Main 3 – Results of the field assessment





Plate 13: General view of Gravity Main 3 (from north to south) [1]



Plate 15: General view of Gravity Main 3 (from north to south) [3]



Plate 14: General view of Gravity Main 3 (from north to south) [2]



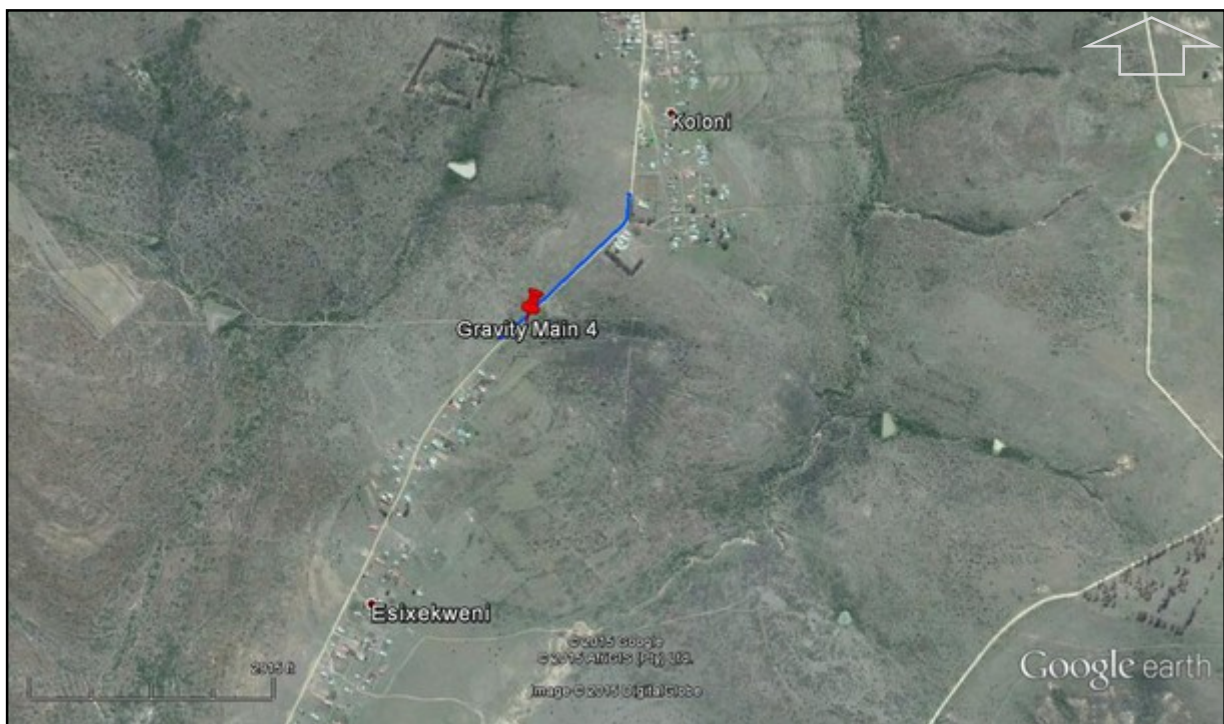
Plate 16: General view of Gravity Main 3 (from north to south) [4]

### 2.3.5) Gravity Main 4

Proposed development of Gravity Main 4 constitutes an approximate 0.8km line route development, from  $S32^{\circ}53'40.6''$ ;  $E27^{\circ}04'31.4''$  in the north to  $S32^{\circ}53'59.1''$ ;  $E27^{\circ}04'12.6''$  in the south, located along the access route between Koloni and Esixekweni villages. No archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, were identified during field assessment of the Gravity Main 4 alignment.

#### **RECOMMENDATIONS:**

1. It is recommended that development of Gravity Main 4 proceed as applied for without the developer having to comply with additional heritage compliance requirements.



**Map 9:** Gravity Main 4 – Results of the field assessment





Plate 17: General view of the Gravity Main 4 (from north to south) [1]



Plate 19: General view of the Gravity Main 4 (from north to south) [3]



Plate 18: General view of the Gravity Main 4 (from north to south) [2]



Plate 20: General view of the Gravity Main 4 (from north to south) [4]

### 2.3.6) Rising Main 5, the Pump Station 1 (PS1) and Pump Station 2 (PS2) Study Sites

The Rising Main 5 alignment comprises an approximate 0.7km line route development, running from the Pump Station 1 (PS1) locality, situated at S32°51'52.7"; E27°01'45.1", north of Newtown Village and just west of the Debe dam wall to the Pump Station 2 (PS2) study site, located at S32°52'03.8"; E27°02'04.4", demarcating the rough north-western boundary of Newtown Village.

#### 2.3.6.1) Site D-RM5-S1: Later Iron Age / Contemporary, Cemetery (S32°51'43.4"; E27°02'35.3")

The Site D-RM5-S1 cemetery is situated more than 1km from the proposed Rising Main 5 development alignment, but along the major access route to the proposed study site. The informal Site D-RM5-S1 cemetery comprises more 500+ graves, with grave styles ranging from moderns style, often individually fenced graves, to more traditional style graves, including stone cairn, stone outlined, simple earth mound and stone head and head and footstone demarcated graves. The site will not be impacted on by development. Temporary conservation measures, including a temporary conservation fence along the eastern boundary of the site, between the site and the access road, with temporary signage indicating the site as a 'No Entry – Heritage Site' zone attached at intervals along the conservation fence should suffice to ensure no accidental impact on the site.

- Heritage site significance rating: Site D-RM5-S1 is assigned a *High / Medium Significance* with a *Generally Protected IV-A Field Rating*.

#### 2.3.6.2) Site D-RM5-S2: Later Iron Age / Contemporary, Cemetery (S32°51'55.2"; E27°02'06.8")

The site D-RM5-S2 co-ordinate indicates the locality of a cluster of graves, in excess of 500, but with a mosaic of grave clusters or informal cemeteries intersected with sparsely scattered smaller family type 'cemeteries' and individual graves characterizing the general area north, north-east of Newtown Village. The Site D-RM5-S2 grave or cemetery cluster is situated roughly 250m from the proposed development alignment, with related graves located further east thereof situated even further away. The general 'cemetery' area is in addition located upslope along a fairly steep slope and development impact cannot be anticipated. Based on proximity from the proposed Rising Main 5 development alignment coined with the topography of the area no conservation measures are deemed necessary.

- Heritage site significance rating: The Site D-RM5-S2 cemetery area stretch further north, north-east of Newtown Village is assigned a *High / Medium Significance* with a *Generally Protected IV-A Field Rating*.

#### 2.3.6.3) Site D-RM5-S3: Later Iron Age / Contemporary, Cemetery (S32°51'57.3"; E27°02'01.7")

Site D-RM5-S3 comprises a small family cemetery of 4 stone cairn graves, 3 of which contain contemporary style grave demarcations in addition. The family cemetery site is situated approximately 100m from the proposed development alignment and will not be impacted by development. The site should be temporarily conserved with construction netting and temporary signage indicating it as a 'No Entry – Heritage Site' area for the duration of the Rising main 5 construction phase to ensure no accidental impact on the site. All temporary conservation measures should be removed after construction.

- Heritage site significance rating: Site D-RM5-S3 is assigned a *High / Medium Significance* with a *Generally Protected IV-A Field Rating*.

#### **2.3.6.4) Site D-RM5-S4: Later Iron Age / Contemporary, Grave (S32°51'58.5"; E27°02'02.0")**

Site D-RM5-S4 comprises a single grave. The grave is identifiable by a large stone as headstone with the grave demarcated by an elongated rectangular stone outline. The grave is situated approximately 90m from the Rising Main 5 alignment and will not be impacted by development. Additional conservation recommendations are made to ensure that no accidental impact occur during the course of construction. It is recommended that the grave be temporarily fenced and that temporary signage indicating the site as a 'No Entry – Heritage Site' be attached to the conservation fence for the duration of construction of Rising Main 5. All temporary conservation measures should be removed after construction.

- Heritage site significance rating: Site D-RM5-S4 is assigned a *High / Medium Significance* with a *Generally Protected IV-A Field Rating*.

#### **2.3.6.5) Site D-RM5-S5: Later Iron Age / Contemporary, Cemetery (S32°51'57.4"; E27°01'59.1")**

The Site D-RM5-S5 cemetery is inferred to be of the older burial grounds in the Newtown area, characterized by weathered grave demarcations and settled grave mounds. Traditional style graves are discernable by faint stone outlines still surfacing above ground and partially covered stone head and footstones. The weathered, overgrown and surface soil covered graves make it difficult to establish the number of graves present the site, but it can reasonable be inferred that well above 40 graves are present in the area, positioned tightly together, giving the impression of a fairly well arranged early cemetery. Graves at the site can be inferred to well pre-date 60 years of age and at least some may well approach the 100 year old mark. Site D-RM5-S5 is situated roughly 40m east of the proposed development alignment but additional site conservation measures would be necessary for purposes of development. The site should be temporarily fenced and temporary signage indicating the site as a 'No Entry – Heritage Site' should be attached to the conservation fence during the construction phase of Rising Main 5. All temporary conservation measures should be removed after construction.

- Heritage site significance rating: Site D-RM5-S5 is assigned a *High / Medium Significance* with a *Generally Protected IV-A Field Rating*.

#### **2.3.6.6) Site D-RM5-S6: Later Iron Age / Contemporary, Grave (S32°52'01.9"; E27°02'04.1")**

Site D-RM5-S6 comprises a single grave site, characterized by a few large stones forming the remnants of a former stone outlined grave. No formal conservation measures are in place. The Site D-RM5-S6 grave is situated approximately 60m from the proposed development alignment and the PS2 study site and will not be impacted by development. It is recommended that additional conservation measures be in place for the tenure of the construction phase to ensure no accidental impact on the site: A temporary conservation fence with temporary signage indicating the site as a 'No Entry – Heritage Site' zone should be erected for the tenure of the construction phase. All temporary conservation measures should be removed after construction.

- Heritage site significance rating: The Site D-RM5-S1 is assigned a *High / Medium Significance* with a *Generally Protected IV-A Field Rating*.

#### **RECOMMENDATIONS:**

1. It is recommended that development of Rising Main 5 proceed, provided the developer ensures conservation requirements with reference to identified Sites D-RM5-S1, D-RM5-S2, D-RM5-S3, D-RM5-S4, D-RM5-S5 and D-RM5-S6 are complied with:
  - Site D-RM5-S1: Temporary conservation fence and temporary signage during the course of construction;
  - Site D-RM5-S2: Temporary conservation fence and temporary signage during the course of construction;



- Site D-RM5-S3: Temporary conservation fence and temporary signage during the course of construction;
  - Site D-RM5-S4: Temporary conservation fence and temporary signage during the course of construction;
  - Site D-RM5-S5: Temporary conservation fence and temporary signage during the course of construction; and
  - Site D-RM5-S6: Temporary conservation fence and temporary signage during the course of construction.
2. It is recommended that development at PS1 proceed as applied for without the developer having to comply with additional heritage compliance requirements.
  3. It is recommended that development at PS2 proceeds as applied for without the developer having to comply with additional heritage compliance requirements.



Map 10: Rising Main 5, the PS1 and PS2 study sites – Results of the field assessment



Map 11: Close up of the spatial distribution of Sites D-RM5-S2 to D-RM5-S6



**Plate 21:** View of Site D-RM5-S1, situated adjacent to the main access road to Rising Main 5



**Plate 23:** Graves continuing from the D-RM5-S2 locality north-eastwards [1]



**Plate 22:** View of cemetery site D-RM5-S2



**Plate 24:** Graves continuing from the D-RM5-S2 locality north-eastwards [2]





Plate 25: View of Site D-RM5-S3



Plate 27: General view of Site D-RM5-S5 [1]



Plate 26: View of Site D-RM5-S4



Plate 28: General view of Site D-RM5-S5 [2]





Plate 29: View of Site D-RM5-S6



Plate 31: Existing infrastructure at the PS1 study site



Plate 30: General view over the Rising Main 5 alignment towards PS1



Plate 32: View of the PS2 study site

### 2.3.7) Rising Main 6 and the Pump Station 3 (PS3) / Eastern Reservoir (ER) Site

The Rising Main 6 alignment comprises an approximate 6.3km line route development, running from the Pump Station 2 (PS2) locality in the village of Newtown to the Pump Station 3 (PS3) / Eastern Reservoir (ER) study site, situated just north-west of Mngqaba James Village at S32°53'11.4"; E27°05'48.5". Three (3) archaeological and cultural heritage resources, as defined and protected by the NHRA 1999, were identified along the line route, namely Site D-RM6-S1, D-RM6-S2 and D-RM6-S3. Aside from the reported on heritage resources individual grave and small family cemetery sites were observed in Newtown Village – but these routinely fenced within homestead yards and thus not reported on for purposes of the development application. These sites will not be impacted by development.

#### 2.3.7.1) Site D-RM6-S1: Colonial Period, Church (S32°52'02.1"; E27°02'49.0")

Site D-RM6-S1 constitutes an old Colonial Period church, the structures of which may well pre-date 100 years of age, dating back to early missionary activity across the former Ciskei homelands area. The church is still in use, well conserved and evidently routinely maintained. The site is formally fenced with an access gate. Current conservation measures comply with SAHRA / EC PHRA Minimum Site Conservation Standards. Site D-RM6-S1 is situated roughly 350m north of the proposed Rising Main 6 alignment. The site is reported on, with specific reference to its proximity from the Rising Main 6 alignment, for purposes of a general heritage sensitivity assessment and will not be impacted on by development. No additional conservation measures for purposes of development are necessary.

- Heritage site significance rating: Site D-RM6-S1, the Colonial Period church site, receives automatic SAHRA / EC PHRA protection as a site of *High Significance* with a *Provincial Grade II Field Rating*.

#### 2.3.7.2) Site D-RM6-S2: Colonial Period, Building (S32°52'03.2"; E27°02'52.9")

Site D-RM6-S2 comprises a Colonial Period building. The site is linked to the early establishment of Newtown Village and the Site D-RM6-S1 Colonial Period missionary church. The D-RM6-S2 building may well have served as a residence of the reverend and may have housed associated offices and accommodation. The site is at present used as a residence. It is formally fenced with an access gate, complying with SAHRA / EC PHRA Minimum Site Conservation Standards. Site D-RM6-S2 is fairly well maintained. The site will not be impacted on based on proximity (roughly 350m) from the Rising Main 6 development alignment. No additional conservation measures for purposes of development are recommended.

- Heritage site significance rating: The Site D-RM6-S2 Colonial Period building receives automatic SAHRA / EC PHRA protection as a site of *High Significance* with a *Provincial Grade II Field Rating*. From a general heritage point of view the site is assigned a *Medium-High Significance* with a *Generally Protected Grade IV-A Field Rating*.

#### 2.3.7.3) Site D-RM6-S3: Later Iron Age / Contemporary, Cemetery (S32°52'08.1"; E27°03'00.8")

Site D-RM6-S3 comprises a large informal cemetery where scattered graves can be found across an approximate 200x200m area. The site is fairly easily identifiable by a number of modern style graves, some of which are individually fenced. The majority of the graves however comprise of traditional style graves, including earth-mound, stone outlined and simple stone head and footstone or only headstone demarcated graves. Significant LIA temporal presence can be inferred from a number of traditional style graves where earth mounds are extremely settled, in cases represented by hollows only. The Site D-RM6-S3 cemetery is inferred to represent the early local cemetery associated with missionary activity in the area, directly related to the localities of Site D-RM6-S1 and D-RM6-S2, but also signifying continuing use thereof or living heritage practice as such. Site D-RM6-S3 is situated roughly 250m from the proposed Rising man 6 alignment, but alongside the main

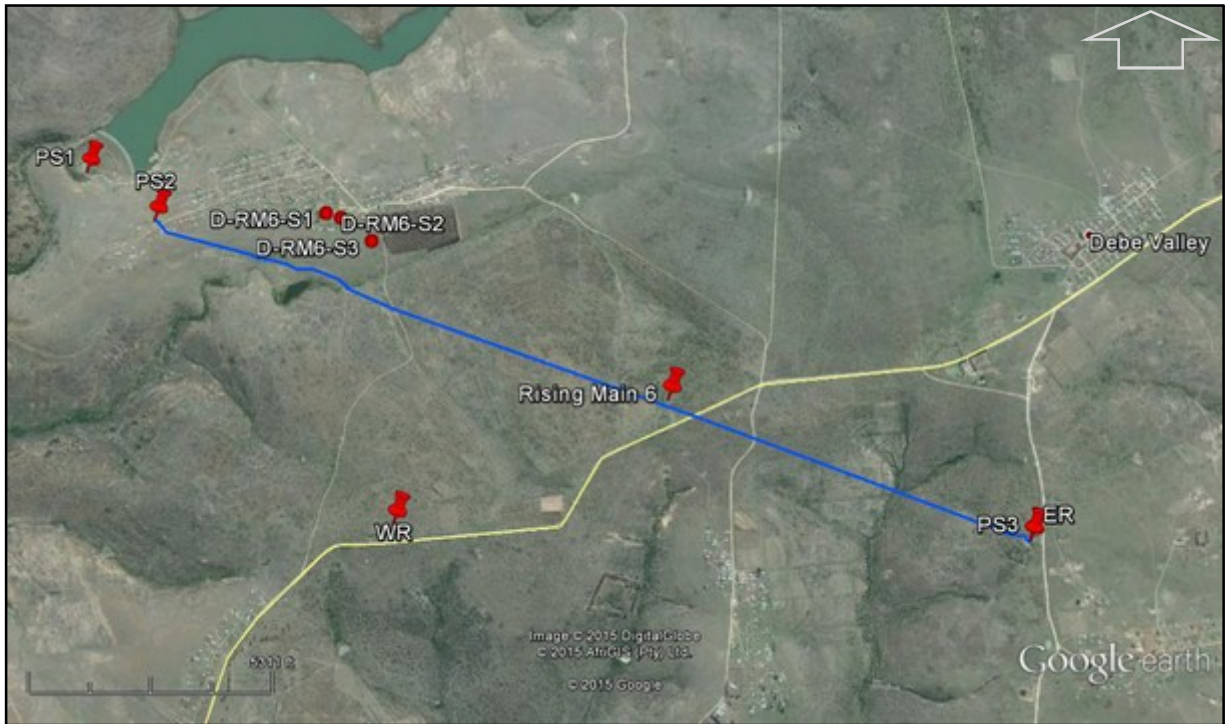
access road to Newtown Village and additional heritage conservation measures for purposes of development is recommended to ensure no accidental impact on the site during the construction phase. It is recommended that the site be temporarily fenced with construction netting or a similar visually clear demarcation for the tenure of construction impact in the vicinity of the site and that temporary signage indicating the site as a 'No Entry – Heritage Site' be attached at intervals along the conservation fence. All temporary conservation measures should be removed upon completion of construction in the vicinity of the site.

- Heritage site significance rating: Cemetery site D-RM6-S3 is assigned a *High / Medium Significance* with a *Generally Protected IV-A Field Rating*.

**RECOMMENDATIONS:**

1. It is recommended that development of Rising Main 6 proceed, provided the developer ensures conservation requirements with reference to identified Sites D-RM6-S1, D-RM6-S2 and D-RM6-S3 are complied with:
  - Site D-RM6-S1: N/A (based on proximity from the study site);
  - Site D-RM6-S2: N/A (based on proximity from the study site); and
  - Site D-RM6-S3: Temporary conservation fence and temporary signage during the course of construction.
2. It is recommended that development at PS3 proceed as applied for without the developer having to comply with additional heritage compliance requirements.
3. It is recommended that development at the ER study site proceed as applied for without the developer having to comply with additional heritage compliance requirements.





Map 12: Rising main 6 and the PS3 / ER site – Results of the field assessment



Map 13: Close-up of the localities of heritage resources identified along the Rising Main 6 alignment with proposed fence of Site D-RM6-S3 indicated in red





Plate 33: General view of the Rising Main 6 alignment [1]



Plate 35: View of the Site D-RM6-S2 Colonial Period building



Plate 34: View of the Site D-RM6-S1 Colonial Period church



Plate 36: Selected graves from the Site D-RM6-S3 cemetery [1]





Plate 37: Selected graves from the Site D-RM6-S3 cemetery [2]



Plate 39: Selected graves from the Site D-RM6-S3 cemetery [4]



Plate 38: Selected graves from the Site D-RM6-S3 cemetery [3]



Plate 40: Selected graves from the Site D-RM6-S3 cemetery [5]





**Plate 41:** General view of the Rising Main 6 alignment [2]



**Plate 43:** General view of the Rising Main 6 alignment [4]



**Plate 42:** General view of the Rising Main 6 alignment [3]



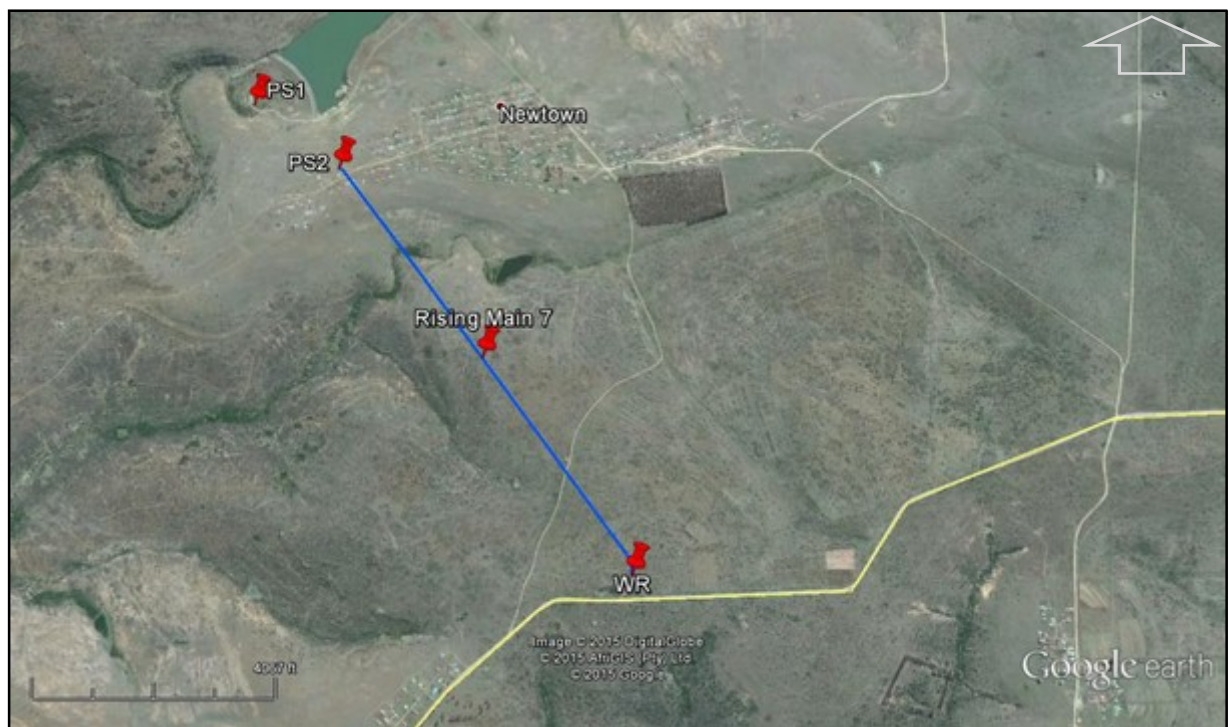
**Plate 44:** View of the PS3 / ER study site

### 2.3.8) Rising Main 7 and the Western Reservoir (WR) Site

The Rising Main 7 line route runs from the Pump Station 2 (PS2) locality in the village of Newtown to the Western Reservoir (WR) site, situated at S32°53'08.8"; E27°03'08.2" comprising an approximate 2.6km line route development. The WR will be upgraded from a 1ML reservoir to a 3ML capacity reservoir. No archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, were identified during field assessment of the Rising Main 7 alignment and the WR site.

#### **RECOMMENDATIONS:**

1. It is recommended that development of Rising Main 7 proceed as applied for without the developer having to comply with additional heritage compliance requirements.
2. It is recommended that upgrading of the WR site proceed as applied for without the developer having to comply with additional heritage compliance requirements.



**Map 14:** Rising Main 7 and the WR site – Results of the field assessment





**Plate 45:** General view of Rising Main 7 [1]



**Plate 47:** General View of Rising Main 7 [3]



**Plate 46:** General view of Rising Main 7 [2]



**Plate 48:** View of the WR site



### 2.3.9) Rising Main 8 and the Far Eastern Reservoir (FER) Site

Rising Main 8 comprises an approximate 5.3km line route development, running from the Pump Station 3 (PS3) / Eastern Reservoir (ER) locality to the Far Eastern Reservoir (FER), situated S32°51'58.8"; E27°07'46.6". The FER will be upgraded from a 0.5ML to a 1.8ML capacity reservoir. Two (2) archaeological and cultural heritage resources, as defined and protected by the NHRA 1999, were identified along the line route, namely Site D-RM8-S1 and Site D-RM8-S2.

#### 2.3.9.1) Site D-RM8-S1: Later Iron Age / Contemporary, Cemetery (S32°52'58.6"; E27°09'49.1")

Site D-RM8-S1 constitutes 3 modern style graves situated within an agricultural plot. The plot is permanently fenced with an access gate, complying with SAHRA / EC PHRA Minimum Site Conservation Standards, with the rising main alignment running immediately adjacent to the plot fence. The developer should ensure that a minimum 5m conservation buffer be maintained between the permanent conservation / plot fence and development impact. Temporary signage indicating the site as a 'No Entry – Heritage Site' zone should be attached to the site fence for the duration of construction impact at the site.

- Heritage site significance rating: The Site D-RM8-S1 cemetery is ascribed a SAHRA / EC PHRA *High Significance* with a *Generally Protected IV-C Field Rating*.

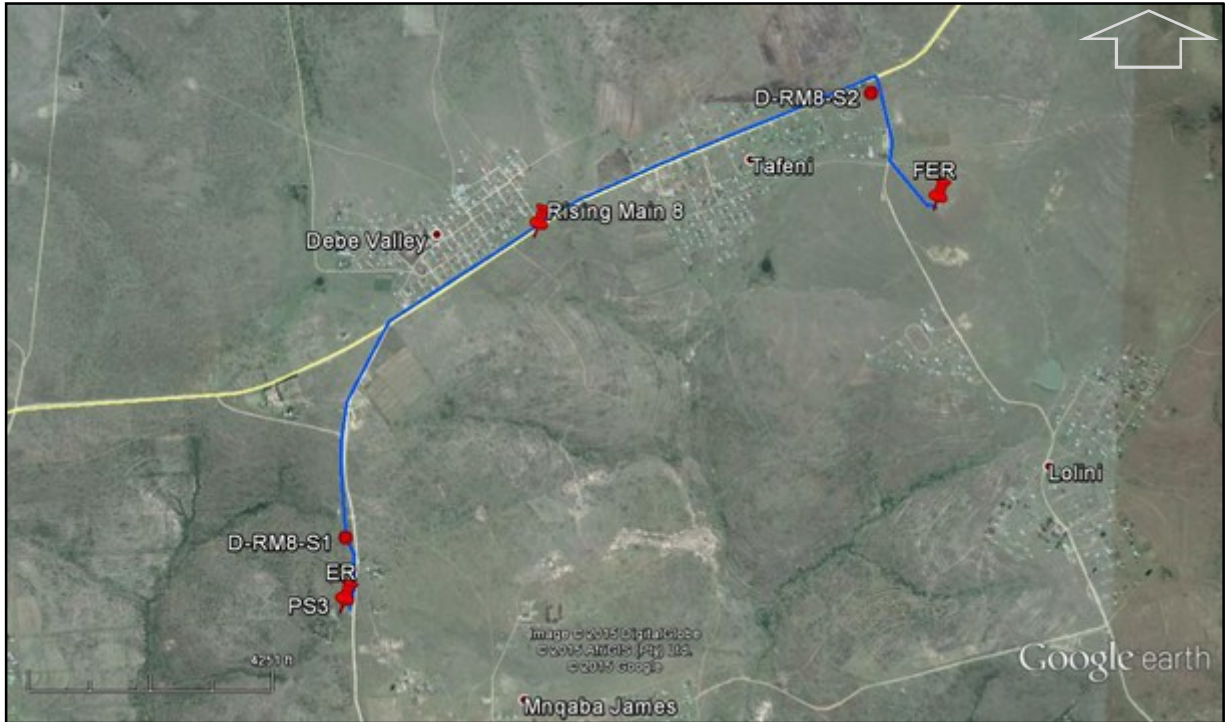
#### 2.3.9.2) Site D-RM8-S2: Colonial Period, Residence (S32°51'39.0"; E27°07'33.1")

Site D-GM1-S2 comprises a formally fenced Colonial Period residence. The residence pre-dates 60 years of age and is formally protected by the NHRA 1999. The site is still in use, with conservation thereof in a fair state. Development will not impact on the site. Current conservation measures comply with SAHRA / EC PHRA Minimum Site Conservation Standards. It is recommended that temporary signage indicating the site as a 'No Entry – Heritage Site' zone be attached to the fence for the duration of development impact in the vicinity of the site to ensure no accidental impact thereon.

- The Site D-RM8-S1 receives automatic SAHRA / EC PHRA protection as a site of *High Significance* with a *Provincial Grade II Field Rating*. From a general heritage perspective the site is assigned a *Medium Significance* with a *Generally Protected Grade IV-B Field Rating*.

### **RECOMMENDATIONS:**

1. It is recommended that development of Rising Main 8 proceed, provided the developer ensures conservation requirements with reference to identified Sites D-RM8-S1 and D-RM8-S2 are complied with:
  - Site D-RM8-S1: Temporary signage during the course of construction; and
  - Site D-RM8-S2: Temporary signage during the course of construction.
2. It is recommended that development at the Far Eastern Reservoir (FER) site proceed as applied for without the developer having to comply with additional heritage compliance requirements.



Map 15: Rising Main 8 and the Far Eastern Reservoir (FER) – Results of the field assessment



Plate 49: View of the PS3 / ER



Plate 51: General view of the Gravity Main 8 alignment [1]



Plate 50: Graves comprising Site D-RM8-S1 situated within the fenced agricultural plot



Plate 52: General view of the Gravity Main 8 alignment [2]





Plate 53: General view of the Gravity Main 8 alignment [3]



Plate 55: The Gravity Main 8 alignment from the FER



Plate 54: View of Site D-GM8-S2 Colonial Period residence



Plate 56: View of the FER study site

### 3 - Environmental Impact Assessment Rating

Identified archaeological and cultural heritage sites are ascribed an Environmental Impact Assessment (EIA) rating, based on the extent or spatial scale of the impact [E] (0 = None, 1 = Site specific, 2 = Local, 3 = Regional, 4 = National and 5 = International), the magnitude of the impact, positive or negative [M+ / M-] (0 = Zero, 2 = Very low, 4 = Low, 8 = High and 10 = Very high), the duration of the impact [D] (1 = Immediate, 2 = Short term, 3 = Medium term, 4 = Long term and 5 = Permanent), the probability of the occurrence [P] (1 = Improbable, 2 = Low probability, 3 = Medium probability, 4 = High probability and 5 = Definite), the irreplaceable loss of resources [I] (0 = None; 1 = Very low, 2 = Low, 3 = Moderate, 4 = High, 5 = Definite), the reversibility of potential impacts [R] (0 = No impact, 1 = Impact will be reversible; 2 = High potential for reversibility; 3 = Moderate potential for reversibility; 4 = Low potential for reversibility; 5 = Impact cannot be reversed) and cumulative impact (None, Low, Medium and High). A site significance point [SP] is assigned as follows:

- o  $SP = (M + D + E + I + R) \times P$ .

A maximum of 150 SP can be assigned to an impact. Environmental Significance [S] is assigned based on the SP as follows:

- o  $<40 = \text{Low [L]}$ ;
- o  $40-74 = \text{Medium [M]}$ ;
- o  $75-99 = \text{Medium-High [MH]}$ ;
- o  $100-124 = \text{High [H]}$ ; and
- o  $125-150 = \text{Very High [H]}$ .

The significance can be either positive [+] or negative [-]. An impact of low [L] is likely to contribute to either + or - decisions about whether or not to proceed with the development, with little real effect and is unlikely to have an influence on project design or alternative motivation. An impact of M implies that if unmanaged could influence a decision on whether or not to proceed with development. An impact of MH is similar to M, with caution to mitigation options and alternative mitigation options should be investigated where possible. An impact of H could influence a decision about whether or not to proceed with development, regardless of available mitigation options and an impact of VH implies that a project cannot proceed and that impacts are irreversible, regardless of available mitigation options.

Environmental impact assessment ratings are grouped per sites with the same basic recommendation per site type or type of impact, with cognizance to the fact that impacts on heritage sites are as a norm irreversible (heritage sites are non-renewable resources) and with reference to the SAHRA (2007) prescribed mitigation options per site significance rating, weighed against development / possible natural impact.



Environmental Impact	Site Number	Environmental Significance																	
		Before Mitigation									After mitigation								
		M	D	E	I	R	P	SP	S	C	M	D	E	I	R	P	SP	S	C
Conservation without additional measures	Sites: D-RM5-S2, D-RM6-S1 and D-RM6-S2	+2	2	1	1	1	1	7	L	+L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<p><b>Comment:</b> Colonial Period and LIA / contemporary sites that will be conserved by the development layout without additional conservation measures being required, based on proximity from the study site</p> <p><b>Summary of mitigation points:</b> N/A</p>																			

**Table 5:** Colonial Period and LIA / contemporary sites that will be conserved without additional conservation measures

Environmental Impact	Site Number	Environmental Significance																	
		Before Mitigation									After mitigation								
		M	D	E	I	R	P	SP	S	C	M	D	E	I	R	P	SP	S	C
Conservation with additional temporary measures	Sites: D-GM1-S1, D-RM5-S1, D-RM5-S3, D-RM5-S4, D-RM5-S5, D-RM5-S6, D-RM6-S6, D-RM8-S1 and D-RM8-S2	+2	2	1	1	1	1	7	L	+L	+4	4	1	2	2	3	39	L	+L
<p><b>Comment:</b> Colonial Period and LIA / contemporary sites that will be conserved by means of additional temporary conservation measures</p> <p><b>Summary of mitigation points:</b> Temporary conservation fences and temporary sign posting</p>																			

**Table 6:** Colonial Period and LIA / contemporary sites that will be conserved by means of additional temporary conservation measures

Environmental Impact	Site Number	Environmental Significance																	
		Before Mitigation									After mitigation								
		M	D	E	I	R	P	SP	S	C	M	D	E	I	R	P	SP	S	C
Conservation with additional permanent measures	Sites: D-GM1-S1	+4	3	2	4	5	1	18	L	+L	+8	4	2	4	5	3	69	M	+M
<p><b>Comment:</b> LIA / contemporary sites that will be conserved by means of additional permanent conservation measures</p> <p><b>Summary of mitigation points:</b> Realignment of the line route, permanent fencing and temporary sign posting</p>																			

**Table 7:** LIA / contemporary sites that will be conserved by means of permanent conservation measures

## 4 - Recommendations

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the proposed *Debe Water Supply Scheme Upgrade: Phase 2* development, Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape, proceeds as applied for provided the developer comply with the listed heritage management recommendations:

- No archaeological or cultural heritage developmental 'fatal flaws' identified;
- Thirteen (13) archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, identified during fieldwork. Four (4) of the identified sites are Colonial Period sites, 9 are LIA / contemporary grave and cemetery sites.
- Current layout indicates cognizance to heritage resources during the planning phase of development – recommendations for site conservation made in this report are primarily to ensure no accidental impact on identified sites during the construction phase.
- [Should any incidental archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, be encountered during the course of development the process described in the 'Heritage Protocol for Incidental Finds during the Construction Phase' should be followed.]

The EC PHRA (APM Unit) HIA Comment will state legal requirements for development to proceed, or reasons why, from a heritage perspective, development may not be further considered.

<b>Debe Water Supply Scheme Upgrade: Phase 2, Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape</b>			
Map Code	Site	Co-ordinates	Recommendations
<b>Debe Water Supply Scheme Upgrade: Phase 2, Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape</b>			
<b>Gravity Main 1</b>			
D-GM1-S1	Colonial Period, Residence	S32°58'46.4"; E26°59'33.0"	1. Temporary conservation fence & temporary signage (Construction phase)
D-GM1-S2	Later Iron Age / Contemporary, Cemetery	S32°58'47.7"; E26°59'43.1"	1. Realignment of line route in vicinity of site to allow minimum 20m conservation barrier; 2. Permanent conservation fence; 3. Temporary signage (Construction phase)
<b>Gravity Main 2</b>			
N/A	N/A	N/A	N/A
<b>Gravity Main 3</b>			
N/A	N/A	N/A	N/A
<b>Gravity Main 4</b>			
N/A	N/A	N/A	N/A
<b>Rising Main 5</b>			
D-RM5-S1	Later Iron Age / Contemporary, Cemetery	S32°51'43.4"; E27°02'35.3"	1. Temporary conservation fence & temporary signage (Construction phase)
D-RM5-S2	Later Iron Age / Contemporary, Cemetery	S32°51'55.2"; E27°02'06.8"	N/A (based on proximity from the study site)
D-RM5-S3	Later Iron Age / Contemporary, Cemetery	S32°51'57.3"; E27°02'01.7"	1. Temporary conservation fence & temporary signage (Construction phase)
D-RM5-S4	Later Iron Age / Contemporary, Grave	S32°51'58.5"; E27°02'02.0"	1. Temporary conservation fence & temporary signage (Construction phase)
D-RM5-S5	Later Iron Age / Contemporary, Cemetery	S32°51'57.4"; E27°01'59.1"	1. Temporary conservation fence & temporary signage (Construction phase)
D-RM5-S6	Later Iron Age / Contemporary, Grave	S32°52'01.9"; E27°02'04.1"	1. Temporary conservation fence & temporary signage (Construction phase)
<b>Rising Main 6</b>			
D-RM6-S1	Colonial Period, Church	S32°52'02.1"; E27°02'49.0"	N/A (based on proximity from the study site)
D-RM6-S2	Colonial Period, Building	S32°52'03.2"; E27°02'52.9"	N/A (based on proximity from the study site)
D-RM6-S3	Later Iron Age / Contemporary, Cemetery	S32°52'08.1"; E27°03'00.8"	1. Temporary conservation fence & temporary signage (Construction phase)
<b>Rising Main 7</b>			

N/A	N/A	N/A	N/A
<b>Rising Main 8</b>			
D-RM8-S1	Later Iron Age / Contemporary, Cemetery	S32°52'58.6"; E27°05'49.1"	1. Temporary signage
D-RM8-S2	Colonial Period, Residence	S32°51'39.0"; E27°07'33.1"	1. Temporary signage
<b>Pump Station 1 (PS1)</b>			
N/A	N/A	N/A	N/A
<b>Pump Station 2 (PS2)</b>			
N/A	N/A	N/A	N/A
<b>Pump Station 3 (PS3)</b>			
N/A	N/A	N/A	N/A
<b>Western Reservoir (WR)</b>			
N/A	N/A	N/A	N/A
<b>Eastern Reservoir (ER)</b>			
N/A	N/A	N/A	N/A
<b>Far Eastern Reservoir (FER)</b>			
N/A	N/A	N/A	N/A

**Table 8:** Archaeological and cultural heritage compliance summary for the proposed *Debe Water Supply Scheme Upgrade: Phase 2* development, Nkonkobe Local Municipality, Amathole District Municipality, Eastern Cape

#### Notes:

- Should any registered Interested & Affected Party (I&AP) wish to be consulted in terms of Section 38(3)(e) of the NHRA 1999 (Socio-cultural consultation / SAHRA SIA) it is recommended that the developer / EAP ensures that the consultation be prioritized within the timeframe of the environmental assessment process.

#### Simplified guide to the identification of archaeological sites:

- ❖ **Stone Age** – Knapped stone display flakes that appear unnatural and may result in similar type ‘shaped’ stones often concentrated in clusters or forming a distinct layer in the geological stratigraphy. ESA shapes may represent ‘pear’ or oval shaped stones, often in the region of 10cm in length or larger. Typical MSA types include blade-like or triangular shaped stones often associated with randomly shaped stones that display use or edge-wear around the rim of the artefact. LSA types may well be small, informally shaped stones, often associated with bone, pieces of charcoal and in cases ceramic shards.
  - Rock Art** – Includes both painted and engraves images.
  - Shell Middens** – Include compact shell lenses that may be quite extensive in size or small ephemeral scatters of shell food remains, often associated with LSA artefact remains, but may also be of MSA and Iron Age cultural association.
- ❖ **Iron Age** – Iron Age sites are often characterized by stone features, i.e. the remains of former livestock enclosures or typical household remains, huts are often identified by either mound or depression hollows. Typical artefacts include ceramic remains, farming equipment, beads and trade goods, metal artefacts (including jewelry) etc. Remains of the ‘Struggle’ – events, histories and landmarks associated therewith are often, based on cultural association, classed as part of the Iron Age heritage of South Africa.
- ❖ **Colonial Period** – Built environment remains, either urban or rural, are of a western cultural affiliation with typical artefacts representing early western culture, including typical household remains, trade and manufactured goods, such as old bottles, porcelain and metal artefacts. War memorial remains including the vast array of associated graves and the history of the Industrial Revolution form important parts of South Africa’s Colonial Period heritage.

## 5 - Acronyms and Abbreviations

---

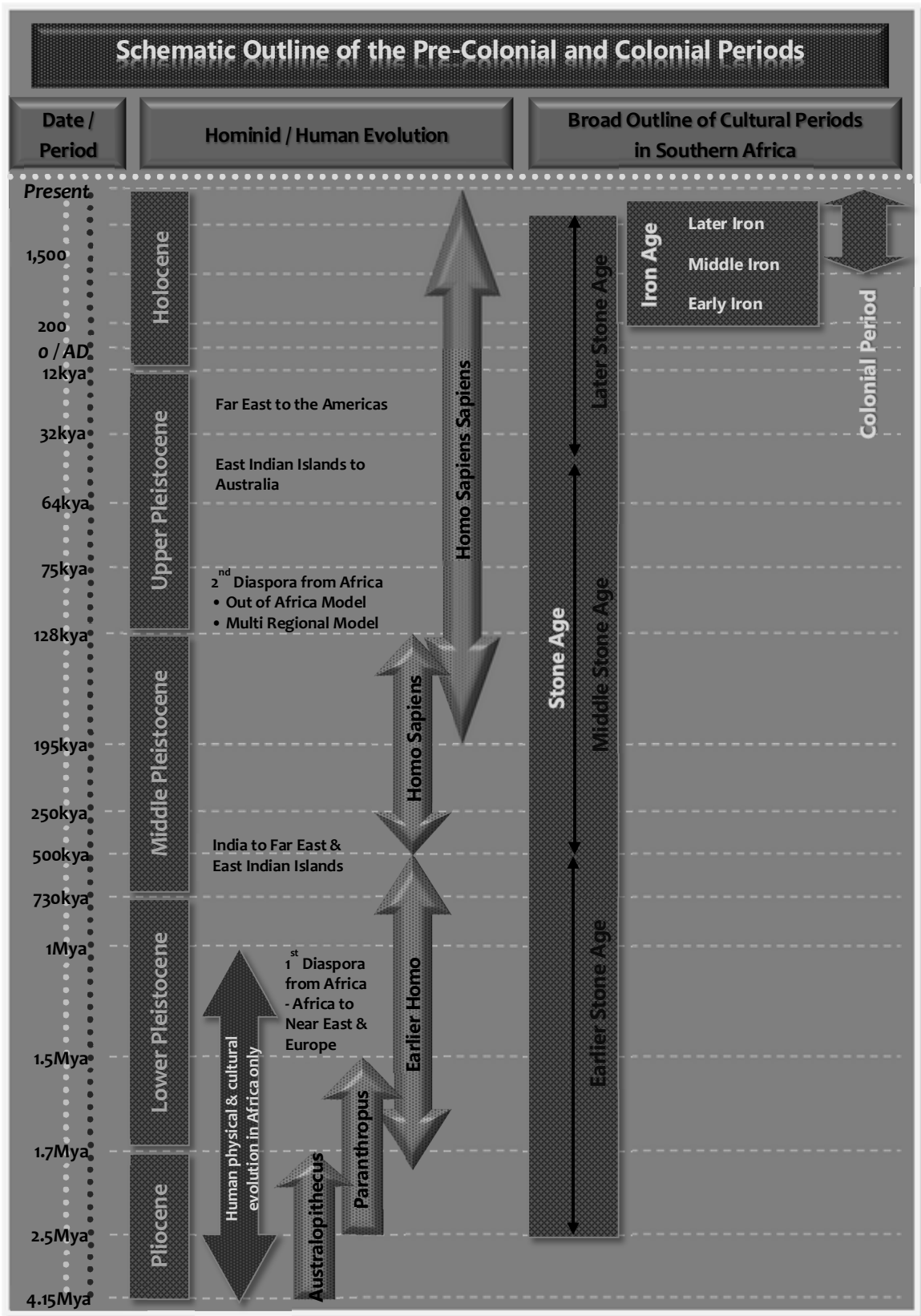
AD	: Anno Domini (the year 0.)
AIA	: Archaeological Impact Assessment
AMAFA	: Amafa aKwaZulu-Natali
ASAPA	: Association of Southern African Professional Archaeologists
BAR	: Basic Assessment Report
BC	: Before the Birth of Christ (the year 0.)
BCE	: Before the Common Era (the year 0.)
BIA	: Basic Impact Assessment
BID	: Background Information Document
BP	: Before the Present (the year 1950.)
cm	: Centimeter
CRM	: Cultural Resources Management
DAC	: Department of Arts and Culture
DEAT	: Department of Environmental Affairs and Tourism
DEDEAT	: Department of Economic Development, Environmental Affairs and Tourism
DME	: Department of Minerals and Energy
DSACR	: Department of Sport, Arts, Culture and Recreation
ECO	: Environmental Control Officer
EAP	: Environmental Assessment Practitioner
EC PHRA	: Eastern Cape Provincial Heritage Resources Authority
EIA	: Environmental Impact Assessment
EIA <sub>1</sub>	: Early Iron Age
EMPr	: Environmental Management Plan report
ESA	: Earlier Stone Age
ha	: Hectare
HIA	: Heritage Impact Assessment
HWC	: Heritage Western Cape
HCMP	: Heritage Conservation Management Plan
ICOMOS	: International Council on Monuments and Sites
IEM	: Integrated Environmental Management
km	: Kilometer
Kya	: Thousands of years ago
LIA	: Later Iron Age
LSA	: Later Stone Age
m	: Meter
m <sup>2</sup>	: Square Meter
MIA	: Middle Iron Age
mm	: Millimeter
MPRDA (2002)	: Mineral and Petroleum Resources Development Act, No 28 of 2002
MSA	: Middle Stone Age
Mya	: Millions of years ago
NEMA (1998)	: National Environmental Management Act, No 107 of 1998
NHRA (1999)	: National Heritage Resources Act, No 25 of 1999
PIA	: Palaeontological Impact Assessment
PHRA	: Provincial Heritage Resources Authority
PSSA	: Palaeontological Society of South Africa
PPP	: Public Participation Process
SAHRA	: South African Heritage Resources Agency
SAHRIS	: South African Heritage Resources Information System
SciA	: Socio-cultural Impact Assessment
SIA	: Social Impact Assessment

## 6 - References

---

1. Anderson, G. (Umlando). 2011. *Heritage Survey of the Proposed Peddie Energy 19MW Photovoltaic Facility, Eastern Cape.*
2. Anderson, G. (Umlando). 2015. *Heritage Survey of the Ndlambe Bulk Water Supply Scheme – Sandile Dam to Cannon Rocks, Eastern Cape.*
3. Booth, C. (Booth Heritage Consulting). 2015. *Addendum: Archaeological and Heritage Investigation of Proposed Deviations and Repeater Sites for an Environmental Authorization Amendment for Fibreco Route 4 (George to Port Elizabeth) and 5 (Port Elizabeth to Durban).*
4. [en.wikipedia.org/wiki/List\\_of\\_heritage\\_sites\\_in\\_Eastern\\_Cape](http://en.wikipedia.org/wiki/List_of_heritage_sites_in_Eastern_Cape).
5. EOH-CES. 2015. *Draft Basic Environmental Assessment Report (BAR) – Debe Water Supply Scheme Upgrade.*
6. South African Government. (No. 107 of) 1998. *National Environmental Management Act.*
7. South African Government. (No. 25 of) 1999. *National Heritage Resources Act.*
8. South African Heritage Resources Agency. 2007. *Minimum Standards for the Archaeological and Heritage Components of Impact Assessments.* (Unpublished guidelines.)
9. Van Ryneveld, K. (ArchaeoMaps). 2008a. *Phase 1 Archaeological Impact Assessment – The Albany Regional Water Supply Scheme, Eastern Cape, South Africa.*
10. Van Ryneveld, K. (ArchaeoMaps). 2012. *Phase 1 Archaeological Impact assessment – Ripplemead Packshed, Portion of Groot Plaats 4, (near Peddie), Nqusha Municipality, Eastern Cape, South Africa.*
11. Webley, L.E. (Albany Museum). 2008. *Phase 1 Archaeological Impact Assessment: Dairy Development at Ann Shaw, Middledrift, Eastern Cape.*





## Appendix B:

### Introduction to the Archaeology of South Africa

Archaeologically the southern African cultural environment is roughly divided into the Stone Age, the Iron Age and the Colonial Period, including its subsequent Industrial component. This cultural division has a rough temporal association beginning with the Stone Age, followed by the Iron Age and the Colonial Period. The division is based on the identified primary technology used. The hunter-gatherer lifestyle of the Stone Age is identified in the archaeological record through stone being the primary raw material used to produce tools. Iron Age people, known for their skill to work iron and other metal, also practiced agriculture and animal husbandry. Kingdoms and civilizations associated with the Iron Age are indicative of a complex social hierarchy. The Colonial Period is marked by the advent of writing, in southern Africa primarily associated with the first European travelers (Mitchell 2002).

During the latter part of the Later Stone Age (LSA) hunter-gatherers shared their cultural landscape with both pastoralists and Iron Age people, while the advent of the Colonial Period in South Africa is marked by a complex cultural mosaic of people; including LSA hunter-gatherers, pastoralists, Later Iron Age farming communities and Colonial occupation.

#### 1) Early Hominin Evolution

DNA studies indicate that humans and chimpanzees shared a common ancestor between 6-8Mya (Sibley & Ahlquist 1984). By 4Mya, based on fossil evidence from Ethiopia and Kenya, hominins (humans and their immediate fossil ancestors and relatives) had already evolved. The earliest fossils are ascribed to *Ardipithecus ramidus* (4.4Mya), succeeded by *Australopithecus anamensis* (4.2-3.9Mya). These fossils are inferred to lie at the base from which all other hominins evolved (Leakey et al. 1995; White et al. 1994).

In South Africa the later hominins are classed into 3 groups or distinct genera; *Australopithecus* (*gracile* australopithecines), *Paranthropus* (robust australopithecines) and *Homo*. South Africa has 3 major hominin sites: Taung in the North-West Province, where Raymond Dart identified the first *Australopithecus* fossil in 1924 (Dart 1925); The Cradle of Humankind (Sterkfontein Valley) sites in Gauteng, the most prolific hominin locality in the world for the period dating 3.5-1.5Mya which have yielded numerous *Australopithecus*, *Paranthropus* and limited *Homo* fossils (Keyser et al. 2000; Tobias 2000); and Makapansgat in the Limpopo Province, where several more specimens believed to be older than most of the Cradle specimens were discovered (Klein 1999).

*A. africanus*, represented at all 3 sites are believed to have been present on the South African landscape from about 3Mya. From approximately 2.8Mya they shared, at least in the Cradle area, the landscape with *P. robustus* and from roughly 2.3Mya with early forms of *Homo* (Clarke 1999). Global climatic cooling around 2.5Mya may have stimulated a burst of species turnover amongst hominins (Vrba 1992); the approximate contemporary appearance of the first stone tools suggests that this was a critical stage in human evolution. But exactly which early hominin population is to be accredited as the ancestor of *Homo* remains elusive.

*H. ergaster* is present in the African palaeo-anthropological record from around 1.8Mya and shortly thereafter the first exodus from Africa is evidenced by *H. erectus* specimens from China, Indonesia and even Europe (Klein 1999).

#### 2) The Stone Age

##### 2.1) The Earlier Stone Age

In South Africa the only Earlier Stone Age (ESA) Oldowan lithic assemblage comes from Sterkfontein Cave. The predominant quartz assemblage is technologically very simple, highly informal and inferred to comprise exclusively of multi-purpose tools (Kuman et al. 1997). The latter part of the ESA is characterized by the Acheulean Industrial Complex, present in the archaeological record from at least 1.5Mya. Both *H. ergaster* and *P. robustus* may be accredited with the production of these tools. The association between stone tools and increased access to meat and marrow supporting the greater dietary breadth of *Homo* may have been vital to *Homo's* evolutionary success; and the eventual extinction of the robust australopithecines (Klein 1999).

Probably the longest lasting artefact tradition ever created by hominins, the Acheulean is found from Cape Town to north-western Europe and India, occurring widely in South Africa. Despite the many sites it is still considered a 'prehistoric dark age' by many archaeologists, encompassing one of the most critical periods in human evolution; the transition from *H. ergaster* to archaic forms of *H. Sapiens* (Klein 1999).

The Acheulean industry is characterized by handaxes and cleavers as *fosilles directeurs* (signatory artefact types), in association with cores and flakes. Handaxes and cleavers were multi-purpose tools used to work both meat and plant matter (Binneman & Beaumont 1992). Later Acheulean flaking techniques involved a degree of core preparation that allowed a single large flake of predetermined shape and size to be produced. This *Victoria West technique* indicates an origin within the Acheulean for the *Levallois technique* of the Middle Stone Age (Noble & Davidson 1966). The lithic artefact component was supplemented by wood and other organic material (Deacon 1970).

##### 2.2) The Middle Stone Age

The Middle Stone Age (MSA), dating from approximately 500kya to 40-27/23kya is interpreted as an intermediate technology between the Acheulean and the Later Stone Age (LSA) (Goodwin & van Riet Lowe 1929). The MSA is typologically characterized by the absence of handaxes and cleavers, the use of prepared core techniques and the production of blades, triangular and convergent flakes, with convergent dorsal scars and faceted striking platforms, often produced by means of the *Levallois technique* (Volman 1984). The widespread occurrence of MSA technology across Africa and its spread into much of Eurasia in Oxygen Isotope Stage (OIS) 7 is viewed as part of a process of population dispersal associated with both the ancestors of the later Neanderthals in Europe and anatomically modern humans in Africa (Foley & Lahr 1997).

After the riches offered by the Cradle sites and Makapansgat, southern Africa's Middle Pleistocene fossil record is comparatively poor. Early Middle Pleistocene fossil evidence suggests an archaic appearance and fossils are often assigned to *H. heidelbergensis* and *H. sapiens rhodesiensis* (Rightmire 1976). Modern looking remains, primarily from Border Cave (KwaZulu-Natal) and Klasies River Mouth (Eastern Cape) raised the possibility that anatomically modern humans had, by 120kya, originated south of the Sahara before spreading to other parts of the world (Brauer 1982; Stringer 1985). Subsequent studies of modern DNA indicated that African populations are genetically more diverse and probably older than those elsewhere (Cann *et al.* 1994). Combined, the fossil and genetic evidence underpins the so-called *Out of Africa 2* model (arguing that gene flow and natural selection led regional hominin populations along distinct evolutionary trajectories after *Homo*'s expansion from Africa in the Lower Pleistocene *Out of Africa 1* model) of modern human origins and the continuing debate as to whether it should be preferred to its *Multiregional* alternative (arguing that modern humans evolved more or less simultaneously right across the Old World) (Mellars & Stringer 1989; Aitken *et al.* 1993; Nitecki & Nitecki 1994).

Persuasive evidence of ritual activity or bodily decoration is evidenced by the widespread presence of red ochre at particularly MSA 2 sites (after Volman's 1984 MSA 1-4 model; Hensilwood & Sealy 1997), while evidence from Lion Cave, Swaziland, indicates that specularite may have been mined as early as 100kya (Beaumont 1973). Evidence for symbolic behavioral activity is largely absent; no evidence for rock art or formal burial practices exists.

### 2.3) The Later Stone Age

Artefacts characteristic of the Later Stone Age (LSA) appear in the archaeological record from 40/27-23kya and incorporates microlithic as well as macrolithic assemblages. Artefacts were produced by modern *H. sapien* or *H. sapien sapien*, who subsisted on a hunter-gatherer way of life (Deacon 1984; Mitchell 2002).

According to Deacon (1984) the LSA can temporally be divided into 4 broad units directly associated with climatic, technological and subsistence changes:

1. Late Pleistocene microlithic assemblages (40-12kya);
2. Terminal Pleistocene / early Holocene non-microlithic assemblages (12-8kya);
3. Holocene microlithic assemblages (8kya to the Historic Period); and
4. Holocene assemblages with pottery (2kya to the Historic Period) closely associated with the influx of pastoralist communities into South Africa (Mitchell 2002).

Elements of material culture characteristic of the LSA reflect modern behavior. Deacon (1984) summarizes these as:

1. Symbolic and representational art (paintings and engravings);
2. Items of personal adornment such as decorated ostrich eggshell, decorated bone tools and beads, pendants and amulets of ostrich eggshell, marine and freshwater shells;
3. Specialized hunting and fishing equipment in the form of bows and arrows, fish hooks and sinkers;
4. A greater variety of specialized tools including bone needles and awls and bone skin-working tools;
5. Specialized food gathering tools and containers such as bored stone digging stick weights, carrying bags of leather and netting, ostrich eggshell water containers, tortoiseshell bowls and scoops and later pottery and stone bowls;
6. Formal burial of the dead in graves (sometimes covered with painted stones or grindstones and accompanied by grave goods);
7. The miniaturization of selected stone tools linked to the practice of hafting for composite tools production; and
8. A characteristic range of specialized tools designed for making some of the items listed above.

#### ➤ Rock Art

Rock Art is one of the most visible and informative components of South Africa's archaeological record. Research into LSA ethnography (as KhoiSan history) has revolutionized our understanding of both painted and engraved (petroglyph) images, resulting in a paradigm shift in Stone Age archaeology (Deacon & Dowson 2001). Paintings are concentrated in the Drakensberg / Maluti mountains, the eastern Free State, the Cape Fold Mountains, the Waterberg Plateau and the Soutpansberg mountains. Engravings on the other hand are found throughout the Karoo, the western Free State and North-West Province (Mitchell 2002). Both forms of LSA art drew upon a common stock of motifs, derived from widely shared beliefs and include a restricted range of naturalistically depicted animals, geometric imagery, human body postures and non-realistic combinations of human and animal figures (anthropomorphic figurines). LSA Rock Art is closely associated with spiritual or magical significance (Lewis-Williams & Dowson 1999).

Aside from LSA or KhoiSan Rock Art, thus art produced by both hunter-gatherer and pastoralist and agro-pastoralist groups, Rock Art produced by Iron Age populations are known to be present towards the north of the country.

#### ➤ Shell Middens ('Strandloper' Cultures)

South Africa's nearly 3,000km coastline is dotted by thousands of shell middens, situated between the high water mark and approximately 5km inland, bearing witness to long-term exploitation of shellfish mainly over the past 12,000 years. These LSA shell middens are easily distinguishable from natural accumulations of shells and deposits can include bones of animals eaten such as shellfish, turtles and seabirds, crustaceans like crabs and crayfish and marine mammal remains of seals, dolphins and occasionally whales. Artefacts and hearth and cooking remains are often found in shell midden deposits. Evidence exist that fish were speared, collected by hand, reed baskets and by means of stone fish traps in tidal pools (Mitchell 2002).

Shell midden remains were in the past erroneously assigned to 'Strandloper cultures'. Deacon & Deacon (1999) explain that 'no biological or cultural group had exclusive rights to coastal resources.' Some LSA groups visited the coast periodically while others stayed year round and it is misleading to call them all by the same name. Two primary sources of archaeological enquiry serves to shed more light on the lifestyles of people who accumulated shell middens, one being the analysis of food remains in the middens itself and the other being the analysis of LSA human skeletal remains of people buried either in shell middens or within reasonable proximity to the coast.

Shell middens vary in character ranging from large sites tens of meters in extent and with considerable depositional depth to fairly small ephemeral collections, easily exposed and destroyed by shifting dune action. Shell middens are also found inland, along rivers where fresh water mussels occur. These middens are often fairly small and less common; in the Eastern Cape often dated to within the past 3,000 years (Deacon & Deacon 1999).

In addition shell middens are not exclusively assigned to LSA cultures; shellfish were exploited during the Last Interglacial, indicating that the practice was most probably continuous for the past 120,000 years (MSA shell middens). Along the coast of KwaZulu-Natal evidence exist for the exploitation of marine food resources by Iron Age communities. These shell middens are easily distinguished from Stone Age middens by particularly rich, often decorated ceramic artefact content. Colonial Period shell middens are quite rare and extremely ephemeral in character; primarily the result of European shipwreck survivors and reported on along the coast of KwaZulu-Natal and the Transkei, Eastern Cape.

### 3) The Iron Age

For close to 2 millennia people combining cereal agriculture with stock keeping have occupied most of southern Africa's summer rainfall zone. The rapid spread of farming, distinctive ceramics and metallurgy is understood as the expansion of a Bantu-speaking population, in archaeological terms referred to as the Iron Age.

#### 3.1) The Early Iron Age

Ceramic typology is central to current discussions of the expansion of iron using farming communities. The most widely used approach is that of Huffman (1980), who employs a multidimensional analysis (vessel profile, decoration layout and motif) to reconstruct different ceramic types. Huffman (1998) argues that ceramics can be used to trace the movements of people, though not necessarily of specific social or political groupings. Huffman's Urewe Tradition coincides largely with Phillipson's (1977) Eastern Stream. A combined Urewe Tradition / Eastern Stream model for the Early Iron Age can be summarized as:

1. The Kwale branch (extending along the coast from Kenya to KwaZulu-Natal);
2. The Nkope branch (located inland and reaching from southern Tanzania through Malawi and eastern Zambia into Zimbabwe); and
3. The Kalundu branch (stretching from Angola through western Zambia, Botswana and Zimbabwe into South Africa).

In southern Africa, recent work distinguishes two phases of the Kwale branch: The earlier Silver Leaves facies (250-430AD) occurring as far south as the Northern Province. The later expression or Mzonjani facies (420-580AD) occurs in the Northern Province as well as along the KwaZulu-Natal coastal belt (Huffman 1998). Since the Silver Leaves facies is only slightly younger than the Kwale type site in Kenya, very rapid movement along the coast, perhaps partly by boat, is inferred (Klapwijk 1974). Subsequently (550-650AD) people making Mzonjani derived ceramics settled more widely in the interior of South Africa.

Assemblages attributable to the Nkope branch appear south of the Zambezi but north of South Africa from the 5<sup>th</sup> Century. Ziwa represents an early facies, with Gokomere deriving jointly from Ziwa and Bambata. A subsequent phase is represented by the Zhizo facies of the Shashe-Limpopo basin, and by Taukome (Huffman 1994). Related sites occur in the Kruger National Park (Meyer 1988). Zhizo (7<sup>th</sup> – 10<sup>th</sup> Century) is ancestral to the Toutswe tradition which persisted in eastern Botswana into the 13<sup>th</sup> Century.

Kalundu origins need further investigation; its subsequent development is however better understood. A post Bambata phase is represented by the 5<sup>th</sup> – 7<sup>th</sup> Century sites of Happy Rest, Klein Africa and Maunatlana in the Northern Province and Mpumalanga (Prinsloo 1974, 1989). Later phases are present at the Lydenburg Heads site (Whitelaw & Moon 1996) and by the succession of Mzuluzi, Ndongonwane and Ntshekane in KwaZulu-Natal (7<sup>th</sup> – 10<sup>th</sup> Centuries) (Prins & Grainger 1993). Later Kalundu facies include Klingbeil and Eiland in the northern part of the country (Evers 1980) with Kgotpolwe being a lowveld variant in Mpumalanga (10<sup>th</sup> – 12<sup>th</sup> Century). Broadhurst and other sites indicate a still later survival in Botswana (Campbell 1991).

Despite the importance accorded to iron agricultural implements in expanding the spread of farming and frequent finds of production debris, metal objects are rare. Metal techniques were simple, with no particular sign of casting, wire drawing or hot working. Jewelry (bangles, beads, pendants etc.) constitute by far the largest number of finds but arrows, adzes, chisels, points and spatulae are known (Miller 1996).

Early Iron Age people were limited to the Miombo and Savannah biomes; excluded from much of the continent's western half by aridity and confined in the south during the 1<sup>st</sup> millennium to bushveld areas of the old Transvaal. Declining summer rainfall restricted occupation to a diminishing belt close to the East Coast and north of S33° (Maggs 1994); sites such as Canasta Place (800AD), Eastern Cape, mark the southern-most limit of Early Iron Age settlement (Nogwaza 1994).

#### ➤ The Central Cattle Pattern

The Central Cattle Pattern (CCP) was the main cognitive pattern since the Early Iron Age (Huffman 1986). The system can be summarized as opposition between male pastoralism and female agriculture; ancestors and descendants; rulers and subjects; and men and women. Cattle served as the primary means of transaction; they represented symbols exchanged for the fertility of wives, legitimacy of children and appeasement of ancestors. Cattle were also used as tribute to rulers confirming sub-ordination and redistribution as loan cattle by the ruler to gain political support. Cattle represented healing and fertilizing qualities (Huffman 1998; Kuper 1980).

This cognitive and conceptual structure underlies all cultural behavior, including the placement of features in a settlement. The oppositions of male and female, pastoralism and agriculture, ancestors and descendants, rulers and subjects, cool and hot are represented in spatial oppositions, either concentric or diametric (Huffman 1986).

A typical CCP village comprise of a central cattle enclosure (byre) where men are buried. The *Kgotla* (men's meeting place / court) is situated adjacent to the cattle enclosure. Surrounding the enclosure is an arc of houses, occupied according to seniority. Around the outer perimeter of the houses is an arc of granaries where women keep their pots and grinding stones (Huffman 1986). The model varies per ethnic group which helps to distinguish ethnicity throughout the Iron Age, but more studies are required to recognize the patterns.



### 3.2) The Middle Iron Age

The hiatus of South African Middle Iron Age activity was centered in the Shashe-Limpopo Valley and characterized by the 5-tier hierarchical Mapungubwe State spanning some 30,000km<sup>2</sup>. By the 1<sup>st</sup> millennium ivory and skins were already exported overseas, with sites like Sofala and Chibueni, Mozambique, interfacing between interior and transoceanic traders. Exotic glass beads, cloth and Middle Eastern ceramics present at southern African sites mark the beginning of the regions incorporation into the expanding economic system that, partly tied together with maritime trading links across the Indian Ocean, increasingly united Africa, Asia and Europe long before Da Gama or Columbus (Eloff & Meyer 1981; Meyer 1998).

Occupation was initially focused at Bambandanyalo and K2. The Bambandanyalo main midden (1030-1220AD) stands out above the surrounding area, reaching more than 6m in places and covering more than 8ha the site may have housed as many as 2,000 people (Meyer 1998). The CCP was not strictly followed; whether this is ideologically significant or merely a reflection of local typography remains unclear. The midden, the size of which may reflect the status of the settlement's ruler, engulfed the byre around 1060-1080AD, necessitating relocation of the cattle previously kept there. The re-organization of space and worldview implied suggests profound social changes even before the sites' abandonment in the early 13<sup>th</sup> century, when the focus of occupation moved to Mapungubwe Hill, 1 km away (Huffman 1998).

Excavations at Mapungubwe Hill, though only occupied for a few decades (1220-1290AD), yielded a deep succession of gravel floors and house debris (Eloff & Meyer 1981). Huffman (1998) suggests that the suddenness with which Mapungubwe was occupied may imply a deliberate decision to give spatial expression to a new social order in which leaders physically removed themselves from ordinary people by moving onto more inaccessible, higher elevations behind the stone walls demarcating elite residential areas. Social and settlement changes speak of considerable centralization of power and perhaps the elaboration of new ways of linking leaders and subjects.

At Bambandanyalo and Mapungubwe elite burial grave goods include copper, bone, ivory and golden ornaments and beads. Social significance of cattle is reinforced by their importance among the many human and animal ceramic figurines and at least 6 'beast burials' (Meyer 1998).

Today the drought prone Shashe-Limpopo Valley receives less than 350mm of rainfall per annum, making cereal cultivation virtually impossible. The shift to drier conditions in the late 1200's across the Shashe-Limpopo basin and the eastern Kalahari may have been pivotal in the break-up of the Mapungubwe polity, the collapse of Botswana's Toutswe tradition and the emergence of Great Zimbabwe (1220-1550AD), southern Africa's best known and largest (720ha) archaeological site (Meyer 1998).

South of the Limpopo and north of the Soutpansberg, Mapungubwe derived communities survived into the 14<sup>th</sup> Century, contemporary with the establishment of Sotho-speaking makers of Maloko pottery.

### 3.3) The Later Iron Age

South African farming communities of the 2<sup>nd</sup> millennium experienced increased specialization of production and exchange, the development of more nucleated settlement patterns and growing political centralization, albeit not to the same extent as those participating in the Zimbabwe tradition. However, together they form the background to the cataclysmic events of the late 18<sup>th</sup> / early 19<sup>th</sup> Century *Mfecane* (Mitchell 2002).

Archaeological evidence of settlement pattern, social organization and ritual practice often differ from those recorded ethnographically. The Moloko ceramic tradition seems to be ancestral to modern Sotho-Tswana speakers (Evers 1980) and from about 1,100AD a second tradition, the Blackburn tradition, appears along South Africa's eastern coastline. Blackburn produced mostly undecorated pottery (Davies 1971), while Mpambanyoni assemblages, reaching as far south as Transkei, includes examples of rim notching, incised lines and burnished ochre slip (Robey 1980). At present, no contemporary farming sites are known further inland in KwaZulu-Natal or the Eastern Cape.

Huffman (1989) argues that similarities between Blackburn and early Maloko wares imply a related origin, presumably in the Chifumbaze of Zambia or the Ivuna of Tanzania, which contains a range of ceramic attributes important in the Blackburn as well as beehive grass huts similar to those made by the Nguni. This is one of the few suggestions of contact between Sotho-Tswana and Nguni speakers on the one hand and farming communities who, if Huffman is correct, were already long established south of the Limpopo. Both ethnographic and archaeological data demonstrate that Sotho-Tswana and Nguni are patrilineal and organize their settlements according to the CCP (Kuper 1980).

From 1,300AD there is increasing evidence for the beginning of agro-pastoralist expansion considerably beyond the area of previous occupation. It is also to this time that the genealogies of several contemporary Bantu speaking groups can be traced (Wilson & Thompson 1969). Associated with this expansion was the regular employment of stone, rather than wood, as building material, an adaptation that has greatly facilitated the discovery and identification of settlements. Maggs (1976) describes 4 basic settlement types all characterized by the use of semi weathered dolomite to produce hard binding *daga* for house floors and a wall building tradition employing larger more regular stones for the inner and outer faces and smaller rubble for the infill. As with the more dispersed homesteads of KwaZulu-Natal and the Eastern Cape, sites tend to be in locally elevated situations, reflecting a deep seated Sotho and Nguni preference for benign higher places rather than supernaturally dangerous riverside localities; another important contrast to both 1<sup>st</sup> millennium (Maggs 1976) and later Zulu Kingdom settlement patterns (Hall & Maggs 1979).

The lack of evidence for iron production in the interior and eastern part of South Africa emphasize exchange relationships between various groups and associated more centralized polities. By the 19<sup>th</sup> Century iron production in KwaZulu-Natal was concentrated in particular clans and lineages and associated with a range of social and religious taboos (Maggs 1992). South of Durban comparatively few smelting sites are known (Whitelaw 1991), a trend even more apparent in Transkei (Feely 1987). However, metal remained the most important and archaeologically evident item traded between later farming communities. (Other recorded trade items include glass and ostrich eggshell beads; Indian Ocean seashells; siltstone pipes; *dagga*, and later on tobacco; pigments including ochre, graphite and specularite; hides and salt.)

Rising polity settlements are particularly evident in the north of the country and dated to the 17<sup>th</sup> Century, including Molokwane, capital of the Bakwena chiefdom (Pistorius 1994) and Kaditshwene, capital of a major section of the Hurutshe, whose population of 20,000 in 1820 almost equals contemporary Cape Town in size (Boeyens 2000). The agglomeration of Tswana settlements in the north of the country was fuelled by both population growth and conflict over access to elephant herds for ivory and long distance trade with the East Coast. During this period ceramic decoration became blander and more standardized than the earlier elaborate decoration that included red ochre and graphite coloring.

The *Mfecane* refers to the wars and population movements of the early 19<sup>th</sup> Century which culminated in the establishment of the Zulu Kingdom and came to affect much of the interior, even beyond the Zambezi: The late 18<sup>th</sup> Century was marked by increasing demands for ivory (and slaves) on the part of European traders at Delagoa Bay; as many as 50 tons of ivory were exported annually from 1750-1790. As elephant populations declined, competition increased both for them and for the post 1790 supply of food to European and American whalers calling at Delagoa Bay (Smith 1970). Cattle raiding, conflict over land and changes in climatic and subsistence strategies characterized much of the cultural landscape of the time.

Competition for access to overseas trade encouraged some leaders to replace locally organized circumcision schools and age-sets with more permanently maintained military regiments. These were now used to gain access through warfare to land, cattle and stored food. By 1810 three groups, the Mthethwa, Ndwandwe and Ngwane dominated northern KwaZulu-Natal (Wright 1995). The Mthethwa paramountcy was undermined by the killing of its leader Dingiswayo in circa 1818, which led to a brief period of Ndwandwe dominance. In consequence one of Dingiswayo's former tributaries, Shaka, established often forceful alliances with chiefdoms further south. Shaka's Zulu dominated coalition resisted the Ndwandwe who in return fled to Mozambique. As the Zulu polity expanded it consolidated its control over large areas, incorporating many communities into it. Others sought refuge from political instability by moving south of the Thukela River, precipitating a further *domino effect* as far as the Cape Colony's eastern border (Wright 1995).

#### 4) The Colonial Period

In the 15<sup>th</sup> Century Admiral Zheng He and his subordinates impressed the power of the Ming Dynasty rulers in a series of voyages as far afield as Java, Sri Lanka, southern Arabia and along the East African coast, collecting exotic animals *en route*. But nothing more came of his expeditions and China never pursued opportunities for trade or colonization (Mote 1991).

Portuguese maritime expansion began around the time of Zheng He's voyages; motivated by a desire to establish a sea route to the riches of the Far East. By 1485 Diogo Cao had reached Cape Cross, 3 years later Bartolomeu Dias rounded the Cape of Good Hope and less than a decade later Vasco da Gama called at several places along South Africa's coast, trading with Khoekhoen (Khoi) at Mossel Bay before reaching Mozambique and crossing the ocean to India. His voyage initiated subsequent Portuguese bases from China to Iraq. In Africa interest was focused on seizing important coastal trading towns such as Sofala and gaining access to the gold of Zimbabwe. Following the 1510 Portuguese-Khoekhoen battle at Table Bay, in which the viceroy of India was killed, Portuguese ships ceased to call along the South African coast (Elphick 1985).

A number of shipwrecks, primarily along the eastern coast attest to Portuguese activity including the Sao Joao, wrecked in 1552 near Port Edward and the Sao Bento, destroyed in 1554 off the Transkei coast. Survivors' accounts provided the 1<sup>st</sup> detailed information on Africa's inhabitants (Auret & Maggs 1982).

By the late 1500's Portuguese supremacy of the Indian Ocean was threatened. From 1591 numerous Dutch and English ships called at Table Bay and in 1652 the Dutch East India Company (VOC) established a permanent base, with the intent to provide fresh food and water to VOC ships. In an attempt to improve the food supply a few settlers (free burghers) were allowed to establish farms. The establishment of an intensive mixed farming economy failed due to shortages of capital and labor, and free burghers turned to wheat cultivation and livestock farming. While the population grew slowly the area of settlement expanded rapidly with new administrative centers established at Stellenbosch (1676), Swellendam (1743) and Graaf-Reinet (1785). By the 1960's the Colony's frontier was too long to be effectively policed by VOC officials (Elphick 1985).

From the 1700's many settlers expanded inland over the Cape Fold Mountain Belt. The high cost of overland transport constrained the ability to sell their produce while settlement of the interior was increasingly made difficult by resident KhoiSan groups, contributing due to a lack of VOC military support to growing Company opposition in the years before British control of the Cape (1795 / 1806) (Davenport & Saunders 2000).

In 1820 a major British settlement was implanted on the eastern frontier of the Cape Colony, resulting in large numbers of the community moving into the interior, initially to KwaZulu-Natal, and then after Britain annexed Natal (1843), further into the interior to beyond the Vaal River. Disruptions of the *Mfecane* eased their takeover of African lands and the Boers (farmers) established several Republics. A few years later the 2<sup>nd</sup> South African War saw both the South African and Orange Free State Republics annexed by Britain, a move largely motivated by British desire to control the goldfields of the Witwatersrand. With adjacent regions of the sub-continent also falling, directly or indirectly, under British rule and German colonization of Namibia, European control of the whole of southern Africa was firmly established before the 1<sup>st</sup> World War (Davenport & Saunders 2000).

#### ➤ Xhosa Iron Age Cultures meets Colonists in the Eastern Cape

From the late 1600's conflict between migrants from the Cape (predominantly Boers) and Xhosa people in the region of the Fish River were strife, ultimately resulting in a series of 9 Frontier Wars (1702-1878) (Milton 1983). Both cultures were heavily based and reliant on agriculture and cattle farming. As more Cape migrants, and later settlers from Britain (1820) and elsewhere arrived, population pressures and competition over land, cattle and good grazing became intense. Cattle raiding became endemic on all sides, with retaliatory raids launched in response. As missionaries arrived with evangelical messages, confrontations with hostile chiefs who saw them as undermining traditional Xhosa ways of life resulted in conflicts which flared into wars.

As pressures between the European settlers and the Xhosa grew, settlers organized themselves into local militia, counteracted by Xhosa warring skills: But both sides were limited by the demands of seasonal farming and the need for labor during harvest. Wars between the Boers and the Xhosa resulted in shifting borders, from the Fish to the Sundays River, but it was only after the British annexed the Cape in 1806 that authorities turned their attention to the Eastern

regions and petitions by the settlers about Xhosa raids. British expeditions, in particular under Colonel John Graham in 1811 and later Harry Smith in 1834, were sent not only to secure the frontier against the Xhosa, but also to impose British authority on the settlers, with the aim to establish a permanent British presence. Military forts were built and permanently manned. Over time the British came to dominate the area both militarily and through occupation with the introduction of British settlers. The imposition of British authority led to confrontations not only with the Xhosa but also with disaffected Boers and other settlers, and other native groups such as the Khoikhoi, the Griqua and the Mpondo. The frontier wars continued over a period of about 150 years; from the 1<sup>st</sup> arrival of the Cape settlers, and with the intervention of the British military ultimately ending in the subjugation of the Xhosa people. Fighting ended on the Eastern Cape frontier in June 1878 with the annexation of the western areas of the Transkei and administration under the authority of the Cape Colony (Milton 1983).

### ► The Industrial Revolution

The Industrial Revolution refers roughly to the period between the 18<sup>th</sup> - 19<sup>th</sup> Centuries, typified by major changes in agriculture, manufacturing, mining, transport, and technology. Changing industry had a profound effect on socio-economic and socio-cultural conditions across the world: The Industrial Revolution marks a major turning point in human history; almost every aspect of daily life was eventually influenced in some way. Average income and population size began to exhibit unprecedented growth; in the two centuries following 1800 the world's population increased over 6-fold, associated with increasing urbanization and demand of resources. Starting in the latter part of the 18<sup>th</sup> century, the transition from manual labor towards machine-based manufacturing changed the face of economic activity; including the mechanization of the textile industries, the development of iron-making techniques and the increased use of refined coal. Trade expansion was enabled by the introduction of canals, improved roads and railways. The introduction of steam power fuelled primarily by coal and powered machinery was underpinned by dramatic increases in production capacity. The development of all-metal machine tools in the first two decades of the 19<sup>th</sup> century facilitated the manufacture of more production machines in other industries (More 2000).

Effects of the Industrial Revolution were widespread across the world, with its enormous impact of change on society, a process that continues today as 'industrialization'.

## 5) References Cited

- Aitken, M.J., Stringer, C.B. & Mellars, P.A. (eds). 1993. *The origin of modern humans and the impact of chronometric dating*. Princeton: Princeton University Press
- Auret, C. & Maggs, T.M.O'C 1982. *The great ship São Bento: remains from a mid-sixteenth century Portuguese wreck on the Pondoland coast*. Annals of the Natal Museum 25:1-39
- Beaumont, P.B. 1973. *The ancient pigment mines of South Africa*. South African Journal of Science 69: 41-46
- Binneman, J.N.F. & Beaumont, P.B. 1992. *Use-wear analysis of two Acheulean handaxes from Wonderwerk Cave, Northern Cape*. South African Field Archaeology 1:92-97
- Boeyens, J.C.A. 2000. *In search of Kadishwene*. South African Archaeological Bulletin 55:3-17
- Brauer, G. 1982. *Early anatomically modern man in Africa and the replacement of the Mediterranean and European Neanderthals*. In De Lumley, H. (ed) *L'Homme erectus et la place de l'homme de tautavel parmi les hominids fossils*. Nice: Centre National de la Recherche Scientifique
- Cann, R.L., Rickards, O. & Lum, J.K. 1994. *Mitochondrial DNA and human evolution: our one lucky mother*. Nature 325: 31-36
- Campbell, A.C. 1991. *The riddle of the stone walls*. Botswana Notes and Records 23:243-249
- Clarke, R.J. 1999. *A discovery of complete arm and hand of the 3.3 million year old Australopithecus skeleton from Sterkfontein*. South African Journal of Science 95:447-480
- Dart, R.A. 1925. *Australopithecus africanus: the man-ape of South Africa*. Nature 115:195-199
- Davenport, T.R.H. & Saunders, C. 2000. *South Africa: A modern history*. London: Macmillan
- Davies, O. 1971. *Excavations at Blackburn*. South African Archaeological Bulletin 26: 165-178
- Deacon, H.J. 1970. *The Acheulian occupation at Amanzi Springs, Uitenhage District, Cape Province*. Annals of the Cape Provincial Museums 8:89-189
- Deacon, J. 1984. *Later Stone Age people and their descendants in southern Africa*. In Klein, R.G. (ed). *Southern Africa prehistory and paleoenvironments*. Rotterdam: A.A. Balkema
- Deacon, H.J. & Deacon, J. 1999. *Human Beginnings in South Africa. Uncovering the Secrets of the Stone Age*. Cape Town: David Phillip Publishers
- Deacon, J. & Dowson, A.D. (eds.) 2001. *Voices from the past. /Xam Bushmen and the Bleek and Lloyd Collection*. Johannesburg: Witwatersrand University Press
- Eloff, J.F. & Meyer, A. 1981. *The Greefswald sites*. In Voigt, E.A. (ed) *Guide to archaeological sites in the northern and eastern Transvaal*. Pretoria: South African Association of Archaeologists
- Elphick, R. 1985. *Khoikhoi and the founding of white South Africa*. Johannesburg: Ravan Press
- Evers, T.M. 1980. *Klingbeil Early Iron Age sites, Lydenburg, Eastern Transvaal, South Africa*. South African Archaeological Bulletin 35:46-57
- Feeley, J.M. 1987. *The early farmers of Transkei, southern Africa, before AD 1870*. Oxford: British Archaeology Reports
- Foley, R.A & Lahr, M.M. 1997. *Mode 3 technologies and the evolution of modern humans*. Cambridge Archaeological Journal 7:3-36
- Goodwin A.J.H. & van Riet Lowe, C. 1929. *The Stone Age cultures of South Africa*. Annals of the South African Museum 27:1-289
- Hall, M. & Maggs, T.M.O'C. 1979. *Nqabeni: a later Iron Age site in Zululand*. South African Archaeological Society Goodwin Series 3:159-176
- Hensilwood, C. & Sealy, J.C. 1997. *Bone artefacts from the Middle Stone Age at Blombos Cave, southern Cape, South Africa*. Current Anthropology 38:390-395
- Huffman, T.N. 1980. *Ceramics, Classification and Iron Age Entities*. African Studies 39:123-174
- Huffman, T.N. 1989. *Ceramics, Settlements and Late Iron Age Migrations*. African Archaeological Review 7: 155-182
- Huffman, T.N. 1986. *Iron Age Settlement Patterns and the Origin of Class Distinction in Southern Africa*. Advances in World Archaeology 5:291-338
- Huffman, T.N. 1994. *Toteng Pottery and the Origins of Bambata*. Southern African Field Archaeology 3:3-9
- Huffman, T.N. 1998. *The Antiquity of Lobola*. South African Archaeological Bulletin 53:57-62
- Keyser, A., Menter, C.G., Moggi-Cheggi, J., Pickering T.R. & Berger, L.R. 2000. *Drimolen: A New Hominid Bearing Site in Gauteng, South Africa*. South African Journal of Science 96:193-197
- Klapwijk, M. 1974. *A Preliminary Report on Pottery from the North-Eastern Transvaal, South Africa*. South African Archaeological Bulletin 29:19-23
- Klein, R.G. 1999. *The Human Career: Human Biological and Cultural Origins*. Chicago: University of Chicago Press
- Kuman, K, Field, A.S. & Thackeray, J.F. 1997. *Discovery of New Artefacts at Kromdraai*. South African Journal of Science 93: 187-193
- Kuper, A. 1980. *Symbolic Dimensions of the Southern Bantu Homestead*. Africa 1:8-23
- Leakey, M.G., Feibel, C.S., McDougall, I & Walker, A.C. 1995. *New Four-Million-Year-Old Hominid Species from Kanopi and Allia Bay, Kenya*. Nature 376:565-57

36. Lewis-Williams, D. & Dowson, T. 1999. *Images of Power. Understanding San Rock Art*. Halfway House: Southern Book Publishers
37. Maggs, T.M.O'C. 1976. *Iron Age communities of the Southern Highveld*. Pietermaritzburg: Natal Museum
38. Maggs, T.M.O'C. 1992. 'My Father's Hammer Never Ceased its' Song Day and Night': The Zulu Ferrous Metalworking Industry. *Natal Museum Journal of Humanities* 4:65-87
39. Maggs, T.M.O'C. 1994. *The Early Iron Age in the Extreme South: Some Patterns and Problems*. *Azania* 29/30:171-178
40. Mellars, P.A. & Stringer, C.B. (eds). 1989. *The Human Revolution: Behavioural and Biological Perspectives on the Origins of Modern Humans*. Edinburgh: Edinburgh University Press
41. Miller, D.E. 1996. *The Tsodilo Jewellery: Metal Work from Northern Botswana*. Cape Town: University of Cape Town Press
42. Milton, J. 1983. *The Edges of War. A History of Frontier Wars (1702-1878)*. Kenwyn: Juta & Co.
43. Mitchell, P. 2002. *The Archaeology of Southern Africa*. Cambridge: Cambridge University Press
44. Meyer, A. 1988. *N Kultuurhistories Interpretasie van die Ystertydperk in die Nasionale Krugerwildtuin*. Phd thesis, University of Pretoria
45. Meyer, A. 1998. *The Archaeological Sites of Greefswald*. Pretoria: University of Pretoria Press
46. More, C. 2000. *Understanding the Industrial Revolution*. London: Routledge
47. Mote, F.W. 1991. *China in the Age of Columbus*. In Levenson, J.A. (ed) *Circa 1492: Art in the Age of Exploration*. New Haven: Yale University Press
48. Nitecki, M.H. & Nitecki, D.V. (eds). 1994. *Origins of Anatomically Modern Humans*. New York: Plenum
49. Noble, W & Davidson, I. 1996. *Human Evolution, Language and Mind: A Psychological and Archaeological Enquiry*. Cambridge: Cambridge University Press
50. Nogwaza, T. 1994. *Early Iron Age Pottery from Canasta Place, East London District*. *South African Field Archaeology* 3:103-106
51. Pakenham, T. 1993. *The Illustrated Boer War*. Parklands: Jonathan Ball Publishers.
52. Pistorius, J.C.C. 1992. *Molokwane an Iron Age Bakwena Village. Early Tswana Settlement in the Western Transvaal*. Johannesburg: Perskor Press.
53. Prins, F.E. & Grainger, J.E. 1993. *Early Farming Communities in Northern Transkei: The Evidence from Ntsitsana and Adjacent Areas*. *Natal Museum Journal of Humanities* 5:153-174
54. Phillipson, D.W. 1977. *The Later Prehistory of Eastern and Southern Africa*. London: Heineman
55. Prinsloo, H. P. 1974. *Early Iron Age Site at Klein Afrika near Wyliespoort, Soutpansberg Mountains, South Africa*. *South African Journal of Science* 70:27 1-273
56. Prinsloo, H.P. 1989. *Vroe Ystertydperk Terreine in die Soutpansberg*. M.A. Thesis, University of Pretoria
57. Rightmire, G.P. 1976. *Relationships of Middle and Upper Pleistocene Hominids from Sub-Saharan Africa*. *Nature* 260:238-240
58. Robey, T.S. 1980. *Mpanbanyoni, A Late Iron Age Site on the Natal South Coast*. *Annals of the Natal Museum* 24:147-164
59. Sibley, C.G. & Ahlquist, J.E. 1984. *The Phylogeny of the Hominid Primates as Indicated by DNA-DNA Hybridization*. *Journal of Molecular Evolution* 20:2-15
60. Smith, A.K. 1970. *The struggle for the Control of Southern Mozambique 1720-1835*. *Ossa* 63-96
61. Stringer, C.B. 1985. *Middle Pleistocene Hominid Variability and the Origin of Late Pleistocene Humans*. In Delson, E. (ed) *Ancestors: The Hard Evidence*. New York: Alan Liss
62. Tobias, P.V. 2000. *The Fossil Hominids*. In Partridge, T.C. & Maud, R.R. *The Cenozoic of Southern Africa*. Oxford: Oxford University Press
63. Volman T.P. 1984. *Early Prehistory of Southern Africa*. In Klein, R.G. *Southern Africa Prehistory and Palaeoenvironments*. Rotterdam: A.A. Balkema
64. Vrba, E.S. 1992. *Mammals as a Key to Evolutionary Theory*. *Journal of Mammology* 73:1-28
65. White, T.D., Suwa, G. & Asfaw, B. 1994. *Australopithecus Ramidus: A New Species of Early Hominid from Aramis, Ethiopia*. *Nature* 371:306-312
66. Whitelaw, G. 1991. *Precolonial Iron Production around Durban and in Southern KwaZulu-Natal*. *Natal Museum Journal of Humanities* 3:29-39
67. Whitelaw, G. & Moon, M. 1996. *The Distribution and Ceramics of Pioneer Agriculturists in KwaZulu-Natal*. *Natal Museum Journal of Humanities* 8:53-79
68. Wilson, M. & Thompson, L. (eds). 1969. *Oxford History of South Africa*. Oxford: Oxford University Press
69. Wright, J.B. 1995. *Political Transformations in the Thukela-Mzimkhulu Region in the Late Eighteenth and Early Nineteenth Centuries*. In Hamilton, C. *The Mfecane Aftermath: Reconstructive Debates in Southern African History*. Johannesburg: Witwatersrand University Press