

## CHAPTER TEN: HERITAGE IMPACT ASSESSMENT

### 10.1 INTRODUCTION

This Chapter of the report presents the findings of the specialist Heritage Impact Assessment conducted by Mr Lloyd Rossouw of Palaeo Field Services. This assessment includes the identification of possible heritage sites or occurrences in the area proposed for development, an assessment of their significance, possible impacts posed by the proposed development, and relevant recommendations for mitigation

The survey is required as a prerequisite for new development in terms of the National Environmental Management Act (Act 107 of 1998) and to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999).

### 10.2 SPECIALIST TERMS OF REFERENCE

In broad terms, the purpose of the heritage assessment is to identify archaeological and palaeontological features on the proposed site, to assess the potential impacts on these features and to provide recommendations for management/ mitigation of residual impacts. The following key elements, *inter alia*, are addressed in this assessment:

- Screening of potential heritage resources on site, including a desktop study of palaeontological and archaeological features.
- Area surveyed on foot to find as many visible archaeological sites and palaeontological features as possible, including cultural features.
- GPS coordinates recorded for all sites, features and material.
- Photographs of all sites, features, materials and general environment.
- Compiled report with recommendations including an assessment of the potential impacts on heritage features/ material, as a result of the development on the site, and proposals for mitigation and/ or protection - towards a Phase 2 and possible Phase 3 investigation.

In general, this report serves to satisfy the Department of Economic Development, Environmental Affairs and Tourism of The Eastern Cape Province (Cacadu Region), the Eastern Cape Provincial Heritage Resources Authority, and the Sundays River Valley Municipality, that the archaeological and paleontological impacts of the envisaged development are within acceptable limits and that the suggested mitigation measures conform to the standards and parameters set by these authorities.

### 10.3 PROJECT INFORMATION

At the request of Public Process Consultants, a Phase 1 Heritage Impact Assessment was carried out over an ~700ha area proposed for agricultural development (citrus development), on the Remainder of Farm 653, situated ~11km east of Addo and ~3km south of the Sundays River, Eastern Cape Province (**Figure 10.1**). Existing infrastructure on the farm will be utilised, therefore, no additional structures will be required to be constructed. The project will require the expansion of an existing irrigation dam, as well as the construction of three new dams and the installation of irrigation pipelines with a length of ~8km from an offtake point at the LSRWUA canal system, the other side of the Sundays River, to Farm 653 (**Figure 10.2**).

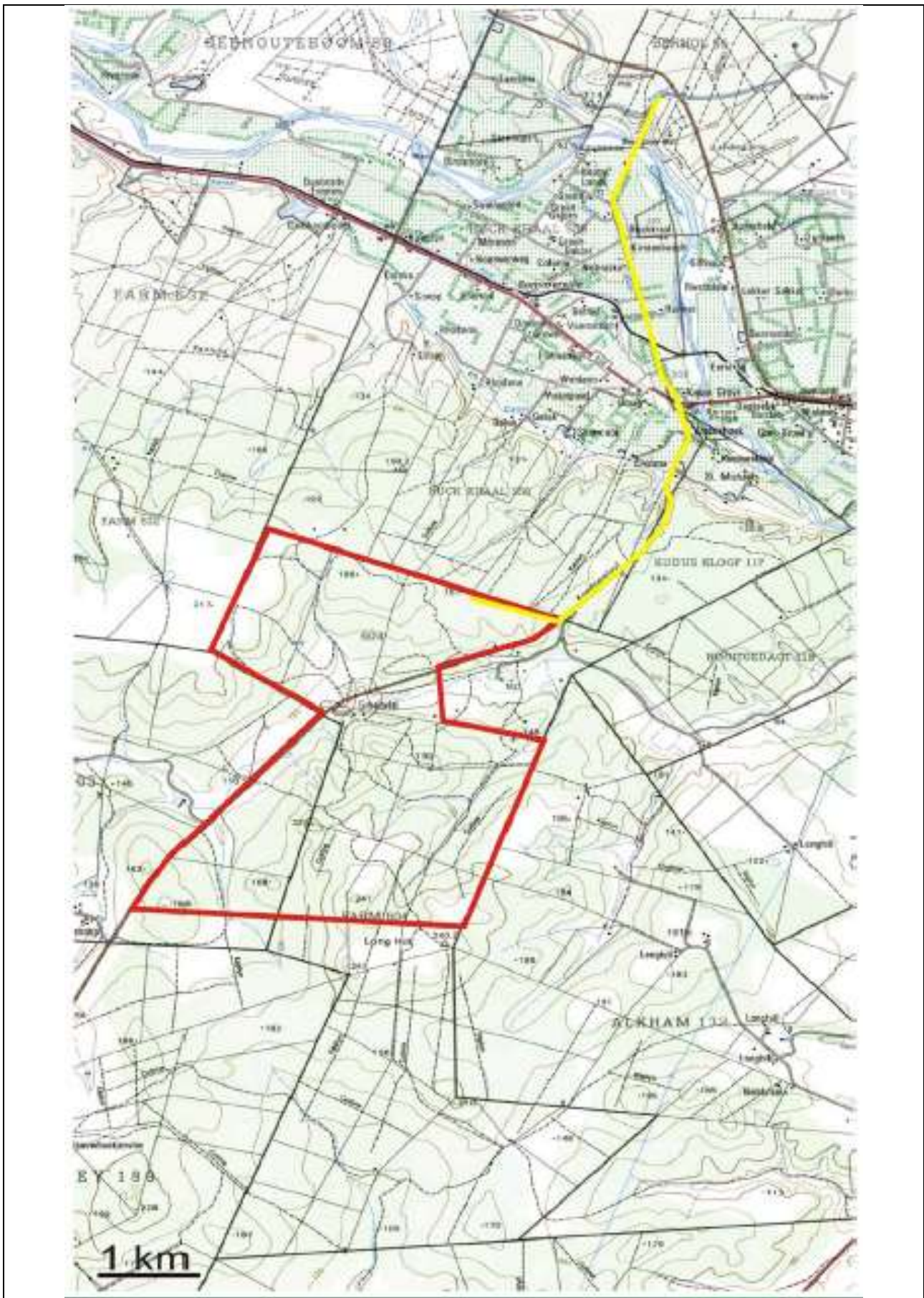


Figure 10.1: Proposed development areas (red – Farm 653; and yellow – pipeline route), using a portion of 1:50 000 scale topographic 3325 BC Coerney and 3325 DA Addo mapping.





Figure 10.2: Aerial view of the study area.

## 10.4 METHODOLOGY

The heritage significance of the affected areas was evaluated based on existing field data, maps, database information and published literature. This was followed up by a site inspection carried out by vehicle and on foot, using a Garmin GPS hand model (set to the WGS 84 map datum) and a digital camera for recording purposes.

### Assumptions and Limitations

The assessment provided within this report is based upon a site visit, where the surface visibility of outcrops and the evidence provided by existing soil cuttings and erosional areas, was hampered by dense thicket vegetation.

#### 10.4.1 Site Information

The following maps were consulted:

- 1:50 000 scale topographic map 3325 BC Coerney and 3325 DA Addo.
- 1:250 000 scale geological map 3324 Port Elizabeth.

#### Site coordinates (Figure 10.2):

- A) 33°31'1.43"S 25°33'49.60"E
- B) 33°31'35.13"S 25°35'45.02"E
- C) 33°31'55.43"S 25°34'59.63"E
- D) 33°32'16.41"S 25°35'0.42"E
- E) 33°32'22.80"S 25°35'36.88"E
- F) 33°33'38.12"S 25°35'6.75"E
- G) 33°33'26.12"S 25°33'0.83"E
- H) 33°32'13.96"S 25°34'11.85"E
- I) 33°31'49.37"S 25°33'28.68"E

#### Pipeline coordinates:

- J) 33°30'40.65"S 25°36'26.62"E
- K) 33°30'23.15"S 25°36'34.84"E
- L) 33°28'50.03"S 25°36'4.51"E
- M) 33°28'6.03"S 25°36'25.73"E

The study area covers ~1170ha of vegetated, undulating terrain on the Remainder of Farm 653 (Figure 10.3).



*Figure 10.3: The study area is a combination of predominantly densely vegetated, undulating terrain.*

## Geology

The study area forms part of the Algoa Basin, which is represented by a succession of sediments of Late Jurassic to Cretaceous age (McLachlan & McMillan 1976; Toerien and Hill 1989; Le Roux 2000 and Shone 2006) (**Figure 10.4**). These sediments are represented by a diverse sediment fill, comprising the Enon, Kirkwood and Sundays River Formations of the Uitenhage Group. During the late-Jurassic period (160 to 145 Ma), pebble and boulder alluvial deposits accumulated in the basin, being washed from the surrounding mountains under a high energy environment, to form the Enon Conglomerate Formation, the basal formation of the Uitenhage Group. A thick succession of clays was then deposited unconformably onto the Enon Formation, forming the mudstones and siltstones of the Kirkwood formation. The Kirkwood Formation represents an accumulation of fine-grained sediments under fluvial conditions. The resultant mudstone and subordinate sandstone also contains foliage and wood fossils. Subsequently, marine and estuarine clays were deposited in the basin during a transgression period to form the Sundays River Formation.



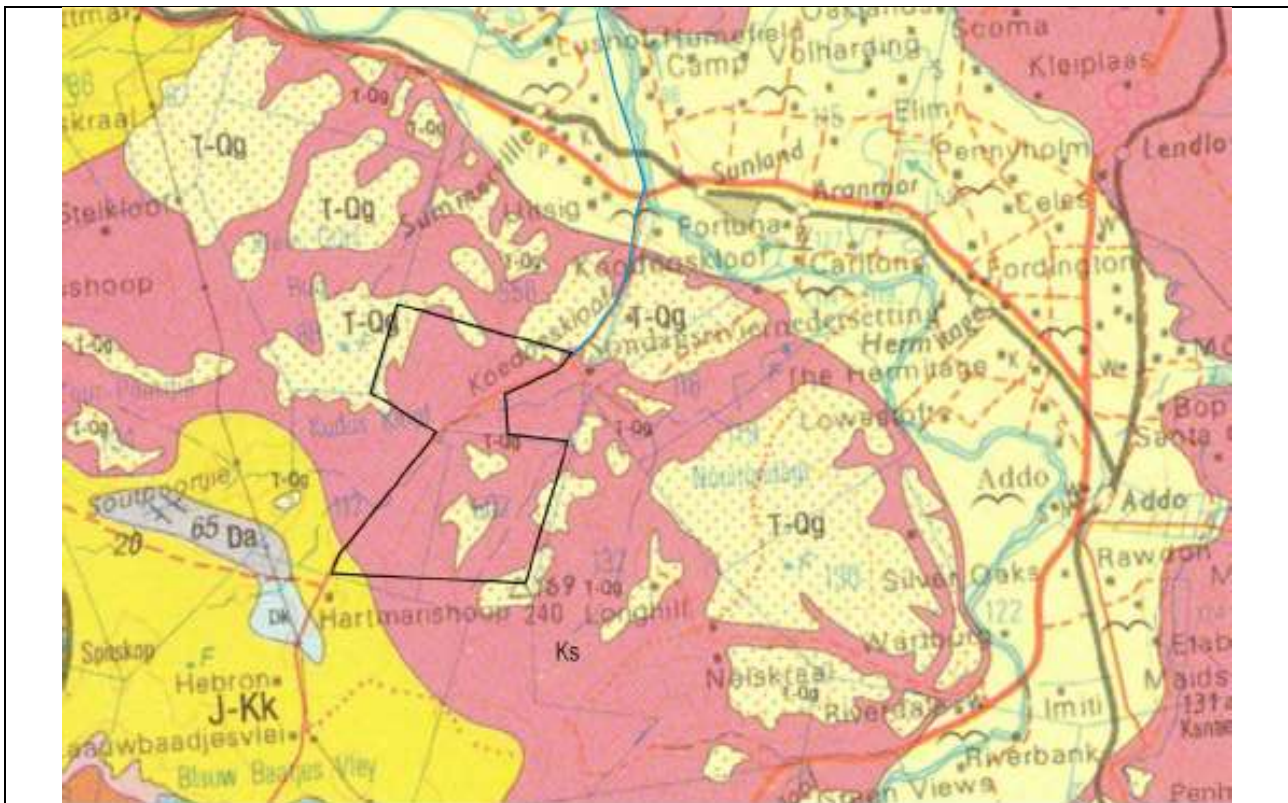


Figure 10.4: The study area forms part of the Algoa Basin, which is represented by a succession of sediments of the Late Jurassic to Cretaceous Uitenhage Group. The Uitenhage Group in the map extract is represented by a diverse sediment fill, comprising the Kirkwood Formation (J.Kk) and overlying Sundays River Formation (Ks), capped by Quaternary Alluvium, surface calcretes, hillwash and residual soils. The study area is underlain marine and estuarine sediments of the Sundays River Farm (Ks).

## 10.5 BACKGROUND INFORMATION

### 10.5.1 Palaeontology

According to the 1:250 000 scale geological map 3326 Port Elizabeth, the study area is underlain by marine and estuarine sediments of the Early Cretaceous Sundays River Formation. The Sundays River Formation contains rich fossil faunas of marine invertebrates such as ammonites, belemnites, bivalves and gastropod shells. Plant remains, vertebrate fragments (including the almost complete marine plesiosaur discovered near Redhouse) and microfossils (forams, ostracods) are also common (Shone 2006). The formation is linked to a shallow marine depositional environment that may have included lagoon, estuarine and shallow shelf settings (McClachlan and Mcmillan 1976). Good exposures of the Sundays River Formation sediments, comprising grey-green sandstones siltstones and mudstones with thin shell-rich limestone beds, are visible in the cliffs bounding the Sundays River, ~6km north of the study area (**Figure 10.5**).



Figure 10.5: Sundays River Formation sediments, exposed cliffs bounding the Sundays River, looking north.

### 10.5.2 Archaeology

Earliest human habitation in the Sundays River Valley is indicated by the presence of bifacial stone tools, which are assigned to Early Stone Age (ESA). ESA bifaces that possibly dates back to between 1.5 million and 300 000 years ago, and younger. Middle Stone Ages flake-blade industries generally occur as contextually derived individual finds on the landscape or occasionally as capped assemblages within Quaternary alluvial deposits. Stone Age sites have been recorded along the Sundays River Valley near Addo and Kirkwood. The incidence of surface scatters usually declines further away from localized areas such as riverine or spring sites. At Amanzi Springs, west of Grassridge near Addo, ESA *in situ* artefacts were found along with well-preserved plant and faunal remains within spring sediments (Deacon 1970). Cave and rock shelters in the adjacent mountains to the north and east of the site frequently contain archaeological remains and rock art associated with San hunter-gatherers who inhabited the area during the last ten thousand years (Deacon 1976). The Melkhoutboom Cave, located in the Zuurberg Mountains, is a Later Stone Age site that dates back 15000 years. Nearby rock paintings in the Zuurberg confirm that this area was inhabited by San hunter-gatherers. Khoi pastoralists occupied the region some 2000 years ago and introduced domesticated animals and pottery to the region (Deacon 1984). Khoi pastoralist sites are often found close to the banks of large streams and rivers and fresh water shell middens are often left as evidence of their stay. Khoi groups who lived in the area during historical times include the Iqua, Damasqua and Gonaqua clans. The Suurberg area is also known for numerous skirmishes that took place between the Xhosa inhabitants, European settlers, British military and Khoi pastoralists during the 18<sup>th</sup> and 19<sup>th</sup> centuries and some historical remains related to these events may still be preserved.

## 10.6 RESULTS

The Sundays River Formation outcrop is poorly exposed within the study area, which is capped by well exposed, thick orange-brown sandy soils, hillwash and poorly sorted reworked gravels (**Figure 10.6 and 10.7**). Although visibility was obscured by the dense thicket vegetation, scatters of uncapped Middle Stone Age stone-tool artefacts were found in secondary context, within the reworked and downwasted gravels capping the hill tops, drainage lines and vehicle tracks (**Figure 10.8**). Some evidence was found for the accumulation of reworked stone tools within the Quaternary sediments covering the underlying sedimentary rocks (**Figure 10.6**). The artefacts are mainly represented by large, irregular flakes with faceted striking platforms, chunks and reduced pieces made from quartzite.





Figure 10.6: Weathered Sundays River Formation siltstones, capped by brown, sandy topsoils (A); thick, sandy alluvium with calcrete nodules (B); overlying a calcretised pebbly gravel (C); and a reworked core within superficial sandy soil (D). Scale 1 = 10cm.



Figure 10.7: The study area is capped by well exposed, thick orange-brown sandy soils, hillwash and poorly sorted reworked gravels.





Figure 10.8: Uncapped Middle Stone Age stone tool (quartzite) artefacts in secondary context, within reworked and downwashed gravels. Scale 1 = 10cm.

Except for a farmstead, assorted farm buildings and the existing dam, no other historically significant structures or archaeological sites were recorded (**Figure 10.9**). A small graveyard is located ~750m southeast of the farmstead (GPS coordinates 33°32'25.78"S 25°34'49.29"E) (**Figure 10.10**).

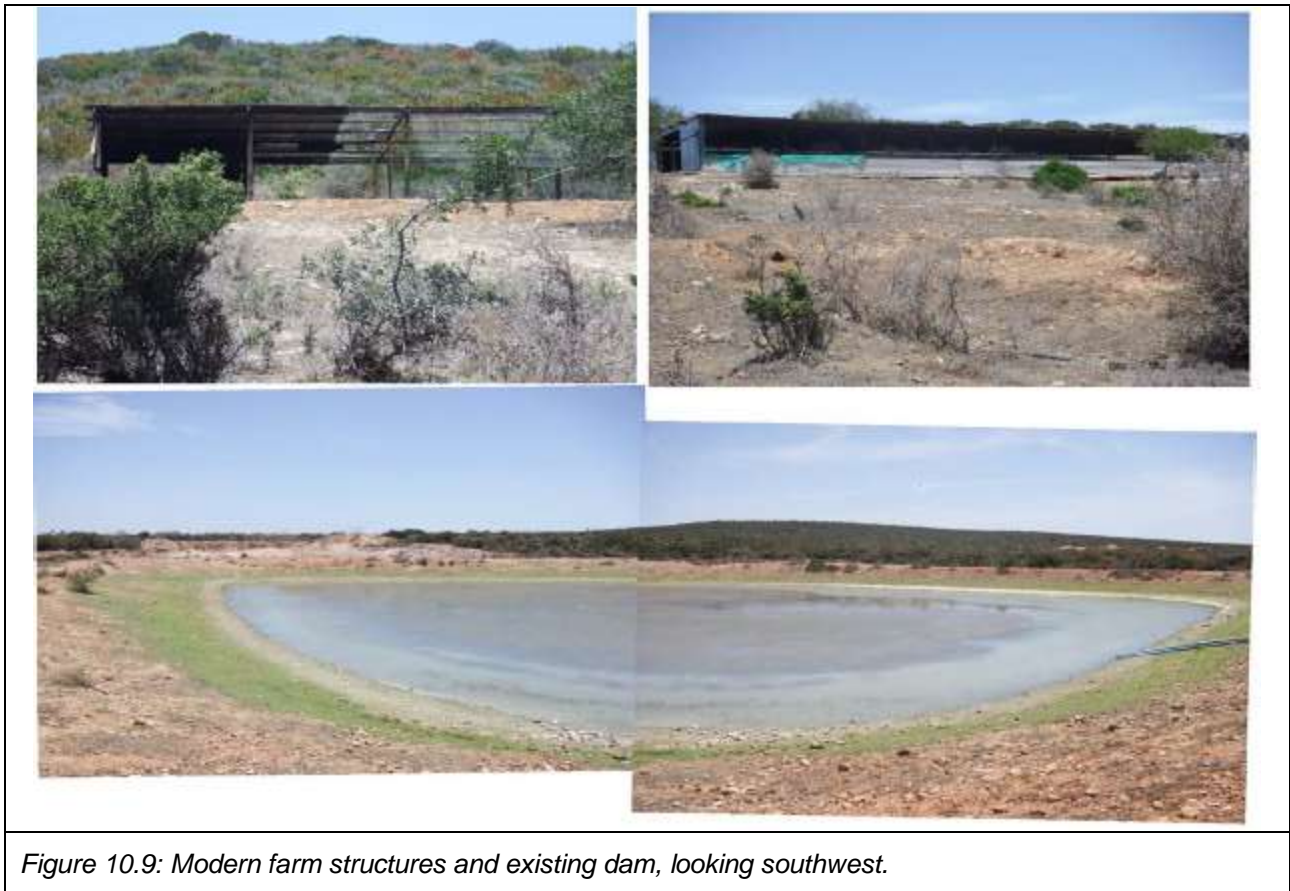






Figure 10.10: Modern graveyard.

The irrigation pipeline footprint is proposed in the reserve of a proclaimed public road (MR00470) on degraded terrain, as well as across four properties. The proposed pipeline route traverses farmland from the canal offtake point at the LSRWUA canal system, the other side of the Sundays River, to the proposed termination point at one of the new dams proposed for construction on Farm 653 (**Figure 10.11**). The pipeline footprint is underlain at depth by Quaternary Alluvium along the Sundays River floodplain. There are no indications of aboveground prehistoric structures, graves, graveyards or historical structures older than 60 years within the proposed pipeline footprint.





Figure 10.11: The irrigation pipeline route from the northeast boundary of Farm 653 (top left), to the Sundays River (bottom right).

**10.7 IMPACT STATEMENT AND RECOMMENDATIONS**

**10.7.1 Palaeontology**

The potential impact by the development on below-ground fossils is considered *negative* and *irreversible*, but localised, and will be limited to the construction phase of the project. Potential palaeontological impact during the construction and operational phase of the development is considered *moderate* to *slight*, since the proposed citrus development will be restricted to areas where superficial sediments (topsoils, alluvium, hillwash etc.) occur at depth. It is further expected that the Quaternary Alluvium underlying the Sundays River floodplain will largely buffer the impact of excavations into unweathered sedimentary bedrock. There are no major palaeontological grounds to halt the proposed development.

<b>Nature of the Impact</b>	<b>Potential project related impacts on belowground fossils.</b> It is unlikely that any of the preparation of the site for cultivation will impact upon any palaeontological heritage during this development, as this will involve the clearing of bush and superficial disturbance of soil layers. However, the construction and expansion of irrigation water dams as well as the installation of the irrigation pipeline may involve excavation of bedrock which may contain fossils.
Extent	Site specific
Duration	Permanent
Consequence /Intensity	High
Probability	Probable
Degree of Confidence	Medium
Reversibility	Irreversible

Irreplaceable Loss of Resources	Irreplaceable
Status and Significance (without mitigation)	High Negative (-)
Mitigation	<ul style="list-style-type: none"> <li>• The Construction Manager should monitor &gt;1m deep excavations into freshly exposed sedimentary bedrock during the construction phase of the project, in particular the dam construction and expansion.</li> <li>• The Construction Manager should be informed about the possible type of fossils (shell beds, ammonites) that may be encountered within the sedimentary bedrock (see <b>Figure 10.12</b>).</li> <li>• If any palaeontological heritage is identified on site, this must be reported immediately to the ECPHRA (Mr Sello Mokhanya, Tel: 043 745 0888; smokhanya@ecphra.org.za). Ideally the fossil material should be left <i>in situ</i> until a palaeontologist has provided input as to how to proceed with regard to mitigation.</li> </ul>
Status and Significance (after mitigation)	High Positive (+) – discovery of fossils during excavation of bedrock, followed by effective mitigation in collaboration with a palaeontologist, would result in the curation of new and important fossil material.

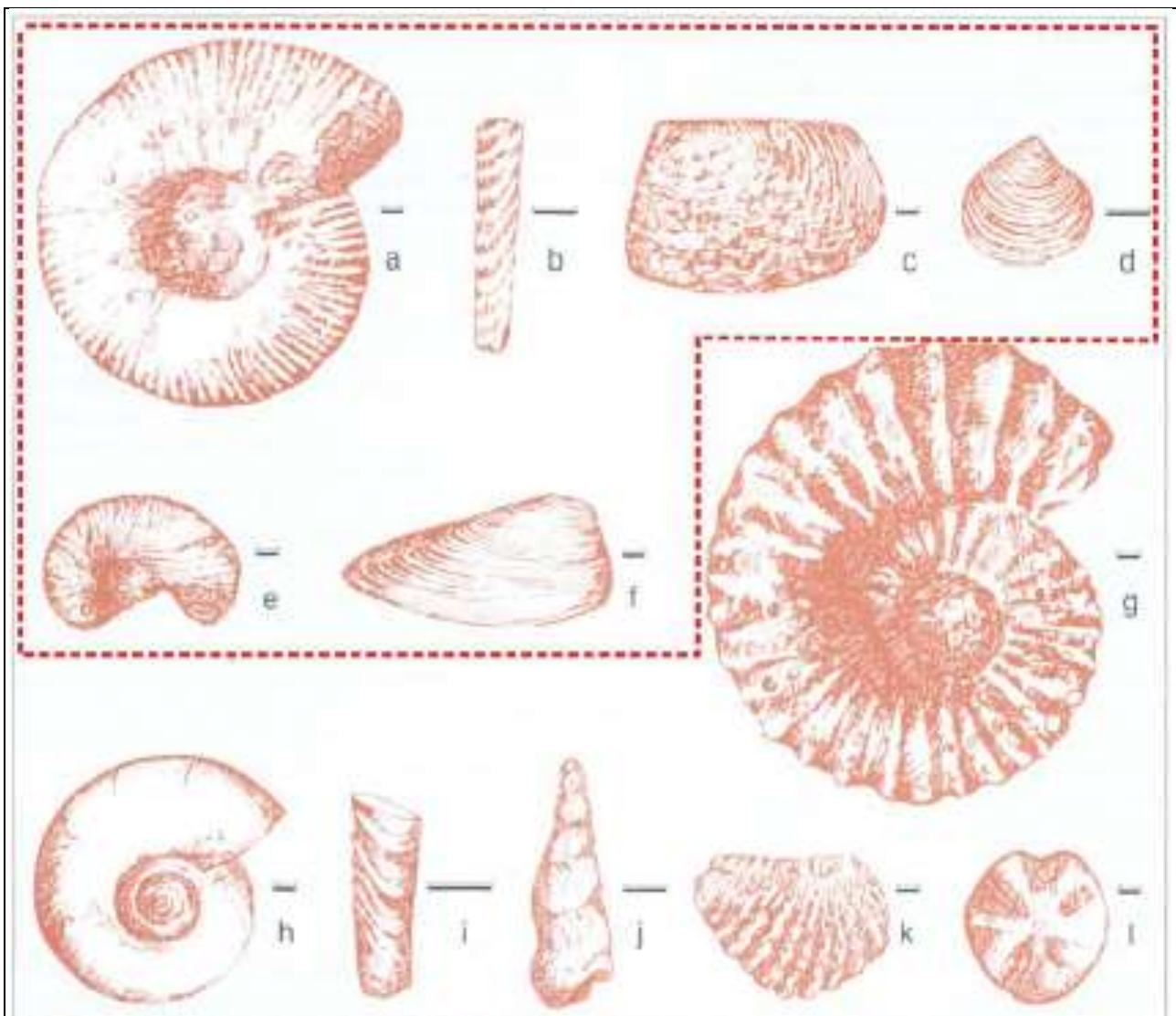


Figure 10.12: Common Sundays River Formation invertebrates – ammonites (a, b), bivalves (c, d, & f) and oysters (e).

### 10.7.2 Archaeology

There are no indications of aboveground prehistoric structures, open sites or rock art within the survey area. Further, no evidence of historically significant structures older than 60 years were observed at the site or along the pipeline footprint. A historical monument, known as “The Lookout”, is located ~90m east of the pipeline route on the northern bank of the Sundays River and will not be impacted on by the development (Oberholster 1972). The survey has yielded a number of stone tools distributed as contextually derived surface scatters at the site. The artefacts could not be associated with intact archaeological open sites. However, isolated to multiple uncapped stone tool scatters (incl. mixed or downwasted assemblages) were widespread. Regarded within the context of cultural landscape, the weathered/ *ex situ* stone tool scatters can be viewed as a clear indication of early human presence on the landscape. There are no major archaeological grounds to halt the proposed development.

Nature of the Impact	The potential impact of the clearing of the vegetation for the proposed agricultural activities on above and below ground archaeology.
Extent	Local
Duration	Permanent
Consequence /Intensity	Low
Probability	Improbable
Degree of Confidence	High
Reversibility	Irreversible
Irreplaceable Loss of Resources	Replaceable, but in some cases Irreplaceable
Status and Significance (without mitigation)	Low Negative (-)
Mitigation	<ul style="list-style-type: none"> <li>• The graveyard must be avoided and protected by a 25m no-go buffer zone.</li> <li>• Middle Stone Age artefacts may occur as capped assemblages within the Quaternary Alluvial deposits flanking the Sundays River. The Construction Manager should be aware of possible accumulations of undisturbed flaked stones when &gt;1m deep trench excavations are to be conducted into unconsolidated sediments, during the construction and installation of the irrigation pipeline.</li> <li>• However, the ECO (must be trained) must monitor the clearing of the vegetation and if concentrations of archaeological materials and/or human remains are exposed then all work must stop for an archaeologist to investigate (see below).</li> <li>• An archaeologist should conduct a walkthrough of the area after the vegetation is cleared to check if any significant sites/ materials were exposed. Further recommendations will follow after the investigation.</li> <li>• If any human remains (or any other concentrations of archaeological heritage material) are exposed during construction, all work must cease in the immediate area of the finds and it must be reported immediately to the archaeologist at the Albany Museum (Tel. 046 6222312) or to the Eastern Cape Provincial Heritage Resources Authority (Tel. 043 6422811). Sufficient time should be allowed to investigate and to remove/collect such material. Recommendations will follow from the investigation.</li> </ul>
Status and Significance (after mitigation)	Neutral (o)



## 10.8 REFERENCES

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## DECLARATION OF INDEPENDENCE

I, Lloyd Rossouw, declare that I act as an independent specialist consultant. I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference. I have no interest in secondary or downstream developments as a result of the authorization of this project and have no conflicting interests in the undertaking of the activity.



03 / 03 / 2017