# *ARCHAEOLOGICAL IMPACT ASSESSMENT*

# Proposed cultivation of pecan nut trees including associated infrastructure on the Farm Bethesda 238/38 & 335/38 Louisevale, Upington Northern Cape

Assessment conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999)

Prepared for:

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Applicant:

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By

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## Executive summary

*Introduction*

ACRM was appointed by Pieter Badenhorst Professional Services, on behalf of the Strauss Groep to conduct an Archaeological Impact Assessment (AIA) for the proposed cultivation of pecan nut trees and associated infrastructure, on the Farm Bethesda 38/225 and 38/335 in Louisevale, near Upington in the Northern Cape Province.

The proposed pecan nut tree plantation will cover a footprint area of about 12 ha. Water will be supplied via a new storage dam, pump station and pipeline situated on Farm 38/238. The dam and pump station will be sited on existing disturbed land, while the land for the pecan nut tree plantation comprises undeveloped agricultural land. Layout for planting might change due to botanical constraints, but no planting will be done within 35m of any watercourse.

The AIA forms part of a Basic Assessment process that is being conducted by Peter Badenhorst Professional Services.

*Legal requirements*

In terms of Section 38 (1) (c) (iii) of the National Heritage Resources Act 1999 (Act 25 of 1999), a Heritage Impact Assessment (HIA) of the proposed project is required if the footprint area of the proposed development is more than 5000m² in extent.

Section 38 (1) (a) of the Act also indicates that any person constructing a powerline, pipeline or road, or similar linear development or barrier exceeding 300m in length is required to notify the responsible heritage resources authority, who will in turn advise whether an impact assessment report is needed before development can take place.

*Objectives*

The overall purpose of the AIA is to assess the sensitivity of archaeological resources in the affected area, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures.

*Findings*

A detailed foot survey of the proposed development site, including associated activities was undertaken by ACRM in April 2016, in which the following observations were made:

More than 80 stone artefacts were counted and mapped with a hand held GPS unit. The majority of the tools are assigned to the Later Stone Age (LSA), while less than five Middle Stone Age (MSA) tools were found. No Early Stone Age (ESA) implements such as handaxes, or large angular flakes and chunks, were encountered. The majority of the lithics are spread very thinly and unevenly over the surrounding landscape (i.e. comprising mostly single, isolated occurrences), but several dispersed (i.e. low density) scatters of tools were recorded alongside the Donkerhoekspruit, on a kopje in the south western portion of the site, and alongside an outcropping of dolerite near a small stream outside the proposed footprint area.

The majority of the tools comprise modified (i.e. utilised & miscellaneous retouched pieces) and unmodified flakes and chunks, but a number of round cores were also found. No formal tools such as scrapers or points were found, but two adzes and a backed `knife' were recorded. One quartzite hammerstone/grindstone was also found, but no organic remains such as pottery, bone or ostrich eggshell were recorded during the field assessment.

More than 96% of the implements are made on locally available banded ironstone, with the remainder in indurated shale, quartz and quartzite. Banded ironstone is well known to have been a favoured and desirable raw material for making stone artefacts and occurs at a number archaeological sites in the Upington area.

As archaeological sites are concerned, however, the occurrences are lacking in context as no pottery, bone or ostrich eggshell was found. While several dispersed scatters of tools were located, mostly outside the proposed footprint area, no evidence of any factory or workshop site, or the result of any human settlement was identified.

Indications therefore, are that the majority of the resources recorded during the study represent discarded flakes and flake debris.

*Grading*

Overall the relatively small numbers and isolated context in which they were found, means that the archaeological resources have been graded as having *low* (Grade 3C) significance.

*Built environment*

In terms of the built environment, no old buildings, structures or features, or any old equipment were found on the proposed development site.

Some ruined concrete buildings related to the previous farming enterprise occur on Farm 38/238, but these structures have no intrinsic heritage significance, or value.

*Graves*

No graves, or typical grave features or markers were encountered during the study.

*Impact statement*

Overall, the results of the study indicate that the proposed activity (i. e. the cultivation of pecan nut trees) and associated activities (i. e. a storage reservoir, pump station & water pipeline), will not have an impact of great significance on the archaeological heritage, as these are expected to be limited. Therefore, there are no objections to the authorization of the proposed development.

*Conclusion*

The study has captured a good record of the archaeological heritage present on the proposed development site, which have been graded as having *low* (Grade 3C) significance.

*Recommendations*

1. No archaeological mitigation is required.

2. Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered, or exposed during preparation of the lands for cultivation, , these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (Ms Natasha Higgit 021 462 4502). Burials, etc. must not be removed or disturbed until inspected by the archaeologist.

Table of Contents

## 1. INTRODUCTION

ACRM was appointed by Pieter Badenhorst Professional Services on behalf of the Strauss Groep, to conduct an Archaeological Impact Assessment (AIA) for the proposed cultivation of pecan nut trees and associated infrastructure on the Farm Bethesda 38/225 and 38/335 in Louisevale (//Khara Hais Local Municipality), near Upington in the Northern Cape (Figures 1 & 2).

The proposed pecan nut tree plantation will cover a footprint area of about 12 ha in extent. Water will be supplied via a new storage dam, pump station and pipeline situated on Farm No. 38/238 (Figure 3). The proposed storage dam and pump station will be sited on existing disturbed land, while the land for the pecan nut tree plantation comprises undeveloped agricultural land. Layout for planting might change due to botanical constraints, but no planting will be done within 35m of any watercourse.

The AIA forms part of the Basic Assessment process that is being conducted by Pieter Badenhorst Professional Services.


Figure 1. Locality Map. Red polygon illustrates the location of the study site

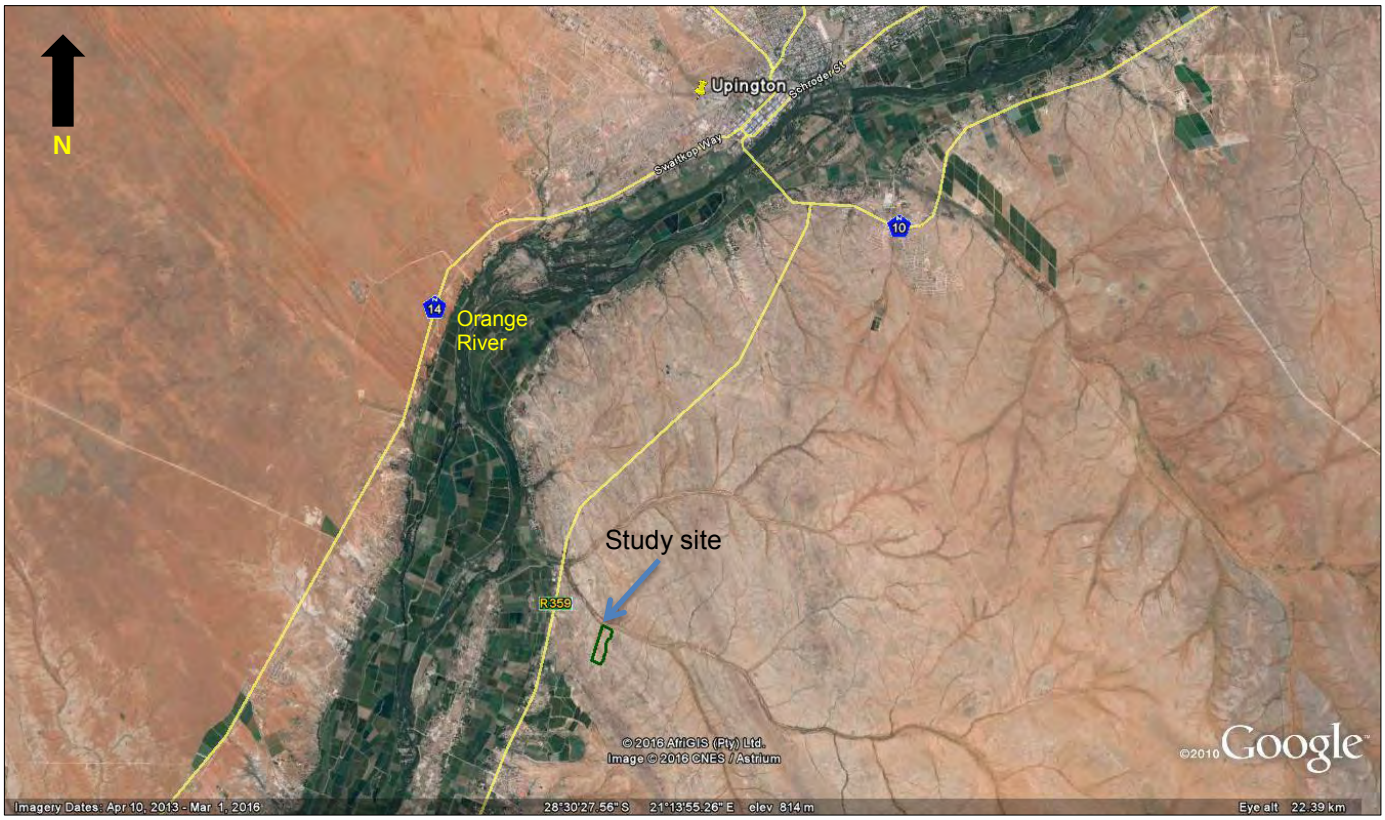


Figure 2.Google image illustrating the location of the proposed development site (green polygon).

## 2. HERITAGE LEGISLATION

The National Heritage Resources Act (Act No. 25 of 1999) makes provision for a compulsory Heritage Impact Assessment (HIA) when an area exceeding 5000 m² is being developed. This is to determine if the area contains heritage sites and to take the necessary steps to ensure that they are not damaged or destroyed during development.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

Section 38 (1) (a) of the Act specifically indicates that any person constructing a powerline, pipeline or road, or similar linear development or barrier exceeding 300m in length is required to notify the responsible heritage resources authority, who will in turn advise whether an impact assessment report is needed before development can take place.

## 3. TERMS OF REFERENCE

The terms of reference for the archaeological study were to:

- Determine whether there are likely to be any important archaeological resources that may potentially be impacted by the proposed development;

- Indicate any constraints that would need to be taken into account in considering the development proposal;

- Identify potentially sensitive archaeological areas, and

- Recommend any further mitigation action.

## 4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The study site is located on the eastern side of the Orange/Gariep River about 12kms south west of Upington. (Figure 3) The proposed pecan nut plantation is situated about 3 km east of the river. Access to the subject property is via the R359. The proposed site is bound by the Donkerhoekspruit on the northern and eastern boundary, an unnamed stream on the southern boundary and a fence line on the western boundary. The site slopes from north to south, and is covered in low scrub and bushes on a gravel and quartz substrate. A few outcroppings of dolerite occur in places. The stream/river courses are infested with thorny Swarthaak. Several, old twee-spoor gravel tracks crisscross the property. There is a kopje in the south western corner, but this has been excluded from the proposed development (Figure 4).

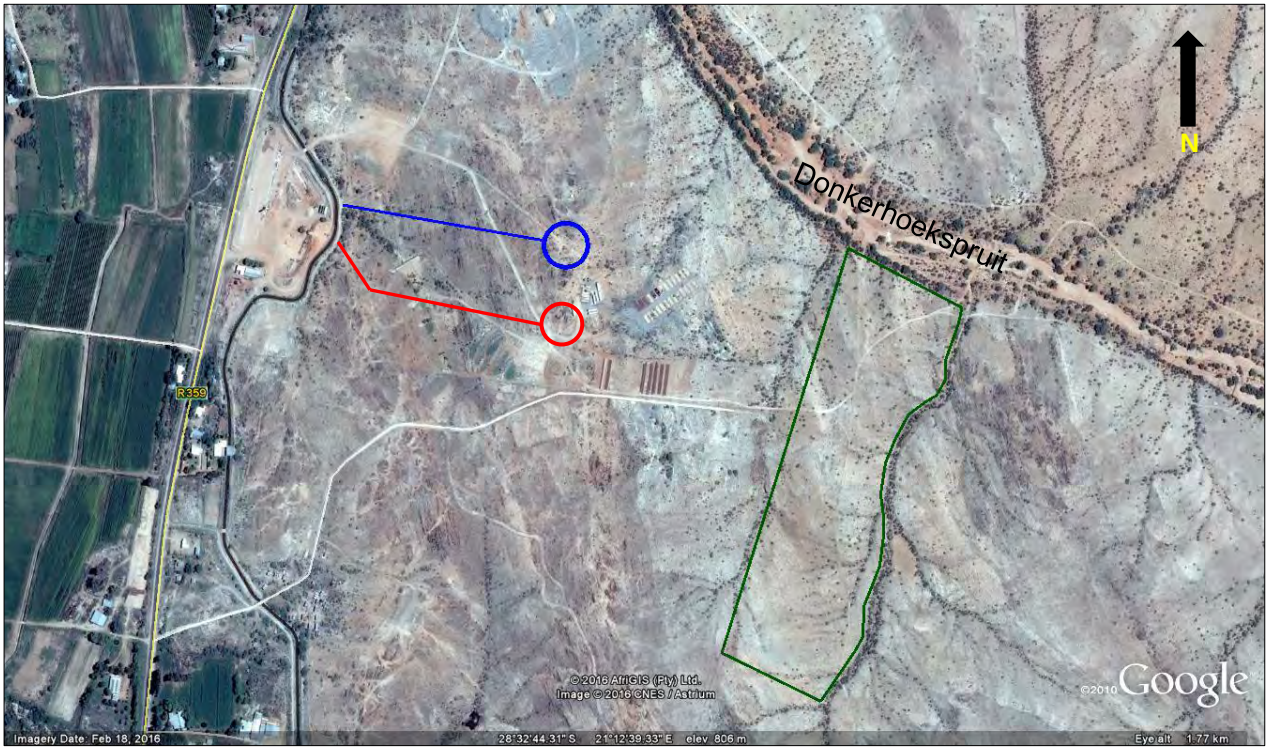

Figure 3. Google satellite map of the proposed pecan nut tree plantation on Farm 35/338 (green polygon) and proposed, and proposed alternative pipeline and storage reservoir (blue & red) on Farm 35/238

Figure 4. The proposed development site facing north. Photograph taken from the kopje

The proposed and proposed alternative pipeline and storage reservoir is located on Farm 35/238 (Figures 5-8).

Figure 5. Footprint area for the proposed reservoir (red)

Figure 6. Route for the proposed pipeline (red)

Figure 7. Footprint for the proposed reservoir (blue)

Figure 8. Route for the proposed pipeline (blue)

## 5. STUDY APPROACH

### 5.1 Method of survey

The overall purpose of the HIA is to assess the sensitivity of archaeological resources in the affected area, to determine the potential impacts on such resources and to avoid and/or minimize such impacts by means of management and/or mitigation measures.

The significance of archaeological resources was assessed in terms of their content and, context. Attributes considered in determining significance include artefact and/or ecofact types, rarity of finds, exceptional items, organic preservation, potential for future research, density of finds and the context in which archaeological traces occur.

Survey track paths were captured (refer to Figure 9) and the position of identified archaeological occurrences and observations were fixed by a hand held GPS unit set on the map datum wgs 84.

A literature survey was also carried out to assess the archaeological context surrounding the proposed development site.

### 5.2 Constraints and limitations

Overall, archaeological visibility was good. The stream/river banks are, however, infested with thorny Swarthaak vegetation, resulting in very low archaeological visibility, but there will be no agricultural development within 35m of the watercourse.

### 5.3 Identification of potential risks

Based on the results of the study, there are no archaeological risks associated with the proposed activities (i.e. cultivation of pecan nut trees). It is maintained that the study has

captured a good record of the archaeological heritage present on the proposed development site.

### 5.4 Results of the desk top study

According to Beaumont and Vogel (2006), the archaeology of the Northern Cape is rich and varied covering long spans of human history. In Upington, no systematic archaeological work has been done, only a handful of commercial archaeology surveys as part of the EIA process. These studies have shown that stone artefact frequencies in the Upington area tend to be low, temporally mixed and occurring in an isolated and displaced context (Beaumont 2006a, b, c, d, 2008; Kaplan 2008; Dreyer 2013; Van Schalkwyk 2014a, 2014b; Nilssen 2012). In contrast Morris (2014) notes that there are, substantial herder encampments along the floodplain of the Orange/Gariep River but these tend to be short duration visits by small groups of hunter-gatherers. Most of these camps have been destroyed by intensive agricultural development alongside the river. Early and Middle Stone Age site older than 20 000 years are rare in the Upington area, but small scatters of tools have been encountered in the area and ESA tools such as handaxes, cleavers cores and blades have been documented north of the town (Morris 2014, Morris 2010, 2012; Kaplan 2013a & b).

## 6. FINDINGS

### 6.1 Archaeology

More than 80 stone artefacts were counted and mapped with a hand held GPS unit (Table 1 & Figure 9). More than 95% of the tools are assigned to the Later Stone Age (LSA) while only three Middle Stone Age (MSA) pieces were found. No Early Stone Age (ESA) implements such as handaxes, or large angular flakes and chunks were encountered during the study. Most of the tools are spread very thinly over the surrounding landscape (i.e. they comprise single, isolated occurrences). There is, however, some patterning in the distribution of tools and it is interesting to note that the majority of the tools occur alongside the Donkerhoekspruit, and in the southern portion of the property (alongside an unnamed stream), while only a few tools were recorded in the northern portion of the proposed footprint area (Figure 9).

While most of the GPS readings record single archaeological occurrences, several dispersed (or low density) scatters of tools were recorded alongside the Donkerhoekspruit (Site 268), and on the kopje (Site 255) in the elevated south western portion of the proposed development site. A scatter of lithics comprising flakes, chunks, cores and several retouched tools, indicating more intensive flaking activity, occurs alongside a small unnamed stream that feeds into the Donkerhoekspruit (refer to Figure 16), but the scatter is located outside the proposed footprint area (Figure 9).

The majority of the tools on the site comprise modified and unmodified flakes and chunks, but a number (n = 12) of round cores were also found suggesting more regular flaking activity. Only a few formal tools were found, including two adzes (Site 250 & Site 296), and a possible `knife' (Site 258). One quartzite hammerstone/grindstone (Site 298) was also found. No organic remains such as pottery, bone or ostrich eggshell were encountered during the field study.

More than 96% of the implements are made on locally available banded ironstone, with the remainder in indurated shale, quartz and quartzite. Banded ironstone is well known to have been a favoured and desirable raw material for making stone artefacts and occurs at a number of sites in the Upington area. It is likely that the raw material was sourced from the Gariep River.

As archaeological sites are concerned, however, the occurrences are lacking in context as no pottery or ostrich eggshell was found. While several dispersed scatters of tools were located, mostly outside the proposed development site, no evidence of any factory or workshop site, or the result of any human settlement was identified.

Indications are that the majority of the remains recorded during the study represent discarded flakes and flake debris.

A collection of tools documented during the study are illustrated in Figures 11-15.

### 6.2 Grading

Overall the relatively small number of tools, and isolated context in which they were found, means that the archaeological remains have been graded as having *low* (Grade 3C) significance.

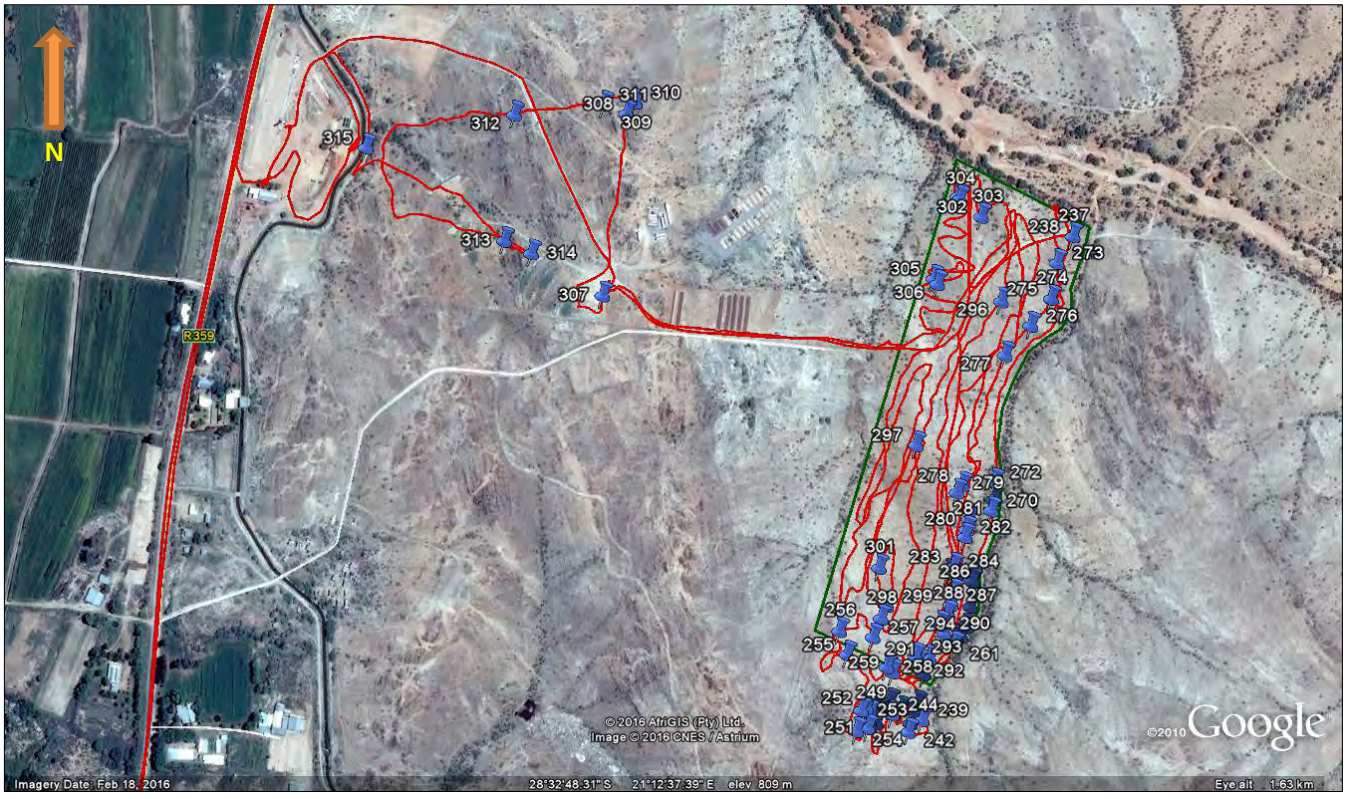

Figure 9. Survey track paths (red) and waypoints of archaeological finds

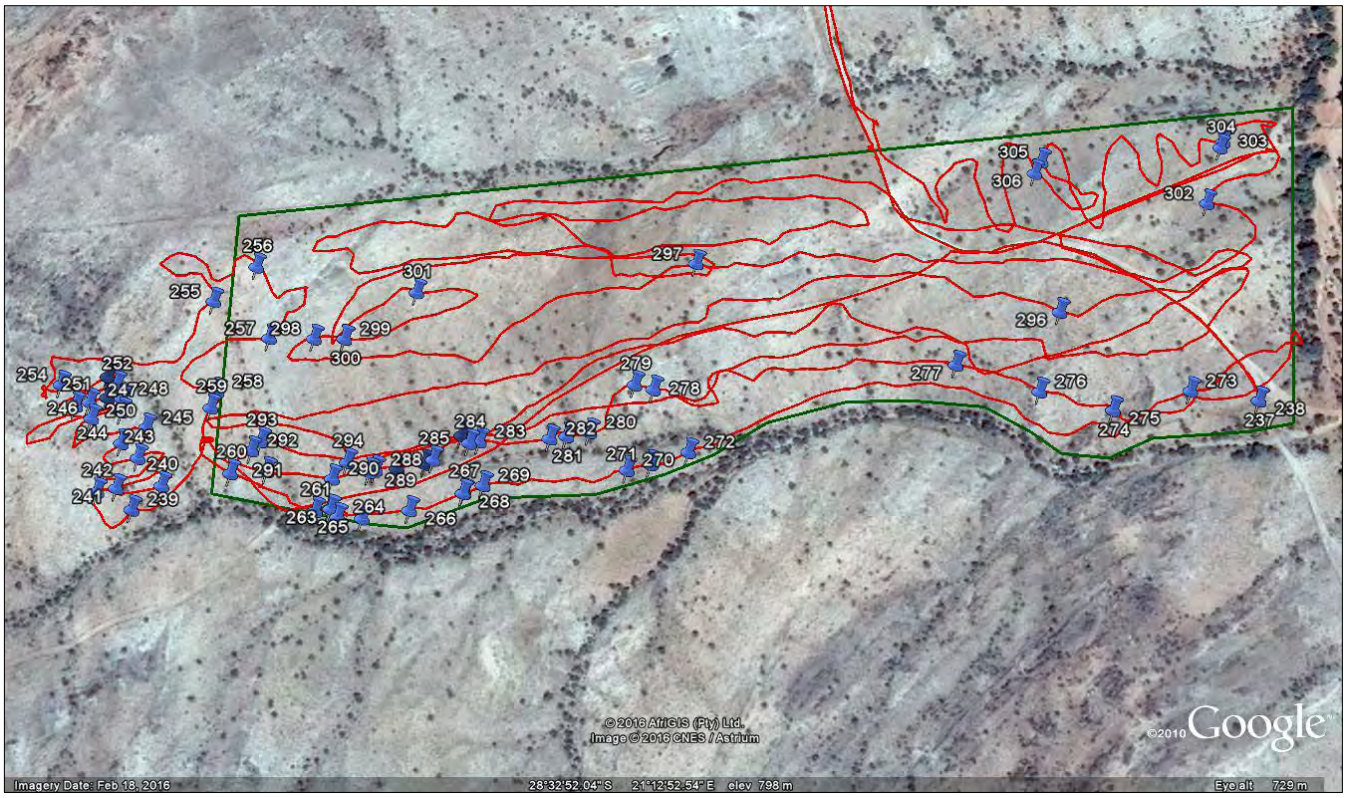


Figure 10. Survey track paths and waypoints of archaeological finds: proposed pecan nut plantation

| Site | Farm name | Lat/long | Description of finds | Grading | Suggested mitigation |
|---|---|---|---|---|---|
| | | | | | |
| 239 | | S28° 33.048' E21° 12.832 | Banded ironstone (BI) misc. retouched flake | 3C | None required (outside footprint area) |
| 240 | | S28° 33.036' E21° 12.828' | BI utilised/retouched chunk | 3C | None required (outside footprint area) |
| 241 | | S28° 33.050' E21° 12.822' | BI utilised/retouched chunk | 3C | None required (outside footprint area) |
| 242 | | S28° 33.057' E21° 12.820' | BI utilised/retouched flake | 3C | None required (outside footprint area) |
| 243 | | S28° 33.040' E21° 12.814' | Weathered Indurated shale (IS) MSA flake | 3C | None required (outside footprint area) |
| 244 | | S28° 33.043' E21° 12.806' | BI chunk | 3C | None required (outside footprint area) |
| 245 | | S28° 33.034' E21° 12.805' | BI retouched flake and MRP | 3C | None required (outside footprint area) |
| 246 | | S28° 33.050' E21° 12.793' | Broken/split IS cobble & BI chunk | 3C | None required (outside footprint area) |
| 247 | | S28° 33.040' E21° 12.795' | Quartz flake | 3C | None required (outside footprint area) |
| 248 | | S28° 33.038' E21° 12.790' | BI chunk | 3C | None required (outside footprint area) |
| 249 | | S28° 33.043' E21° 12.788' | BI retouched chunk and weathered IS chunk | 3C | None required (outside footprint area) |
| 250 | | S28° 33.049' E21° 12.787' | BI adze (step flaking) | 3C | None required (outside footprint area) |
| 251 | | S28° 33.053' E21° 12.786' | BI chunk | 3C | None required (outside |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | footprint area) |
| 252 | | S28° 33.038' E21° 12.784' | BI chunk | 3C | None required (outside footprint area) |
| 253 | | S28° 33.040' E21° 12.780' | BI misc. retouched chunk | 3C | None required (outside footprint area) |
| 254 | | S28° 33.055' E21° 12.776' | Dispersed scatter of tools associated with outcropping of dolerite – including BI core, retouched/utilised flakes, chunks & manuport | 3C | None required (outside footprint area) |
| 255 | | S28° 32.998' E21° 12.768' | Dispersed scatter of tools on quartz covered kopje inc. BI core, chunks, utilized/retouched flakes, porphyry core. | 3C | None required (outside footprint area) |
| 256 | | S28° 32.980' E21° 12.762' | BI chunk, 2 flakes | 3C | None required |
| 257 | | S28° 32.985' E21° 12.791' | BI chunk | 3C | None required |
| 258 | | S28° 33.008' E21° 12.802' | BI `knife' on cobble flake | 3C | None required |
| 259 | | S28° 33.012' E21° 12.807' | BI retouched/utilized flake | 3C | None required |
| 260 | | S28° 33.013' E21° 12.834' | Flat, utilized BI flake | 3C | None required |
| 261 | | S28° 32.992' E21° 12.860' | BI MRP and chunk | 3C | None required |
| 262 | | S28° 32.987' E21° 12.862' | BI utilised/retouched flake | 3C | None required |
| 263 | | S28° 32.987' E21° 12.862' | BI utilised/retouched flake | 3C | None required |
| 264 | | S28° 32.986' E21° 12.866' | BI round core | 3C | None required |
| 265 | | S28° 32.978' E21° 12.870' | BI utilised flake | 3C | None required |
| 266 | | S28° 32.963' E21° 12.874' | Large quartzite chunk | 3C | None required |
| 267 | | S28° 32.944' E21° 12.876' | BI chunk | 3C | None required |
| 268 | | S28° 32.944' E21° 12.876' | A low density scatter of tools, including BI utilized/retouched flakes, core and several flaked chunks alongside the Donkerhoekspruit | 3C | None required |
| 269 | | S28° 32.937' E21° 12.877' | Same as above | 3C | None required |
| 270 | | S28° 32.891' E21° 12.893' | BI chunk | 3C | None required |
| 271 | | S28° 32.883' E21° 12.895' | Split/broken BI cobble | 3C | None required |
| 272 | | S28° 32.870' E21° 12.896' | BI MRP and chunk | 3C | None required |
| 273 | | S28° 32.706' E21° 12.952' | BI chunk/core | 3C | None required |
| 274 | | S28° 32.733' E21° 12.946' | Quartzite chunk/cobble core | 3C | None required |
| 276 | | S28° 32.753' E21° 12.929' | BI core | 3C | None required |
| 277 | | S28° 32.775' E21° 12.906' | BI chunk | 3C | None required |
| 278 | | S28° 32.872' E21° 12.869' | Weathered BI core/chunk | 3C | None required |
| 279 | | S28° 32.877' E21° 12.864' | Small BI chunk | 3C | None required |
| 280 | | S28° 32.898' E21° 12.874' | BI chunk | 3C | None required |
| 281 | | S28° 32.905' E21° 12.872' | Quartz core/chunk | 3C | None required |
| 282 | | S28° 32.911' E21° 12.870' | BI utilized flake | 3C | None required |
| 283 | | S28° 32.933' E21° 12.860' | IS cortex cobble chunk | 3C | None required |
| 284 | | S28° 32.936' E21° 12.860' | BI MSA retouched flake | 3C | None required |
| 285 | | S28° 32.949' E21° 12.860' | BI chunk | 3C | None required |
| 286 | | S28° 32.952' E21° 12.860' | BI chunk and MSA retouched flake | 3C | None required |
| 287 | | S28° 32.962' E21° 12.858' | Flat, worked out BI core (?MSA) | 3C | None required |

| | | | | | |
|---|---|---|---|---|---|
| 288 | | S28° 32.968' E21° 12.855' | Weathered IS retouched cortex flake and BI chunk | 3C | None required |
| 289 | | S28° 32.971' E21° 12.855' | BI cortex cobble core/chunk & BI flake | 3C | None required |
| 290 | | S28° 32.983' E21° 12.851' | BI chunk | 3C | None required |
| 291 | | S28° 33.002' E21° 12.839' | Flat, utilized BI flake and broken BI flake | 3C | None required |
| 292 | | S28° 33.004' E21° 12.829' | BI miscellaneous retouched chunk | 3C | None required |
| 293 | | S28° 33.000' E21° 12.827' | BI chunk | 3C | None required |
| 294 | | S28° 32.976' E21° 12.848' | Small BI flake | 3C | None required |
| 295 | | S28° 32.938' E21° 12.856' | Quartzite chunk/split cobble | 3C | None required |
| 296 | | S28° 32.734' E21° 12.904' | BI cortex flake/?backed adze with slight step flaking | 3C | None required |
| 297 | | S28° 32.841' E21° 12.830' | Round quartzite core | 3C | None required |
| 298 | | S28° 32.971' E21° 12.798' | Dolerite hammerstone/grindstone | 3C | None required |
| 299 | | S28° 32.962' E21° 12.803' | BI chunk | 3C | None required |
| 301 | | S28° 32.933' E21° 12.797' | IS flat flake and BI chunk/core | 3C | None required |
| 302 | | S28° 32.671' E21° 12.887' | Flat BI utilized flake | 3C | None required |
| 303 | | S28° 32.655' E21° 12.868' | BI cobble flake | 3C | None required |
| 304 | | S28° 32.657' E21° 12.869' | Weathered BI flake | 3C | None required |
| 305 | | S28° 32.717' E21° 12.846' | BI MRP | 3C | None required |
| 306 | | S28° 32.721' E21° 12.849 | IS cortex cobble core | 3C | None required |
| 307 | | S28° 32.726' E21° 12.563' | Proposed alternative dam | 3C | None required |
| 308 | | S28° 32.590' E21° 12.585' | Several BI flakes and chunks lying about the existing storage dam | 3C | None required |
| 309 | | S28° 32.582' E21° 12.593' | Existing storage dam | 3C | None required |
| 311 | | S28° 32.583' E21° 12.566' | A few BI flakes alongside existing water pipeline | 3C | None required |
| 312 | | S28° 32.590' E21° 12.489' | BI chunk alongside existing water pipeline | 3C | None required |
| 313 | | S28° 32.685' E21° 12.480' | BI chunk alongside alternative (red) water pipeline | 3C | None required |
| 314 | | S28° 32.694' E21° 12.503' | BI flake alongside proposed alternative (red) pipeline | 3C | None required |
| 315 | | S28° 32.614' E21° 12.362' | Several BI chunks and flakes alongside existing water canal | 3C | None required |

Table 1. Spreadsheet of waypoints and description of archaeological finds


Figure 11. Collection of tools from proposed pecan nut tree plantation. Scale is in cm

Figure 12. Collection of tools from proposed pecan nut tree plantation. Scale is in cm

Figure 13. Collection of tools from proposed pecan nut tree plantation. Scale is in cm


Figure 14. Collection of tools from proposed pecan nut tree plantation. Scale is in cm

Figure 15. Collection of tools from Farm 338/38. Scale is in cm


Figure 16. Site 254. View facing north west, behind the kopje

### 6.3 Built environment

In terms of the built environment, no old buildings, structures, features, or old equipment were found in the proposed footprint area.

Some ruined concrete buildings related to the previous farming enterprise occur on Farm 38/238, but these structures have no intrinsic heritage significance, or value.

### 6.4 Graves

No graves, or typical grave features or markers were encountered during the study.

## 7. ASSESSMENT OF IMPACTS

In the case of the proposed cultivation of pecan nut trees including associated infrastructure on Farm 238/38 and Farm 338/38 in Louisevale, it is expected that archaeological impacts will occur during the implementation phase of the project, but that the overall impact on archaeological resources will be *low* (Table 2).

| **Potential impacts on archaeological heritage** | |
|---|---|
| Extent of impact: | Site specific |
| Duration of impact; | Permanent |
| Intensity | Low |
| Probability of occurrence: | Probable |
| Significance without mitigation | Low |
| Significance with mitigation | Negative |
| Confidence: | High |

Table 2. Assessment of archaeological impacts.

## 8. CONCLUSION

The results of the study indicate that the proposed cultivation of a 12 ha pecan nut tree plantation on Farm 238/38, and a storage dam, pipeline and pump station on Farm 338/38, will not have an impact of great significance on the archaeological heritage.

The majority of the tools recorded comprise single isolated occurrences, while a few dispersed scatters of tools were mapped alongside the Donkerhoekspruit (Site 268), and outside the proposed footprint area (Site 254 & Site 255).

It is maintained that the baseline study has captured most of the information on the archaeological heritage present on the proposed development site.

## 9. RECOMMENDATIONS

With regard to the proposed cultivation of a pecan nut tree plantation (Farm 238/38) and associated infrastructure (Farm 238/38) in Louisevale near Upington, the following recommendations are made:

1. No archaeological mitigation is required.

2. Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (SAHRA) (Att Ms Katie Smuts 021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.

## 10. REFERENCES

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