G & A Heritage

Heritage Management Consultants

Phase 1 Heritage Impact Assessment Report

Heritage Impact Assessment Scoping Report for the Prospecting Rights Application Boreholes and Trenches: Hedley Plains A 64 Portions 2, 3, 4 and 5 near Copperton in the Northern Cape Province.

Prepared By:

G & A Heritage

Heritage Management Consultants

Prepared For:

Goldipro Pty (Ltd)

2018/03/05

CREDIT SHEET

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Disclaimer; *Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. G&A Heritage and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

Statement of Independence

As the duly appointed representative of G&A Heritage, I Stephan Gaigher, hereby confirm my independence as a specialist and declare that neither I nor G&A Heritage have any interests, be it business or otherwise, in any proposed activity, application or appeal in respect of which the Environmental Consultant was appointed as Environmental Assessment Practitioner, other than fair remuneration for work performed on this project.

SIGNED OFF BY: STEPHAN GAIGHER

MANAGEMENT SUMMARY

Site name and location: Heritage Impact Assessment Scoping Report for the Prospecting Rights Application Boreholes and Trenches: Portion 3 of the farm Hedley Plains A 64 Portions 2, 3, 4 and 5 near Copperton in the Prieska District of the Northern Cape Province.

Municipal Area: Siyathemba District Municipality

Developer: Goldipro Pty. (Ltd.)

Consultant: G&A Heritage, P.O. Box 522, Louis Trichardt, 0920, South Africa.
38A Vorster St, Louis Trichardt, 0920

Date of Report: 05 March 2018

The purpose of the management summary is to distil the information contained in the report into a format that can be used to give specific results quickly and facilitate management decisions. It is not the purpose of the management summary to repeat in shortened format all the information contained in the report, but rather to give a statement of results for decision making purposes.

This study focuses on the Prospecting Rights Application Boreholes and Trenches for Portion 3 of the farm Hedley Plains A 64 Portions 2, 3, 4 and 5 near Copperton in the Northern Cape Province.

This study encompasses the heritage impact investigation. A preliminary layout has been supplied to lead this phase of this study.

The study focusses exclusively on the borehole and trench footprints which are expected to not exceed 5m x 5m and will be located along existing roads.

Scope of Work
A Heritage Impact Assessment (including Archaeological, Cultural heritage, Built Heritage and Palaeontological Assessment) to determine the impacts on heritage resources within the study area.

The following are the required to perform the assessment:

- A desk-top investigation of the area;
- A site visit to the proposed development site;
- Identify possible archaeological, cultural, historic, built and palaeontological sites within the proposed development area;
- Evaluate the potential impacts of construction and operation of the proposed development on archaeological, cultural, historical resources; built and palaeontological resources; and
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural, historical, built and palaeontological importance.

The purpose of this study is to determine the possible occurrence of sites with cultural heritage significance within the study area (borehole and trench footprints). The study is based on archival and document studies combined with fieldwork investigations.

Palaeontology
"The Precambrian igneous and metamorphic basement rocks underlying the Vogelstruisbult 104 study area (Blue Rock Quarry site) at depth are entirely unfossiliferous. The overlying Permo-Carboniferous glacially-related sediments of the Dwyka Group (Karoo Supergroup) are, at most, sparsely fossiliferous, with occasional transported stromatolitic carbonate erratics. However, these Karoo sediments are unlikely to be directly impacted by the proposed shallow borrow pit and quarry developments. The Kalahari Group sediments (calcretes, alluvium and aeolian sands) mantling the older

bedrocks that will be exploited in the Red Sand Quarry site as well as Borrow Pits 1 and 2 sites are generally of low palaeontological sensitivity. Quaternary fossil mammal bones and teeth have been recorded from similar rocks elsewhere in Bushmanland but are very scarce. They are most likely to be found in association with subsurface alluvial gravels and perhaps also stone artefacts concentrated along ancient water courses (Red Sand Quarry Site)." (Almond, 2015).

Findings & Recommendations
The areas surveyed (borehole and trench footprints) showed different heritage significance. The sites at Hedley Plains contained some Stone Age artifacts. No deposit or manufacturing sites were evident in the areas surveyed.

Recommendations
Provided the activities stays with prospecting boreholes and trenches, there is no need for any further work. Should mining activities be considered, the areas should be submitted to a full Heritage Impact Assessment.

Fatal Flaws
No fatal flaws were identified.

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List of Abbreviations

Bp ..... Before Present

EIA ..... Early Iron Age

ESA ..... Early Stone Age

Fm ..... Femtometre (10^{-15}m)

GPS ..... Geographic Positioning System

HIA ..... Heritage Impact Assessment

I&AP ..... Interested and Affected Parties

LIA ..... Late Iron Age

LSA ..... Late Stone Age

MYA ..... Million Years Ago

MSA ..... Middle Stone Age

NHRA ..... National Heritage Resources Act no 22 of 1999

SAHRA ..... South African Heritage Resource Agency

S&EIR ..... Scoping & Environmental Impact Reporting

2018/03/05

Um.....Micrometre (10^{-6} m)

WGS 84 ..... World Geodetic System for 1984

Chapter 1

PROJECT RESOURCES

HERITAGE IMPACT REPORT

HERITAGE IMPACT ASSESSMENT SCOPING REPORT FOR THE PROSPECTING RIGHTS APPLICATION: BOREHOLES AND TRENCHES ON THE FARM HEDLEY PLAINS A 64 PORTIONS 2, 3, 4 AND 5 NEAR COPPERTON IN THE NORTHERN CAPE PROVINCE.

1. INTRODUCTION

Legislation and methodology
G&A Heritage was appointed by *Goldipro (Pty) Ltd.* to undertake a heritage scoping assessment for the prospecting rights application boreholes and trenches: Portion 3 of the farm Hedley Plains A 64 Portions 2, 3, 4 and 5, near Copperton in the Prieska District of the Northern Cape Province.

Section 38(1) of the South African Heritage Resources Act (25 of 1999) requires that a heritage study is undertaken for:

(a) Construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
(b) Construction of a bridge or similar structure exceeding 50 m in length; and
(c) Any development, or other activity which will change the character of an area of land, or water –
(1) Exceeding 10 000 m^2 in extent;
(2) Involving three or more existing erven or subdivisions thereof; or
(3) Involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years; or
(d) The costs of which will exceed a sum set in terms of regulations; or
(e) Any other category of development provided for in regulations.

While the above describes the parameters of developments that fall under this Act., Section 38 (8) of the NHRA is applicable to this development. This section states that;

(8) *The provisions of this section do not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.*

In regards to a development such as this that falls under Section 38 (8) of the NHRA, the requirements of Section 38 (3) applies to the subsequent reporting, stating that;

(3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2) (a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;
(b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7;
(c) An assessment of the impact of the development on such heritage resources;
(d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
(e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
(f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
(g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.

(1) Ancestral graves,
(2) Royal graves and graves of traditional leaders,
(3) Graves of victims of conflict (iv) graves of important individuals,
(4) Historical graves and cemeteries older than 60 years, and
(5) Other human remains which are not covered under the Human Tissues Act, 1983 (Act No.65 of 1983 as amended);

(h) Movable objects, including ;
(1) Objects recovered from the soil or waters of South Africa including archaeological and paleontological objects and material, meteorites and rare geological specimens;
(2) Ethnographic art and objects;
(3) Military objects;
(4) Objects of decorative art;
(5) Objects of fine art;
(6) Objects of scientific or technological interest;
(7) Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings; and
(8) Any other prescribed categories, but excluding any object made by a living person;

(i) Battlefields;
(j) Traditional building techniques.

A '**place**' is defined as:
(a) A site, area or region;
(b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);
(c) A group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures); and (d) an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.

'**Structures**' means any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

'**Archaeological**' means:
(a) Material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
(b) Rock art, being a form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation; and
(c) Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land or in the maritime cultural zone referred to in section 5 of the Maritime Zones Act 1994 (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;

(d) Features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

'Paleontological' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

'Grave' means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. The South African Heritage Resources Agency (SAHRA) will only issue a permit for the alteration of a grave if it is satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned.

The removal of graves is subject to the following procedures as outlined by the SAHRA:

- Notification of the impending removals (using English, Afrikaans and local language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;
- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from the SAHRA;
- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

The limitations and assumptions associated with this heritage impact assessment are as follows;

- Field investigations were performed on foot and by vehicle where access was readily available.
- Sites were evaluated by means of description of the cultural landscape, direct observations and analysis of written sources and available databases.
- It was assumed that the site layout as provided by *Goldipro (Pty) Ltd.* is accurate.
- We assumed that the public participation process performed as part of the Basic Assessment process was sufficiently encompassing not to be repeated in the Heritage Assessment Phase.

Table 1. Impacts on the NHRA Sections

Act	Section	Description	Possible Impact	Action
National Heritage Resources Act (NHRA)	34	Preservation of buildings older than 60 years	No impact	None
	35	Archaeological, paleontological and meteor sites	Yes	Mitigation and chance finds protocol
	36	Graves and burial sites	No Impact	None
	37	Protection of public monuments	No impact	None
	38	Does activity trigger a HIA?	Yes	HIA

Table 2. NHRA Triggers

Action Trigger	Yes/No	Description
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	No	N/A
Construction of a bridge or similar structure exceeding 50m in length.	No	N/A

Development exceeding 5000 m^2	Yes	Prospecting rights application: Hedley Plains A 64 Portions 2, 3, 4 and 5
Development involving more than 3 erven or sub divisions	No	N/A
Development involving more than 3 erven or sub divisions that have been consolidated in the past 5 years	No	N/A
Re-zoning of site exceeding 10 000 m^2	Yes	Prospecting rights application: Hedley Plains A 64 Portions 2, 3, 4 and 5
Any other development category, public open space, squares, parks or recreational grounds	No	N/A

2. Background Information

2.1 Prospecting Rights Application

2.1.1 Project Description

Goldipro (Pty) Ltd has applied for a Prospecting Right for Copper, Zinc, Lead, Gold, Silver, Cobalt, Sulphur, Barytes, Pyrite, Molybdenum, Chrome, Platinum Group Metals, Nickel, Tungsten, Limestone, Stone Aggregate and Sand over Portions 2, 3, 4 and 5 of the Farm Hedley Plains A 64, near Copperton in the Prieska District of the Northern Cape Province (hereinafter referred to as 'Hedley Plains') which application was accepted by the Department of Mineral Resources.

Prospecting activities are planned to be conducted in phases over a period of four years.

Description of planned non-invasive activities:
(These activities do not disturb the land where prospecting will take place e.g. aerial photography, desktop studies, aeromagnetic surveys, etc.)

Phase 1:
In order to direct the exploration programme in an efficient manner, there will be a review of all available information and data gathered by previous exploration on the farm. A desktop study will be undertaken of the base metal potential of the area. A site investigation of the target areas will be undertaken to identify infrastructure and determine any potential problems that may need to be addressed.

Phase 2:
Any anomalous features identified will be mapped in detail. The various rock types and their contacts will also be mapped.

Phase 3:
A 3 line kilometer magnetic survey (or any other suitable geophysical method) will be undertaken using a proton 5 magnetometer over selected areas as identified during the desktop study. This study will result in identifying potential base metal / sulphide mineralization.

Phases 5, 7 & 9:
Drill samples will be collected in one meter intervals and logging will be done by a qualified geologist who will record the lithology, mineralogy, degree of mineralization and structural features. Mineralized samples will be analyzed at an internationally recognized (ISO certified) laboratory.

Phase 10:
A detailed feasibility report, containing resource calculations, will be compiled after drilling operations have been completed to evaluate the economic viability of the project.

Description of Planned Invasive Activities:
(These activities result in land disturbances e.g. sampling, drilling, bulk sampling, etc.)

Phase 4: Percussion drilling
Percussion drilling will be used initially to identify the position of a suspected base metal deposit. The position of the boreholes is dependent on the results of the review of historical activities, geological mapping, desktop study and geophysical survey.

Forty boreholes, on average 50m deep each, are planned. The collar position of all boreholes will be surveyed. All drilling will be short term and undertaken by a contractor using truck-mounted equipment.

Angled percussion holes are planned to locate and intersect the mineralization. A traverse line or grid drilling is used to identify and define the extent of any mineralization. The sizes of the boreholes drilled will be determined by such factors as cost, proposed sampling, availability of drilling machines and the volume of sample required, among others.

Each drill site will be rehabilitated. The boreholes will be filled with drill chips and covered with topsoil.

Phases 6: Core drilling
Depending on the results from the non-invasive prospecting activities as well as the percussion drilling phase, further confirmation and exploratory drilling may be required. Core drilling will only be used if mineralization has been found. The position of the boreholes is dependent on the results of the non-invasive activities.

Twenty boreholes, on average 75m deep, are planned for phase 6, but depending on results this could be more. The collar position of all boreholes will be surveyed.

Each drill site will be rehabilitated before a new site is established. The boreholes will be covered with a metal plate and 0.2m previously stored topsoil.

Phase 8: Trenching
This phase will only be undertaken should positive drilling results be achieved in the foregoing phases. In order to determine the true location and width of the surface outcrop of the mineralized oxide zone, trenches with a north-east striking, approximately 2 meter deep and 1 meters wide will be made. Ten trenches of 15m length on average are planned at this stage but depending on drilling results this could be more.

2.1.2 Site Description

A temporary site shall be established at each drill site consisting of the following:

- Drill rig.
- Water tank for domestic use.
- Chemical toilets.

Each drill site shall be rehabilitated before a new site is established and the borehole drilled.

2.1.3 Public Participation

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

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

Figure 1. Notice of Application for a Prospecting Right

2.1.4 Site Location

The Application Areas are situated approximately 60km west-south-west of the small town of Prieska in the Northern Cape Province.

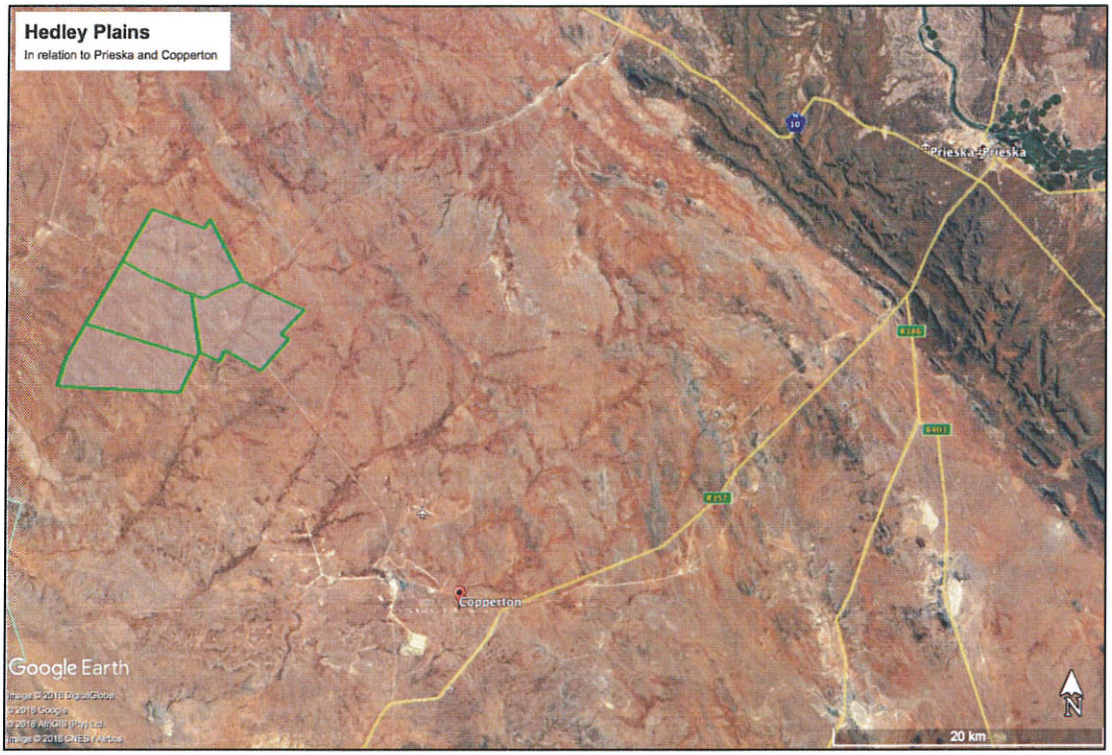


Figure 2. Locality of the of the Farm Hedley Plains A 64 Portions 2, 3, 4 and 5 in Relation to Prieska

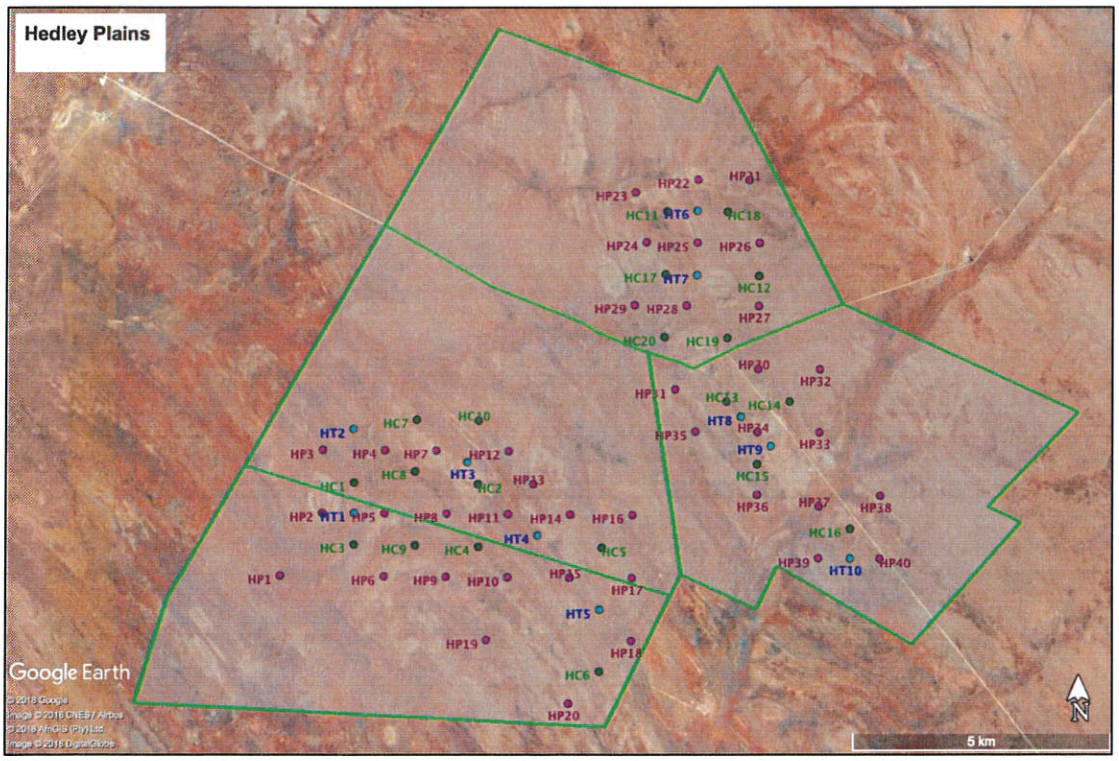


Figure 3. Location Map, Hedley Plains

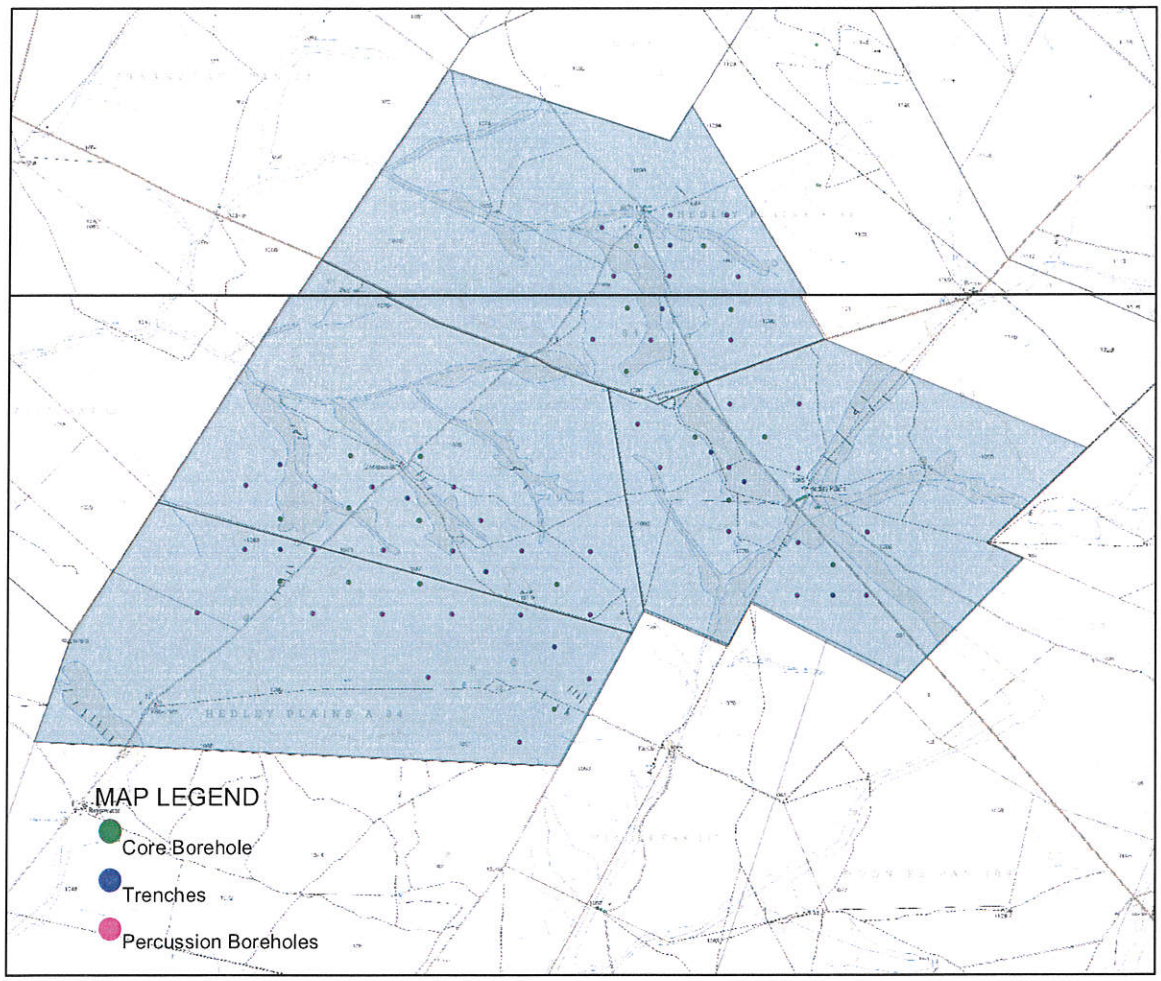


Figure 4. Location of Proposed Boreholes and Trenches at Hedley Plains

2.1.5 Alternatives Considered

None

2.1.6 GPS Track Paths

The indicated drill sites correspond to the investigation sites and as such GPS track paths will be superfluous.

Chapter 2

PROJECT RESOURCES

HERITAGE INDICATORS WITHIN THE RECEIVING ENVIRONMENT

3. REGIONAL CULTURAL CONTEXT

3.1 PALEONTOLOGY

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

"The inferred palaeontological sensitivity of fossil heritage within each of the four rock units represented in the study area near Copperton is summarized in the table below (cf also Almond & Pether 2008). Given the zero to low palaeontological sensitivity of rocks in the region, the small footprint of the development, no further palaeontological mitigation is recommended for this development" (Almond, 2011).

TABLE 1: FOSSIL HERITAGE IN THE COPPERTON AREA				
GEOLOGICAL UNIT	ROCK TYPES & AGE	FOSSIL HERITAGE	PALAEONT-OLOGICAL SENSITIVITY	RECOMMENDED MITIGATION
Gordonia Formation KALAHARI GROUP	mainly aeolian sands *plus* minor fluvial gravels, freshwater pan deposits PLEISTOCENE	calcretised rhizoliths & termitaria, ostrich egg shells, land snail shells, rare mammalian and reptile(*e.g.* tortoise) bones, teeth freshwater units associated with diatoms, molluscs, stromatolites *etc*	LOW	none recommended any substantial fossil finds to be reported by ECO to SAHRA
Mbizane Formation DWYKA GROUP	tillites, interglacial mudrocks, deltaic & turbiditic sandstones, minor thin limestones LATE CARBONIFER-OUS – EARLY PERMIAN	sparse petrified wood & other plant remains, palynomorphs, trace fossils (*e.g.* arthropod trackways, fish trails, U-burrows) possible stromatolites in limestones	LOW	none recommended any substantial fossil finds to be reported by ECO to SAHRA
Vogelstruis-bult Formation JACOBSMYN PAN GROUP	high grade metamorphic rocks (*e.g.* banded gneisses, migmatites) MID PROTEROZOIC = LATE PRECAMBRIAN	none	ZERO	none recommended
Spioenkop Formation MARYDALE GROUP	metamorphic rocks (*e.g.* quartzites, schists, amphibolites) ARCHEAN = EARLY PRECAMBRIAN	none	ZERO	none recommended

Figure 5. Stone formation table

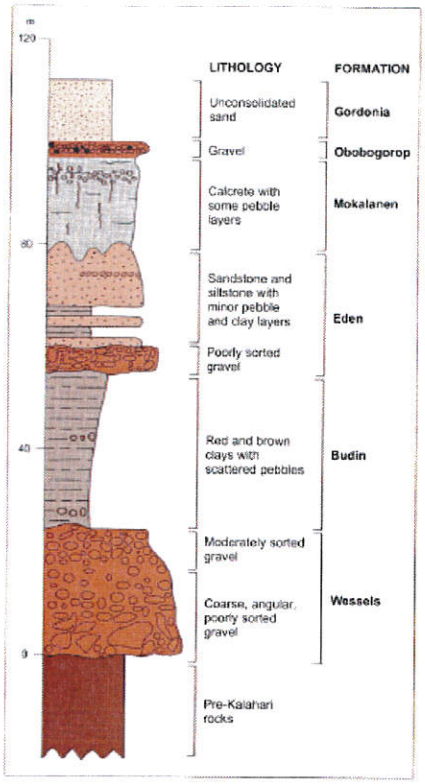


Figure 6. Stratigraphy of the Kalahari Group (from Partridge, 2006)

The Palaeontology Sensitivity Map published by SAHRA on the South African Heritage Resources Information System (SAHRIS) gives guidelines for the management of paleontological sensitive areas.

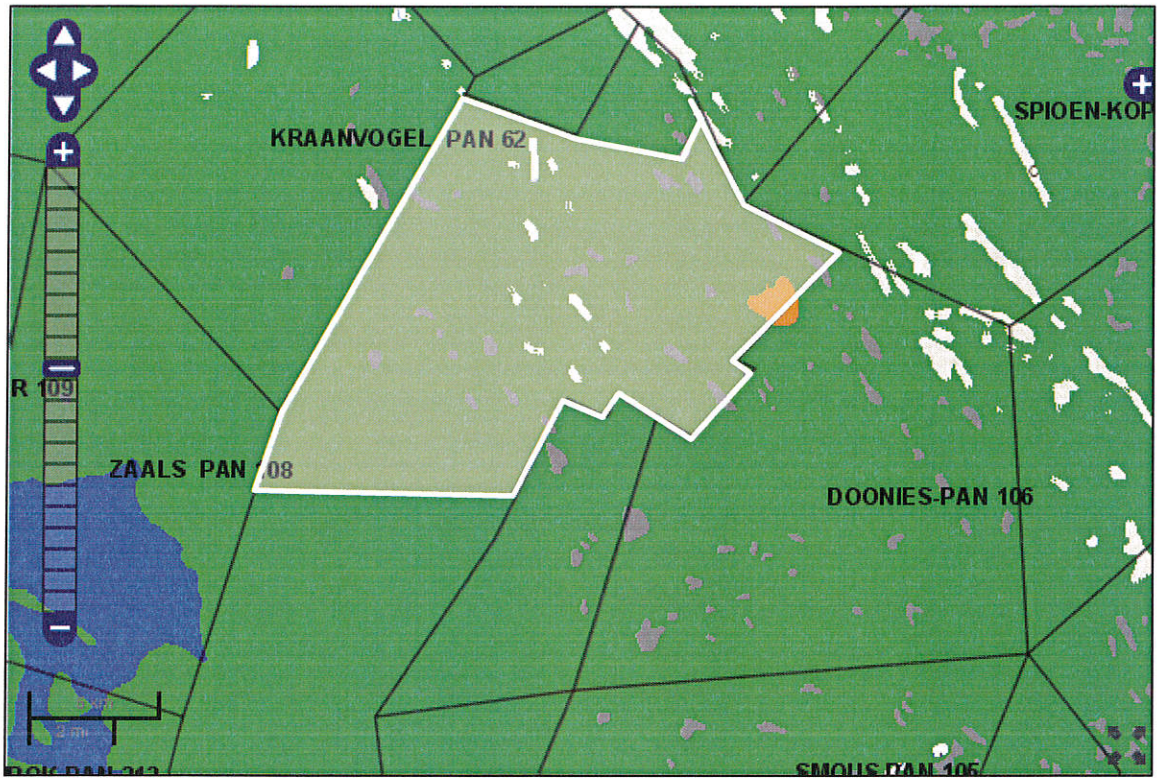


Figure 7. Palaeontology Sensitivity Map

Table 3. Palaeontological Sensitivity

Colour	Sensitivity	Action Required
RED	VERY HIGH	Field assessment and protocol for finds is required.
ORANGE / YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely.
GREEN	MODERATE	Desktop study is required.
BLUE	LOW	No Palaeontological studies are required however, a protocol for finds is required.
GREY	INSIGNIFICANT / ZERO	No Palaeontological studies are required.
WHITE / CLEAR	UNKNOWN	These area will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

3.2 Stone Age

This area is home to all three of the known phases of the Stone Age, namely: The Early- (2.5 million – 250 000 years ago), Middle- (250 000 – 22 000 years ago) and Late Stone Age (22 000 – 200 years ago). The Late Stone Age in this area also contains sites with rock art from the San and Khoi San cultural groups. Early to Middle Stone Age sites are less common in this area, however rock-art sites and Late Stone Age sites are much better known (Clark 1959).

Archaeological and heritages studies in the Northern Cape indicate that the area is of high Stone Age archaeological and heritage significance. It is in fact a cultural landscape where Stone Age, Iron Age and Historical period sites contribute the bulk of the cultural heritage of the region (also see Hart, 2005; Kaplan, 2010; Kiberd, 2006; Morris, 1990; Orton, 2011). A study conducted by Schalkwyk (2011) for the establishment of a mainstream renewable solar power in Prieska region revealed that most sites in this region belong to the Stone Age that are the Early Stone Age (ESA), Middle Stone Age (MSA) and Late Stone (LSA). Similar observations were made by Morris (2000). Kiberd (2001, 2006) who also excavated Budu Pan 25 -30 km northwest of Coppertonwhere ha profile ESA, MSA and LSA deposits was recorded. Several LSA sites in the northwest and south of the Prieska region were also investigated by Beaumont et al., (1995), Smith (1995a), and Parsons (2003, 2004, 2007). Rock engraving sites are also found in the Prieska region. Kuil and Driekopseiland are some of the rock engraving sites in the region (Beaumont et al., 1995, Beaumont and Vogel 1989, Rudner and Rudner 1968, Rush and Parkington 2010, Wilman 1933). Orton (2012) found scrapped engravings between Copperton and Vanwyksvlei. Stone circles belonging to the LSA were also recorded further along the Orange River by Orton (2012) in addition to what Sampson (1968) had earlier recorded. Cave sites also exist in the landscape eastern Northern Cape regions with MSA deposits. A British fort at Prieska is one of the heritage sites that is ruminant of the late 19-century Anglo-Boer war. In addition, there are also war graves in the region (also see Southerncape 2010, Orton 2012). A study conducted by Orton (2012) revealed also historical sites in Klipgat Pan.
SOURCE: Archaeological and Heritage Impact Assessment Report for the Proposed 75 MWP Photovoltaic Power Plant and its Associated Infrastructure on a Portion of the Remaining Extent of Erf 1 Prieska, Northern Cape – "ABC Prieska Solar 1 Project"

Most archaeological material in the Northern Cape is found near water sources such as rivers, pans and springs, as well as on hills and in rock shelters. Sites usually comprise of open sites where the majority of evidence of human occupation is scatters of stone tools (Parsons 2003).

The survey found that Stone Age archaeological material was present throughout the study area. The vast majority of it was considered to be background scatter, the "low density lithic scatter" of Beaumont et el. (1995:240).

During the Middle Stone Age, 200 000 years ago, modern man or Homo sapiens emerged, manufacturing a wider range of tools, with technologies more advanced than those from earlier periods (Deacon 1984). This enabled skilled hunter-gatherer bands to adapt to different environments. From this time onwards, rock shelters and caves were used for occupation and reoccupation over very long periods of time.

The Late Stone Age, considered to have started some 20 000 years ago, is associated with the predecessors of the San and Khoi Khoi. Stone Age hunter-gatherers lived well into the 19th century in some places in SA. Stone Age sites may occur all over the area where an unknown number may have been obliterated by mining activities, urbanisation, industrialisation, agriculture and other development activities during the past decades.

Specifically, the Wonderwerk Cave in the Kururman hills has provided much Stone Age information (Beaumonth 1984, 2006).

Specularite mining is noted by Beaumont and Bashier (1974) at Doornfontein and Blinkklipkop between 800AD – 820AD.

A limited number of Rock-Art sites are located in this area, mostly due to the lack of suitable shelter sites.

3.3 Iron Age

Although there is documentary evidence of a large Iron Age Tswana village – Dithakong, located in the general area the occurrence of this is still hotly contested and the findings of Cobbing have been largely discredited (Cobbing 1988, SAHRA ARC pers. comm).

More recent research by Jacobs shows occupational Tswana sites to occur during the later "Bantu Expansion" and "Proto-Difiqane between c1750 and 1830 in the study area. Specifically the Tlhaping and Tlharo chiefdoms are referred to here (N. J. Jacobs, 199). It is even

suggested that some Sotho-Tswana people might have preceded the Tlhaping and Tlharo in this region. This is however not a recent postulations since Ellenberger and MacGregor already proposed earlier Iron Age communities in these areas as early as 1912 (Ellenberger & MacGregor, 1912).

Tswana Industry groups might have continued the specularite mining noted in the Stone Age during the Iron Age in this area from 1600 on.

According to Breutz (1963) Iron Age settlements could be found as far south as Gatlhose and Majeng, which are both within 25km of the study area. Such sites have also been identified at Danielskuil (Snyman, 1986). These groups were eventually driven from the area by the Kora (Snyman, 1986).

3.4 The Historic Era

The study area was most likely settled by white farmers relatively late in South Africa's history. Very little of the region's recent history is recorded. Neither the Genealogical Society not the Monuments Database at Google Earth have any recorded sites in the study area.
Copper and Zinc was discovered in the region in 1968 and the Prieska Copper Mines, owned by Anglovaal Mining Ltd. was established. It became of the South Africa's major base-metal mines, one of the first to have a decline from the surface, using trackless mining methods.
Copperton saw its heyday between 1970 and the end of the 20th century when the town housed mine workers and their families. The copper and zinc mine which opened in 1972 was shut down down by the Anglovaal Mining Group in 1991. Most of the buildings were demolished and only a few houses are presently used by Armscor, who operate the weapons testing center at Alkantspan. Their primary purpose was initially to test artillery, rockets, short range missiles, mortars and anti-aircraft weapons for the then SA Defense Force. Present day, the Alkantspan Test Range has become a major asset for its owners. It is today not only used by the SA National Defence Force (SANDF) but finds itself hosting foreign militaries as well as foreign munitions manufacturers.
Sources:

- http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=36798
- http://www.sahra.org.za/sahris/sites/default/files/otherrefsdecisions/1-DSR%20Hoekplaas%20PV2-11_0.pdf
- http://www.nersa.org.za/Admin/Document/Editor/file/Consultations/Electricity/Presentations/Mulilo%20Renewable%20Energy%20Solar%20PV%20Prieska.pdf
- Van Der Walt, J. 2013. Archaeological Impact Assessment Report for the Garob to Kronos Power Line, near Copperton in the Northern Cape.
- Orton, J. 2015. Heritage Impact Assessment for three Proposed Solar Energy Facilities and three Associated Transmission Lines near Copperton, Prieska Magisterial District, Northern Cape.

3.5 Cultural Landscape

Most of the areas investigated is being used for small livestock breeding and raising. Some of the properties border the Alkantpan Ballistic Testing Range for Denel. Small farm homesteads and associated outbuildings as well as farming structures such as water troughs and livestock enclosures abound in the area.

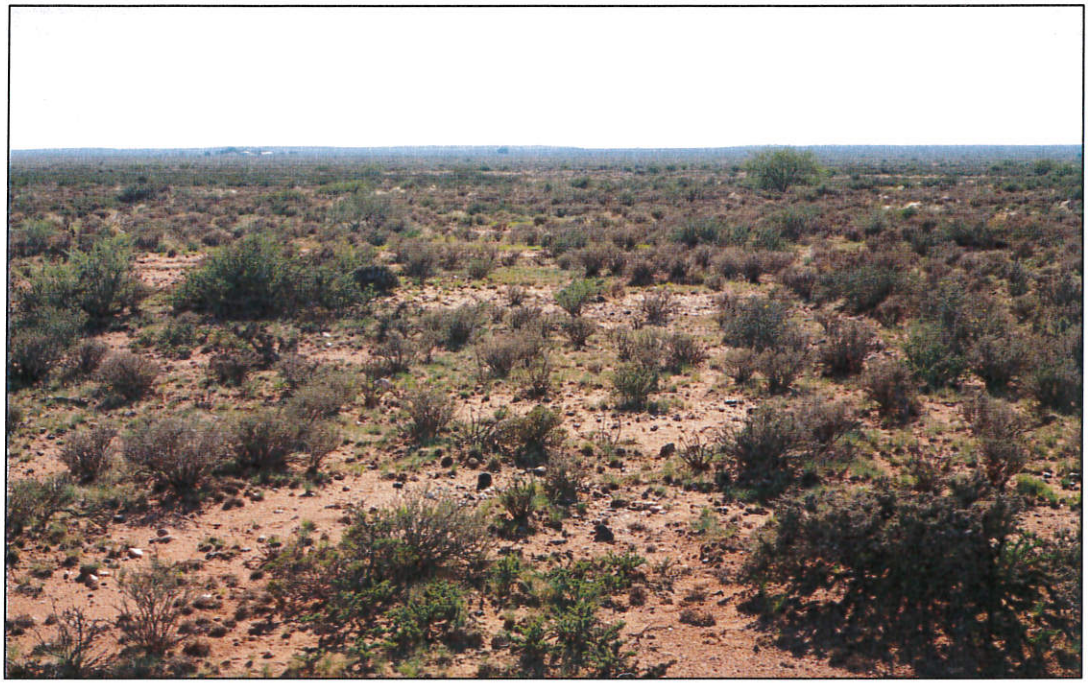


Figure 8. General Landscape of the study area

Figure 9. General Landscape of the study area

Figure 10. General Landscape of the study area

Figure 11. General Landscape of the study area

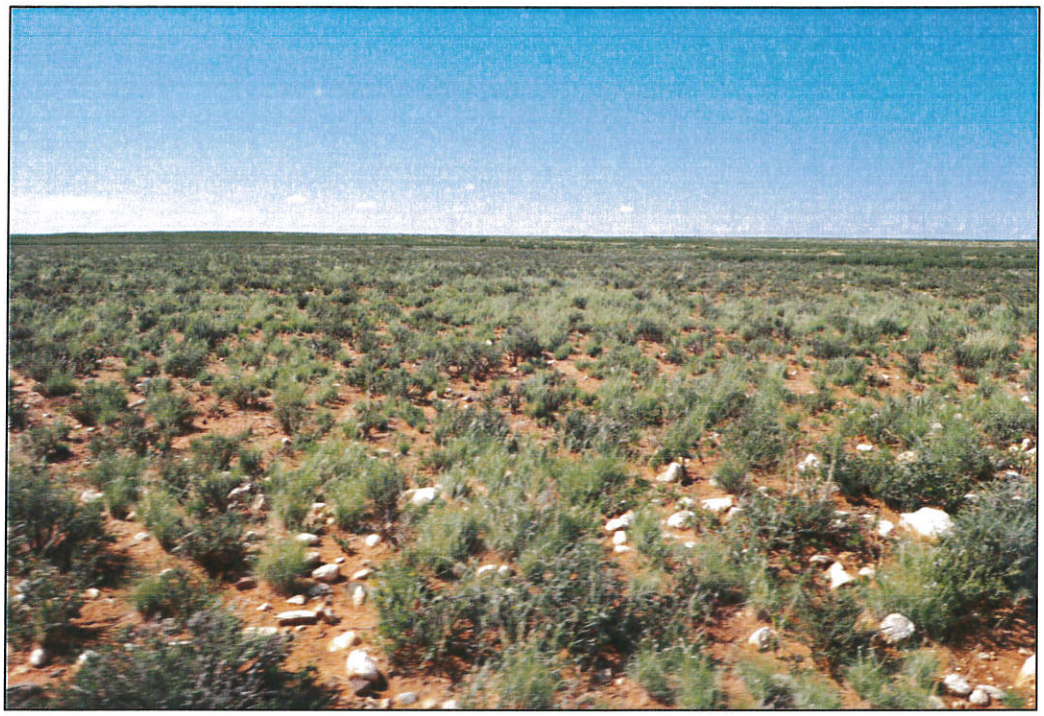


Figure 12. General Landscape of the study area

Figure 13. General Landscape of the study area

3.6 Archival Research

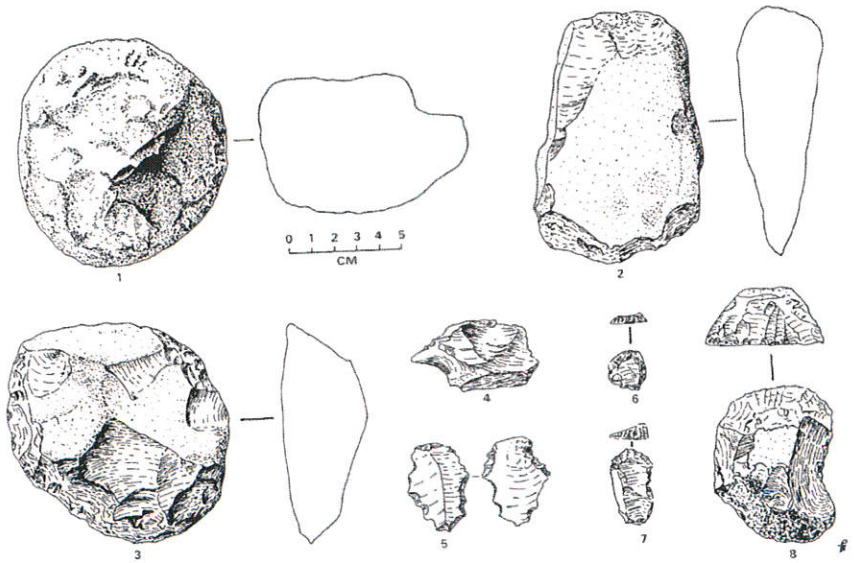
Three main sources of information regarding the heritage sensitivity of this area could be identified. These were;

- Scientific publications on heritage related research in the area
- Previous heritage studies in the area as per the SAHRIS database
- Historic maps and figures as available in the National Archive

3.6.1 Scientific publications

Several publications on heritage related work in this area could be sourced. These include, but are not limited to;

- ✓ Beaumont, P.B. and Boshier A.K. (1974). *Report on Test Excavations in a Prehistoric Pigment Mine near Postmasburg, Northern Cape*. The South African Archaeological Bulletin, Vol.29, No 113/114 (Jun., 1974), pp. 41 – 59.
- ✓ Humphreys, A.J.B. *Note on the Southern Limits of Iron Age Settlement in the Northern Cape*. The South African Archaeological Bulletin, Vol 31, No. 121/122 (jun., 1976), pp. 54-57.
- ✓ Thackeray, A.I., Thackeray J.F., Beaumont, P.B. *Excavations at the Blinkklikop Specularite Mine near Postmasburg, Northern Cape*. The South African Archaeological Bulletin, Vol. 38, No. 137 (Jun., 1983), pp. 17-25.
- ✓ Forssman, T.R., Kuman, K, Leader, G.M., Gibbon, R.J. *A Later Stone Age Assemblage from Canteen Kopje, Northern Cape*. The South African Archaeological Bulletin, Vol. 65, No. 192 (December 2010), pp. 204-214.
- ✓ Couzens, R., Sadr, K. *Rippled Ware at Blinklipkop, Northern Cape*. The South African Archaeological Bulletin, Vol. 65, No. 192 (December 2010), pp. 196 – 203.
- ✓ Rudner, J., Rudner, I. *Rock-Art in the Thirstland Areas*. The South African Archaeological Bulletin, Vol.23, No. 91 (Dec., 1968), pp. 75-89.
- ✓ Humphreys, A.J.B., *Cultural Material from Burials on the Farm St. Cair, Douglas Area, Northern Cape*. The South African Archaeological Bulletin, Vol 37, No. 136 (Dec., 1982), pp. 68-70.



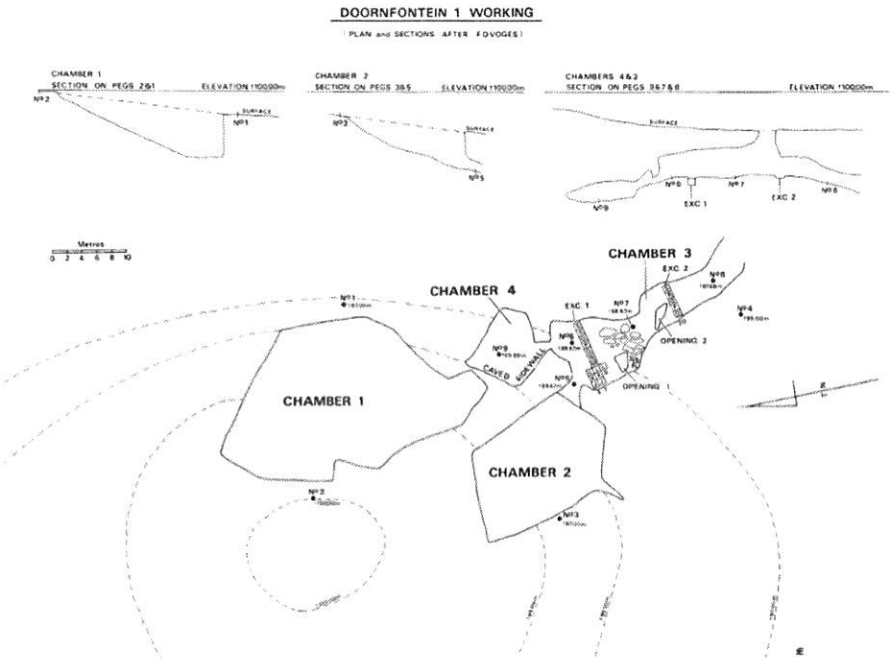


Figure 14. Stone Tools and Layout figure for Doornfontein (Beaumont & Boshier, 1974)

- The identification of petroglyphs of elephant, kudu, ostrich, etc. on the farm Beeshoek. Some geometric symbols similar to *Late Red Art* is also identified here by Judner in 1968 (Judner & Judner, 1969).
- Petroglyphs are also identified at Koegrabie on the farm Eindgoed (Rudner & Rudner, 1968).

3.6.2 SAHRIS Database Studies

An extensive research into the SAHRIS database resulted in the identification of the following heritage related studies that have been performed over the last decade in the study area. Only studies within a radius of 50km from the study area were considered.

- Lavin, J., Bluff, K. 2016. Heritage Screener: CTS16_056 ACRM WEF Access Road Copperton
- Kaplan, J., Wiltshire, N. 2011. Archaeological Impact Assessment of Proposed Wind Energy Facility, Power Line and Landing Strip in Copperton, Siyathemba Municipality, Northern Cape.
- Kaplan, J. 2010. Archaeological Scoping Study and Impact Assessment of a Proposed Photovoltaic Power Generation Facility in Copperton Northern Cape.
- Attwell, M. Heritage Assessment Proposed Wind Energy Facility and Related Infrastructure, Struisbult Farm 103, Portions 4 and 7, Copperton, Prieska.
- Almond, J.E. 2011. PIA Desktop Study: Proposed Plan 8 Wind Energy Facility Near Copperton, Northern Cape Province.
- Almond, J.E. 2011. Palaeontological Impact Assessment: Desktop Study – Proposed 100MW Concentrating Solar Power (CSP) Generation Facility: Copperton, Northern Cape.
- Orton, J. 2013. Heritage Impact Assessment for Multiple Proposed Solar Energy Facilities on Farm Hoekplaas 146, Copperton, Northern Cape.
- Orton, J. 2015. Heritage Impact Assessment for four Proposed Borrow Pits on Remainder of Farm Vogelstruisbult 104/1, Prieska Magisterial District, Northern Cape.
- Orton, J. 2014. Archaeological Mitigation of Later Stone Age Sites on the Remainder of Portions 4 of Klipgats Pan 117, Prieska Magisterial District, Northern Cape.

- Van Der Walt, J. 2013. Archaeological Impact Assessment for the Proposed Bosjesmansberg PV Center Solar Energy Facility, located close to Copperton in the Northern Cape.
- Orton, J. 2012. Heritage Impact Assessment for a Proposed Photovoltaic Energy Plant on the Farm Hoekplaas near Copperton, Northern Cape.
- Almond, J.E., Smuts, K. 2012. Palaeontological Specialist Assessment: Desktop Study Proposed Photovoltaic Energy Plant on Farm Hoekplaas (Remainder of Farm 146) near Copperton, Northern Cape Province.
- Orton, J. 2012. Heritage Impact Assessment for a Proposed Photovoltaic Energy Plant on the Farm Vogelstruisbult near Copperton, Northern Cape.
- Van Der Walt, J. 2012. Archaeological Impact Assessment Report for the Proposed Garob Wind Energy Facility Project, located close to Copperton in the Northern Cape.
- Almond, J.E. 2012. Palaeontological Desktop Study for the Proposed Photovoltaic Energy Plant on the Farm Struisbult (Portion 1 of Farm 104) near Copperton, Northern Cape.
- Orton, J. 2916. Heritage Impact Assessment for a Proposed Photovoltaic Energy Plant on The Farm Klipgats Pan Near Copperton, Northern Cape.
- Van Der Walt, J. 2013. Archaeological Impact Assessment Report for the Garob to Kronos Power Line, near Copperton in the Northern Cape Province.
- Orton, J. 2015. Heritage Impact Assessment for three Proposed Solar Energy Facilities and three Associated Transmission Lines near Copperton, Prieska Magisterial District, Northern Cape.
- Almond, J.E. 2015. Environmental Impact Assessment Process: Proposed 75 Megawatt Kronos Photovoltaic Facilities 1 – 3 and Associated Transmission Lines 1 – 3 near Copperton, Northern Cape.
- Webley, L. 2014. Archaeological Impact Assessment: Proposed Construction of Humansrus PV 2 Grid Connection (associated with the Humansrus PV Energy Facility, previously named RE Capital 14 Solar Development) on the Remainder of the Farm Humansrus 147 near Copperton, Northern Cape.
- Fourie, W. 2015. Three 75MW Solar Photovoltaic (PV) Energy Facilities – Helena Projects.

3.6.3 Historic Maps

Especially during the evaluation of historic structures, the use of archived historic maps is very handy. They give a direct chronological reference for such sites and also lead the investigation on the ground.

The following historic map sets are relevant for this study (in chronological order);

- 2922 CA & CC Topographic Sheet, First Edition Cadastral Survey (1970, 1988 & 2005)

2922 CA 1970 Hedley Plains

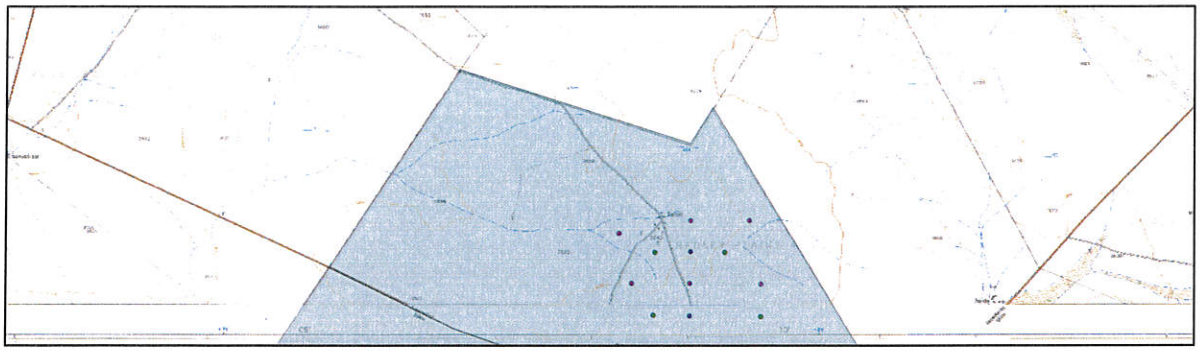


Figure 15. 2922 CA (1970)

2922 CA 1988 Hedley Plains

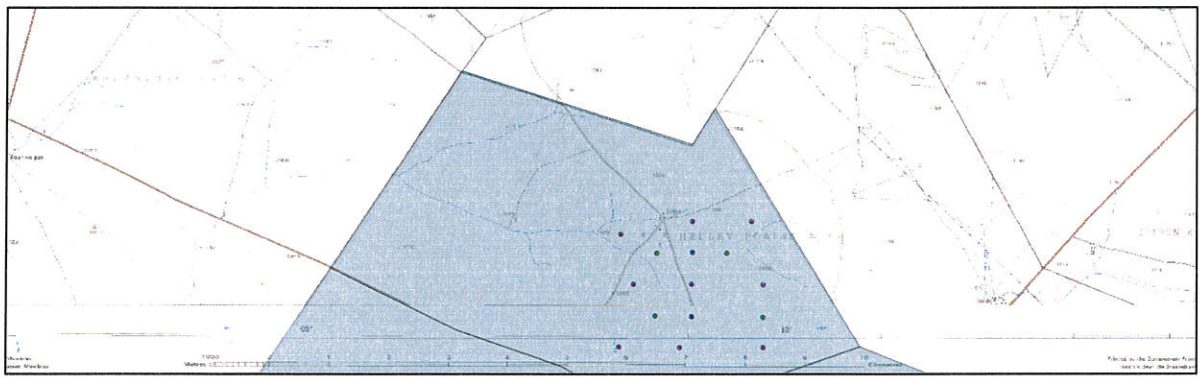


Figure 16. 2229 CA (1988)

2922 CA 2005 Hedley Plains

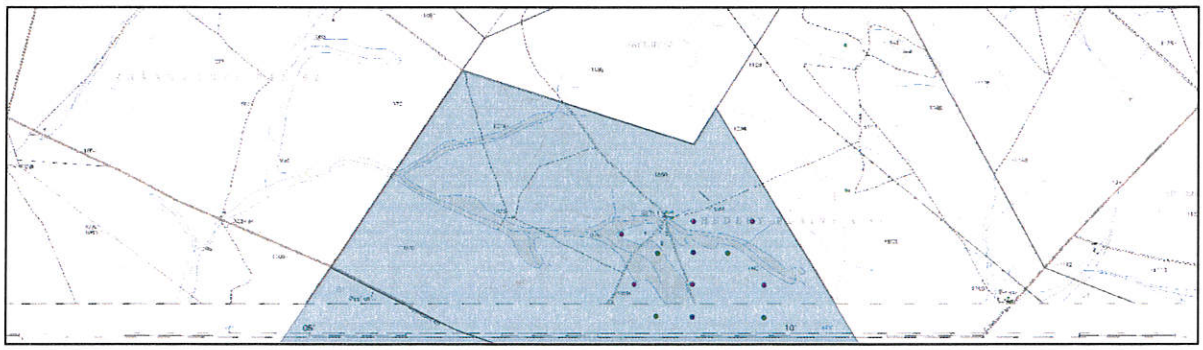


Figure 17. 2922 CA 2005

2922 CC 1970 Hedley Plains

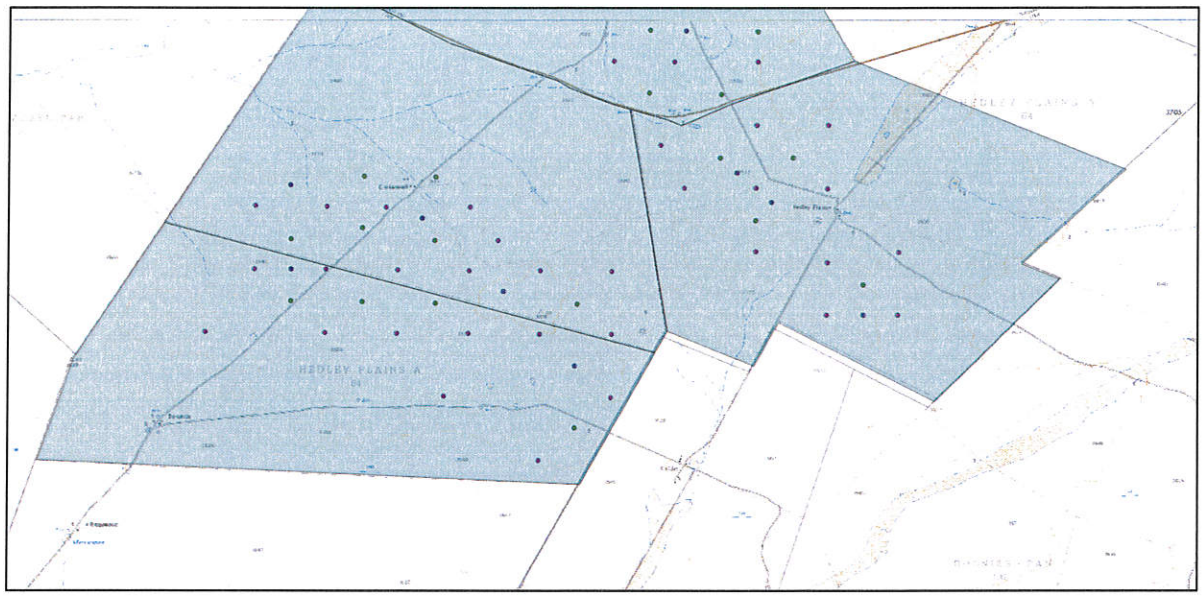


Figure 18. 2922 CC 1970

2922 CC 1988 Hedley Plains

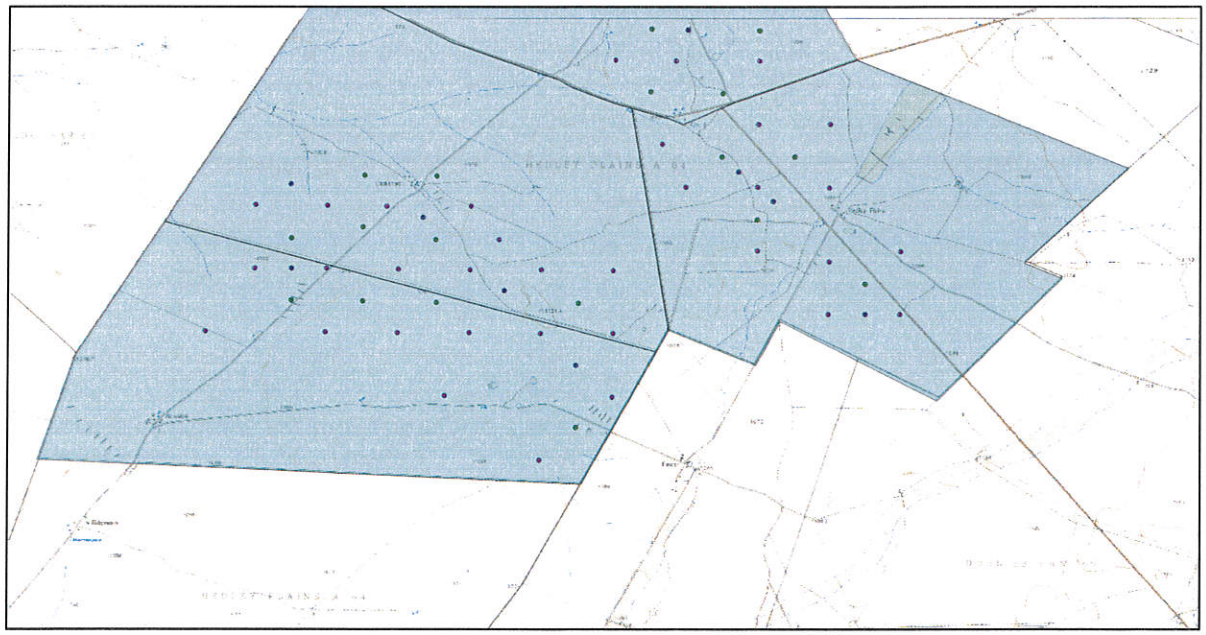


Figure 19. 2922 CC 1988

2922 CC 2005 Hedley Plains

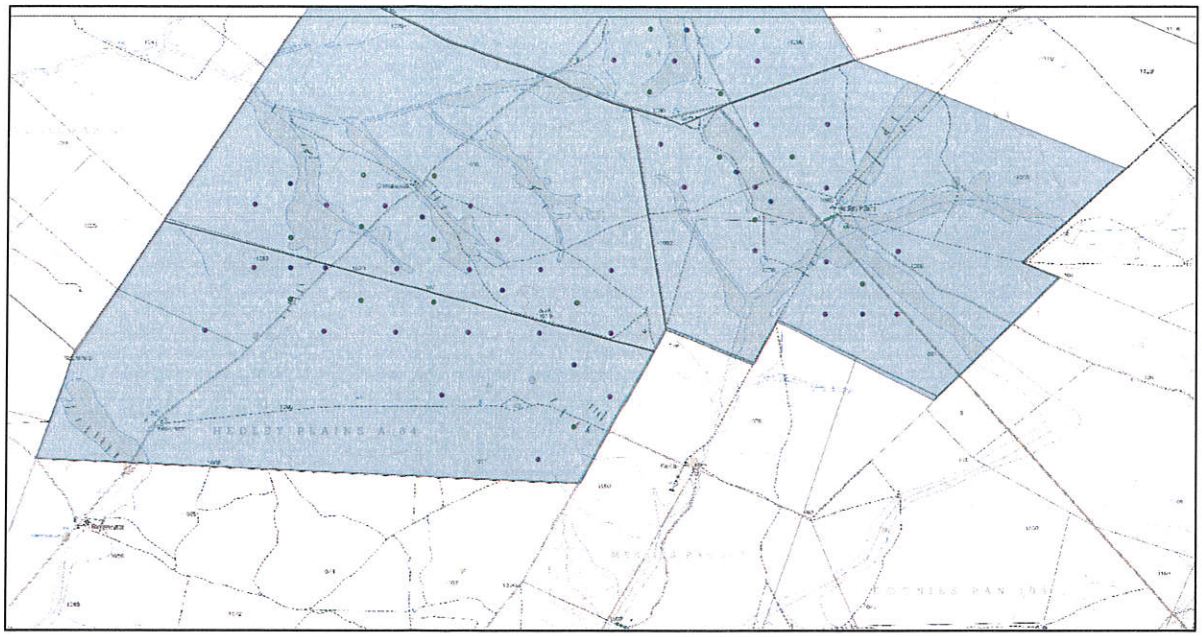


Figure 20. 2922 CC 2005

None of the historic maps shows any developments with the exception of the Copperton Mine development in the late 1970's and some prospecting holes on Hedley Plains in the middle 1980's. None of these are of any heritage significance. Much of the old Copperton Mine structures have since been demolished in an effort to keep vagrants from occupying the structures.

4. Findings

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

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

4.1 Fieldwork Results

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

4.2 Location of Boreholes and Trenches: Hedley Plains

No.	Identification No.	Core Boreholes	
1	HC1	29°47'16.33"S	22°04'52.12"E
2	HC2	29°47'17.39"S	22°06'21.48"E
2	HC3	29°47'54.62"S	22°04'52.12"E

4	HC4	29°47'56.22"S	22°06'22.01"E
5	HC5	29°47'56.75"S	22°07'50.84"E
6	HC6	29°49'13.34"S	22°07'49.25"E
7	HC7	29°46'35.50"S	22°05'37.33"E
8	HC8	29°47'09.51"S	22°05'36.27"E
9	HC9	29°47'55.15"S	22°05'36.27"E
10	HC10	29°46'38.03"S	22°06'22.01"E
11	HC11	29°44'28.78"S	22°08'37.12"E
12	HC12	29°45'08.67"S	22°09'43.13"E
13	HC13	29°46.26"33S	22°09'20.20"E
14	HC14	29°46'26.33"S	22°10'05.41"E
15	HC15	29°47'05.14"S	22°09'42.16"E
16	HC16	29°47'45.05"S	22°10'49.56"E
17	HC17	29°45'07.60"S	22°08'36.05"E
18	HC18	29°44'28.78"S	22°09'20.73"E
19	HC19	29°45'46.97"S	22°09'20.73"E
20	HC20	29°45'46.43"S	22°08'35.52"E
No.	Identification No.	Percussion Boreholes	
1	HP1	29°48'13.79"S	22°03'59.02"E
2	HP2	29°47'35.03"S	22°04'29.16"E
2	HP3	29°46'56.06"S	22°04'29.52"E
4	HP4	29°46'56.37"S	22°05'14.19"E
5	HP5	29°47'35.34"S	22°05'13.84"E
6	HP6	29°48'14.13"S	22°05'13.48"E
7	HP7	29°46'56.63"S	22°06'50.99"E
8	HP8	29°47'35.65"S	22°05'58.51"E
9	HP9	29°48'14.61"S	22°05'58.16"E
10	HP10	29°48'14.92"S	22°06'42.84"E
11	HP11	29°47'35.95"S	22°06'43.19"E
12	HP12	29°46'56.98"S	22°06'43.53"E
13	HP13	29°47'17.26"S	22°07'01.22"E
14	HP14	29°47'36.25"S	22°07'27.86"E
15	HP15	29°48'15.21"S	22°07'27.52"E
16	HP16	29°47'36.54"S	22°08'12.54"E
17	HP17	29°48'15.51"S	22°08'12.20"E
18	HP18	29°48'54.48"S	22°08'11.87"E
19	HP29	29°48'53.78"S	22°06'27.60"E
20	HP20	29°49'33.15"S	22°07'26.84"E

21	HP21	29°44'09.24"S	22°09'36.01"E
22	HP22	29°44'09.00"S	22°08'58.97"E
23	HP23	29°44'16.85"S	22°08'14.25"E
24	HP24	29°44'47.73"S	22°08'22.12"E
25	HP25	29°44'47.97"S	22°08'58.64"E
26	HP26	29°44'48.25"S	22°09'43.30"E
27	HP27	29°45'27.22"S	22°09'42.97"E
28	HP28	29°45'26.89"S	22°08'50.96"E
29	HP29	29°45'26.65"S	22°08'13.65"E
30	HP30	29°46'06.19"S	22°09'42.65"E
31	HP31	29°46'18.80"S	22°08'42.98"E
32	HP32	29°46'06.47"S	22°10'27.31"E
33	HP33	29°46'45.44"S	22°10'26.99"E
34	HP34	29°46'45.16"S	22°09'42.32"E
35	HP35	29°46'44.87"S	22°08'57.65"E
36	HP36	29°47'24.13"S	22°09'42.00"E
37	HP37	29°47'31.23"S	22°10'26.62"E
38	HP38	29°47'24.68"S	22°11'11.35"E
39	HP39	29°48'03.38"S	22°10'26.35"E
40	HP40	29°48'03.65"S	22°11'11.03"E
No.	Identification No.	Trenches	
1	HT1	29°47'35.19"S	22°04'52.14"E
2	HT2	29°46'43.23"S	22°04'51.59"E
3	HT3	29°47'03.90."S	22°06'13.69"E
4	HT4	29°47'49.08"S	22°07'04.57"E
5	HT5	29°48'35.05"S	22°07'49.25"E
6	HT6	29°44'28.25"S	22°08'58.81"E
7	HT7	29°45'08.14"S	22°08'58.47"E
8	HT8	29°46'35.74"S	22°09'30.48"E
9	HT9	29°46'53.92"S	22°09'52.04"E
10	HT10	29°48'03.65"S	22°10'49.56"E

4.3 Fieldwork Findings

Hedley Plains

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

4.3.1 Site 001

High density of stone tools was discovered at a site near a pan at the coordinates 29°46'05.51"S 22°09'01.29"E.

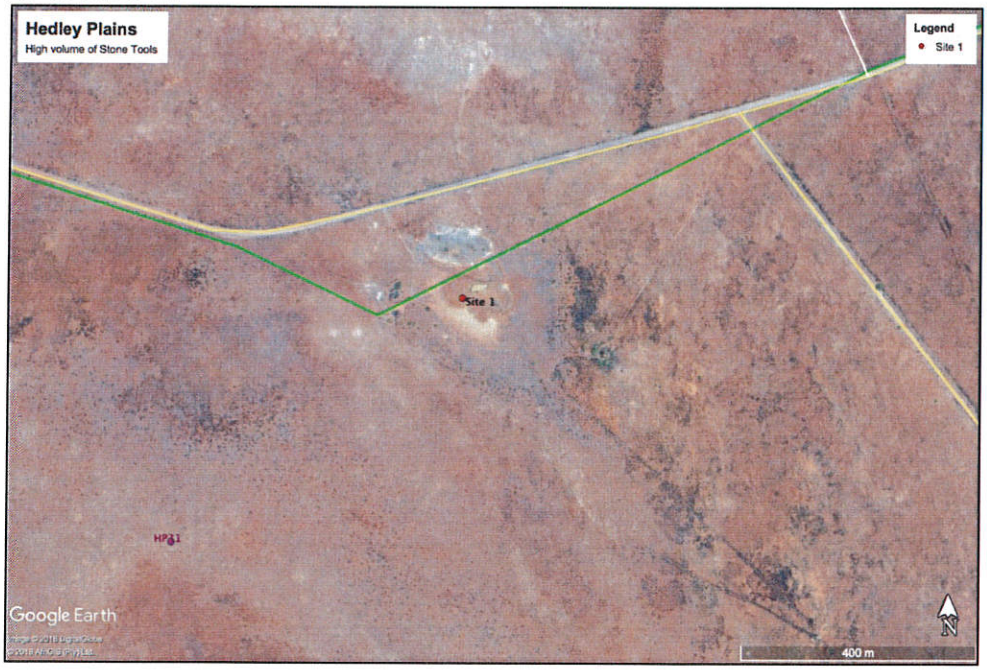


Figure 21. Location of Stone Tool Site 001

Figure 22. Area containing a high density of Stone Tools (Site 001)

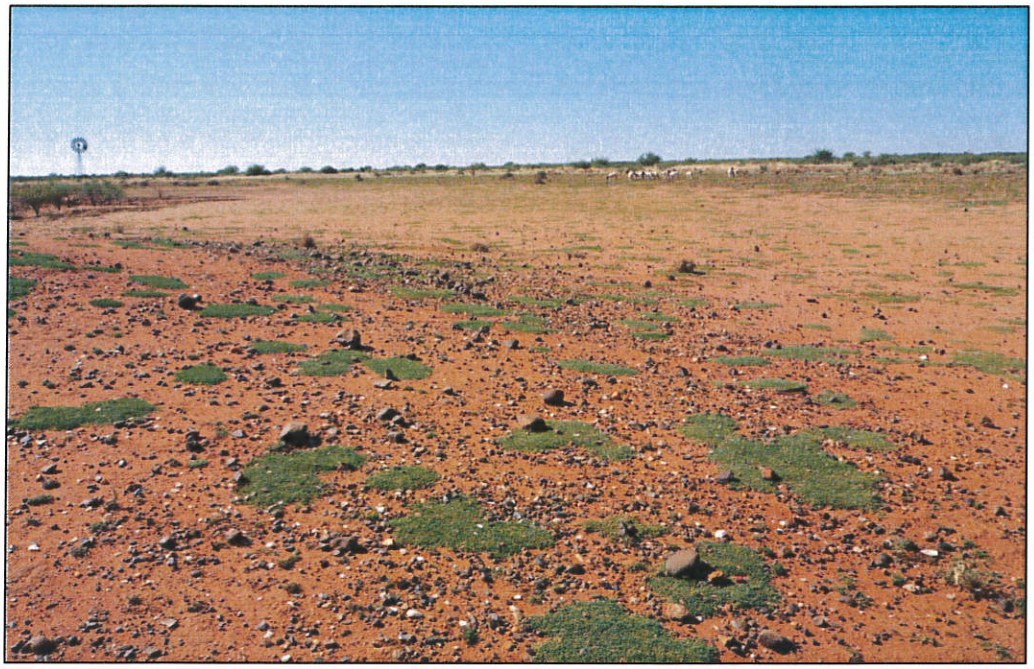


Figure 23. Area containing a high density of Stone Tools (Site 001)

Figure 24. Area containing a high density of Stone Tools (Site 001)

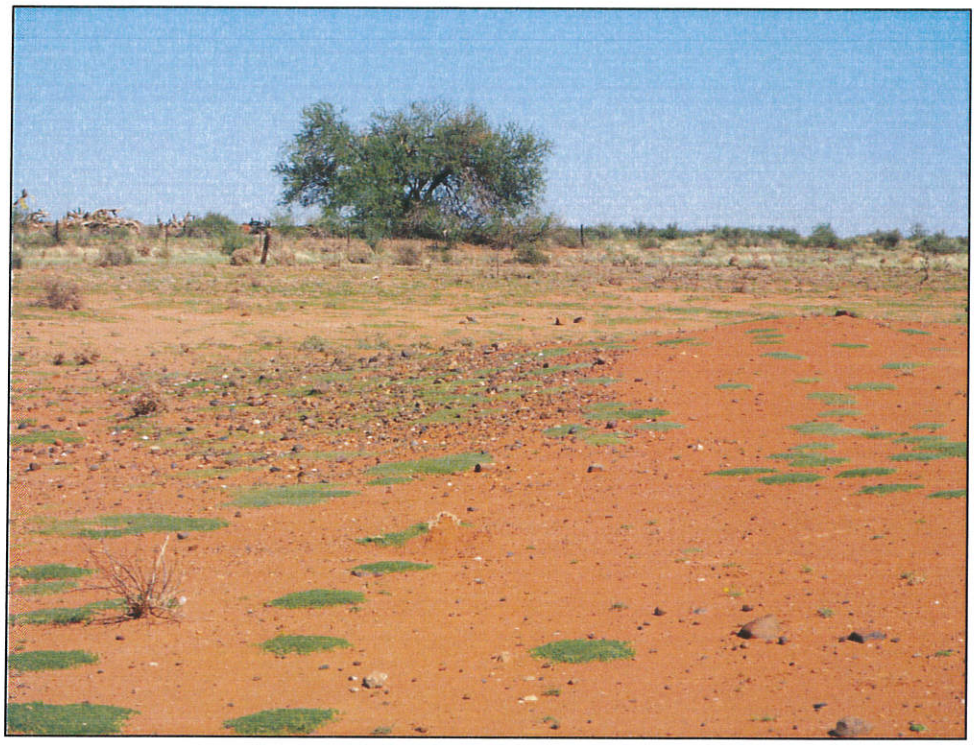


Figure 25. Area containing a high density of Stone Tools (Site 001)

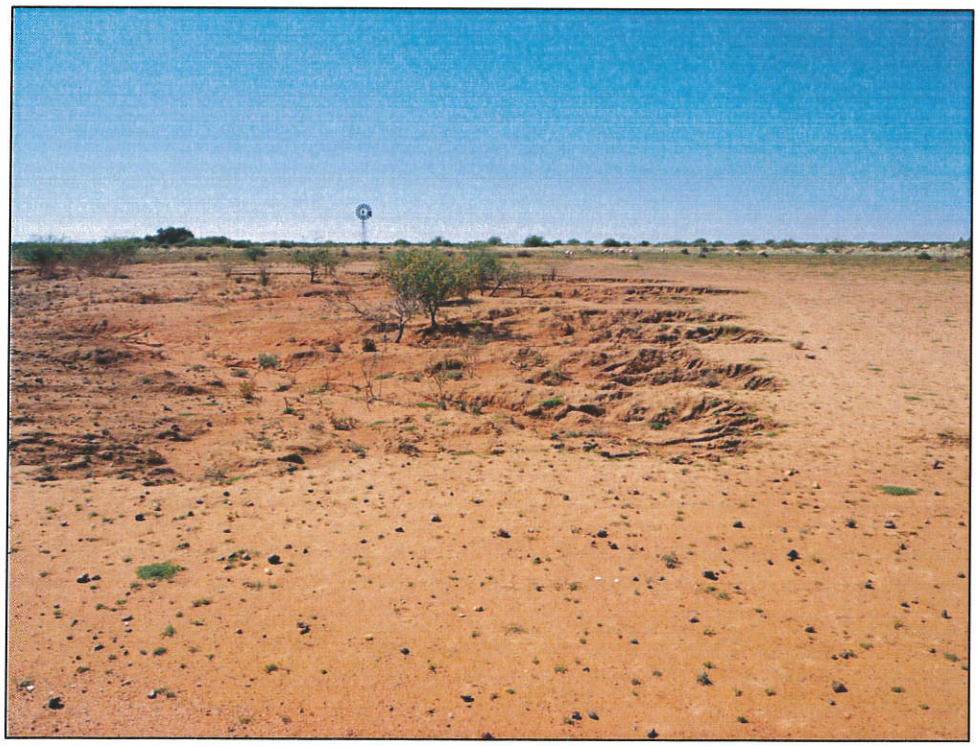


Figure 26. Area containing a high density of Stone Tools (Site 001)

Figure 27. Area containing a high density of Stone Tools (Site 001)

Figure 28. Stone Tools at Site 001