EcOz Environmental Services

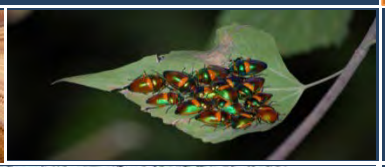
Appendix O1
Archaeological Report

Sherwin Iron (NT) Pty Ltd

Sherwin Creek Iron Ore Project

Environmental Impact Statement





2013

An assessment of the archaeological potential of Area C and the proposed haul road, Sherwin Iron 2013

A report for Sherwin Iron by Earthsea Heritage Surveys (Earthsea Pty Ltd)

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Archaeological Survey of parts of Area C and the potential haul road route, Sherwin Iron, 2013

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GLOSSARY

Definitions of terms referred to in this interim report are listed below:

Anthropomorph: A figure of a human form, commonly found in rock art of the Top End.

Archaeological survey: An archaeological assessment of a defined survey area by qualified professionals (archaeologists), locating and recording places and objects as defined by the NT *Heritage Act* 1991. The survey methods could be reconnaissance, stratified or comprehensive (see below).

Artefact Scatters: Consists of stone artefacts, either located in the open or in a sandstone overhang.

Bees Wax Figures: Where bees wax has been modified and placed on shelter walls to form an image.

Comprehensive survey: Often called 100% land survey. This type of survey will typically allow for a group of technical experts (i.e. archaeologists) and Traditional Owners to transect across an area of land on foot recording any and all located archaeological sites and artefacts. Typically the team will transect about 15-20 metres apart in a line abreast. Five people in a team would usually survey 0.6 to 1.0 square kilometres per day.

Culturally Modified Tree: A culturally modified tree (CMT) is a tree that has been modified by Aboriginal people for economic, social or spiritual reasons. They date to pre- and post- contact periods but all are connected to a traditional practice. The most common type of CMT is a 'sugar bag' scar, which is the result of extracting the honey of the native bee. Other scars include marker trees (marking territory, resources), woomera, digging stick, coolamon and spear point scars. Older scars are in Ironwood trees, as Eucalypts and Corymbia species do not tolerate termites well. Trees range in significance from low (sugarbag scars) to higher (marker trees, spear point trees etc.). Trees that are scarred by stone axes are often considered of higher significance by Aboriginal people.

Figurative Art: Art motifs which resemble objects familiar to the observer, representational or naturalistic art.

Grid Reference Datum: All grid references reported in this report are in GDA94.

Heritage Assessment: An archaeological and or heritage study of an area involving an assessment of the risk of locating sites that have not yet been mapped. This process will often involve a desktop study of past surveys in the area or similar land units and reconnaissance surveys by foot, vehicle or helicopter.

Heritage clearance: Heritage clearance under the NT Heritage Act is issued by the NT Heritage Branch, Department of Lands, Planning Environment following a satisfactory archaeological survey of an area.

Holocene: The Holocene epoch is an era within the Quaternary Period of geologic time, dating from 10,000 years ago to the present. It was preceded by the Pleistocene epoch.

Isotropic: Of equal physical properties along all axes. An isotropic rock is identical in all directions, giving it the physical properties required for knapping.

Major Rock shelter: Consists of +100 rock art motifs, combination of archaeological site features (stone artefacts, stone quarry, cultural deposit, burials, grinding hollows) usually sited in a large sandstone overhang, shelter, or cave-like structure.

Minor Rock Art Site: Consists of rock art motifs (<20) located in a sandstone overhang.

Minor Rock shelter: Typically consists of a small sandstone overhang that has a combination of archaeological features, including a small number of rock art motifs (+20), stone artefacts, and/or grinding hollows.

Motif: A very common word used in describing rock art. This is usually defined as a recurrent visual image which has a particular arrangement (Maynard 1977). A mark or combination of marks of human origin, which can reasonably be interpreted to have formed an individual or separate picture, or design or a recurrent type of figure.

Permit to disturb: Consent from the Minister to disturb an archaeological place or object, required under Section 72, of the NT *Heritage Act* 2012.

Petroglyph: A mark or picture made on rock through the process of pecking, pounding, abrading or scratching the rock surface.

Pleistocene: The Pleistocene epoch is an era in the Quaternary period of geologic time, dating from approximately 2 million years ago to 10,000 years ago.

Reconnaissance survey: An archaeological survey by foot, vehicle or helicopter. This type of survey is used to assess the limitations of more intense survey strategies, and to provide an assessment of the probability of locating sites within the survey area, within the resources of the survey project.

Significance: An assessment of the importance of an archaeological place or object according to established criteria. Significance assessment is an essential tool in the decision making process for heritage sites. (Refer to Section 7)

Stencils: Where paint has been applied over an object placed against the shelter wall. Most commonly found in the form of hand stencils, however many examples of items of material culture have been documented.

Stratified survey: A systematic foot survey covering a representative sample of landscape features through transects. This type of survey aims to locate a representative sample of archaeological places and objects across defined landscape features in a broad survey area. Recommendations can then be made on the probability of finding sites through comprehensive survey.

Superimposition: When multiple motifs are executed over one another at different times in the past.

X-ray Art: A style of rock art in which the internal skeleton and internal organs of humans or animals are depicted.

Zoomorph: A figure of animal form, featured in rock art.

1.0 EXECUTIVE SUMMARY

Earth Sea Heritage Surveys undertook an archaeological and heritage assessment of Sherwin Iron's proposed Haul Road and Area C on EL24101, 15-22 July 2013. Sherwin Iron are proposing to develop a haul road from Area C to the existing Adelaide to Darwin railway. Sherwin Iron are also proposing to move from exploration to production in Area C in the near future The archaeological and heritage assessment was conducted on foot and by helicopter by Karen Martin-Stone, of Earth Sea Heritage Surveys. The consultant was accompanied in the field by Traditional Owner representatives, Dennis Duncan, Tom Thompson and Donald Daniels. Traditional Owner, David Daniels, was consulted at his home each day throughout the survey. Barney Ellaga was consulted on two occasions. Barney, Arnold (surname unknown) and Able Lansen met the consultant in the field on the final day, with Col Jardine of Sherwin Iron.

Area C is located in EL24101, held by Sherwin Iron (NT) Pty Ltd. The proposed Haul Road runs approximately 165km from Area C along the Roper Highway and across the Stuart Highway to the railway. Very little archaeological survey has previously been conducted in the Roper River region. Past archaeological and anthropological surveys have located stone artefact scatters, WWII sites and sacred sites.

The survey located 12 rock art sites, one historical site, one stone artefact scatter and numerous isolated stone artefacts. The Indigenous archaeological places and objects are heritage sites within the meaning of the NT *Heritage Act* 2012. The *Heritage Act* provides for a process of permitting the disturbance of Aboriginal archaeological sites subject to conditions including provision for salvage of the artefacts, study of the data from the sites and return to Traditional Owners. Under the *Heritage Act*, historic sites become may protected through a nomination, assessment and registration process. The historical site located in the survey is not currently on the NT Heritage Register, and is unlikely to satisfy the registration requirements.

In this report, the consultants provide a risk assessment of areas where works are proposed. It is important to note that this assessment does not provide a heritage clearance for future work programs that may include more extensive ground disturbance.

1.1 SUMMARY OF RECOMMENDATIONS

The consultant makes the following recommendations:

1. It is recommended that a 100m conservation buffer zone be implemented around all rock art sites recorded in the survey.
2. It is recommended that a 100m conservation buffer zone be implemented around the stone artefact scatter, SHER13_02.
3. It is recommended that the Sherwin Creek area be re-surveyed in conditions of better visibility.
4. It is assessed that the existing Roper Highway easement has a moderate risk of archaeological sites.
5. It is assessed that the 5km-wide haul road corridor south of the Roper Highway has a high risk of archaeological sites in some areas.
6. It is assessed that the proposed section of haul road from the existing railway to the Roper Highway has a low risk of archaeological sites.
7. The consultants believe that comprehensive archaeological survey of the haul road is not required. However, it is recommended that future archaeological survey samples at least 20% of the haul road route.
8. It is recommended that archaeological surveys are conducted prior to any other ground disturbance works.
9. It is recommended that a baseline survey sampling representative landforms be conducted across the Sherwin Iron leases, to address the lack of regional archaeological data and assist in the development of a regional predictive model for site location.
10. It is recommended that all Authority Certificates issued by the Aboriginal Areas Protection Authority are current for the Project.
11. It is recommended that the Traditional Owner group be consulted on the mitigation of impacts on archaeological sites located in the tenement.

2.0 PROJECT AND PROJECT AREA

The Sherwin Iron 2013 work program proposes the construction of a haul road from site to the railway, and development from exploration activities to production in Area C. Area C is located off the Roper Highway, approximately 140km east of the Stuart Highway, in EL24101. This tenement is located across four pastoral stations, one of which is owned by an Aboriginal Corporation (Numul Numul Station). The area was subject to Native Title Claim NTD6064/01, which covered the entire EL with the exception of a parcel of Private Freehold at Big River Homestead. Native Title determinations do not negate the provisions of the *Aboriginal Sacred Sites Act* 1991 or the *Heritage Act* 2012.

The survey area within Area C was defined by the conceptual pit outline. Further survey areas included the proposed camp area and a section of Sherwin Creek, as requested by Sherwin Iron. The survey area for the proposed haul road was defined as a 5km-wide corridor along the southern edge of the Roper Highway, diverging from the highway in a westerly direction to the existing railway.

Earth Sea Heritage Surveys undertook an archaeological and heritage assessment of the survey area from 15-22 July 2013.

3.0 THE LEGISLATIVE AND SOCIAL BASIS FOR CULTURAL HERITAGE PROTECTION

3.1 PROTECTION OF ABORIGINAL AND HISTORIC HERITAGE PLACES

Cultural heritage conservation legislation is complicated in Australian jurisdictions. This is the result of the evolution of the Australian constitutional framework, particularly the inclusion of new themes, such as Aboriginality, heritage and the environment into an existing regulatory framework. The result of this developmental change is that the Commonwealth retains responsibility for Indigenous issues, including some cultural heritage issues, while the States and Territories retain control of land use and development control areas. Therefore, both Commonwealth and Northern Territory Acts apply in particular circumstances within the Northern Territory.

3.2 COMMONWEALTH ACTS

***Aboriginal Land Rights (Northern Territory) Act* 1976 (ALRA).** The ALRA's primary purpose was to address land ownership issues for Indigenous Territorians that were seen as the Traditional Owners of lands in Aboriginal Reserves such as Arnhem Land. These lands had essentially remained in Aboriginal custodianship and the Commonwealth moved to make them a special type of freehold land. The ALRA also defined Sacred Sites as places 'sacred or otherwise of significance in the Aboriginal Tradition'. The Act also provides for the formation of Land Councils tasked with protecting the rights of all Aboriginal people in the NT, particularly in the areas of land claims under ALRA and the Native Title Act 1991. The Land Councils also advance Aboriginal employment, training and participate in the management of mineral tenements on Aboriginal lands.

***Native Title Act* 1993**. The *Native Title Act* gives some Aboriginal people the ability to access and use traditional lands for some purposes. Agreements, known as Indigenous Land Use Agreements, may be entered into by Native Title claimants and other interested parties on the nature of land use and access to land, including the protection of cultural heritage resources.

***Aboriginal and Torres Strait Islander Heritage Protection Act* 1984**. This Act is a site protection Act of 'last resort', meaning that the Act is meant to provide emergency protection for Aboriginal and Torres Strait Islander heritage sites when all other avenues have been exhausted. Generally an Indigenous group must apply to the Minister to have protective covenants placed over an area or site. The power to provide such protection resides in Section 51 of the Constitution giving the Commonwealth powers on Aboriginal issues. Therefore this Act may override all State and Territory cultural heritage acts where there are conflicting provisions.

The ***Environment Protection and Biodiversity Conservation Act*** (EPBC Act) commenced on 16 July 2000. On 1st January 2004, a new Commonwealth heritage regime came into effect following amendments to the EPBC. The legislation proscribes the criteria for listing National Heritage places and Commonwealth heritage places and management principles for National Heritage and Commonwealth Heritage places. The Heritage Division of Department of Environment and Heritage is the Commonwealth agency responsible for the administration of the EPBC Act and providing support to the Australian Heritage Council. The Australian Heritage Council is to be supported by an Indigenous Heritage Committee to advise the Council on sites of Aboriginal significance. The

new Commonwealth heritage regime has created two new heritage registers, and is retaining the Register of the National Estate as a database.

As the Commonwealth has no powers in regards to land use (other than on Commonwealth owned lands) the power emanating from the Act resides in the Commonwealth's powers to negotiate funding and other arrangements in relation to conservation of heritage places.

3.3 NORTHERN TERRITORY ACTS

NT Aboriginal *Sacred Sites Act* 1989

The NT *Sacred Sites Act* 1989 protects sites that are 'sacred and otherwise of significance in the Aboriginal Tradition'. Sacred Sites are protected whether the location of the sites are known or not by any person or company seeking to do work on lands. The Act is administered by the Aboriginal Areas Protection Authority. The Authority can issue a Certificate indemnifying a proponent for an area upon application and payment of a fee. The Certificate may contain conditions limiting or preventing works in and around registered and recorded Sacred Sites. The Authority Certificate will contain maps outlining any restricted work areas in the area of application.

The NT *Heritage Act* 2012 (valid from 1 October 2012):

The new NT *Heritage Act* (2012) was promulgated on 1 October 2012. The Act provides protection for the same classes of places as the previous NT *Heritage Conservation Act* 1991, with some changes.

As under the previous Act, members of the community can nominate areas, places, sites, buildings, shipwrecks and heritage objects to the register. If the Minister agrees that these features are of special significance to the heritage of the NT, the place is added to the register. The place will then be protected from accidental and deliberate damage or harm. The Act allows for processes to approve works and maintenance for a heritage place.

As under the previous Act, the *Heritage Act* provides a 'blanket' or 'presumptive' protection for Aboriginal and Macassan archaeological places and objects until a decision by the Minister to either permanently protect these places or permit their disturbance or destruction. This decision making process is triggered by an application to disturb these places. There are penalties for accidental or deliberate destruction of these sites.

The new Act includes a provision for the declaration of classes of places or objects that are known to be of significance in the NT but where not all locations are currently mapped and recorded. Protection will likely be extended to:

- Relics of the Overland Telegraph Line;
- WWII aircraft crash sites;
- Lone graves (i.e. graves that are not in regular cemeteries); and,
- Shipwrecks.

The Heritage Act 2012 also provides for

- A new process for heritage listing;

- Makes all Aboriginal and Macassan archaeological places and objects Heritage Places and Objects. Disturbance or work on such places or objects will be permitted on a case by case or regional basis. The new Act and policies emanating from the Act mandate consultation with Traditional Owners of these places prior to any disturbance or program, including academic based disturbance.
- Permits to carry out works on Aboriginal archaeological places will only be issued if there is no other viable alternative to the works, the Traditional Owners agree to the process and there is a reasonable plan to record and study a site prior to disturbance. For example, a stone artefact scatter may be permitted if the Traditional Owners agree to the process and there is a reasonable access to data by external researchers. Study plans will have to be submitted with a permit to conduct works on archaeological sites. These studies may be conducted by external agencies (i.e. A university researcher) or by the company.
- Improved processes for carrying out work;
- Increased penalties; and
- Expanded rights of review.

The Act can be viewed on the Department website: http://dlp.nt.gov.au/ .

4.0 CULTURAL OCCUPATION BACKGROUND

4.1 INDIGENOUS OCCUPATION OF THE TOP END

The arrival of modern humans onto continental Australia has been dated to at least 50,000 years BP (Before Present) (Roberts *et al*, 1990). These dates were obtained from samples taken from sites in Kakadu National Park, indicating broader occupation of the Top End region. Archaeologists believe that the most likely region of arrival was the Kimberley and Top End coast line. Much lower sea levels at the time mean that the earliest occupation sites are likely to be underwater.

The archaeological record shows very gradual change in material culture throughout this late Pleistocene period and into the mid-Holocene. The early stone tool industry is known as the 'Australian core tool and scraper tradition.' It is characterised by large core tools, and steep-edged, chunky, high-backed scrapers (Flood, 1995:49). Ground-edged axes first appear in the archaeological record at about 35,000 BP (Geneste, et al, 2010). By 23,000 BP they are becoming more common in Kakadu, and some feature waists for hafting (Flood, 1995:88).

Rock art has also been studied by archaeologists, and a chronology of the art sequence of the Arnhem Land Plateau has been developed by George Chaloupka (1993) and Tacon (1995). This chronology shows the development of discrete styles succeeding each other over time. The styles are correlated to environmental conditions as they changed over time, from pre-estuarine to estuarine to freshwater, and then to the historical era of contact with Makassan and European subjects.

In the mid-Holocene, approximately 5,000 BP, an abrupt change occurs in the archaeological record with the introduction of the Australian small tool tradition, and the subsequent arrival of the dingo approximately 4,000 BP (Flood, 1995:221). The Australian small tool tradition is characterised by smaller, more delicate tools including backed blades, unifacial and bifacial points, tulas and burren adzes.

It is possible that food processing technology for *Macrozamia* (cycads) was developed in the Pleistocene, but there is more evidence that it began or intensified from 4,500 BP. Cycads are a highly toxic plant species, requiring specialised knowledge for food preparation. Their food value is exceptionally high, and while the food preparation process is relatively intensive, it is possible to manage food supply through fire management and support large groups of people for weeks or months at a time (Flood, 1995:238).

There are two theories that attempt to explain changes in the archaeological record. One argues for ongoing cultural development in Australia, while the other argues for waves of contact with people arriving from Asia. It is perhaps a combination of both, but it is clear that the first arrivals on the Australian continent must have made a water crossing. It is also clear that the dingo arrived from Asia, and the most likely explanation for this is that it was deliberately brought here by people. The existing evidence is inconclusive but seems to indicate that there was increasing sophistication in technology during the Holocene and increasing contact with South East Asia.

4.2 INDIGENOUS OCCUPATION OF THE ROPER RIVER AREA

Indigenous occupation of the Roper River area prior to the arrival of Europeans has not been studied thoroughly by archaeologists, but it can be assumed it was generally consistent with Indigenous occupation of the broader Top End region. The Top End, including the Roper River region on its southern margin, is rich in resources, and was seasonally exploited in a fisher, hunter, gatherer economy. The richness of food resources enabled large groups of people to gather for ceremony and other purposes.

The Roper River region requires further archaeological study, but the few surveys completed to date show that the area contains a suite of highly significant Indigenous cultural heritage places that possibly span from the Pleistocene through to the early historic period of European settlement in the Northern Territory. The most highly visible components of this archaeological record are rock art sites, which show significant differences to the more well-known rock art traditions of western Arnhemland and the Katherine region.

4.3 HISTORY OF THE 'TOP END'

The Darwin-Katherine region represents one of the most intensively occupied areas in the Northern Territory for the past 140 years. The history of the wider region has been well documented by Powell (1988) and Carment (1996). The following summary history of this region is compiled from these references.

European settlement in the area began with an expedition to the area by Fred Litchfield from the settlement at Escape Cliffs near the mouth of the Adelaide River. The party mapped the escarpment country now named as Litchfield National Park and found the Finniss River, named after the less than illustrious leader of the Escape Cliffs settlement, Boyle Travers Finniss. Litchfield also found gold in the Finniss, ensuring that the area would be visited and occupied shortly after permanent settlement.

The period of 1869 to 1890 is considered as an economic boom period, and perhaps the Northern Territory's most important until World War II. During this period the Overland Telegraph Line was established, gold fields and a railway to Pine Creek constructed, plantation agriculture attempted, and pastoral country was taken up and stocked. This period also saw the provision of a port facility and essential services such as postal, health, judicial, and protective services on a peninsula in Darwin Harbour which became an economic and administrative centre for the Northern Territory. Port Darwin was declared a free port and in 1870 the Government Resident was instructed to establish "friendly relations with the natives, procedures for dealing with pastoral lands, the allotment of selections under land orders and the formation of experimental gardens" (Bauer 1964:68). The opening of the Pine Creek goldfields and the establishment of Katherine (previously Emungalan, located on the northern bank of the Katherine River) proved to be major centres drawing Aboriginal groups from far reaching areas.

In 1872 the Overland Telegraph Line (OTL) was established in the Northern Territory, making Darwin a vital link in the communication web of the Empire. Following this event, a port facility was constructed and a gold rush period began in the 1870's. The mining boom spread across the Top End, including an area of focus to the southeast of Pine Creek. A railway was built to Pine Creek in 1889 and further development of the town continued. The development of the mining and pearling industries and the growing domestic economy attracted migrants from China, Japan, the Philippines, and the Malay Peninsula from which workers and

families settled in Darwin. Middle class Europeans in Darwin managed to establish a social hierarchy, which in turn segregated the locations that people settled in the township. This led to the demarcation of areas as being the white administration and residential zones, the establishment of a 'Chinatown', and shanty areas where the dispossessed Indigenous community resided.

In 1911 the administration of the Northern Territory was transferred from South Australia to the Commonwealth Government and the Township of Palmerston was renamed Darwin. From 1913 the Commonwealth Government, through its Northern Territory administration, applied a policy of control and segregation of Aboriginal people. This particularly affected Aboriginal groups close to Darwin and Katherine region. Aboriginal groups were required to live in close proximity in settlements despite long standing taboos, alliances or intergroup hostility.

A build-up of defence personnel in the 1930's saw the population of Darwin increase from a few thousand to approximately 15,000 by the outbreak of hostilities in 1941. World War II developments from 1939 to 1945 had a significant impact on the development of Darwin and surrounding regions, including Katherine. Major developments consisted of the construction of the Stuart Highway in 1941, air force airstrips, the stationing of large numbers of military personnel and use of the Darwin Harbour for naval purposes.

4.4 HISTORY OF THE ROPER RIVER REGION

The first non-Aboriginal presence in the Roper River region probably dates back to soon after 1650, when Macassan traders began seasonal migration to the north and western coasts of the continent, fishing for trepang. It is known that Macassans travelled to the bottom of the Gulf of Carpentaria (Powell 2000:39), but it is not known if they spent significant amounts of time in the Roper River region.

In 1845, the explorer Ludwig Leichhardt passed through the region while making his way to Australia's northern coastline from Brisbane. Leichhardt named the Roper River after one of his men. It was at this time that the region was first noted as potentially suited to pastoralism.

The overland telegraph line was built in 1870-1872, and crossed the Roper River region around Mataranka. John McDouall Stuart's 1862 exploration route was selected as the best option for the telegraph line, which ran between Darwin and Port Augusta in South Australia. The line linked Australia with Europe via a British cable out of Singapore. The construction of the telegraph line coincided with the discovery of gold and other minerals, and led to the first mining boom in the Northern Territory.

A stock route was pushed through the area in 1872 by D'Arcy Uhr, and soon afterwards pastoral leases were taken up. The pastoral industry experienced a boom through the 1880s, which crashed in 1891 along with the rest of the NT economy. In 1904, the Roper River Concessions Syndicate Ltd, of Glasgow, purchased a lease of 13,000km^2, dominating the region. This endeavour failed in 1908.

In 1908, the Church Missionary Society established a mission on the Roper River. The mission was often seen by Indigenous people as a refuge from poor treatment in the pastoral industry. However, the mission also had an impact on changing Indigenous culture in the region. The mission continued until 1968, when government policies of self-determination led to the eventual closure of all missions in the Northern Territory.

A police station was built at Roper Bar in 1937, the remains of which are still standing today. The area was relatively unaffected by World War II, although Aboriginal people still talk of the old days in terms of "before the Army" or "after the Army." During WWII, the 2/1 North Australia Observer Unit was responsible for patrolling the north coast from Yampi Sound (WA) to Normanton (Qld).The Nackeroos, as the unit was colloquially known, was under the command of anthropologist / soldier, Major WEH Stanner.

Pastoralism has continued to be the dominant industry in the Roper River region, and sporadic exploration for minerals has taken place since the 1950s.

5.0 METHODOLOGY

5.1 ARCHAEOLOGICAL BACKGROUND

Knowledge of the archaeological background in the Roper River region is severely limited, as very few archaeological studies have previously been undertaken in the region. The NT Government Heritage Branch's register of sites records very few sites across the region, and this is undoubtedly due to a lack of archaeological survey rather than a lack of archaeological sites. Maps of sites recorded on the NT register can be found at Figures 2 & 3 below. Background research conducted prior to the current survey located three reports focused on the western part of the Roper River region (Guse 1999; Guse & Niemoller 1998; Hermes 1986), two reports focused on the eastern end of the Roper River region (Guse 1998; Jung 2012) and one report focused on Numul Numul Station (Crassweller 2011). Some of these surveys were conducted in conditions of low visibility (eg. Crassweller 2011; Jung 2012) or with minimal sampling of landforms (Hermes 1986; Jung 2012). Therefore, there is insufficient data for the region to accurately predict the patterning of archaeological sites across landforms in the region.

Ethnographic data has been used by archaeologists to interpret the archaeological record, however its use in archaeology is contentious (Guse 1998:11). Pickering (1994) used ethnographic information quite extensively to develop a model of the seasonal use of the landscape by Garrawa people in the Borroloola region. Pickering's model established the seasonal patterns in mobility across the landscape, relative to permanent water. Using data from a different region, and acknowledging the impact of colonisation on the veracity of the data, limits the applicability of Pickering's model to the current survey area. However, a model can be developed which can be tested against the archaeological record.

The consultant's previous findings across the Top End have demonstrated the following general patterns in the archaeological record:

- Surface lithic artefact scatters are the most frequently occurring archaeological site;
- Sites are most likely to occur less that 1000 metres from permanent water;
- Sites frequently occur on or near rock outcrops;
- Lithics are most frequently manufactured from the most common raw materials in the local region; and
- There is a paucity of archaeological sites located on black soil plains and sand plains across the Top End. This is possibly a function of site formation processes rather than a cultural absence of artefacts (i.e. covering of sites by accumulating sediment).

Pickering's ethnographic study of the seasonal use of landscape in the Borroloola region can expand on the above predictive model by hypothesising that:

- The majority of archaeological material will be located less than 2km from major watercourses;
- Some archaeological material will be located 2km-9km from major watercourses; and
- Very little archaeological material will be located more than 9km from major watercourses.

As stated above, there is insufficient evidence at present to design survey methodology in this region using the above predictive model. The current study will test this predictive model by sampling various land phases within the survey area. Future archaeological work on the project leases will be integral to the development of an accurate understanding of archaeological patterning in the region.

The archaeological survey used stratified random sampling and judgement (or purposive) sampling. These methods are in accordance with standard practice for field archaeology (see Burke & Smith, 2004:68). They allow archaeologists to obtain an accurate impression of the area, without surveying every square metre.

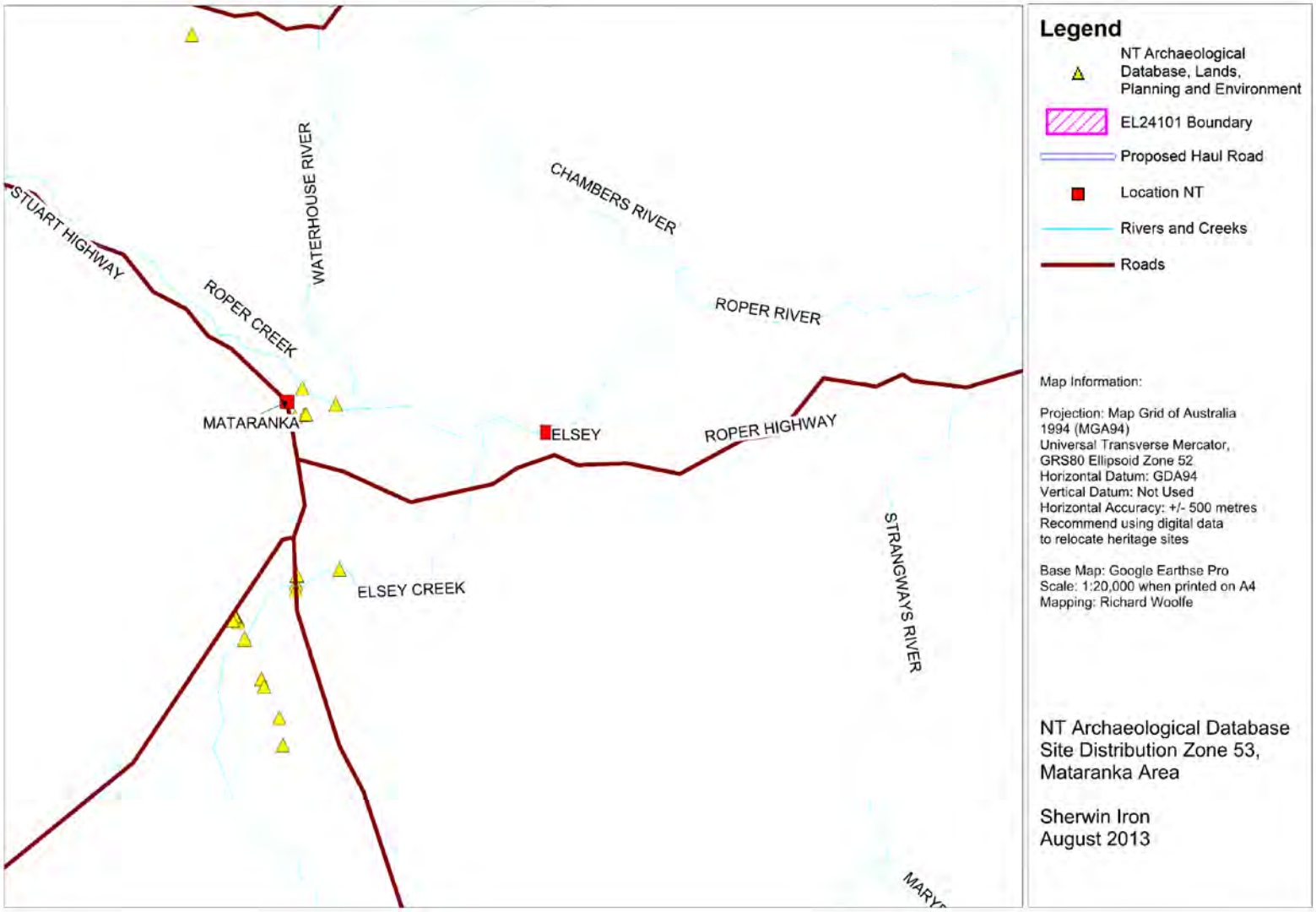


FIGURE 1: MAP OF SITES PREVIOUSLY RECORDED IN THE NT ARCHAEOLOGICAL SITES DATABASE, MATARANKA REGION

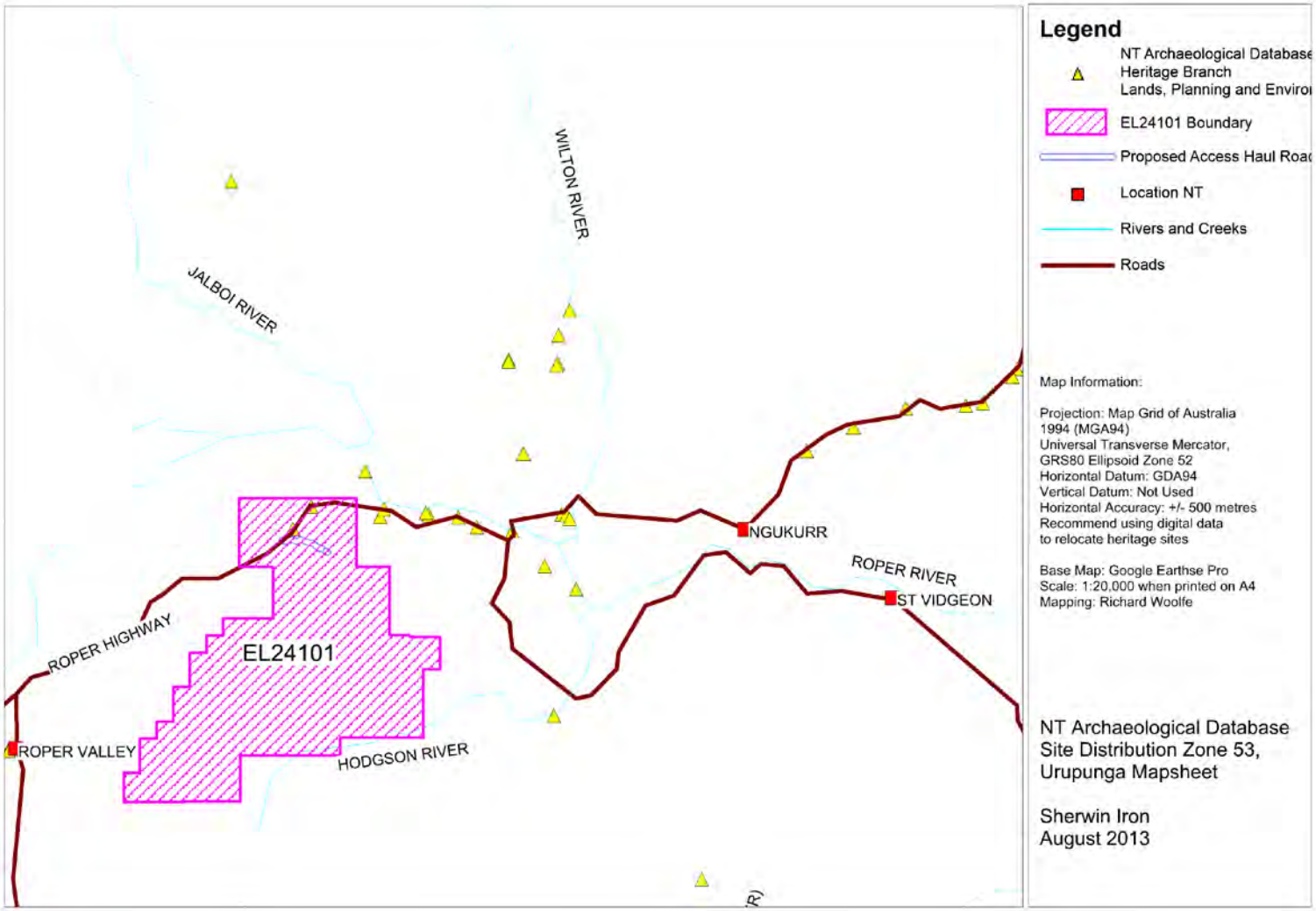


FIGURE 2: ARCHAEOLOGICAL SITES ON NT ARCHAEOLOGICAL DATABASE, COURTESY OF HERITAGE BRANCH, LANDS, PLANNING AND ENVIRONMENT

5.2 TYPES OF ARCHAEOLOGICAL MATERIAL

In many areas of Australia there is a continuous scatter of stone artefacts often called the "background artefact scatter" or "off-site archaeological material". The density of the background artefact scatter varies in response to the nature and amount of past human activity. The geomorphic context of artefacts also affects their visibility and the conclusions that can be drawn about their deposition: for example, artefacts covered in sediment are not visible, and artefacts moved by erosion have a distorted relationship with their original location. As a result, background scatter of archaeological debris is often very important in the reconstruction of prehistory. Within a landscape littered with archaeological material, archaeologists also call unique or rare types of debris or especially dense concentrations of archaeological material "archaeological sites." These sites are taken to reflect that this point was a focus of particular activities, and their identification is usually regarded as important for management purposes.

According to Burke and Smith (2004:63), an archaeological site is defined as "any place that contains the physical evidence of past human activity" which can take on an "enormous variety of forms". Archaeologists often make a distinction between relatively dense, localised concentrations of archaeological material (named sites) and the sparsely distributed materials that surround them (background scatter).

Archaeological sites in Australia are initially defined as either:

- Indigenous;
- Non-Indigenous (more commonly referred to as European or historical sites); and,
- Contact (containing both Indigenous and non-Indigenous material culture remains). Macassan sites on the northern Australian coast are examples of this site type.

Site types that are known to occur in the region are as follows[1]:

- *Artefact scatters* may contain flaked or ground artefacts and hearthstones. Artefact scatters may occur as surface scatters of material or as stratified deposits where there have been repeated occupations. These scatters do not necessarily imply that prehistoric people actually camped on the site; rather, they may only indicate that some type of activity was performed there.
- *Knapping locations*,
- *Stone arrangements* can range from simple cairns to more elaborate arrangements. Some stone arrangements were used in ceremonial activities and represent sacred or totemic sites. Other stone features were constructed by Aboriginal people as route markers, territory markers, and walls of huts, animal traps, hides, or seed traps.
- *Culturally modified trees,*

[1] These sites may occur in conjunction. For example, there may be artefact scatters around stone arrangements.

- *Rock art sites* are usually found in protected shelters and can range from small numbers of motifs on a single panel, to large and complex sites of many panels. Some rock shelters containing art were also used as occupation sites.
- *Non-Indigenous:* Pastoral infrastructure such as stockyards, fencing and homesteads; lone graves; mission and supply infrastructure including boat docks; the old police station; and mining related material from the early days of mineral exploration including mining camps, survey markers and rubbish dumps.

Identification of stone artefacts, rock art and culturally modified trees are discussed in more detail below, as these are the most common artefacts found in the broader region.

5.3 THEORETICAL APPROACH FOR SITE AND OFF SITE ARCHAEOLOGY

It has been widely recognised that a strictly site based approach to the documentation of archaeological materials does not adequately reflect the nature of hunter-gatherer land use strategies and mobility patterns. Off-site archaeology is a methodological approach designed to address this issue.

Off-site archaeology was originally defined by Foley (1981:10) as the study of the archaeological record on a regional scale, based on an assumption of underlying spatial continuity of archaeological materials, in the context of both behavioural and geomorphological properties. Foley (1981:10) states that there are four structural components essential to the analysis of off-site archaeology. These consist of behaviour, discard, accumulation and post-depositional factors (Foley 1981:10). The off-site archaeological approach uses a behaviour-discard approach in which the ecology, geology, and geomorphology are considered to influence the patterns of artefact discard by hunter-gatherers. Foley's (1981) study of Amboseli archaeology in Africa diagrammatically highlighted areas of high artefact density that were more intensively utilised and inhabited and other areas that had lower and intermediate artefact densities, which indicated less frequent occupation and specific utilisation of land resources.

Therefore by recording the densities of artefacts through a systematic survey, such density patterns may reveal much more about the utilisation of an area than the distribution of sites by themselves. It is the principle of this theory that is adopted for use in any archaeological survey in the Northern Australia.

5.4 SITE DEFINITION

Following the above methodology it was necessary to define site boundaries for the description heritage places and the mitigation of impacts upon these places. Indigenous archaeological sites can contain a wide variety of cultural materials and features. Boundaries of sites that are based on geographical features, such as a rockshelter and shell middens, can be easily defined. Other sites, such as stone artefact scatters and groups of culturally modified trees are more difficult to define.

According to Burke and Smith (2004:220) the decision on defining the extent of a site depends largely on the research and survey objectives. For this survey it is important to define site boundaries for the purpose of site management and mitigation in relation to the proposed development.

An open site is often defined as a concentration of cultural material with a moderate density relative to the background density of similar types of cultural debris at those or similar points in the landscape. This definition particularly applies to stone artefact densities. Due to presence of a background density of stone artefacts in the general area, clusters of stone artefacts can be defined as a site when the following criteria were met:

- An average density of artefacts of more than 5 times greater than the average density of the background scatter: or,

- There was an identifiable boundary to the site where either artefact densities diminished sufficiently to be classified as background scatter or environmental features determined a boundary

5.5 DEFINITION OF 'BACKGROUND SCATTERS' AND 'ISOLATED ARTEFACTS'

It was planned that isolated artefacts and background scatters of artefacts were to be recorded in the following manner:

- Groups of artefacts that were identified in the landscape, that were not in great enough densities to constitute a 'site' according to the definition, but are located within a 20 metre diameter area, are defined as a background scatter of isolated artefacts, or low density artefact scatter[2].

- Therefore a group of isolated artefacts can be designated with the same ID number and the same grid reference.

- Artefacts found apart in distances greater area than 25 metres were to be given a new ID number and grid reference.

This method allowed the effective recording of small groups of isolated artefacts in a time efficient manner.

Archaeologically this does not mean that background scatters or isolated artefacts constitute an 'archaeological site'. An archaeological site is an arbitrary definition employed by archaeologists in an attempt to be able to analyse past Indigenous land use and settlement patterns. It is important to classify groups of archaeological materials into manageable units that can be compared and contrasted, and that may reflect different activities and uses of the landscape. This is sometimes easy to identify as in the case of a rock shelter, or stone arrangement. However sometimes it is much harder to define these boundaries when dealing with high densities of stone artefacts along an area such as the Victoria River terraces in the NT or the shell middens around Dampier in WA. For this reason, arbitrary definitions of an 'archaeological site' and 'background scatter' are employed to be able to distinguish between higher and lower artefact densities in the landscape.

The purpose of recording background scatters of isolated artefacts was to aid in the identification of Indigenous mobility and land use at a macro-scale according to land systems and land units. Land systems cover very large and broad areas, and land unit categories, such as river terrace, escarpment, can also cover broad areas. The purpose of this survey was not to specifically identify micro-scale archaeological land use, but use the macro-scale environmental information to help inform an assessment of archaeological patterns in the region.

For the purposes of mapping archaeological materials within the project area, background scatters of isolated artefacts can be dealt with in a similar fashion as another category of archaeological site.

[2] Owing to the technological constraints of hand held GPS, it is not feasible to accurately record the grid reference of each isolated artefact that is within a 20 metre diameter area.

5.6 IDENTIFYING ARTEFACTS

5.6.1 IDENTIFYING CULTURALLY MODIFIED TREES (CMTS)

This study uses two reports on CMTs which set the standard in defining scarred trees in Australia:

1. *Culturally Modified Trees of the Weipa Region*, Darlene McNaughton and Michael Morrison, Report for Comalco Aluminium, Weipa.

2. *Aboriginal Scarred Trees of NSW: A Field Manual*. Andrew Long, Department of Environment and Conservation NSW.

McNaughton and Morrison's work records ethnographic and archaeological aspects of scarred trees in the Weipa region and is relevant to the study of CMTs across the tropical north of Australia.

5.6.2 CMT DIAGNOSTICS

McNaughton and Morrison (2005:61) outline a number of CMT diagnostics which informed this study (additional points by consultant are in italics):

1. Tree species and age. Stringybarks are relatively short lived and scarring to them is likely to be very recent. *Evidence from Arnhemland indicates that stringybarks are often used for sugarbag procurement, canoe construction and coolamon construction but this process often kills the tree* (pers. obs.)

2. Creation of a dry face: bark removal only in this region is unlikely to be a cultural modification. The texture of a dry face is important, as cultural modifications are more likely to have a smoother face.

3. Presence of tool marks: indicative of a cultural modification.

4. Does the scar touch the ground: as noted above a scar touching the ground may be a termite damage scar? In addition to McNaughton and Morrison's comment on this area, *some of the scars touching the ground may be the result of sapling growth and decay.*

5. Location of scar on tree: sugarbag scars may be at considerable heights from the ground. Other types of scars should be with adult reaching height.

6. Condition of the tree: living, fallen, stump, stump and log all have been found to have cultural modification.

7. Scar shape: *lenticular holes in dead ironwoods may not be sugarbag scarring, but the result of branch fall.* However some branch fall holes are later occupied by sugarbag bees. The nest is then accessed by a few blows by a tool. These scars may be difficult to assess without accompanying tool marks.

8. Association with other archaeological sites: *particularly if there are other culturally modified scars on the same or nearby tree*.

9. Incision depth: some marker scars are difficult to identify except by the regularity of shape.

5.6.3 RECORDING OF CMTS

Following the above diagnostic properties, the following attributes were recorded with each CMT find:

- Location: GPS coordinates, datum, recorder, date, time;
- Tree: species, girth (one metre from ground), condition (living, dead, fallen, stump, stump and log), condition of scar, regrowth on each scar;
- Tree context: environmental context, disturbance factors, other archaeological sites, vegetation nearby, proximity of other CMTs, old drill lines, tracks, proximity to water etc;
- For each scar: type, height above ground, length, width, condition, axe marks and what type of axe if possible, orientation of scar (degrees);
- Notes on the face of the scar if appropriate (most sugarbag scars penetrate hollow core of tree and therefore do not have a face).Notes on woomera type scars, i.e. where it is a multiple woomera blank removal around tree.
- Comments of the Traditional Owner representative/s, particularly on significance and what type of scar; and
- Photographs of the tree and each scar on the tree. Number and date/ time for each image.

5.6.4 IDENTIFYING STONE ARTEFACTS

A requirement for successful cultural heritage assessment involves the accurate identification of archaeological materials as highlighted by Burke and Smith (2004). Since the identification of stone artefacts is basic to the accurate recognition and measurement of the archaeological record it is imperative that people undertaking archaeological surveys be able to differentiate between natural objects and artefacts. Principles of artefact identification employed in this survey follow those recommended by Hiscock (1984) and Holdaway and Stern (2004).

Each time sufficient force is placed on the surface of an isotropic rock it will fracture into two pieces. The fragment that has been struck contains the ring-crack, where fracture was initiated, and is called the flake. The flake is usually the smaller of the two pieces of stone. The larger fragment, from which the flake has been removed, is called the core. On both the flake and the core the surface that is struck is called the platform. Flakes are identified by the distinctive surface created when they are removed from the core. The classification of artefacts in this survey was based on identifiable characteristics outlined by Hiscock (1984). For an object to be classed as a flaked artefact, it needed to possess one or more of the following characteristics:

- A positive or negative ring crack;
- A distinct positive or negative bulb of percussion;
- A definite eraillure scar in an appropriate position beneath a platform; and

- Remnants of flake scars (dorsal scars and ridges).

These characteristics indicate the application of an external force to a core. Artefact morphologies will be described by using the four types of artefacts as defined by Hiscock (1984:128-129):

- Flake: Flakes exhibits a set of characteristics that indicate they have been struck off a core. The most indicative characteristics are ring-cracks, which show where the hammer hit the core. The ventral surface may also be deformed in particular ways, for example a bulb or eraillure scar;

- Core: A piece of stone with one or more negative flake scars, but no positive flake scars;

- Retouched Flake: A flake that has had flakes removed from it, identified by flake scars on or deriving from the ventral surface; and

- Flaked Piece: This is a chipped artefact which cannot be classified as a flake, core, or retouched flake. This category is used only when an artefact was definitely chipped but could not be placed in another group.

Other artefacts and implement types that have been identified in northern Australia are listed below following characteristics as outlined by McCarthy (1976), Cundy (1989), Kamminga (1982) and Holdaway and Stern (2004) include:

- Unifacial Points are flakes that have been retouched along the margins from one surface (either dorsal or ventral) to give or enhance its pointed shape. These unifacial points are sometimes symmetrical or leaf shaped;

- Bifacial Points are retouched onto both ventral and dorsal surfaces of a flake to enhance or give the artefact its point shape. These points may have the platform removed and the proximal end rounded;

- Serrated Points are bifacial flaked points that have serrated margins;

- Edge ground axes. Classified primarily by the shaping process of flaking, pecking and polishing. These generally have only one working edge that has been ground to a sharp margin but there are also examples with two leading edges;

- Grindstones are characterised by a worn and abraded surface (‘s). The surface may either have concave depression of a convex surface;

- Hammerstones show use wear on the surface in the forms of abrasion, pitting and edge fracturing with some negative scarring from the process of producing stone tools; and

- Pounders are artefacts that are used primarily for processing food and plant materials.

5.6.5 IDENTIFYING ROCK ART

The rock art of the Roper River region has not previously been studied by archaeologists. Therefore, no periods or phases in the local rock art tradition have been identified, as they have for regions such as western Arnhemland and the eastern Kimberley.

There have been two schools of thought in the archaeological interpretation of rock art. One approach favours the interpretation of rock art as representative of temporal changes in environment and diet. The other approach favours the interpretation of art as representative of social complexity through the use of style to communicate cultural messages.

The west Arnhem example is particularly useful for demonstrating the former approach, as it has been extensively investigated. According to Chippendale and Tacon (1998:90) there is a strong framework provided for identifying and dating the long tradition of rock art in Western Arnhem Land. Chaloupka (1985; 1993) has defined various rock art styles and grouped them into art periods and phases for the West Arnhem region. By relating the known climatological, geomorphological, archaeological, historical, zoological and botanical data, Chaloupka (1985) developed a chronology for the rock art. Evidence of weathering, chemical changes in the rock surfaces and pigments, and the order in which paintings are apparently superimposed at particular sites also contributed to this process. According to Chaloupka (1985) the key to major stylistic changes lies in significant environmental changes, particularly sea level fluctuations experienced in the region during the late Pleistocene and Holocene. On this basis he proposed four main chronological periods for the classification of rock art in the West Arnhem region. This is further expanded by Chippendale and Tacon (1998:107) who present a chronology of western Arnhem Land rock art based on Chaloupka's research, their own and others (Figure 3). Chippendale and Tacon (1998) provide a useful chronology for identification of rock art that is utilised in this study.

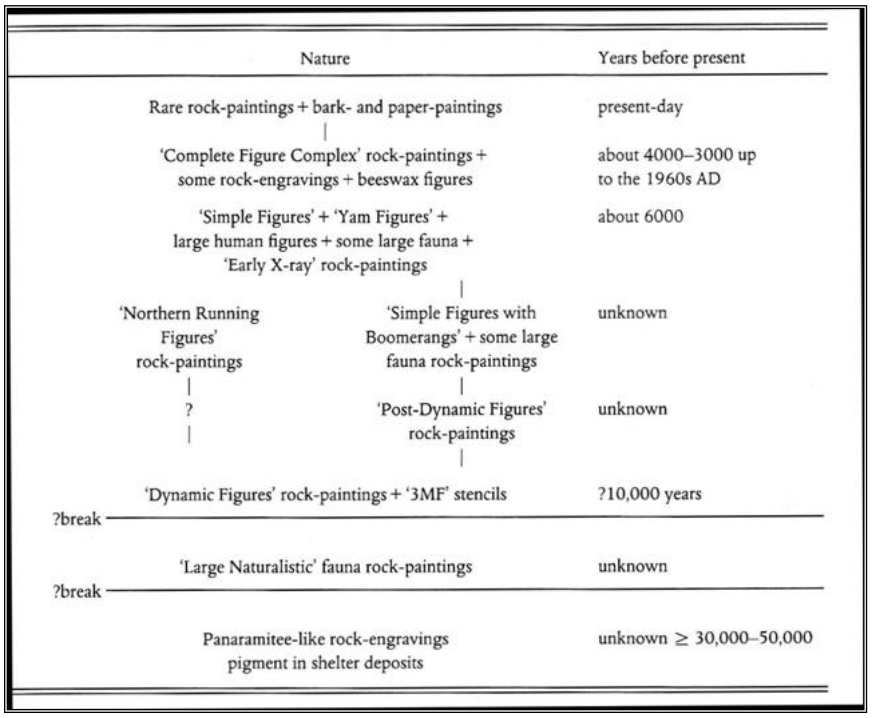
- **Pre-estuarine Period (before 8000 BP)** The pre-estuarine period may be as old as 20,000BP and up to 50,000BP. Chaloupka (1983) inferred that the hunting weapons depicted in the art such as boomerangs which could have been effectively used only in the grasslands and low woodlands that predominated in Kakadu at that time. Extinct faunal species from the late Pleistocene are also used as evidence for this time frame. The pre-estuarine period contained a number of different rock art styles. The earliest of these consisted of prints of hand, grass and other objects. These were followed by paintings of naturalistic figures including macropod and extinct fauna, dynamic figures, post-dynamic figures and yam figures. Weapons such as spears are clearly illustrated in the art. Chaloupka considers the main body of art from this time period to be dated between 20000 BP to 8000 BP. Chaloupka argued that the changing art of the late Pre-estuarine Period reflected changing times for the Aboriginal people.

- **Estuarine Period** (8000BP to 1500BP) Chaloupka (1983) defined the estuarine period by relating the art to the changes occurring in floodplain conditions from 8000 years ago and the subsequent changes in the nature of the resource base. Styles of the estuarine period are characterised by the appearance of animals, notably fish and a decline in the representations of emu and macropod. Depictions of hunters with a range of weapons documented the change in technology, which took place in response to the changing environment and resource availability. The x-ray style of art developed and was continued in use up until the present.

- **Freshwater Period** (from 1500BP) The freshwater period is defined from 1500 years ago with the appearance of large freshwater swamps and floodplains. Freshwater faunal and floral species were

depicted such as Jabiru, water lilies and magpie geese. Different material culture was again developed and depicted to utilise the emerging resources.

- **Contact Period** (since Macassan and European contact 300 years ago). The final phase of the Contact period from about 300 years ago differed only in the choice of the subject matter. According to Chippendale and Tacon (1998:95) European people and European objects have been known in Arnhem Land since early settlements on the Coburg Peninsula some 160 years ago. Therefore depictions of items such as guns, ships, European persons and items, and introduced animals are datable from that period onwards.



Nature	Years before present
Rare rock-paintings + bark- and paper-paintings	present-day
'Complete Figure Complex' rock-paintings + some rock-engravings + beeswax figures	about 4000–3000 up to the 1960s AD
'Simple Figures' + 'Yam Figures' + large human figures + some large fauna + 'Early X-ray' rock-paintings	about 6000
'Northern Running Figures' rock-paintings	unknown
'Simple Figures with Boomerangs' + some large fauna rock-paintings	
?	unknown
'Post-Dynamic Figures' rock-paintings	
'Dynamic Figures' rock-paintings + '3MF' stencils	?10,000 years
?break	
'Large Naturalistic' fauna rock-paintings	unknown
?break	
Panaramitee-like rock-engravings pigment in shelter deposits	unknown ≥ 30,000–50,000

FIGURE 3: CHIPPENDALE AND TACON'S (1998:107) PROPOSED CHRONOLOGY OF ARNHEMLAND ROCK ART

Changes in Australian rock art research methodologies followed the introduction of 'post-processualism' in Australian archaeology[3]. The emphasis in rock art research shifted to attempting to understand;

- The integrating function of art in Aboriginal society,
- How a range of social and economic information is encoded in art and its distributional characteristics.
- How it may reflect fundamental changes in social organisation, group interaction and land use.

[3] Processualism is widely regarded as a school of anthropological / archaeological thought originating in the US with Lewis Binford. Archaeological theory in the present is often a modification or rejection of processual thought, and is therefore defined as 'post-processual'.

These types of investigations required information on the cultural and natural contexts of rock art production whereas previous studies had tended to be more focused on rock art in isolation.

Important steps in the development of current perspectives on the study of Indigenous rock art were taken by Maynard (1977) and Clegg (1983). These archaeologists developed a more analytical approach to the study of rock art. Maynard (1977) contended that meaning is always highly specific and usually esoteric and as such is probably completely intractable. Clegg (1983) extended this position to argue against attempting to reconstruct the meaning of motifs on the grounds that it is impossible to securely ascertain either the subject or motivation of the artist.

Another influence in the study of rock art came from the study of semiotics, the study of signs. This is where style became re-conceptualized as a means of communicating information. This development in rock art research was partly attributable to the increasing influence of anthropological studies of cultural material which demonstrated the communicative capacity of style. The increased emphasis on social explanations in archaeology emerged in rock art studies in information exchange theories. The main functions of style are related to cultural processes such as group integration and differentiation and boundary maintenance. The concept of information exchange as an explicit theoretical tool has been used to interpret a wide range of rock art. The general approach is based on the notion that the functional interdependence between art and other cultural components which is so evident in ethnographic studies that art and changes in art can tell much about the complexity of pre-contact cultural systems. This same functional interdependence indicates that archaeological studies of art need to be undertaken in the light of all available evidence for systemic context, one basic component of which is resource utilisation. Fundamental to this approach is the notion of style as information. The main point about the use of information exchange theory in Australian rock art studies is that it moves beyond a simple correlation between stylistic similarity and social interaction to consideration of the causes underlying these interactions.

There are generally two main types of rock art (Clegg 1983):

- *Engravings and poundings* where the pattern depicted is one of relief and pictures were apparently produced by removing material from the rock surface.
- *Drawings*, *stencils* and *paintings* where the material was added to the rock surface.

Common rock art terms used in this report include:

- *Anthropomorph*: A figure of a human form.
- *Figurative Art*: Art motifs which resemble objects familiar to the observer, representational or naturalistic art.
- *Motif*: A very common word used in describing rock art. This is usually defined as a recurrent visual image which has a particular arrangement (Maynard 1977). A mark or combination of marks of human origin, which can reasonably be interpreted to have formed an individual or separate picture, or design or a recurrent type of figure.
- *Petroglyph:* A mark or picture made on rock through the process of pecking, pounding, abrading or scratching the rock surface.

- *X-ray Art*: A style of rock art in which the internal skeleton and internal organs of humans or animals are depicted.
- *Zoomorph*: A figure of animal form.
- *Stencils:* Where paint has been applied over an object placed against the shelter wall. Most commonly found in the form of hand stencils, however many examples of items of material culture have been documented.
- *Bees Wax Figures:* Where bees wax has been modified and placed on shelter walls to form an image.
- *Superimposition*: When multiple motifs are executed over one another at different times in the past.

5.7 SURVEY METHODOLOGY

The survey of the proposed haul road was conducted by helicopter, as reconnaissance ahead of future possible ground survey. The helicopter flew at a low altitude and the landscape was assessed for probability of sites. Approximate boundaries were recorded for areas assessed as being prospective for archaeological sites, based on landform, watercourses, vegetation, outcropping stone and the consultant's predictive model for site location. Areas of existing infrastructure were also recorded.

Transects in Area C were traversed on foot with the aim of examining any areas of ground surface visibility. Areas of erosion and ground exposure were examined for archaeological evidence such as stone artefacts, and charcoal. Rock shelters and overhangs were investigated for presence of rock art. Ground surfaces and cuttings were examined to determine the degree of soil disturbance, erosion and potential for archaeological deposits below current ground. Mature trees were examined for evidence of scarring or carving.

During the survey, detailed field notes were made and photographs taken. Surface sites found during the survey were recorded in detail. Following the methodological approaches and the survey methodology described above, the following survey strategy was adopted:

- Map the proposed survey areas using MapInfo v11.5. Using GBM Mobile software, upload base mapping and the polygons representing the locations of the survey area boundaries to a Trimble Nomad unit.
- Transect these areas, identifying and recording archaeological material.
- Archaeological features were recorded using GBM mobile software using data fields appropriate to site type.
- The tracks of all transects were recorded using the tracking feature on the Nomad, recorded directly to a MapInfo tab file.
- Download all data to the MapInfo project, then project site data onto maps.

Location data was recorded using the GDA94 datum. The projection co-ordinate system is MGA94.

Based on the predictive model of site distribution outlined in Section 5.1, and the results of the current survey, a risk assessment of particular areas within the survey area was carried out. Areas were assessed according to number of sites and isolates recorded in a sample, the environmental context, the likelihood of containing more sites and the extent of proposed works in the area. Management recommendations for these areas were then formulated to propose the least-risk scenario to both the proponent and the cultural heritage.

6.0 RESULTS

6.1 SUMMARY SURVEY RESULTS

The survey in Area C focused on the eastern escarpment and the gorge systems, and included transects in the proposed camp area and along Sherwin Creek. The landforms that were surveyed were determined by company priorities and the timeframe available. Future surveys of the tableland plateau and the lower creek systems will increase our understanding of patterning of archaeological sites across landforms in the region.

The surveys recorded 12 rock art sites, 1 open site, and 1 historical site. In addition, 10 isolated Aboriginal artefacts and 1 historical artefact were recorded. It is probable that many of the isolated artefacts recorded along the bank of Sherwin Creek comprise an open site. Visibility was very poor in the vicinity of these artefacts, and the ground surface was one of rapidly aggrading sediment, which may have obscured artefacts. This location should be resurveyed in conditions of high visibility, preferably after a fire.

6.2 ROCK ART SITES

The survey recorded 12 rock art sites in Area C. A summary of the rock art sites can be found in Table 1 below. As discussed in section 5.6.5, little is known about rock art in the Roper River region. However, some patterns can be observed in the sites recorded in this survey. The sample size on which these observations are made is very small; hence, they would need to be confirmed through further testing. One of the more striking observations, when comparing these sites to rock shelters documented in western Arnhemland, is that many of the rock shelters here are relatively large and contain relatively few motifs. For example, Site SHER_RA13_08 measured 20m long x 30m wide x 8m high, and contained only 12 hand stencils. Another observation is that many of the rock art sites occur in the upper reaches of the gorge systems, even if similar sized shelters occur in the lower reaches of the gorges. Many rock shelters were observed with no art at all. The motif diversity in most sites is very limited. In most cases, the sites contain only hand stencils, or hand stencils with animal tracks. However, some of the shelters exhibit significant motif diversity. Some motifs have not previously recorded in other rock art traditions across the Top End, or are particularly rare – for example, Site SHER_RA13_05 contains a long row of stencilled dots at head height, a cross, a 'sun' that may be part of the head of an anthropomorph, and grind holes on a vertical wall surface. Grind holes on a wall surface are also represented in SHER_RA13_09.

Site photos from each of the twelve rock art sites, showing some of the motifs described, can be found in Appendix A.

The rock art in the current survey results shows some similarities to west Arnhem rock art, but it is difficult to quantify a connection to the west Arnhem traditions without further survey and analysis. While western Arnhemland is in reasonable geographic proximity, the relationship between the differing art traditions (if any) cannot yet be adequately demonstrated. Some of the similarities observed between the west Arnhem and Roper River art are the presence of hand stencils, animal tracks, macropod, anthropomorph, serpent and magpie goose motifs. The few anthropomorphs observed in the current survey do not correspond with styles defined by Chaloupka, such as dynamic figures, post-dynamic figures or Mountford figures. According to Chaloupka (1983:91), hand stencils, animal tracks, macropods and serpents were introduced into the west Arnhem art lexicon between 8,000 and 20,000 years before present (BP). Magpie geese were introduced after 1,500BP. It is impossible to ascertain with any accuracy the antiquity of the art in the current survey, without further extensive investigations.

TABLE 1: SUMMARY OF ROCK ART SITE RESULTS

Site ID	Environmental Context	Description	L	W	H	Site features	Rock Art Method	Rock Art Motifs	Site Condition
SHER_RA 13_01	Escarpment	Single motif and two grind holes	12	4	3	Emu footprint motif	Brushed	Emu footprint	Poor. Exfoliation wasps water
SHER_RA 13_02	Gorge	Massive shelter with 20+ hand stencils	30	30	10	Deep dry shelter with probable subsurface deposits	Stencils and prints	Hand stencils some 3MF	Excellent. Wasps
SHER_RA 13_03	Gorge	Single panel with lines only	8	1	3	Single panel with lines	Brushed	Parallel lines vertical	Good
SHER_RA 13_04	Gorge	Large shelter with hand stencils. No artefacts seen. Probable subsurface deposits	30	20	10	Large shelter dry and cool.	Stencilled	Hand stencils, indistinct	Good. Exfoliation wasps
SHER_RA 13_05	Upper gorge	Large shelter with approx 15 panels of art	40	30	5	Wooden coolamons, many grind holes, probable subsurface deposits	Brushed and stencilled	Anthropomorphs, serpents, hand stencils, stencilled dots, dugong, magpie goose, croc, turtle, cross, sun, circle, indistinct, emu footprint	Very good. Fading, exfoliation, wasps, feral animals.
SHER_RA 13_06	Upper gorge	Medium shelter with 3 panels of art	8	4	4	Red and white ochre, grind hole.	Brushed and stencilled	?pig/possum, hand stencils	Very good. Fading
(Cont.'d over)									

Site ID	Environmental Context	Description	L	W	H	Site features	Rock Art Method	Rock Art Motifs	Site Condition
SHER_RA 13_07	Gorge	Large shelter with one hand stencil, one kangaroo track motif	25	15	10	Sharp boulders at entrance, small cavern at back.	Stencilled and brushed	Hand stencils, kangaroo track	Good
SHER_RA 13_08	Gorge	Large shelter with approx 12 hand stencils	20	30	8	Hand stencils	Stencilled	Hand stencils	Good. Faded
SHER_RA 13_09	Creek line	Large shelter with 3 yellow hand stencils and unusual grind holes in the wall	25	8	5	Deep sediment probable subsurface deposits, unusual grind holes on the wall	Stencilled	Hand stencils	Fair. Faded, wasps, exfoliation
SHER_RA 13_10	Upper gorge	large shelter with few motifs	25	15	8	Large shelter with red and white hand stencils, two engraved emu footprints.	Stencilled and engraved	Hand stencils, emu footprint	Fair. Faded, exfoliation wasps
SHER_RA 13_11	Upper gorge	Single panel on ceiling with only yellow art.	5	3	2	Single panel on ceiling with only yellow art	Brushed and stencilled	Emu footprint, hand stencils	Very good. Wasps
SHER_RA 13_12	Upper gorge	Three hand stencils on ceilings	8	7	2	White hand stencils	Stencilled	Hand stencils	Poor. Faded

(Table 1, continued.)

6.3 OPEN AND HISTORICAL SITES

Site SHER13_01 is a historical site, featuring concrete slabs, metal drums and discarded drill core. It was recorded in conditions of low visibility. Local knowledge passed on by Col Jardine (Sherwin Iron) holds that this was the location of the original 1950s exploration camp run by BHP. The exploration conducted by BHP was the first mineral exploration in the area. This site is assessed as having low archaeological significance.

Site SHER13_02 is a medium density stone artefact scatter, located on the margins of Sherwin Creek. It was recorded in conditions of medium visibility. A wide variety of artefact types are represented in the site, including flakes, broken flakes, retouched flakes, unifacial points and bifacial points. The raw materials used in the manufacture of the artefacts were chert and siltstone. The use of these raw materials is in line with expectations based on the geology of the broader region. The site has been disturbed by feral animals and alluvial deposit. Traditional Owner representative, Dennis Duncan, has advised that the site is of high cultural significance. The site is assessed as having moderate archaeological significance.

A summary of the site results can be found in Table 2. Images of both sites can be found in Appendix A.

TABLE 2: SUMMARY OF OPEN SITE RESULTS

Site ID	Site Type	Disturbance factors	Artefact types	Raw materials	Total # artefacts
SHER13_01	Historic	Buffalo, bulldozers 2012-13 track	Concrete slabs, metal drum, discarded drill core.	Concrete, metal, stone	Not recorded
SHER13_02	Stone artefact scatter	Feral animals, alluvial deposit	Flakes, broken flakes, blades, unifacial points, bifacial points, retouched flakes	Chert, siltstone	100+

6.4 ISOLATED ARTEFACTS

Ten isolated artefacts of Indigenous origin and one of historic origin were located across the survey area. Some of the artefacts were distributed in relatively close proximity on the banks of a creek, and included four grindstones and one grinder (artefacts SHER_ISO13_02 to SHER_ISO13_06, see Table below). While the low density of these recorded artefacts doesn't fit the criteria for site definition, it is highly probably that sites exist in this location. Grind stones are indicators of domestic occupation sites, and are found relatively rarely as isolated artefacts across the Top End. Visibility at time of survey was very low, and the artefacts were recorded in areas of erosion and other better visibility. The probable sites are also likely to have been obscured by the aggrading sediment of the creek bank. The consultant recommends further survey of the Sherwin Creek area in conditions of high visibility.

The stone artefacts located throughout the survey have the potential to increase our understanding of archaeological patterns across the landscape, particularly with regard to the sourcing and distribution of raw material.

The metal axe head may have been associated with the BHP exploration of the area in the 1950s, or with pastoral occupation of the area or post-contact Indigenous culture. No culturally modified trees were located in the vicinity of the broken axe head, and the period to which it dates is unknown. A selection of images of isolated artefacts can be found in Appendix A.

TABLE 3: SUMMARY OF ISOLATED ARTEFACTS

Artefact number	Qty	Artefact types	Raw materials	Comments
SHER_ISO13_01	1	Broken axe head	Metal	Broken metal axe head, "hytech forged 4 1/2 tool" engraved.
SHER_ISO13_02	1	Portable grindstone	Sandstone	Probable continuous site, covered by alluvium.
SHER_ISO13_03	4	Flakes, broken flakes	Siltstone, chert	4 flakes in erosion. Probable continuous site under alluvium
SHER_ISO13_04	1	Portable grindstone	Sandstone	Probable continuous site
SHER_ISO13_05	2	Portable grindstone	Sandstone	Flat grindstone and grinder. Possible site, low visibility.
SHER_ISO13_06	1	Portable grindstone	Not identified	Possible site - portable grindstones on rise near creek. Low visibility.
SHER_ISO13_07	1	Grinding hollow	Not identified	Possible grind holes

6.5 RISK ASSESSMENT OF HAUL ROAD CORRIDOR

A reconnaissance survey was carried out by helicopter along the length of the proposed haul road corridor, to assess the archaeological potential of the landscape. The survey focused on a 5km-wide corridor immediately south of the existing Roper Highway. Approximately 10km east of the Stuart Highway, the corridor diverged from the Roper Highway and continues west to the existing railway (see Project Area map in Section

2). At the time of the survey, Sherwin Iron was considering two options for the development of a haul road. The first option is to upgrade the existing Roper Highway to a two-lane highway, and construct a new road from the point of divergence to the railway. The second option is to construct an entirely new road, separate from the Roper Highway, within the 5km corridor.

The consultant made a visual assessment for archaeological prospectivity based on landform, vegetation, disturbance, presence of outcropping stone and permanent water. Within the 5km corridor along the Roper Highway, there is a significant amount of existing pastoral infrastructure, such as dams, fences, stockyards, tracks and a workers' camp. There are also a number of areas that exhibit high archaeological prospectivity, according to the predictive model outlined in Section 5.1. These areas have a high probability for archaeological sites because they exhibit hills within close proximity to permanent water, often with outcropping stone that may be a source of raw material for artefacts. There are also sections of this 5km corridor that could not be assessed without ground survey, as the baseline information for archaeological patterning of sites in the region is currently inadequate for those landforms.

The divergent section of the proposed haul road, from the railway to the Roper Highway, crossing the Stuart Highway, appears to travel along an existing cadastral boundary. Much of this section of the proposed route travels along a fence line that has already been cleared. The risk of archaeological sites in this section is assessed as very low, as the route travels across sand plain with low open woodland. This land form usually exhibits a low density background scatter of isolated artefacts and culturally modified trees, and very few archaeological sites. Hermes (1986) surveyed the gas pipeline route that passes across this area and found sites only along watercourses and on hills.

The easement along the existing Roper Highway was assessed against the predictive model established in Section 5.1. Most of this area has been disturbed through the construction of the highway, however there are some areas that still maintain integrity of surface and may contain archaeological sites. Some areas along the existing highway occur on landforms for which insufficient archaeological data is available, for example the low flat areas of limestone geology around Salt Creek and Elsey Creek. The probability of finding sites in these areas is unknown. The probability of locating sites on known landforms is assessed as moderate.

6.5.1 SUMMARY OF HAUL ROAD CORRIDOR ASSESSMENT

The consultant's assessment is that the construction of a separate road within the 5km corridor south of the existing Roper Highway would require extensive archaeological survey and carries a high probability of locating previously unrecorded archaeological sites. The need to disturb considerable amounts of existing pastoral infrastructure may also influence the final decision on location of the haul road.

The consultant's assessment is that the divergent section of proposed haul road, that diverges from the Roper Highway approximately 10km east of the Stuart Highway and continues west to the railway, carries a low risk of archaeological sites. This area would require an archaeological survey of minimal sampling to confirm this assessment before construction could proceed.

The consultant's assessment of the proposal to widen the existing Roper Highway is that it carries a moderate risk of archaeological sites. This proposal would require a moderate amount of archaeological

ground survey sampling undisturbed areas and landforms for which there is currently insufficient archaeological data.

7.0 SIGNIFICANCE ASSESSMENT

There are two types of significance that are commonly considered in assessing the future of heritage places in the Northern Territory, cultural significance and archaeological significance. Cultural significance assesses the significance of Indigenous heritage places to the traditional owners of the land. In a broader sense, cultural significance reflects the views of the broader community on the historic, aesthetic or social values of a place. For Indigenous sites, the cultural significance must be assessed in consultation with the relevant Aboriginal custodians of sites for an area. This process is mandated by Commonwealth legislation, including the *Native Title Act* 1991 and Territory legislation such as the *Aboriginal Sacred Sites Act* 1989. In this survey, Traditional Owner representatives, David Daniels, Dennis Duncan and Tom Thompson provided advice on the cultural significance of the survey results.

Archaeological significance is assessed against criteria set out in the regulations to the NT *Heritage Act* 2012, and in the Burra Charter (Maquis-Kyle and Walker 1992). The Act regulations are criteria to assess places for permanent protection by adding to the NT Heritage Register. Archaeological (or scientific) significance includes the potential of a place to add to the knowledge of the past. The research potential of an archaeological place is often only fulfilled by collection and analysis of artefacts and sometimes excavation. This is a destructive process and requires a permit under Section 72 to proceed.

The general ranking of archaeological significance is as follows:

1. Low significance: These sites are unlikely to be nominated to the NT Heritage Register as they would not satisfy any of the significance criteria. In addition, sites in this category often occur in large numbers across the Top End landscape (i.e. isolated objects.) These sites can add to our understanding of past life ways by understanding their spatial and possibly temporal distribution. Some may demonstrate limited information about post-European settlement technologies and use of the land in the Northern Territory.

2. Moderate significance: These sites may have characteristics that are assessable under one or more of the heritage assessment criteria for the Commonwealth Heritage List; however they are unlikely to reach the thresholds necessary for permanent declaration to the list. These sites have the potential to add to our knowledge of past life ways and are still considered to have local and Territory heritage significance.

3. High significance: These sites may be nominated to the Commonwealth Heritage List; and may, if assessed as of special significance, potentially be recommended for inclusion on the heritage list. These sites are considered to have significant local, Territory, and National heritage value.

Rock art sites found in this survey are likely to be significant in the following ways:

- Rock art documented in the survey area sites have aesthetic value in regards to known significant rock art features across the Top End region.
- Distinct, previously unrecorded rock art styles are represented in these sites. These rock art styles may be of considerable antiquity, and represent an unknown aspect of the Indigenous past in the region. As such the art has considerable research value, in addition to its cultural value.
- Rock art sites are considered significant to local Indigenous people as a tangible reminder of the long standing association with ‘country’.
- Rock art recorded in this study may be temporally and culturally associated with the styles and traditions previously documented in the Arnhem Land region.

The sites have the potential to contribute to further understanding of settlement and mobility of Indigenous people through time and space; the nature and distribution of archaeological sites; links between rock art and the cultural deposits; and temporal and spatial variability of rock art traditions.

7.1 SIGNIFICANCE ASSESSMENT OF SITES

The significance assessment procedures outlined above were applied to the recorded sites. A summary of the significance assessment can be found in Table 4, below. Management recommendations for each site are developed in accordance with the significance of the site, and are included in the summary table.

The rock art sites identified in the survey were all assessed as having high archaeological significance, for the reasons outlined in Section 7.0. Site SHER_RA13_05 was assessed as having very high significance, due to the presence of wooden artefacts, the diversity of motifs in the art and the probability of subsurface archaeological deposits. The rock art sites are highly significant both individually and collectively.

It has been the consultant's experience in other parts of the Top End that rock art is consistently highly valued for its cultural significance. Archaeological significance is assessed according to research or scientific value, and as such archaeological significance in some specific other rock art sites of the Top End has been assessed as moderate or low, depending on the nature of the site. The sites in this survey have all been assessed as having high archaeological significance particularly because the rock art traditions of the region have not been investigated or understood. In future, as more research is undertaken and the art traditions are better understood, some sites may be reassessed as having lower archaeological significance.

Site SHER13_01, the former BHP exploration camp, is not protected under the provisions of the *Heritage Act* 2012. It is unlikely to meet the criteria necessary for nomination to the NT Heritage Register.

The stone artefact scatter, SHER13_02, is protected under the provisions of the *Heritage Act* 2012, and is assessed as having moderate archaeological significance. The isolated artefacts located along Sherwin Creek were also included in the site significance assessment process, as it is highly likely they form part of larger sites. The recorded site and isolated artefacts conform to traditional owner, David Daniels', information that the old people used to live in the high country and follow the creek down to a ceremonial ground further downstream along Sherwin Creek. These sites and artefacts have the potential to provide evidence for past life ways of the region.

TABLE 4: SUMMARY OF SIGNIFICANCE ASSESSMENT OF SITES AND MANAGEMENT RECOMMENDATIONS

Site ID	Site type	Archaeological Significance	Cultural Significance	Management Recommendation
SHER_RA13_01	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER_RA13_02	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER_RA13_03	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER_RA13_04	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER_RA13_05	Rock art site	Very high	Very high	Impose a 100m conservation buffer zone.
SHER_RA13_06	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER_RA13_07	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER_RA13_08	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER_RA13_09	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER_RA13_10	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER_RA13_11	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER_RA13_12	Rock art site	High	High	Impose a 100m conservation buffer zone.
SHER13_01	Historic site	Low	N/A	Avoid if possible.
SHER13_02	Stone artefact scatter	Moderate	Moderate	Impose a 100m conservation buffer zone. Survey in conditions of high visibility.
SHER_ISO13_02	Isolated artefact	Low	Moderate	Avoid. Survey in conditions of high visibility
SHER_ISO13_03	Isolated artefacts	Low	Moderate	Avoid. Survey in conditions of high visibility
SHER_ISO13_04	Isolated artefact	Low	Moderate	Avoid. Survey in conditions of high visibility
SHER_ISO13_05	Isolated artefacts	Low	Moderate	Avoid. Survey in conditions of high visibility
SHER_ISO13_06	Isolated artefact	Low	Moderate	Avoid. Survey in conditions of high visibility

8.0 RECOMMENDATIONS

The consultant makes the following recommendations:

1. It is recommended that a 100m conservation buffer zone be implemented around all rock art sites recorded in the survey.
2. It is recommended that a 100m conservation buffer zone be implemented around the stone artefact scatter, SHER13_02.
3. It is recommended that the Sherwin Creek area be re-surveyed in conditions of better visibility.
4. It is assessed that the existing Roper Highway easement has a moderate risk of archaeological sites.
5. It is assessed that the 5km-wide haul road corridor south of the Roper Highway has a high risk of archaeological sites in some areas.
6. It is assessed that the proposed section of haul road from the existing railway to the Roper Highway has a low risk of archaeological sites.
7. The consultants believe that comprehensive archaeological survey of the haul road is not required. However, it is recommended that future archaeological survey samples at least 20% of the haul road route.
8. It is recommended that archaeological surveys are conducted prior to any other ground disturbance works.
9. It is recommended that a baseline survey sampling representative landforms be conducted across the Sherwin Iron leases, to address the lack of regional archaeological data and assist in the development of a regional predictive model for site location.
10. It is recommended that all Authority Certificates issued by the Aboriginal Areas Protection Authority are current for the Project.
11. It is recommended that the Traditional Owner group be consulted on the mitigation of impacts on archaeological sites located in the tenement.

9.0 REFERENCE LIST

Burke, H & Smith, C. 2004. The Archaeologists Field Handbook, Unwin & Allen, Sydney.

Chaloupka, George. 1993. Journey In Time: the 50,000-year story of the Australian Aboriginal Rock Art of Arnhem Land. Reed New Holland, Sydney.

Chaloupka, G. 1985 Chronological sequence of Arnhem Land Plateau Rock Art, in in R. Jones (ed) Archaeological Research in Kakadu National Park. Canberra: Australian National Parks and Wildlife Special Publication 13. pp 291-298.

Chippendale, C. and P.S.C. Tacon 1998 The many ways of dating Arnhem Land rock art, north Australia, in Chippendale, C. and P.S.C. Tacon (eds) *The Archaeology of Rock Art*. Cambridge University Press.

Clegg, J. 1983 Recording prehistoric art, in G. Connah (ed) *Australian Field Archaeology: A Guide To Techniques*. Australian Institute of Aboriginal Studies, Canberra.

Crassweller, C. 2011. Archaeology Report – a cultural heritage survey for the proposed Sill 80 Project on Numul Numul Station, NT. A report for EcOz VDM, on behalf of Australian Ilmenite Resources.

Flood, Josephine. 1995. Archaeology of the Dreamtime: the story of prehistoric Australia and its people. Revised edition. Angus & Robertson, Sydney.

Foley, R. 1981 "Off-Site Archaeology and Human Adaptation in Eastern Africa: An Analysis of Regional Artefact Density in the Amboseli, Southern Kenya". BAR International Series 97.

Geneste, Jean-Michel, Bruno David, Hugues Plisson, Chris Clarkson, Jean-Jacques Delannoy, Fiona Petchey & Ray Whear, 2010. Earliest Evidence for Ground-Edge Axes: 35,400±410 cal BP from Jawoyn Country, Arnhem Land, in Australian Archaeology Vol 71:66-69

Guse, D. 1998. Archaeological Survey of the Urapunga and Roper Bar OFC extensions, Northern Territory. A report for Telstra.

Guse, D. 1999. Archaeological Salvage at Bitter Springs, Mataranka, Northern Territory. A report for Willing and Partners Pty Ltd.

Guse, D. And G. Niemoller. 1999. Archaeological survey of the Stuart Highway to Mataranka Homestead optic fibre cable corridor, Northern Territory. A report for Telstra.

Hermes, M. 1986. Amadeus Basin to Darwin natural gas pipeline – Spread 2 – Internal report on archaeological findings.

Hiscock, P. 1984 "A preliminary report on the stone artefacts from Colless Creek Cave, Northwest Queensland". *Queensland Archaeological Research.* 1:120-151.

Holdaway, S. and N. Stern 2004 *A Record in Stone: The Study of Australia's Flaked Stone Artefacts.* Museum Victoria and AIATSIS, Canberra.

Jung, S. 2012. Western Desert Resources Limited – Roper Bar Iron Ore Project: supplementary archaeological survey report – haul road. A report for EcOz Environmental Services.

Kamminga, J. 1982 "Over the Edge: Functional analysis of Australian stone tools". Occasional Papers in Anthropology No 12.

Maquis-Kyle, P. and M. Walker, 1992. The Illustrated Burra Charter: making good decisions about the care of important places. Australia ICOMOS and the Australian Heritage Commission, Canberra.

Maynard, L. 1977. Classification and terminology in Australian rock art. In P. J. Ucko (ed.), *Form in Indigenous Art*, Gerald Duckworth and Co. Ltd., London. pp. 387-402.

McCarthy F.D. 1976 *Australian Aboriginal Stone Implements*. Australian Museum, Sydney.

McNaughton, D. & Morrison, M. 2005. "Culturally modified trees of the Weipa Region, Western Cape York Peninsula", unpublished report to Comalco Aluminium Pty. Ltd. Weipa.

Pickering, M. 1994 The physical landscape as a social landscape: a Garawa example. *Archaeology in Oceania* 29:149-161.

Powell A., 1988 Far Country: A Short History of the Northern Territory. Melbourne University Press, Carlton.

Roberts, R.G., R. Jones and M.A. Smith, 1990. Thermoluminescense dating of a 50 000-year-old human occupation site in northern Australia. In Nature, Vol. 345 (6271):153-156.

APPENDIX A: IMAGES OF ARCHAEOLOGICAL PLACES AND OBJECTS

APPENDIX A: IMAGES OF ARCHAEOLOGICAL PLACES & OBJECTS

This appendix showcases a selection of images from the places and objects recorded in the survey.

SITE IMAGES OF SHER_RA13_01

FIGURE 1: VIEW OF THE ESCARPMENT FROM SHER_RA13_01, FACING SOUTH

FIGURE 2: PAINTED EMU FOOTPRINT

FIGURE 3: GRIND HOLES

SITE IMAGES OF SHER_RA13_02

FIGURE 4: DENNIS DUNCAN IN SITE SHER_RA13_02

FIGURE 5: DENNIS DUNCAN AT THE ENTRANCE TO SHER_RA13_02

FIGURE 6: A CHILD'S HAND STENCIL, CLOSE TO THE CURRENT FLOOR

FIGURE 7: A ROW OF HAND STENCILS

FIGURE 8: A POSSIBLE 3MF HAND STENCIL WITHIN A CIRCLE

FIGURE 9: ONE OF THE HAND STENCILS AT TOP LEFT, AND ONE AT LOWER CENTRE, APPEAR TO BE WITHIN A CIRCLE

FIGURE 10: THE FLOOR OF SHER_RA13_02 IS AGGRADING SOFT SEDIMENT WITH PROBABLE SUBSURFACE DEPOSIT

SITE IMAGES OF SHER_RA13_03

FIGURE 11: FADED PARALLEL LINES

FIGURE 12: MORE PARALLEL LINES ON SAME WALL PANEL

SITE IMAGES OF SHER_RA13_04

FIGURE 13: TOM THOMPSON IN SITE SHER_RA13_04

FIGURE 14: HAND STENCILS

SITE IMAGES OF SHER_RA13_05

FIGURE 15: VIEW OF THE VALLEY FROM SHER_RA13_05

FIGURE 16:VIEW OF SHER_RA13_05 FROM SHER_RA13_06

FIGURE 17:TWO PAPERBARK COOLAMONS ON A SHELF

FIGURE 18: DETAIL OF THE GATHERED ENDS OF THE COOLAMONS

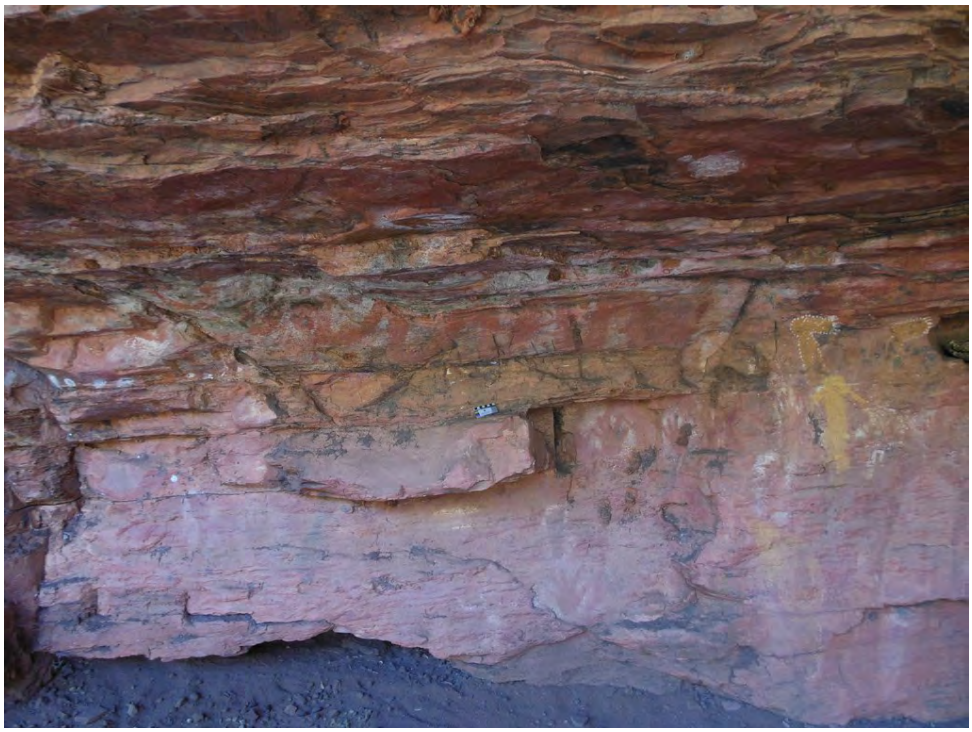


FIGURE 19: A RED SERPENT MOTIF, WITH AN INVERTED YELLOW ANTHROPOMORPH MOTIF ON THE RIGHT, AMONGST OTHERS. A FOOT STENCIL AND HAND STENCILS CAN BE SEEN CLOSER TO THE FLOOR. 8CM SCALE IN CENTRE.

FIGURE 20: MANY OF THE ROCKS ON THE FLOOR OF THE SHELTER HAD MULTIPLE GRIND HOLES

FIGURE 21: A TURTLE, AN UNIDENTIFIED LARGE YELLOW CIRCLE, AND ANTHROPOMORPH. THE YELLOW SUNBURST MOTIF MAY BE PART OF THE ANTHROPOMORPH.

FIGURE 22: AN ELONGATED WHITE ANTHROPOMORPH, NEAR THE ANTHROPOMORPH FROM FIG. 27

FIGURE 23: AN UNIDENTIFIED MOTIF OF WHITE DOTS

FIGURE 24: A SOLID RED CROSS WITH WHITE BORDER

FIGURE 25: ONE OF TWO SERPENT MOTIFS IN SHER_RA13_05

FIGURE 26: GRIND HOLES / CUPULES IN THE WALL, OVERPAINTED BY A YELLOW MOTIF, LOCATED UNDER THE SHELF STORING THE COOLAMONS.

FIGURE 27: A FOOT STENCIL AND HAND STENCILS CLOSE TO THE CURRENT FLOOR

FIGURE 28: A VERY FRESH-LOOKING HAND STENCIL

FIGURE 29: MULTIPLE LAYERS OF MOTIFS ON A SINGLE PANEL

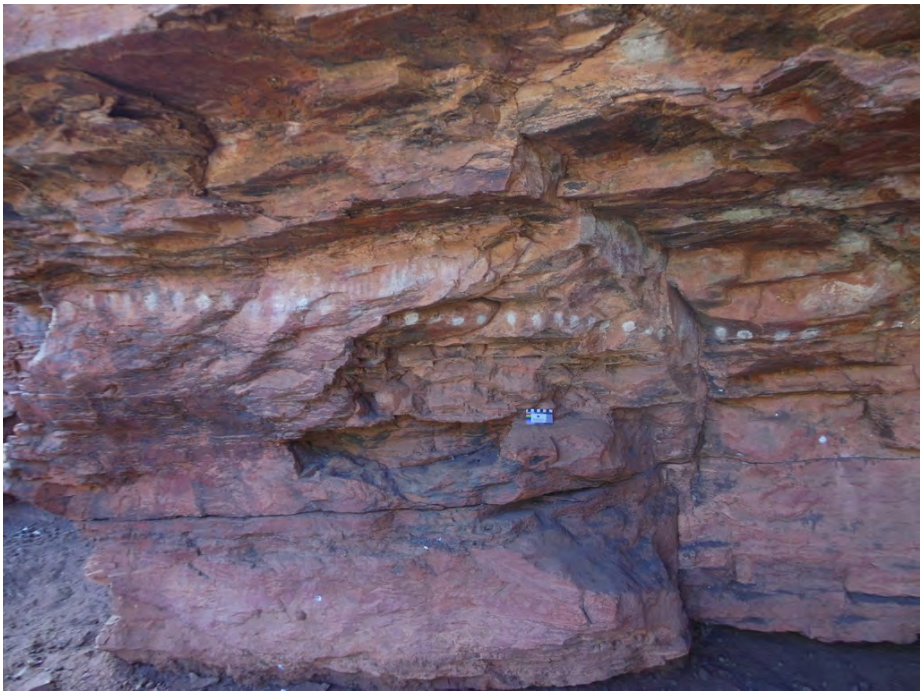


FIGURE 30: A LONG ROW OF WHITE DOTS, STENCILLED AT HEAD HEIGHT

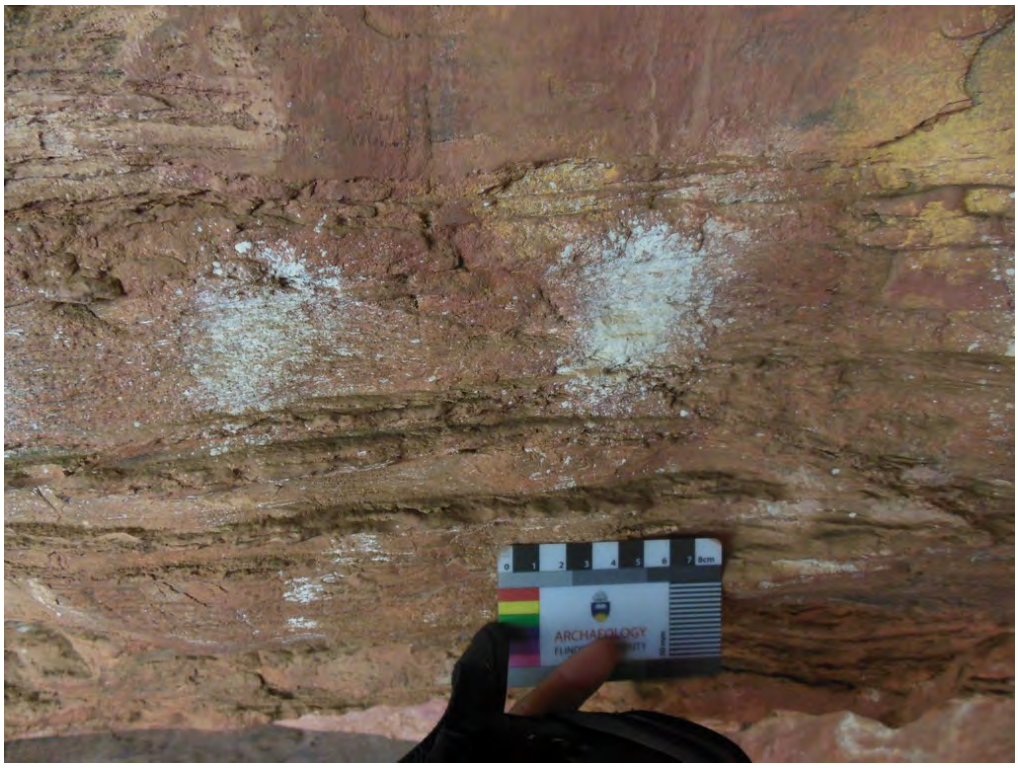


FIGURE 31: CLOSE UP OF THE STENCILLED WHITE DOTS

FIGURE 32: MAGPIE GOOSE AND DUGONG MOTIFS AT THE ENTRANCE TO THE SHELTER

SITE IMAGES OF SHER_RA13_06

FIGURE 33: TOM THOMPSON AT THE ENTRANCE TO SHER_RA13_06

FIGURE 34: HAND STENCIL

FIGURE 35: UNIDENTIFIED MAMMAL FIGURE SHOWING INTERNAL ORGAN AND EXCRETED OBJECT

FIGURE 36: GRIND HOLE IN SHER_RA13_06

SITE IMAGES OF SHER_RA13_07

FIGURE 1: VIEW FROM THE INTERIOR OF SHER_RA13_07

FIGURE 2: WHITE HAND STENCIL

FIGURE 3: KANGAROO TRACKS MOTIF

SITE IMAGES OF SHER_RA13_08

FIGURE 4: TOM THOMPSON IN SHER_RA13_08

FIGURE 5: RED HAND STENCILS

FIGURE 6: RED HAND STENCIL

FIGURE 7: HAND STENCILS

SITE IMAGES OF SHER_RA13_09

FIGURE 8: TOM THOMPSON IN SHER_RA13_09

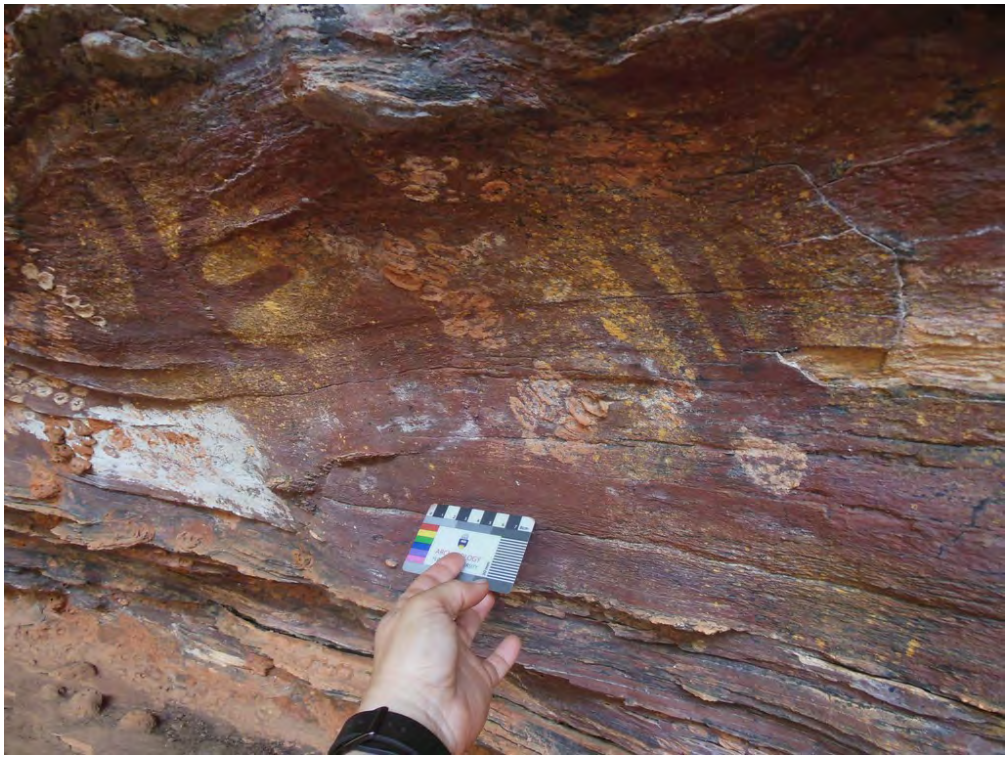


FIGURE 9: YELLOW HAND STENCILS

FIGURE 10: YELLOW HAND STENCIL

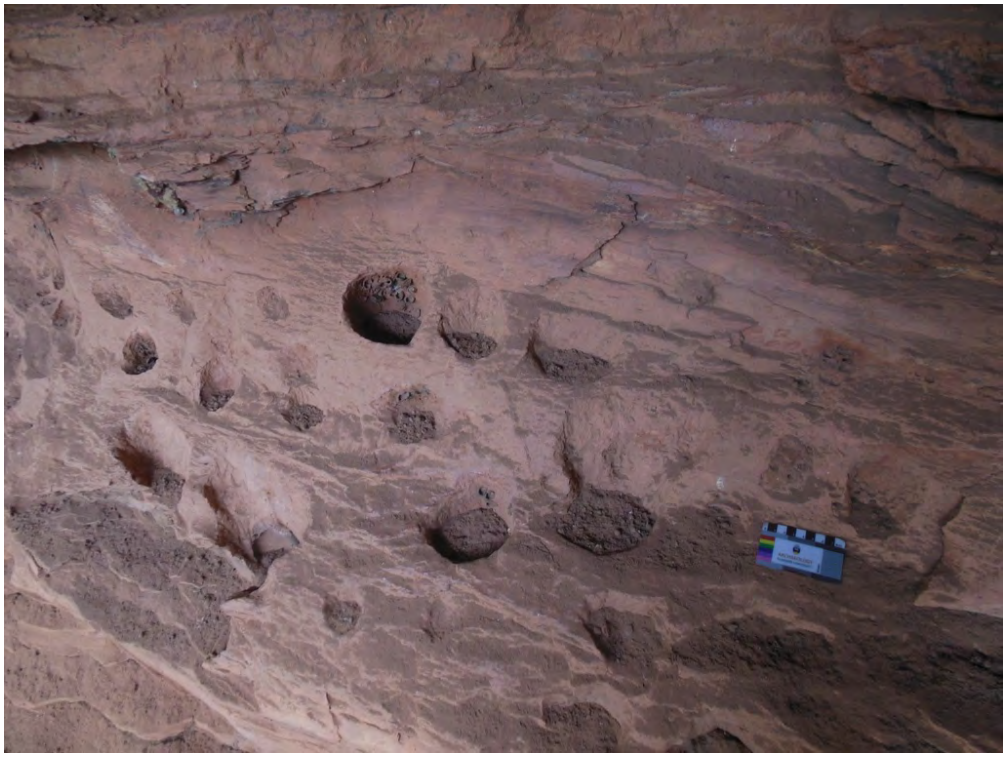


FIGURE 11: GRIND HOLES IN THE WALL OF SHER_RA13_09

FIGURE 12: GRIND HOLES ALONG THE FULL LENGTH OF THE WALL. SCALE = 8CM

SITE IMAGES OF SHER_RA13_10

FIGURE 13: EMU TRACK PETROGLYPH

FIGURE 14: HAND STENCIL PARTIALLY COVERED BY WASP NESTS.

SITE IMAGES OF SHER_RA13_11

FIGURE 15: YELLOW HAND STENCILS AND EMU FOOTPRINT MOTIFS

SITE IMAGES OF SHER_RA13_12

FIGURE 16: FADED WHITE HAND STENCIL

FIGURE 17: WHITE HAND STENCILS

IMAGES OF HISTORICAL SITE SHER13_01

FIGURE 18: DENNIS DUNCAN ON A SLAB IN SHER13_01

FIGURE 19: METAL DRUM

FIGURE 20: DISCARDED CORE

FIGURE 21: NUMEROUS SMALL PIECES OF DISCARDED CORE

IMAGES OF OPEN SITE SHER13_02

FIGURE 22: DENNIS DUNCAN IN SHER13_02

FIGURE 23: CHERT AND SILTSTONE ARTEFACTS IN SHER13_02

FIGURE 24: DORSAL SURFACE, CHERT BLADE

FIGURE 25: VENTRAL SURFACE, CHERT BLADE

FIGURE 26: CHERT UNIFACIAL POINT

A SELECTION OF IMAGES OF ISOLATED ARTEFACTS

FIGURE 27: SHER_ISO13_01 BROKEN METAL AXE HEAD

FIGURE 28: SHER_ISO12_03 CHERT FLAKE

FIGURE 29: SHER_ISO13_04 PORTABLE GRINDSTONE

FIGURE 30: SHER_ISO13_05 PORTABLE GRINDSTONE AND GRINDER

APPENDIX B: DATA COLLECTED BY OTHERS

APPENDIX B: DATA COLLECTED BY OTHERS

During the field survey, further data on other archaeological sites and potential sites was collected by Col Jardine and Howard Smith, of Sherwin Iron, and by Justine Shailes of EcOz Environmental Services. Col Jardine has also provided images of sites recorded prior to the survey period. This data has been collated here to provide a centralised reference of known and potential heritage for Area C.

B1: POTENTIAL SITES RECORDED BY JUSTINE SHAILES, ECOZ

Justine Shailes, Senior Environmental Consultant at EcOz Environmental Services, recorded the locations of three potential archaeological sites she came across during her environmental surveys in Area C. In each location, Justine found round depressions in flat rock surfaces that appear to be grind holes. These locations should be archaeologically surveyed to confirm the presence of sites.

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FIGURE 1: GRIND HOLE, LOCATION A. PHOTO BY JUSTINE SHAILES

FIGURE 2: GRIND HOLE, LOCATION A. PHOTO BY JUSTINE SHAILES

FIGURE 3: GRIND HOLE, LOCATION A. PHOTO BY JUSTINE SHAILES.

FIGURE 4: LOCATION B. PHOTO BY JUSTINE SHAILES.

FIGURE 5: GRIND HOLES, LOCATION B. PHOTO BY JUSTINE SHAILES

FIGURE 6: GRIND HOLES, LOCATION B. PHOTO BY JUSTINE SHAILES

FIGURE 7: POSSIBLE GRIND HOLE, LOCATION C. PHOTO BY JUSTINE SHAILES.

B2: SITES RECORDED BY HOWARD SMITH, SHERWIN IRON

Howard Smith conducted transects with Col Jardine in the southern part of Area C, 18-20 July 2013. The following tables outline the sites and artefacts Howard located during these transects. All photos are by Howard Smith.

TABLE 1: HOWARD SMITH SURVEY RESULTS



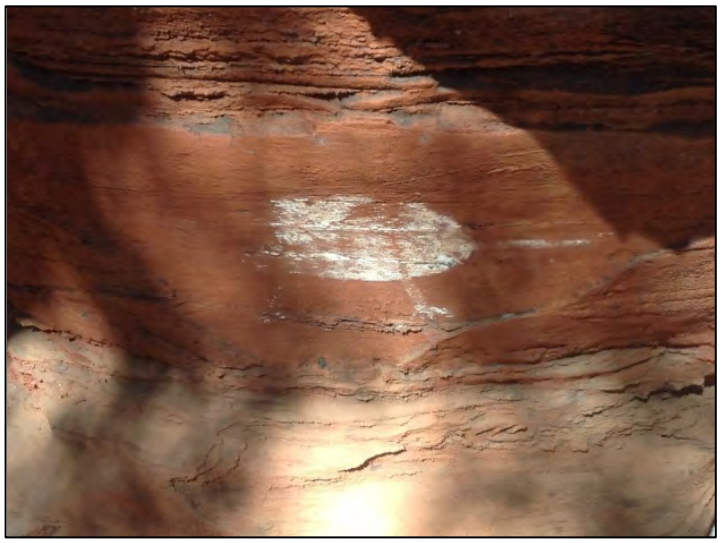


Site 1: This site consists of two small caves set in a ferruginous shale overhang approximately 30m long. The main cave is about 2m high, 5-6 m wide and 5m deep. No artefacts were observed, however two rocks that may hold sharpening lines were found close to the entrance. The caves do not hold any examples of rock art, but there is a faint hand stencil located on the ledge wall approximately 10m upstream of the main cave.

Site 2: A small, rocky overhang with a lower ledge approximately 1m high and an higher ledge at about 2m. The overhang is 1-2m deep. It contains two clear white hand stencils and a possible third on the facing walls. However, there no other artwork or artefacts were observed.

Site 3: This is a large overhang approximately 6m high, 5m deep and 20m wide and facing west. The floor is littered with small shards of fallen rock, making it difficult to identify the possibility of stone artefacts. A solitary white stencil of a hand is located near the entrance.

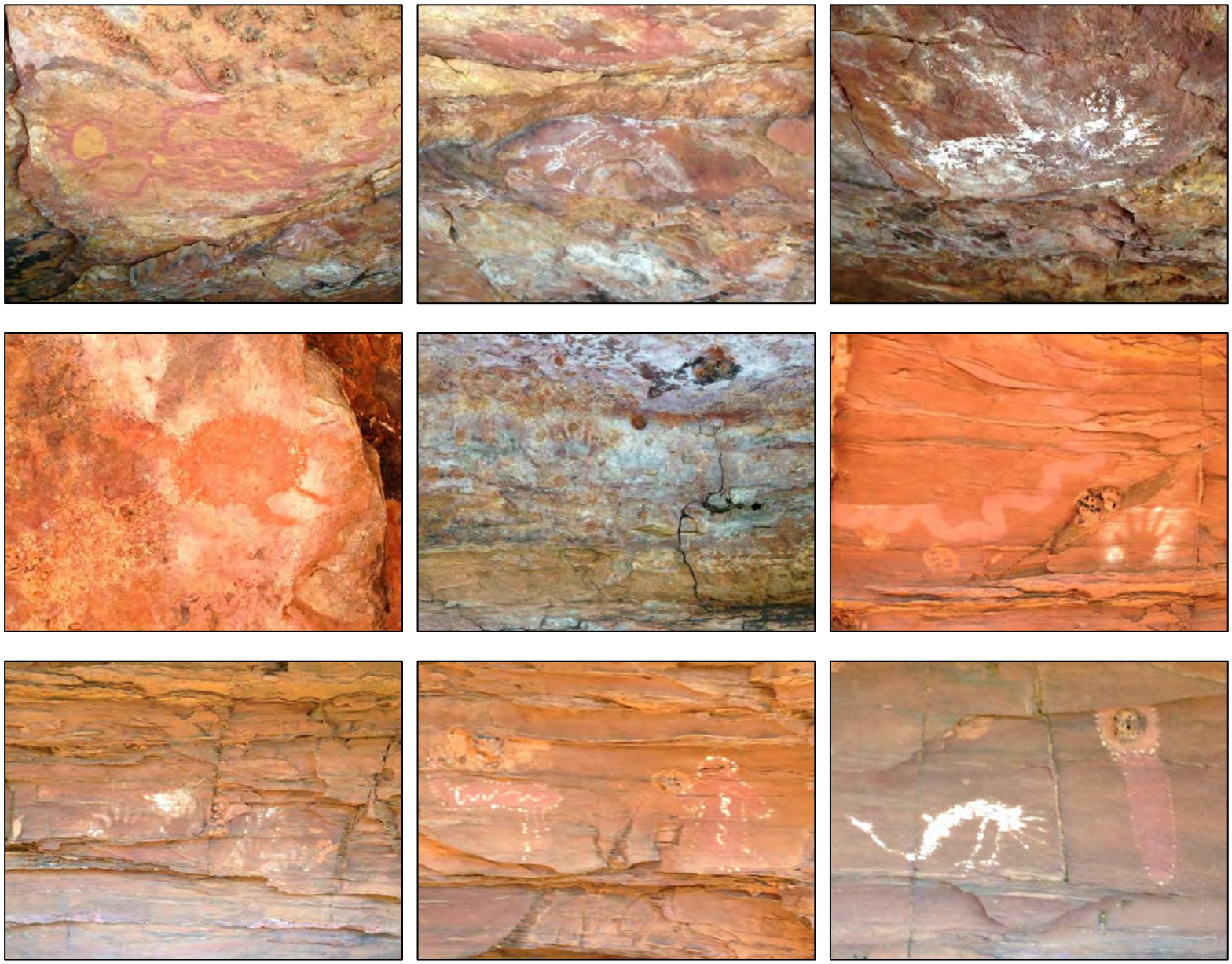
Site 4: This site is a rounded ferruginous shale rock shelter about 1.5m high, 6m wide and 6m deep. There are a number of animal bones near the entrance of the shelter. No artefacts were observed, however there are a number of examples of artwork, including white hand stencils on the facing wall and ceiling and a white motif (~7 inches across) on the ceiling towards the back.



Site 5: This site is a multiple-shelved cave, about 10m high, 20m wide and 15m deep and located at the head of a small ravine. There is a white motif (which may represent a small marsupial) at the northern entrance of the cave. A core, which has had several flakes removed, was located at the entrance of the cave just below the motif.

Site 6: A ferruginous shale shelter about 2m high, 4m wide and 3m deep. It contains one white hand stencil near the cave centre, but no other evidence of human visitation was observed.

Site 7: A shelter approximately 2m high, 5m wide and 4m deep, that holds no examples of rock art. Two small stone artefacts were found on the cave floor, near the entrance. The cave floor is dusty and littered with rock shards, suggesting that others may be present.



Site 8: A series of 10 photographs showing the "Mermaid Cave": This shelter is about 2m high, 20m long, 3m deep and adjoins the main art chamber. It is adorned with several examples of rock art, ranging from simple white stencils, red ochre monochrome, to duochrome anthropomorphic figures.

B3. PHOTOS PROVIDED BY COL JARDINE

Col Jardine, community relations manager at Sherwin Iron, provided the following additional photos of the 'Mermaid Cave' site, recorded above by Howard Smith.

FIGURE 8: 'MERMAID CAVE' SITE OVERVIEW. PHOTO BY COL JARDINE.

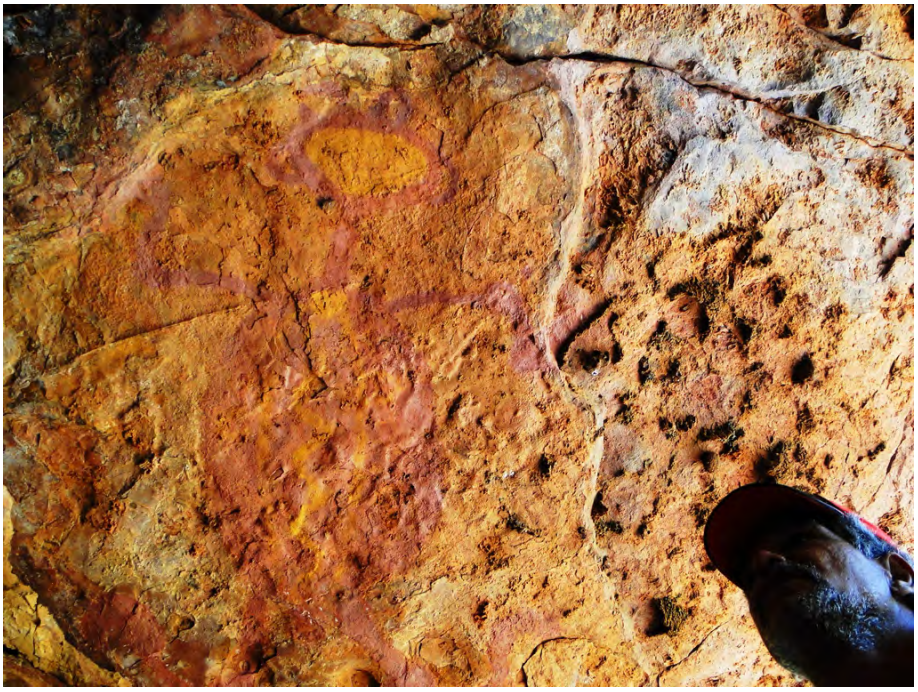


FIGURE 9: DUOCHROME FIGURE, 'MERMAID CAVE.' PHOTO BY COL JARDINE.

FIGURE 10: INDISTINCT MOTIF. PHOTO BY COL JARDINE.

FIGURE 11: WHITE HAND STENCIL. PHOTO BY COL JARDINE.

FIGURE 12: INDISTINCT MOTIF. PHOTO BY COL JARDINE.

FIGURE 13: RED HAND STENCIL. PHOTO BY COL JARDINE.

FIGURE 14: DUOCHROME FIGURE. PHOTO BY COL JARDINE.

FIGURE 15: INDISTINCT MOTIF. PHOTO BY COL JARDINE.

FIGURE 16: SERPENT MOTIF AND HAND STENCILS IN BACKGROUND. PHOTO BY COL JARDINE.

FIGURE 17: BOOMERANG, EMU AND UNKNOWN MOTIFS. PHOTO BY COL JARDINE.

FIGURE 18: POSSIBLE EMU AND ANTHROPOMORPH MOTIFS. PHOTO BY COL JARDINE.

FIGURE 19: PARALLEL LINES. PHOTO BY COL JARDINE.

FIGURE 20: INDISTINCT MOTIF. PHOTO BY COL JARDINE.

Aboriginal Areas Protection Authority
protecting sacred sites across the territory

Our File: 2011/14619
In reply please quote: 20111361

Sherwin Iron (NT) Pty Ltd
PO Box 1126
SUBIACO WA 6904

ATTENTION: Stacey Apostolou

RE: ISSUE OF AUTHORITY CERTIFICATE FOR EXPLORATION LICENCE 24101

I refer to your application for Authority Certificate received on the 18th July 2011 for the above location. Accordingly, under the powers delegated to me under Section 19 of the *Northern Territory Aboriginal Sacred Sites Act 1989* I am pleased to issue the attached Authority Certificate.

Please read carefully the conditions outlined in the Certificate. In particular, you should note that it has been issued for an indefinite period of time, providing that the works covered by the Certificate start within the period stipulated in condition 3.

Please be advised that archaeological places or objects may exist within or in the vicinity of your application area and that all such materials are protected under the *Northern Territory Heritage Conservation Act 1991.* The locations of known Aboriginal heritage sites are marked by blue squares on the attached map, and the locations described in an appendix to the Authority Certificate. For further information please contact the Heritage Branch of the Department of Natural Resources, Environment, the Arts and Sport on (08) 8999 5036 or email heritage.nreta@nt.gov.au.

You should also note that the Authority has issued you with two identical copies of digitised maps attached. One copy should be retained with your original Certificate. The second is supplied for use by contractors to avoid unnecessary photocopying of a colour coded document.

Please note that the cost of this Authority Certificate will be $6,010 and an invoice will be issued to you by the Department of Business and Employment [DBE). The terms and conditions of the invoice will require you to make payment within 30 days of receipt.

If you have any further queries regarding this Authority Certificate please contact Jackie Gould on 8999 4343.

Yours faithfully

DR. BEN SCAMBARY
Chief Executive Officer
4 September 2012

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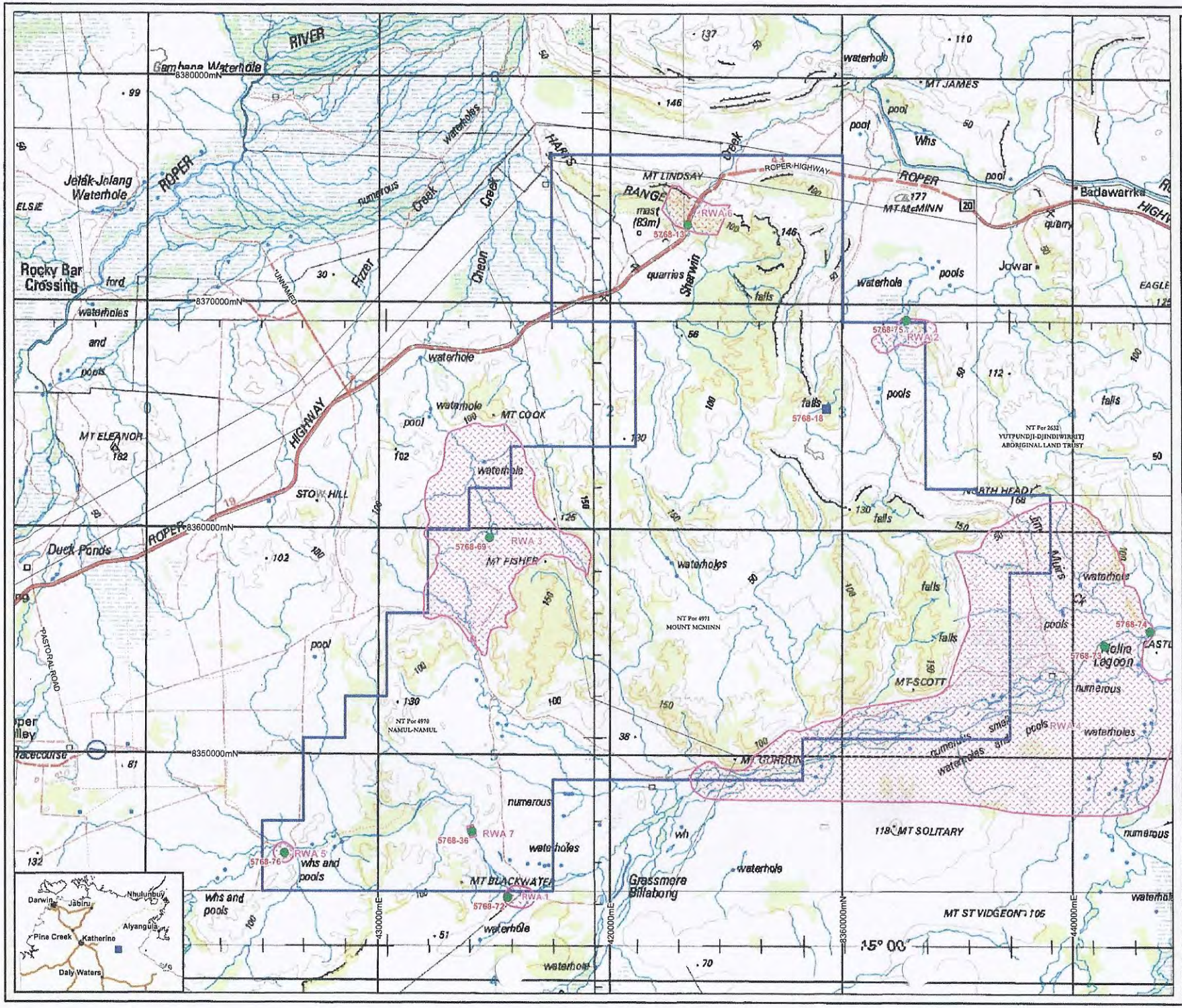

EL24101

ANNEXURE "A" MAP FORMING PART OF

AUTHORITY CERTIFICATE C2012/185

ISSUED TO: Sherwin Iron

AUTHORISED COPY: NUMBER 1 OF 4

CHECKED BY: ..... DATE 4/9/2012

SHAWN SMITH - SENIOR LAND INFORMATION OFFICER

SCALE 1 : 150 000

0 3,000 6,000
metres

Projection MGA Zone 53
Horizontal Datum: GDA94

KEY

- Subject Land
- Other Site
- Restricted Works Area
- Recorded Sacred Site

Prepared and produced by Aboriginal Areas Protection Authority (AAPA), Darwin, Northern Territory of Australia 20/07/2011
© Northern Territory of Australia

This map forms part of a Certificate issued by the Authority under section 22 of the *Northern Territory Aboriginal Sacred Sites Act 1989*. No reliance should be put on the accuracy of the information on the map except as it relates to the land the subject of the Certificate and the fact that sites are not shown in other areas shall not be taken as a definitive indication of the existence or lack of existence of sites in these areas.

J2011 0383

ABORIGINAL AREAS PROTECTION AUTHORITY
AUTHORITY CERTIFICATE

Issued in accordance with Section 22 of the Northern Territory Aboriginal Sacred Sites Act 1989.

REFERENCE: **2011/14619** **(Doc: 20111361)** **C2012/185**

APPLICANT: Sherwin Iron (NT) Pty Ltd
PO Box 1126
SUBIACO WA 6904

SUBJECT LAND: Exploration Licence 24101, as shown on the map which is annexure 'A' hereto.

PROPOSED WORK OR USE: RC and diamond drilling of up to 514 holes with a maximum depth of 60m; up to 445 drill pads; and up to 104kms of associated line/track clearing.

CONDITIONS:

1. The applicant shall ensure that the conditions of this Certificate are included in any subsequent contract or tender documents for the works or use described herein.
2. The applicant shall ensure any agent, contractor or employee is aware of the conditions of this Certificate and the obligations of all persons (who enter on, or carry out works or use land on which there is a sacred site) under Part IV of the *Northern Territory Aboriginal Sacred Sites Act 1989.*
3. This Certificate shall lapse and be null and void if the works in question or the proposed use is not commenced within 24 months of this Certificate.
4. The applicant shall ensure any agent, contractor or employee is aware of the content of section 40(1) of the *Northern Territory Aboriginal Sacred Sites Act 1989* which provides that this Certificate does not negate the need for consent, approval or permission for the subject works or use of the land which may be required under another statute.
5. Within the area marked Restricted Works Area (RWA 1) on annexure 'A' associated with sacred site 5768-72, no works and no damage shall occur.

   Sacred site 5768-72 comprises a billabong and adjacent area along Blackwater Creek approximately 2km east south-east of Mt Blackwater.
6. Within the area marked Restricted Works Area (RWA 2) on annexure 'A' associated with sacred site 5768-75, no works and no damage shall occur.

   Sacred site 5768-75 comprises a permanent spring in a flat area of country surrounded by hills, situated about 6km due south of the Roper Highway.
7. Within the area marked Restricted Works Area (RWA 3) on annexure 'A' associated with sacred site 5768-69, no works and no damage shall occur.

   Sacred site 5768-69 comprises open country extending through a circular valley area surrounded by ridges including Mt Cook to the north.
8. Within the area marked Restricted Works Area (RWA 4) on annexure 'A' associated with sacred site 5768-73 and 5768-74 no works and no damage shall occur.

   Sacred site 5768-73 comprises a large plain situated south and east of Mt Gordon and Mt Scott and extending east along the Hodgson River.

   Sacred site 5768-74 comprises a billabong along the Hodgson River.

9. Within the area marked Restricted Works Area (RWA 5) on annexure 'A' associated with sacred site 5768-76, no works and no damage shall occur.

   Sacred site 5768-76 comprises a lagoon situated adjacent to station tracks and fence line approximately 1.05km northwest of Jaberu Hill.

10. Within the area marked Restricted Works Area (RWA 6) on annexure 'A' associated with sacred site 5768-13, no works and no damage shall occur.

    Sacred site 5768-13 comprises a long narrow gorge through which the Roper Highway passes, south of Mt Lindsay.

11. Within the area marked Restricted Works Area (RWA 7) on annexure 'A' associated with sacred site 5768-36, no works and no damage shall occur.

    Sacred site 5768-36 comprises a waterhole along Blackwater Creek in a gorge situated north of Mt Blackwater.

The COMMON SEAL of the
ABORIGINAL AREAS PROTECTION AUTHORITY
was hereto affixed on the 4 day
of September 2012

ABORIGINAL AREAS PROTECTION AUTHORITY
THE
COMMON SEAL
OF

DR. BEN SCAMBARY
Chief Executive Officer

Attachments: Appendix, List of known Aboriginal Heritage Places

Appendix:

Archaeological places or objects exist within or in the vicinity of your application area. All such materials are protected under the *Northern Territory Heritage Conservation Act 1991*. Those that could be identified at the time this Certificate was issued are described in this Appendix, and have been shown as blue squares on the attached map (Annexure A). For further information please contact the Heritage Branch of the Department of Natural Resources, Environment, the Arts and Sport on (08) 8999 5036 or email *heritage.nreta@nt.gov.au*.

Known Aboriginal heritage places within the subject land:

1. Occupation site 57618-18 located at 429327E 8365365N