

Appendix 6

**Archaeological Survey for the Proposed Browns
Oxide Mine, Batchelor, NT**

**ARCHAEOLOGICAL SURVEY FOR THE PROPOSED
BROWNS OXIDE MINE, BATCHELOR, NT**

A report for Enesar Consulting Pty Ltd

On behalf of Compass Resources NL (Compass)

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SUMMARY

This report describes an archaeological survey of the proposed Browns Oxide Project located seven kilometers north of Batchelor. Begnaze Pty Ltd was contracted by Enesar Consulting on behalf of Compass Resources to undertake a survey to describe the nature and significance of any archaeological material located within the boundaries of the proposed mine site. Recommendations are made to mitigate the loss of any identified and unidentified archaeological or historic places and objects in the areas to be disturbed

Four archaeological sites and seven areas of isolated artefacts (background scatters) were located during the survey. In order that compliance with the provisions of the Northern Territory Heritage Conservation Act 1991 is carried out, the following recommendations are made if the following archaeological sites and objects are to be disturbed by the project.

Site	Easting*	Northing	Significance	Recommendation
RM1	52 717247	8562406	Low	Permission to disturb/destroy sought, no further action required
RM2	52 717088	8562523	Low/mod.	Permission to disturb/destroy sought, detailed on-site recording
RM3	52 717184	8562164	Low	Permission to disturb/destroy sought, no further action required
RM4	52 715956	8562670	Low	Permission to disturb/destroy sought, no further action required
B/scatters	various		Low	Permission to disturb/destroy sought, no further action required

*WGS84

Because of very low ground visibility and difficult access due to the dense vegetation at the time of this survey, it is recommended that a further survey be made over the northeast section of the proposed development in the area of the hill adjacent to the East Finniss River after the vegetation has been burnt.

The North Australian Railway is at the moment listed on both the Commonwealth's Register of the National Estate and Northern Territory Heritage Register. It is recommended that permission to destroy the section of the line in the project area between 52 7152175E 8562450N and 715200E 8562100N is sought from only the Minister of the Environment and Heritage, Northern Territory, as there are no legal constraints for the project on the Register of the National Estate.

While there are no legal constraints for the protection of the CRA mine head, it is recommended that it is removed to a location where it will not be destroyed by the proposed project.

If any archaeological or historic sites or objects are located during the construction and operational stages of the project, it is recommended that all work should cease immediately in the area and the Heritage Conservation Services contacted to obtain advice to ensure that this material is protected.

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1.0. INTRODUCTION

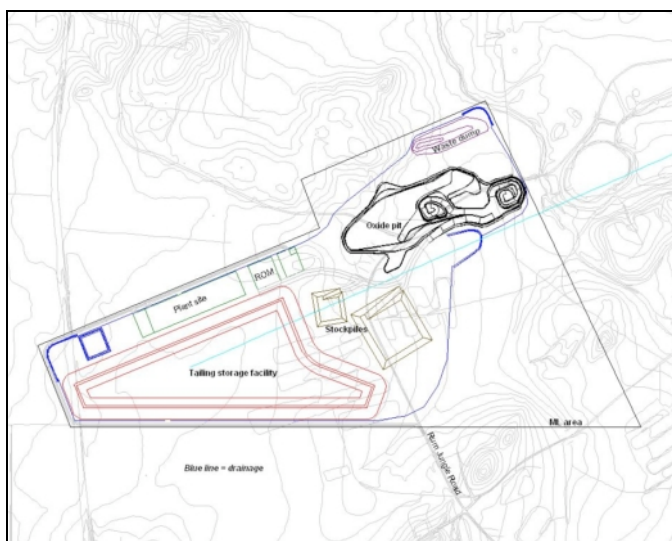
This report describes an archeological and heritage survey over the proposed mining operation called the Browns Oxide Project. The proposed mine is located 65km south of Darwin and 7km northwest of the Batchelor township. Begnaze Pty Ltd was engaged by Enesar Consulting Pty Ltd on behalf of Compass Resources NL (Compass) to provide the archaeological and heritage component of the Browns Oxide Project environmental impact assessment. The scope of works from the Office of the Environment and Heritage required an archaeological survey over those areas that will be impacted upon in the short to medium future and possess some potential to contain prescribed archaeological places or objects resulting from Aboriginal occupation.

Figure 1 illustrates the boundary of the areas to be disturbed by the current project area where the western edge is near the old North Australian Railway and the eastern boundary is adjacent to the old Rum Jungle Mine. The majority of the proposed disturbance is in the northern and western sections of the project area

The aim of the archaeological study is to locate and record any archaeological objects or places to ensure that the provisions of the *Northern Territory Heritage Conservation Act 1991* are not contravened. The archeological survey was carried out as follows:

- The archaeological and heritage study identified archaeological and historic material within the designated area by means of pedestrian surveys carried out in a manner that ensured the highest possible coverage of the area.
- Any archaeological or heritage places, objects or classes of objects located during the survey were recorded in such detail as to permit independent assessment of their significance. The location of any archaeological places and objects included coordinates obtained by a hand-held Global Positioning System using WGA84 datum. All sites were named in order to identify the sites on the ground.
- After assessing the significance of the archaeological place or object, recommendations are made regarding compliance with the provisions of the *Northern Territory Heritage Conservation Act 1991*.

Figure 1. Proposed Browns Oxide Mine footprint



2.0. THE ENVIRONMENTAL SETTING

The geomorphology, geology and vegetation in the general area of the proposed development are key factors influencing the type and visibility of any archaeological material and sites that exist in the area. As indicated by Figure 1 the survey area covers an area of approximately 2km².

The area is located on the dissected foothills geomorphic unit and the Batchelor Land System (Christian and Stewart 1953, Pietsch 1986) which consists of unconsolidated sand, ferruginous, clayey sand and gravelly soils that form undulating rubblely rises and low hills which are dominated by woodlands, mixed scrubland, cycads and *Livistona* palm forests and stands of *Melaleuca*, *Pandanus* and grassland in low lying drainage areas. Small patches of monsoon forest occur at Rum Jungle (Christian and Stewart 1953:94). The survey area consists of undulating country interspersed by small hills with the terrain draining into the eastern branch of the Finnis River located near the eastern border. This section of the creek does not flow from about June to December.

The geology of the area indicates that the type of raw material used in the manufacture of stone artefacts in the past was locally available. Within five kilometers of the survey area there are outcrops of sandstone, siltstone, quartz and quartzite in the Mount Partridge group, and dolerite from the Zamu Dolerite Group. (Pietsch 1986 and 1989, Christian and Stewart 1953). The area between the low lying hills and flood plains is of Quaternary alluvium, composed mainly of silt, sand and clay deposited along the creeks and major drainage lines.

3.0. CULTURAL SETTING.

3.1. Ethnographic background.

Ethnographic and ethnohistoric data can be used to develop predictive models regarding the nature and distribution of archaeological sites in the proposed development area. The following description outlines the subsistence strategies and settlement patterns documented during the late nineteenth and early twentieth century.

Basedow (1907) and Foelsche (1882) give general accounts of subsistence activities in the Top End of Australia and they describe permanent swamps and lagoons as being focal points, especially in the dry season, for subsistence activities. Besides being a source of fresh water, these features provided fish, geese, ducks, turtles, crocodiles and their eggs, shell fish and the roots of water lilies and rushes. Kangaroos and wallabies could be ambushed on animal tracks leading to the water source (Foelsche 1882:12-13). Away from the lagoons, wallabies, snakes, goannas and other small game were hunted.

Brockwell (1995) notes that the only items used to facilitate the subsistence activities described above that are likely to survive in the archaeological record are shell fish hooks, hearths containing cooking stone or termites nests and stone tools such as spear heads, axe heads, knives and, grindstones. Other items used in the daily life of the Aboriginal people in the past that are unlikely to have survived are wooden spears, digging sticks and small bags and nets.

3.2. Historic record.

The surveyor general of South Australia, WG Goyder in 1869, led the first European group in the area. Their presence was not welcomed by one group of Aborigines who attacked the party in the Adelaide River area, 25 kilometres south of Batchelor (Annabell 1997). The aim of the survey was to map out new towns, farming areas and search for minerals. One of Goyder's party found a green ore which looked like copper near a huge quartz reef they named 'Giants Reef' a couple of kilometres from the old Rum Jungle Mine.

In 1872 the construction of the Overland Telegraph Line resulted in a rough track along the line being used to reach the gold fields in the south from Southport on Darwin Harbour (Barrie 1982). A hotel was built next to the Overland Telegraph Line in 1874 and was located approximately two kilometers south of the Brown's Oxide Project (Barrie 1982). The North Australian Railway had been completed from Darwin to Pine Creek 1890s and a remnant of the line is in the western section of the proposed development area.

In the 1880s and 1890s several agricultural ventures such as coffee and tobacco were started in the area, however all were short lived because of climate, soil and marketing problems. In 1911 a government experimental farm was set up at Batchelor and had closed by 1919 (Powell 1993).

World War II brought Batchelor into prominence when in February 1942 the Americans arrived to expand the Batchelor airstrip into a major base (Barrie 1982:111). While there were thousands of servicemen in the area no infrastructure was built in the Rum Jungle area.

The Rum Jungle area was prospected by many fossickers from 1887 when shafts were sunk for silver and copper and in 1907 the Rum Jungle copper mine commenced two kilometers north of the Rum Jungle railway station. During the 1940s small amounts of gold were mined approximately seven kilometres northeast of Batchelor.

In 1949 a local prospector Jack White received confirmation that there was uranium rich ore in the Rum Jungle area and after two years of exploration mining commenced at White's Mine by CRA (Barrie 1982). Between 1954 and 1958 the open cut mining method was used and before this started it was necessary to dam the East Branch of the Finnis River above and below the mine. The ore was stockpiled and processing of the uranium ore ceased in 1964. Copper mining at the "Intermediate" open cut adjacent to the Browns lease continued for another year. During the 1970s and 80s much of the mine was rehabilitated and much of the infrastructure was sold off.

3.3. Archaeological background.

There are no recorded archaeological sites within the boundaries of the study area. However it should be pointed out that there is a paucity of systematic archaeological surveys in this area prior to the current study. There have been several archaeological surveys carried out for archaeological clearances in the Batchelor region and have included a narrow corridor for the proposed route of the Darwin – Alice Springs railway, a survey by Burns (1996) and Heritage Surveys (2002) southeast of Batchelor and north in the Manton Dam region.

Burns (1996) located two scatters and a quarry along the proposed railway corridor to the south of Coomalie Creek. These sites range in size from 900 to 4800m², with average artefact densities ranging between 1 to 15/m². The sites generally contain a variety of artefact types including bifacial points, cores, flakes and retouched flakes, and raw materials of Gerowie tuff and white quartz.

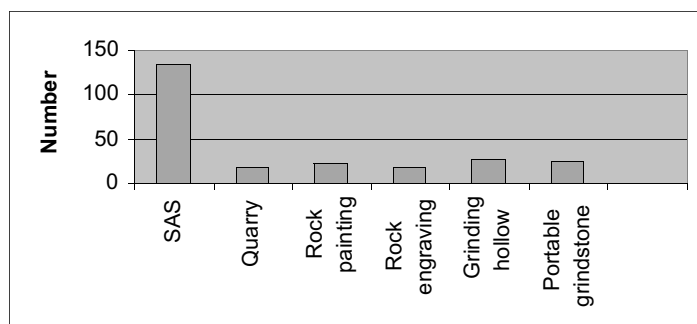
In the Manton Dam area Heritage Surveys (2002:23-240) found that zones along quartzite ridges were the areas with the highest density of archaeological material and that the majority of isolated artefacts were found within 100 metres of a permanent or semi-permanent water source. The survey located five artefact scatters, one rock shelter and one quartz quarry. The majority of the sites were located on low rises and adjacent to creeks. Quartz represented the dominant raw material in all of the sites and two sites contained several tuff flakes and flakes manufactured from an unidentified volcanic raw material. The site dimensions ranged from 25-375 square metres and the mean average densities were less than 0.5 artefacts per square metre.

Bourke's survey (2002) between Coomalie Creek and Batchelor identified four stone artefacts scatters, dimensions ranging from 200-700 square metres with an average densities from

1-7 artefacts per square metre. Artefact types recorded included flakes, retouched flakes, cores and the broken butts of bifacial points made from quartz, tuff and quartzite.

A search of the Archaeological Site Register at the Heritage Conservation Branch identified 192 sites consisting of either stone artefact scatter (SAS), quarries, rock art or engravings and 51 sites that contained either grinding hollows or portable grindstones within 50 kilometres of the survey area (Figure 2). Open artefact scatters are the most common type of site in the region.

Figure 2. Archaeological site types in the region



Quartz, which crops out locally, is the dominant raw material in all sites in the area. Artefacts manufactured from Gerowie tuff, are present in small numbers and must have been transported some distance to the sites, possibly from outcrops of this material that occur to the south and east of the survey area.

Sites to the south of the study area tend to be dominated by the raw material Gerowie Tuff, while north of the area closer to Darwin in places where surveys have been undertaken such as Berry Springs, quartz is the major raw material component in all sites (Burns 1999; Guse 1995). This pattern reflects the nearest available type of raw material for artefact manufacture.

Guse (1998) suggests that medium-large sized artefact scatters with a low diversity of raw material and artefact types found in association with rock outcrops suitable for quarrying, represent short-term logistic encampments of a mobile Aboriginal population focussing on water and raw material sources.

3.4. General expectations, site patterning in the Rum Jungle area.

While the density and nature of archaeological material can be expected to vary across the study area as a reflection of the variation in resources, it is expected that a higher number of stone artefacts will occur within areas of rock suitable for stone artefact manufacture (eg quartz,) than in areas devoid of such material. Quaternary sediments such as flood plains around watercourses will contain no suitable rock source. There will be a greater relative frequency of archaeological material adjacent to permanent and semi- permanent water such as the East Branch of Finnis River and its tributaries.

4.0. METHODOLOGY

Before the survey commenced contact was made with the majority of the relevant members of the Kungarakan and Warai people, through the Northern Land Council, who are responsible for the country that will be affected by the development. The survey was carried out and then the results discussed with the relevant people.

The consultant met with John Earthrowl of Compass Resources at the site and was shown the boundaries of the proposed area to be disturbed and vehicular access to various areas.

Stratified transect were made over the area west of Rum Jungle Road and consisted of a series of parallel pedestrian transects approximately 100 metres apart. Transects in the southeast section of the survey area east of Rum Jungle Road targeted areas around and over the higher ground and along the waterways. Access to the northeast section was difficult (see results below) and consequently only accessible areas were surveyed. Enesar Consulting stated that the historic Rum Jungle mine site is outside of the study area and should not be surveyed.

The survey was carried out by Christine Crassweller and took two days.

4.1. Types of archaeological sites.

Previous archaeological surveys in the area indicate the possibility of locating three types of site types that can broadly be defined as follows:

- *Artefact scatters.* These may contain flaked or ground artefacts and hearthstones and indicate a range of activities has occurred there in the past. They occur as surface scatters of materials or as stratified deposits when there has been repeated occupations.
- *Knapping floor.* A cluster of stone artefacts that represent the remains of an episode of stone artefact manufacture.
- *Stone quarries* are generally sites where stone for flaked or edge ground artefacts have been extracted from an outcropping source of rock.

4.2. Site definition.

An archaeological site is defined for this survey as having ten or more stone artefacts within an area of 2 m² or a concentration of artefactual material with an average density that is 5 times greater than the average density of the background scatter. A site will have an identifiable boundary where either artefact densities decrease to the extent as to be classified as background scatter or environmental features determine the boundary.

Background scatter is generally a very low density, more or less continuous distribution of artefacts over the landscape. Although these artefacts do not constitute a site they will be given location details for research purposes.

4.3. Artefact identification.

A requirement for a successful archaeological project involves the accurate identification of archaeological materials. The following principles were used in artefact identification.

Each time sufficient force is applied to the surface of an isotropic rock it will fracture into two pieces, the core and the flake. For an object to be identified as a flaked object it needs to possess one or more of the following:

- a positive or negative ring crack.
- a distinct positive or negative bulb of percussion.
- a distinct erillure scar in an appropriate position below the platform.
- definite remnants of flake scars on dorsal surface or ridges.

Stone artefacts are divided into four main technological types; cores, unretouched flakes, retouched flakes and flaked pieces (Hiscock 1984:128-129). They are defined as follows:

- *cores* are pieces of stone that have one or more negative scars and the absence of positive flake scars.
- *unretouched flakes* are pieces of stone that have been struck off another piece of stone and ideally possess platforms, positive bulbs of percussion, concentric ripples, ring cracks and /or craillure scars on the ventral surface.
- *retouched flakes* are flaked flakes. They are identified by the presence of negative scars that must have been created after the ventral surface of the flake had been created. There will be either negative scars on the ventral surface or negative scars on the dorsal surface, which have been formed by the flake being hit on the ventral surface.
- *flaked pieces* are stone artefacts that have been formed by knapping but cannot be identified as either a core or a flake.

Other artefact and implement types that have been identified in the region are listed below following characteristics outlined by McCarthy (1976).

- *Unifacial points* are flakes that have been retouched along the margins from one surface, either ventral or dorsal to give or enhance its pointed shape. They can be symmetrical or leaf shaped.
- *Bifacial points* are retouched along both ventral and dorsal surfaces of a flake to enhance or give the artefact its pointed shape. They may have the platform removed and the proximal end rounded.
- *Edge ground axes* have been shaped by the process of flaking, pecking and polishing. They generally have only one working edge that has been ground to a sharp margin although occasionally they may have two leading edges.
- *Grindstones* are characterized by a worn and abraded surface or surfaces. There also may be a concave surface.
- *Hammerstones* have use-wear on the surface in the form of the abrasion, pitting, edge fracturing with some negative scarring.
- *Manuports* are stone material that are not found naturally in an area and must have been carried in by humans.

4.4. Assessment of significance and heritage management principles.

According to Sullivan and Bowdler (1984) archaeological significance means that it has scientific, archaeological or research value, that is, it has the potential to assist current or future research into problems of human history or other areas of enquiry. The Australian ICIMOS Charter for the Conservation of Places of Cultural Significance, otherwise known as the Burra Charter (Maquis-Kyle and Walker 1992:73) states that the scientific value or research potential of a place depends upon the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place or object may contribute to further substantial information.

Therefore the significance of a site is firstly related to the intactness or integrity of a site, that is, the state of preservation as well as the stratigraphic reliability of the cultural material. Secondly, the representativeness of a site is important either because a site is unusual or because the site has research potential when taken in conjunction with other sites. Thirdly a site may provide chronology extending back into the past.

5.0. RESULTS

The surface of the majority of the survey area was highly disturbed by previous mining activities. Across the undulating plains were numerous costains, deep trenches, mounds of soil and areas of up to 500 x 50 metres where the surface had been removed. Ground surface visibility over the undulating plains was over 80%. The average ground visibility was higher in the southeastern section on the rocky and stony surfaces and around the creek banks. This section had

not been as highly disturbed in the past. The section south and north of the road into the Old Rum Jingle Mine was even more highly disturbed and there was very little surface that had not been cleared in the past. The hill located in the northeast corner was vegetated by gamba grass on the west and vine forest thickets on the east adjacent to the East Branch of the Finnis River. Consequently access over the hill was difficult and transects were only made over the hill in a north south direction where the vegetation allowed access.

As mentioned above the section north of the creek in the southeastern section has been highly disturbed and contains large areas where the surface has been removed. This has possibly resulted in the enlargement of the original floodplain area as the result of the diversion channel constructed in the 1950s. Transects were made through and around this floodplain.

Four archaeological sites of stone artefact scatters and seven areas of isolated artefacts (background scatters) were located during the survey, the details of which are found below. The historic sites and objects located during the survey included the North Australian Railway in the western section of the proposed development area, a 1960s mine head, a 1940s mine lease marker and several dumps of glass bottle and/or burnt can dumps. Three of these dumps were located adjacent to Whites Road in a highly disturbed area criss-crossed by old vehicle tracks and a fourth glass dump was located adjacent to several trenches and soil mounds west of the Rum Jungle Road. The glass dumps consisted of mostly beer bottles that indicated the dumps were associated with more recent (post 1960s) mining activities in the area.

5.1. RM1

Type: Artefact scatter / Mine lease marker

Location:

Grid reference: 52 717243E 8562425

1:100,000 Map Sheet: Batchelor 5171, 1:100,000, SD 52.

Ground visibility: 80-90%

This small low density stone artefact scatter is located half way up the southern slope of large rocky hill in a small level area amongst the rock outcrop surrounded by open *Eucalypt* woodlands with scattered *Livistonia* palms. The sixteen artefacts identified in the area were all manufactured from quartz. The majority of artefacts are located within an area of 5 x 3 metres with the remainder as isolated artefacts up the slope. Average density was one artefact per square metre with highest density of five per square metre. The artefacts consisted of unretouched flakes average length of 20-25mm and one core.

The slope was also covered in many non-artefactual quartz fragments and there was no indication that the locally outcropping material was quarried.

The summit of the hill, which is approximately 20 metres to the north of the site, had two cleared and leveled areas approximately 2 x 4 and 2 x 2 metres with the larger rocks placed around the boundary of the cleared area. In the middle of the lower and more southern cleared area is a galvanized pipe cemented into a large metal tin can that has been set in concrete in the ground. The concrete has been etched in writing that included 'Laid by T Rae A. McGregor' on the base and on the top of the concrete in the tin can is 'W. Austen W 4957' and 'J. Rae WL85', other illegible names and the date '6/9/42'

Site's relationship to proposed development.

The site is located in the southeast section of the survey area, approximately 100 metres west of the north-south fence line and within the proposed mine lease area. It is not in an area that is proposed to be disturbed.

Site's archaeological significance.

The presence of the mine lease marker suggests that the stone artefact scatter may have been disturbed in the past even though there does not appear to be any evidence of disturbance on the rocky surface of the site. As the stone artefact scatter contains a low diversity and density of stone artefacts when compared with sites in the wider region and may have been disturbed the site is assessed as having low research potential and can be considered to be of low archaeological significance.

Site's historic significance

As the mine marker is associated with events, developments or cultural phases, that is the past mining activities in the earlier days of Rum Jungle, there is low to moderate historic significance to the site. While mine lease markers are common in the area the object has been made more significant by the unconventional manner in which it has been made.

5.1. RM2

Type: Stone Artefact Scatter

Location:

Grid reference: 52 717088E 8562573

1:100,000 Map Sheet: Batchelor 5171, 1:100,000, SD 52.

Ground visibility: 80%

This site is located along a low quartz outcrop on a gentle slope and approximately 50 metres from a small flood plain. While the flood plain has now been highly disturbed there is evidence that a small creek flowed along the base of the slope in the past. This site is in an area that has been disturbed by mining activities with a deep trench cutting through the outcrop ten metres west of the site and an exploration pit ten metres to the northeast. The vegetation consists of open *Eucalypt* woodlands, *Cycads* and *Livistona* palms.

The majority of artefacts were manufactured from quartz and consisted of unretouched flakes, two bifacial quartz points and two quartz cores. Also identified were one quartzite core, four tuff flakes, one that had been steep retouched along one lateral and a flake manufactured from an unidentified volcanic material. Also noted in the site was a knapping floor consisting of very clear quartz flakes. The maximum density of stone artefacts was 5 artefacts per metres square and the average density was 2 per metre square.

Site's relationship to proposed development.

The site is located in the southeast section of the survey area and approximately 100 metres west of the north-south fence line and within the proposed mine lease area. It is not in an area that is proposed to be disturbed.

Site's archaeological significance

While this site is situated in an area that has been disturbed, the presence of the knapping floor indicates the site itself appears to be relatively intact. As there is a wider diversity and higher density in the artefact type and raw material, this site has research potential for understanding stone procurement, manufacture or use in the area. Consequently this site has been assessed as having low to moderate archaeological significance.

5.3. RM3

Type: Stone Artefact Scatter

Location:

Grid reference: 52 717184E 8562164N

1:100,000 Map Sheet: Batchelor 5171, 1:100,000, SD 52.

Ground visibility: 85%

The small low-density artefact scatter site is located on a low quartz outcrop approximately 5 metres from a small creek in an area of open *Eucalypt* woodlands and *cycads*. Boulders and small quartz cobbles crop out forming a dense carpet of quartz over an area of approximately 10 x 8 square metres, however there was no sign of the outcrop being quarried, nor were any quartz core identified at the site. The quartz flakes were located in an area of 4 x 3 metres with an average density less than 0.2 artefacts per square metre and a maximum density of 3 artefacts per square metre. Two small broken tuff flakes were also located on the outcrop.

Site's relationship to proposed development.

RM3 is located in the southeast section of the survey area and 5 metres north of the east west track and on the eastern side of the small creek.

Site's archaeological significance.

At first appearance this site had all the potential for being a quartz quarry. Nonetheless no signs were found of quarry activities nor were there many quartz artefacts identified. Therefore this site has been assessed as having low research potential and low archaeological significance.

5.4. RM4

Type: Stone Artefact Scatter

Location:

Grid reference: 52 715956E 8562670N

1:100,000 Map Sheet: Bynoe 5072, 1:100,000, SD 52.

Ground visibility: 90%

The small artefact scatter site is located on the northwestern side of a 2 metre high rock outcrop in the middle of undulating plains covered in open eucalypt woodlands. The artefacts were located in an area of 3 x 1 metres and were all manufactured from quartz except for one quartzite flake. None of the flakes were retouched. Average and maximum density was 5 artefacts per square metre. There is no indication that the site has been impacted by erosion or recent mining activities.

Site's relationship to proposed development.

MR4 is located in the area of the proposed ROM and mining contractor facilities and will be disturbed by the development.

Site's archaeological significance.

As this is a small stone artefact scatter with a low diversity of artefact types and raw material, and of a site type relatively common in the region, this site has been assessed as having low research potential and consequently has low archaeological significance.

5.5. Background Scatters

Seven areas with a background scatter of isolated stone artefacts were identified during the survey. The majority of isolated artefacts, Background Scatters 1 and 2 were located in the southeast section of the survey area, adjacent to a small tributary of the East Branch of the Finnis

River. Background Scatter 3 was located on the northwest side of a 2 metre high rock outcrop in the middle of an undulating plain. The artefacts were in the same position in relation to a rock outcrop as was artefact scatter RM4, located approximately 150 metres away. Background Scatters 5 and 6 were located on either the summit or the side of a rocky slope. The remaining two, Background Scatters 4 and 7, were located on the undulating plain.

Table 1. Location of background scatters

Backgro Scatter	Easting	Northing	Ground Visibility %	Location
1	52 717021**	8562270	85	700 m transect along northern bank of un-named creek
2	52 716900*	8562200	90	600m transect along southern bank of same creek
3	52 715926*	8562577	85	Rock outcrop on plain
4	52 715699*	8562295	80	Undulating plain
5	52 716117*	8562733	90	Edge of ironstone ridge
6	52 716183*	8563096	<10	Stony slope
7	52 716198*	8562260	85	Undulating plain

**Batchelor 5171 map sheet, * Bynoe 5072 map sheet

The majority of artefacts were unretouched flakes manufactured from quartz, which is locally available. One example each of quartzite and dolerite artefacts were identified, both of these raw materials can be found within 5 kilometres. No isolated artefacts were manufactured from tuff. The low proportion of retouched isolated artefacts tallies with the proportion of retouched artefacts identified in the stone artefact scatters.

Table 2. Description of isolated artefacts

Background scatter No.	Type of artefact	Raw material	Dimension (mm)
1	Unretouched flake	Quartzite	15 x 22 x 2
	Unretouched flake	Quartz	20 x 18 x 5
	Unretouched flake	Quartz	28 x 25 x 5
	Retouched flake, one lateral margin	Dolerite	30 x 18 x 8
2	Unretouched flake, platform preparation	Quartz	40 x 46 x 8
	Unretouched flake	Quartz	22 x 18 x 4
	Unretouched flake	Quartz	18 x 16 x 4
	Unretouched flake	Quartz	32 x 20 x 8
	Bifacial point butt	Quartz	40 x 36 x 8
3	Unretouched flake, broken longitudinally	Quartz	32 x 27 x 6
	Bifacial point butt	Quartz	28 x 25 x 6
	Unretouched flake	Quartz	25 x 38 x 8
	Unretouched flake	Quartz	21 x 24 x 4
	Unretouched flake	Quartz	32 x 30 x 4
4	Core, multi-platform	Quartz	82 x 66 x 58
5	Retouched flake, use wear	Quartz	18 x 15 x 4
6	Retouched flake on one lateral	Quartz	19 x 15 x 4
7	Bifacial point butt	Quartz	44 x 28 x 8

5.6. The North Australian Railway

The North Australian Railway runs across the western section of the survey area in a north-south direction. The only remains are the gravel bed on which the tracks were laid and in some sections the top layer of the gravel has been removed. There are the remains of metal bolts and other metal fragments along the line. As this section of the line has been highly disturbed it has been assessed as having low historic significance.

5.7. CRA Mine Head

This mine head was used in the 1960 and is located on southern side of Rum Jungle Road near the corner with Whites Road. It appears to be relatively intact and is still in good condition. Compass Resources plans to either donate the structure to an interested party in Batchelor to be displayed in the town or to move it from its present location where it would be destroyed to a location where it will be protected. As noted above much of the infrastructure from the Rum Jungle mine has been removed from the region and the mine head is only one of a few intact remaining structures associated with the mining boom in the area in the 1960s.

5.8. Discussion

The findings of the survey indicate that the density of Aboriginal archaeological sites and isolated stone artefacts decrease with distance from the Eastern Branch of the Finnis River. The size of the sites and the type of artefacts identified are similar to those found elsewhere in the region. As the proposed mine site has been highly disturbed in the past, there has probably been a loss of Aboriginal archaeological material in the area.

6.0. EFFECTS OF HERITAGE LEGISLATION ON FINDINGS.

There are both Northern Territory and Commonwealth legislations that protect archaeological and historic sites in the Northern Territory. There are two kinds of heritage sites protected under the *NT Heritage Conservation Act (1991)* that places legal constraints on owners of private property, local government and the Crown:

- Places or objects listed on the Northern Territory Heritage Register are declared heritage places and objects that are protected under section 33 of the Act. The protection of these sites and objects includes those that are proposed, that is, the place may warrant declaration under the Act but has not yet made its recommendations to the minister.
- Prescribed archaeological places and objects that are protected under sections 29 and 39 of the Act. These are listed on the Archaeological Site Register and include all sites and objects pertaining to the past occupation by Aboriginal people.

It is an offence under the Act to damage, destroy, alter or carry out work of any sort on declared or prescribed sites without the written consent of the Minister or Minister's delegate. Consequently the four stone artefact scatters and all the isolated stone artefacts (prescribed places and objects) located during the survey are protected under the act.

As the CRA mine head and the mine lease marker at site RM2 are not on either of the lists they are not protected under the Act. A section of the North Australian Railway in the vicinity of Adelaide River is presently nominated for The Northern Territory Heritage Register. It should not put legal constraints on the section of the railway line in the survey area.

The Commonwealth Government protects heritage sites under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Environment and Heritage Legislation Amendment Act (No 1) 2003* and places legal constraints on archaeological and historic sites. There are two lists of protected heritage sites that may be relevant to this study. The lists are available on the internet at <http://www.deh.gov.au> and they are:

- *The Register of the National Estate* represents a national database of places with significant Indigenous, historic or environmental values. There are no legal constraints on private owners. The Commonwealth Government is the only body whose actions are constrained as a result of listing in the Register of the National Estate

- *The National Heritage List* that protects places of exceptional natural and cultural significance with penalties for any breaches. Approval by the Minister of Environment and Heritage is needed before any sites are disturbed.

The North Australian Railway (NAR) is the only historic site on any of the Commonwealth registers that is located in the proposed development area. It is listed as an Indicative Place on the Register of the National Estate, that is, data has been provided to or obtained by the Commission and has been entered into the database. It is at some stage in the assessment process. However a description of the site includes the comment that:

“As a whole, the system does not meet the threshold for listing on the Register of the National Estate”

Consequently it is unlikely that the NAR will be registered in the future. There are no legal constraints as a result of being listed on this register.

7.0. RECOMMENDATIONS and MITIGATION PROCEDURES

7.1. Archaeological material

Four archaeological sites were located during the survey. It is recommended that if RM1, RM3 and RM4 are to be disturbed by the development, permission to destroy the sites should be sought from the Minister of the Environment and Heritage. As these three sites have been assessed as having low archaeological significance it is recommended that no further mitigation procedures are necessary for compliance with the provisions of the *Northern Territory Heritage Conservation Act 1991*.

As site RM2 has been assessed as having low to moderate archaeological significance it is recommended that if the site is to be destroyed then permission should be obtained from the Minister of Environment and Heritage to destroy the site with the *proviso* that a detailed surface survey is carried out over the site before it is disturbed.

As the background scatters of isolated artefacts have been assessed as having low archaeological significance it is recommended that permission to destroy the objects be obtained from the Minister of the Environment and Heritage. No further action is thought necessary for the mitigation of these objects.

It is recommended that a further survey be made over that northeast section of the proposed development in the area of the hill adjacent to the East Finnis River after the vegetation has been burnt. This recommendation is made because at the time of the survey ground visibility was very low and the predictive model and findings from this survey indicate that the area has a high potential for the presence of archaeological material.

7.2 Historic material.

The majority of historic material located during the survey have been assessed as having low historic significance as they are most likely related to the more recent mining activities in the area and have a low research potential. Although the CRA mine head is not protected under either the Commonwealth and Northern Territory heritage lists and it is associated with the Batchelor mining boom in the 1950s and 1960s it is recommended that the structure is removed to a ‘safe’ place either in Batchelor or on the Browns Oxide mine site.

If the North Australian Railway Line is to be destroyed / disturbed by the project then it is recommended that permission to disturb/ destroy is obtained from the Minister of the Environment and Heritage for the section of the railway line between approximately 52 7152175E 8562450N and 715200E 8562100N.

7.3. Construction and operational stages.

The majority of the proposed disturbance is planned to occur in the northeastern section of the Browns Oxide Project site. As this area, that includes the surrounding pit crest and buffer zone, has been highly disturbed in the past and there is little of the original surface remaining, there is a very low potential for the presence of archaeological material in this area. While the areas in the western section of the proposed development have not been disturbed to the same extent, it is located on undulating plains with very few geological features that may have been a focus for Aboriginal activities in the past. As there was a low frequency of identified archaeological material in this section and the areas around the geological features were examined during the survey, it is considered that the potential for the presence of unidentified archaeological or historic material is low. Consequently it is recommended that no further action is required to mitigate the loss of any unidentified archaeological or historic material during the construction and operation stages of the development.

However if any archaeological or historic sites or objects are identified during the construction and operation stages, all work in the area should cease immediately and advice obtained from the Heritage Conservations Services to mitigate the loss of any archaeological or historic material.

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Figure 3. Sketch map of RM 1

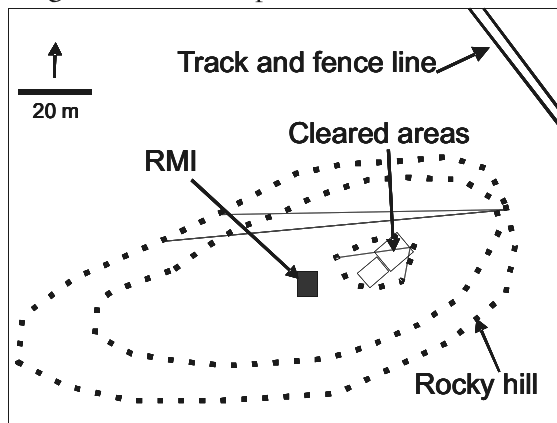


Figure 4. Sketch map of RM 2

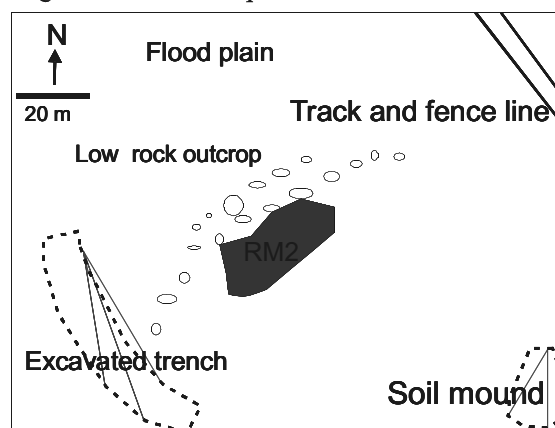


Figure 5. Sketch map of RM 3

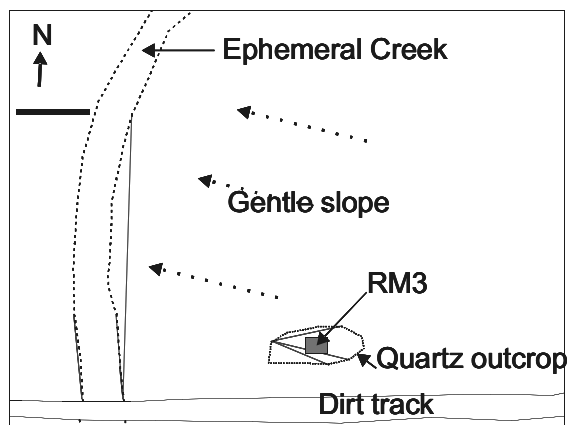


Figure 6. Sketch map of RM 4

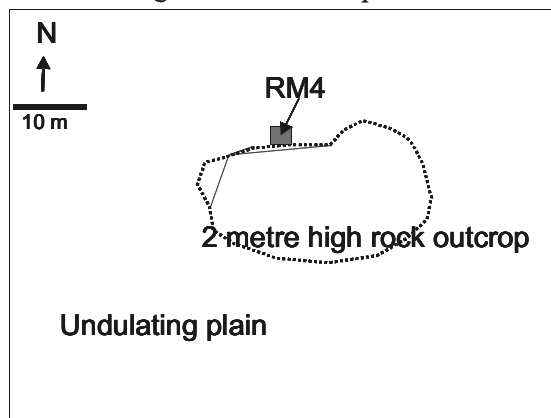




Plate 1 Site RM1, facing SE



Plate 2. Site RM1, mine lease marker, facing north



Plate 3. Site RM2, facing west



Plate 4.Site RM3, facing east



Plate 5. Site RM4, facing south



Plate 6. CRA mine head, facing east



Plate 7. North Australian railway, facing south



Plate 8. Bottle dump, west of Rum Jungle Road