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TAWNY ROCK
DRAGON REPORT

Proposed development of
Stage 1b and 1c, Silvertion Wind Farm,
far western New South Wales



***Status and distribution of the Tawny
Rock Dragon and their habitat***

FINAL

December 2008

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1 INTRODUCTION

On behalf of Silverton Wind Farm Developments Pty. Ltd (SWFD), further biodiversity assessments to investigate the potential expansion of the Stage 1 Project Approval application (proposed turbine increase from 120 to 289) were undertaken and documented in the form of a Biodiversity Addendum.

The Biodiversity Addendum presented the findings of investigations into biodiversity values and likely impacts associated with development within these additional Stage 1 areas (known as Stage 1b & c) of the proposed wind farm at Silverton, near Broken Hill in far western New South Wales (Map 1). The Biodiversity Addendum accompanies the Biodiversity Assessment for the Stage 1 project application which is now referred to as Stage 1a.

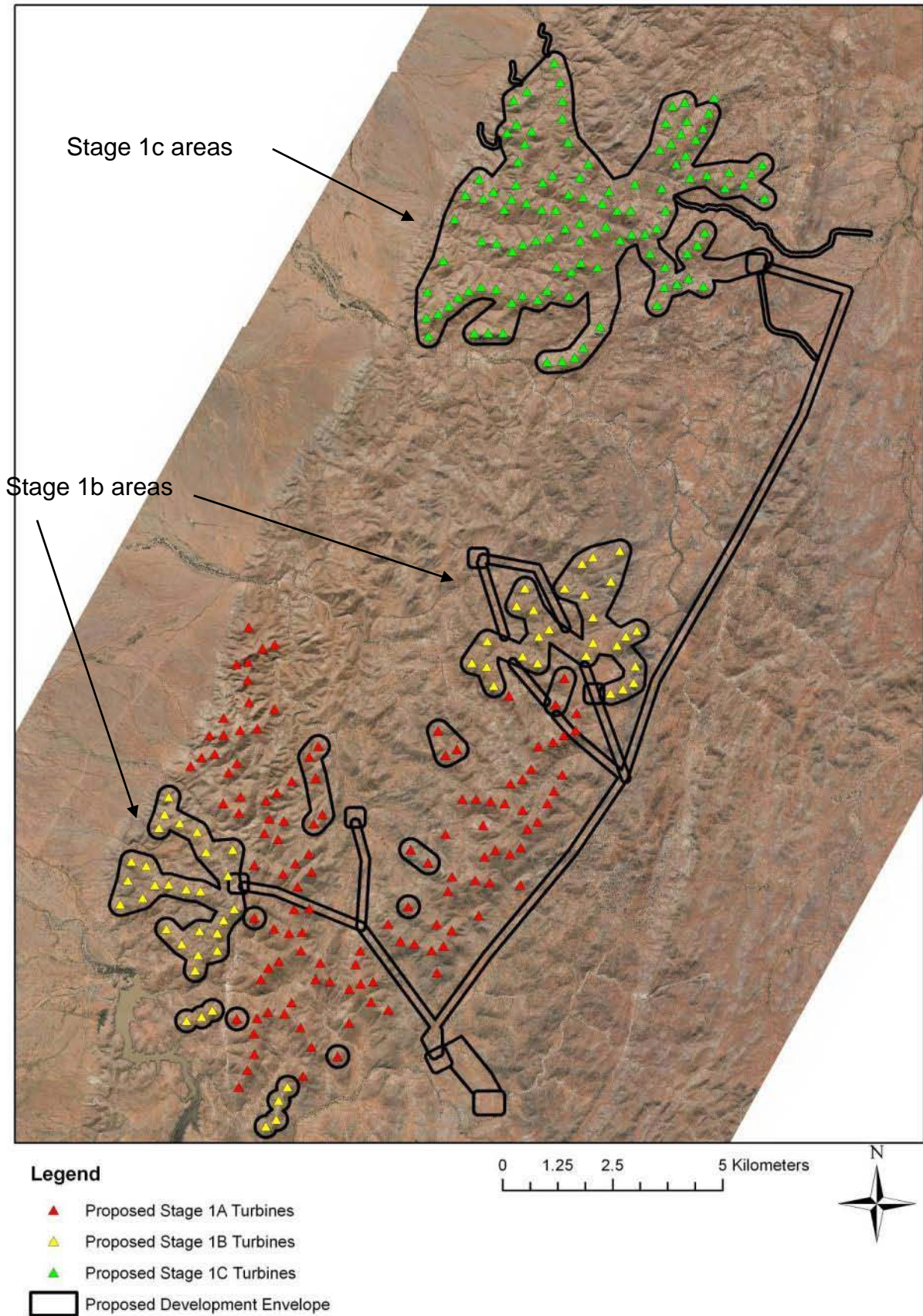
The Tawny Rock Dragon (*Ctenophorus decessi*) was identified in the initial surveys of the Stage 1a proposal in 2007. This species is currently listed as Endangered under Schedule 1 of the NSW *Threatened Species Conservation Act 1995M* (DECC 2008b). The Biodiversity Addendum recommended that a study on the status and distribution of the Tawny Rock Dragon and their habitat be undertaken for the Stage 1b and 1c areas by conducting a detailed survey and assessment.

As such, this study has the following aims and objectives:

- Determine the presence of Tawny Rock Dragon across the Stage 1b and 1c areas.
- Determine if the rocky outcrops identified in the biodiversity technical report provide habitat for Tawny Rock Dragon in the Stage 1b and 1c areas.
- Identify any 'hot spots' for Tawny Rock Dragon (ie, areas of high abundance or area occupied).
- Determine if any locations of Tawny Rock Dragon occur outside of the development envelopes.
- Undertake an analysis of microhabitats based on presence/absence of Tawny Rock Dragon in an effort to gain a greater understanding of their habitat.
- Determine if Tawny Rock Dragon occurrence is inversely correlated to the occurrence of another rock-obligate species, the Gidgee Skink, *Egernia stokesii*.
- Provide discussion on the population of the Tawny Rock Dragon in the study area, the original Stage 1 study area, and the locality.
- Discuss the rocky outcrops identified in the biodiversity technical report for their potential to provide habitat for Tawny Rock Dragon in Stage 1b and 1c areas.

- Provide discussion as to likely outcomes of a goat management plan on the Tawny Rock Dragon population.
- Provide a clear set of recommendations for the management of this species in the Stage 1b & c area.
- Provide an assessment of significance on the Tawny Rock Dragon based on the findings and recommendations of this study.

This report is intended to meet the assessment requirements under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* and the NSW *Threatened Species Conservation Act 1995*.



Map 1-1: Proposed additional areas of the Stage 1 development (Stage 1b & 1c)

The Stage 1 development envelope (now termed 'Stage 1a') and 'Stage 1b and 1c' envelope were assessed within two separate biodiversity assessments. This document is an addendum to the Stage 1b and 1c Biodiversity Addendum.

2 METHODOLOGY

2.1 Literature review

Information on the Tawny Rock Dragon was sought from a variety of information sources. These included:

1. The Biodiversity Constraints Technical Report (NGHEnvironmental, 2008a).
2. Data collected during the 2007 and 2008 fauna surveys, covering the Stage 1a, 1b and 1c development envelopes .
3. DECC Wildlife Atlas searches based on the Broken Hill and Unincorporated area (DECC, 2008a).
4. DECC Threatened species databases (DECC, 2008b).
5. Searches of ecological scientific journal databases such as, Science Direct, JSTOR, Wiley Interscience, Springer Link, OVID and Google Scholar.
6. Searches of the Australian Museum online reptile database (BioNet, 2008).
7. Discussions with a number of herpetologists.

2.2 Field sampling techniques

2.2.1 *Tawny Rock Dragon*

Surveys for Tawny Rock Dragon were conducted between the 24th and 29th November 2008. Fieldwork sought to determine the presence and distribution of Tawny Rock Dragon and their habitat across the study area. These were conducted using two teams of two; each team consisted of an experienced ecologist and an assistant.

Walking transects were conducted through areas of potential habitat either on foot, or by vehicle by slowing driving on tracks within the study area after Blomberg and Shine (Blomberg and Shine, 1996). While the development envelope includes transmission line routes and tracks these have only been considered where they overlap with suitable habitat. The longer road and transmission line routes which traverse lower areas which do not contain suitable rocky habitat have not been targeted. Both observers visually scanned areas of potential habitat using high-powered binoculars seeking active animals (ie. engaged in display, combat, foraging, movement) and inactive animals (basking, resting).

Records of Tawny Rock Dragon collected during the field work for the Biodiversity Addendum (NGHEnvironmental, 2008b) are also incorporated into the results; while the cooler temperatures during the former surveys were not considered optimal for adequate detection of the Tawny Rock Dragon, the species was recorded at several locations and this data is included. The Tawny Rock Dragon has been known to be recorded in low temperatures, in thermally stable rocky

environments such as the study area. One researcher who studied the Tawny Rock Dragon for a PhD suggests that they can be detected in temperatures as low as 20 degrees Celsius in such environments (Louise Osborne, pers.comm).

Additionally, many of the Stage 1b areas in the south of the study area near Umberumberka Dam were traversed on foot in November 2007 (NGHEnvironmental, 2008c) while gaining access to the Stage 1a area. Therefore, all data relevant to the Tawny Rock Dragon from all surveys in the study area are incorporated into this study.

Surveys were also conducted in areas offsite (outside of areas proposed to be impacted by site development) to determine if the Tawny Rock Dragon was present in other rocky outcrops. The location of these searches was based on the potential for suitable habitat (rocky ridges) and practicalities of access (Map 2-4).

All sampling was carried out under Scientific Research Permit S10433 issued by the Department of Environment and Climate Change (Parks and Wildlife Division) and the authority of a Department of Primary Industries Director-General Animal Care and Ethics Committee determination. Total survey effort for Tawny Rock Dragon across the study area totals 338 hours and is shown (Mapset 2, Table 1).

Table 1: Survey effort for Tawny Rock Dragon

Survey period	Area	Effort
November 2007	Stage 1a and lower sections of part of 1b	Four persons for 5 days - 160 hours
September 2008	Stage 1b and 1c	7 hours reptile searches plus opportunistic sightings as part of wider biodiversity effort
November 2008	Stage 1b and 1c	Four persons for 2 ½ days Six persons for 1 ½ days – totalling 171 hours

2.2.2 *Habitat assessment*

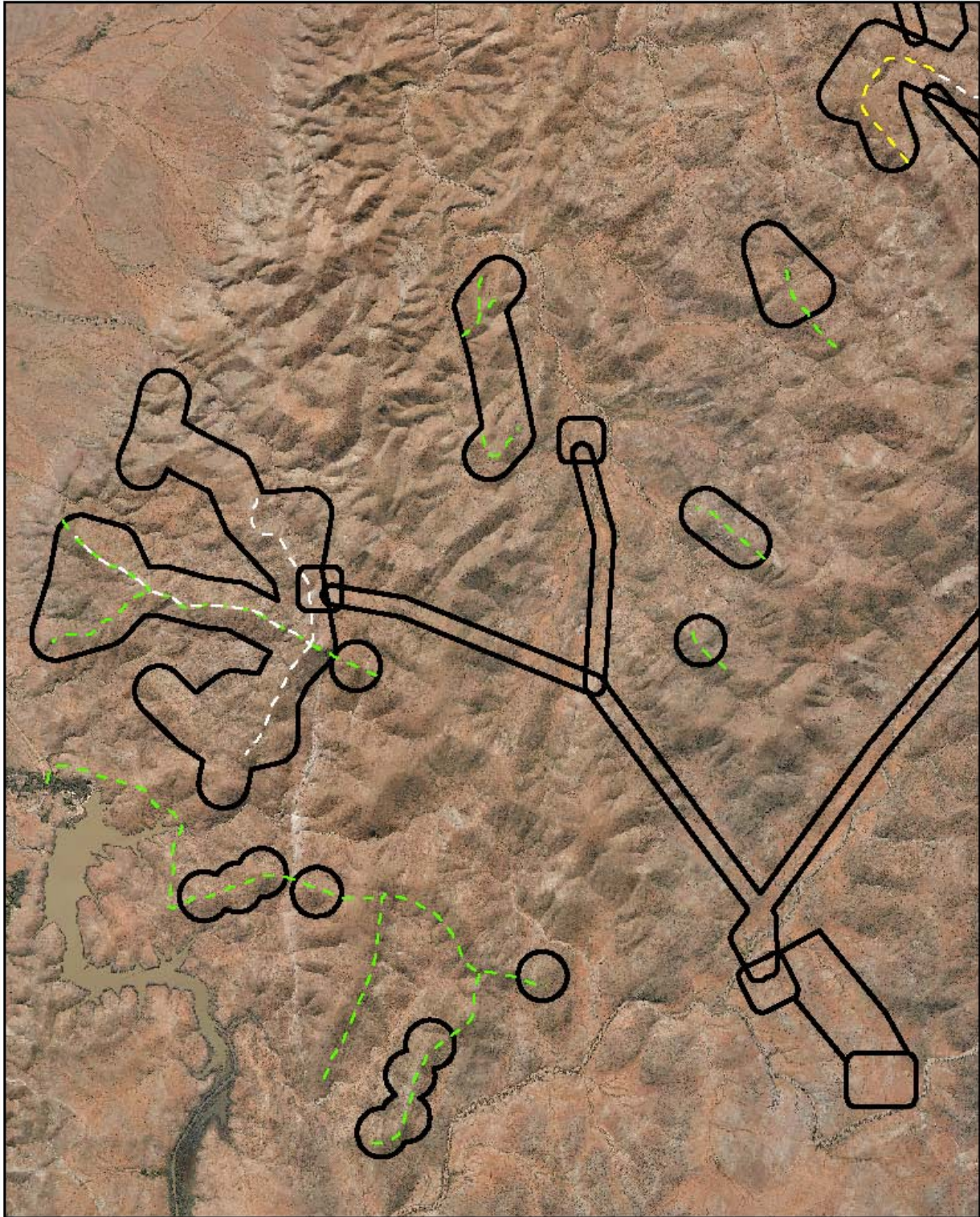
Habitat variables were measured considering the known ecological requirements of the Tawny Rock Dragon and other members of the *Ctenophorus* genus (DECC, 2008b, Gibbons and Lillywhite, 1981, Swan et al., 2004, NGHEnvironmental, 2008c, Stuart-Fox and Owens, 2003, Osborne, 2005a, Osborne, 2005b). Other habitat attributes that are also known to have an influence on reptile presence/absence such as grazing level and the composition of ground

microhabitat variables were also included (Sass, 2004, Hecnar and M'Closkey, 1998, Fischer, 2004).

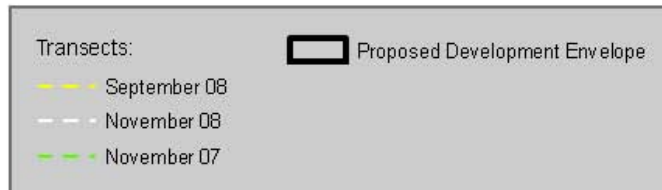
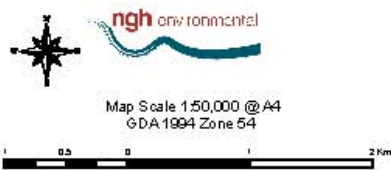
Habitat variables were measured from a 10m x 10m quadrat at sites where the Tawny Rock Dragon was recorded and not recorded. Within each quadrat, 19 variables were measured (Table 2). The locations of habitat assessments are provided (Appendix C).

Table 2: Summary of habitat variables measured within each quadrat.

Habitat variable – fragment	Abbreviation	Details
1. Vegetation cover	%GVEG	Percentage cover of ground vegetation
2. Bare ground	%BRGR	Percentage cover of bare ground
3. Rock outcropping	%ROCK	Percentage cover of exposed rock outcropping
4. Fallen timber	%TIMB	Percentage cover of fallen timber
5. Level of grazing	#SCATS	Number of pats (feral or native) as a surrogate for the current grazing level
6. Rock size (0-100mm)	%ROCK0100	Percentage cover of rocks between 0-100mm
7. Rock size (101-250mm)	%ROCK101250	Percentage cover of rocks between 101-250mm
8. Rock size (251-500mm)	%ROCK251500	Percentage cover of rocks between 251-500mm
9. Rock size (501-1000mm)	%ROCK501-1000	Percentage cover of rocks between 501-1000mm
10. Rock size (>1000mm)	%ROCK1000+	Percentage cover of rocks greater than 1000mm
11. Crevice width (0-25mm)	#CREV025	Number of rock crevices between 0-25mm wide
12. Crevice width (26-50mm)	#CREV2650	Number of rock crevices between 26-50mm wide
13. Crevice width (51-100mm)	#CREV51100	Number of rock crevices between 51-100mm wide
14. Crevice width (>100mm)	#CREV100+	Number of rock crevices greater than 100mm wide
15. Degradation of crevices	%CREVSCAT	Percentage of crevices with scats within
16. Gidgee skinks	GIDGE	Presence or Absence of Gidgee skinks
17. Gidgee skink scats	GIDGESCAT	Presence or Absence of Gidgee skink scats
18. Landscape position	LAND	Position in the landscape (Ridge, Mid-slope, Valley)
19. Micro-landscape position	MICROLND	Position of the site (Slope, Flat, Gully)



Tawny Rock Dragon: Map 2.1



Map 2-1: Survey transects



Tawny Rock Dragon: Map 2.2

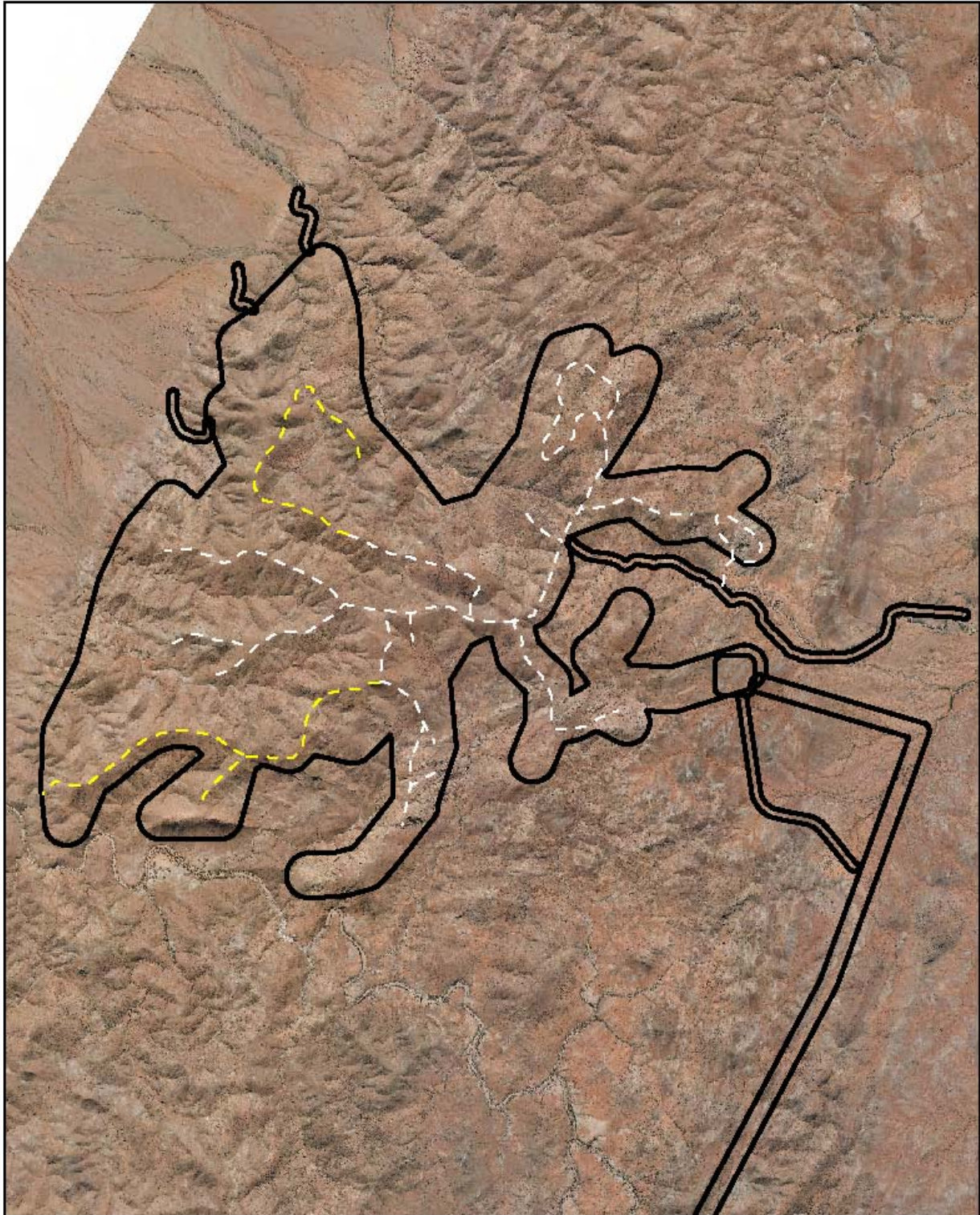


Map Scale 1:30,000 @ A4
GDA 1994 Zone 54



Transects:	Proposed Development Envelope
September 08	
November 08	
November 07	

Map 2-2: Survey transects



Tawny Rock Dragon: Map 2.3

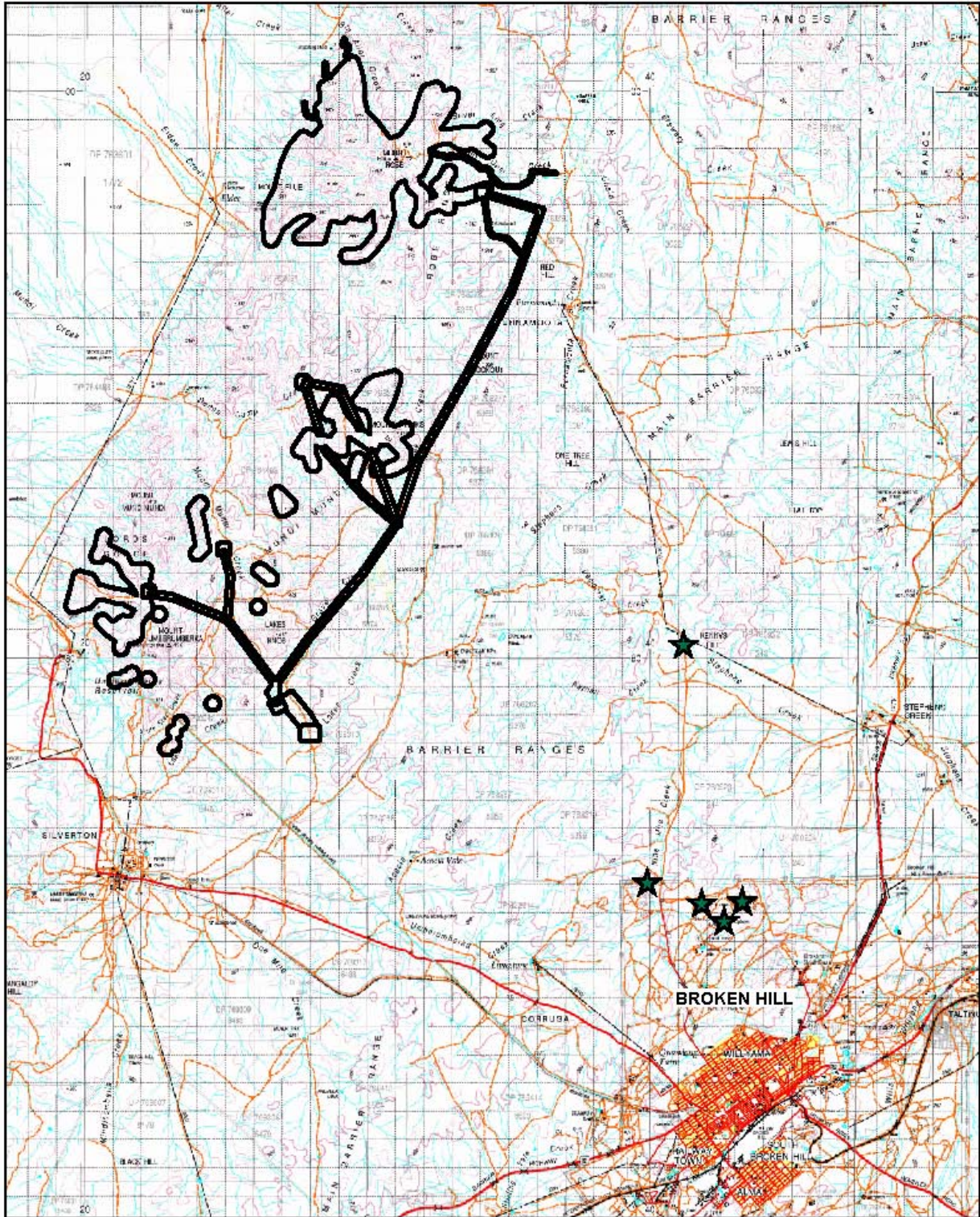


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Transects:	Proposed Development Envelope
September 08	
November 08	

Map 2-3: Survey transects



Tawny Rock Dragon: Map 4



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	Locality Searches
	Proposed Development Envelope

Map 2-4: Location of offsite Tawny Rock Dragon searches

2.3 Data analysis

2.3.1 Status and distribution of the Tawny Rock Dragon

Distribution of Tawny Rock Dragon presence was mapped using ArcGIS 9.2. Maps produced with this software were then used to visualise distribution patterns across the study area.

Limited behavioural data was also collected to provide a greater understanding of the species. This included the age of the dragon (adult or yearling), the sex (male or female) and the behaviour of the dragon when first observed (basking, feeding, displaying, mating).

2.3.2 Habitat variables

Habitat variables were examined to determine potential differences in habitat in the study area. This data was then analysed using non-metric multidimensional scaling (MDS) analyses using the software package PRIMER 5.2.9 (Primer Ltd 2001). Multi-dimensional scaling (MDS) ordination was performed in order to create a visual representation of the relationships between each habitat assessment (Clarke, 1993, Minchin, 1987). Ordinations were performed in two dimensions, with 100 iterations for each dimension to guard against dissolute explanation (Wilkinson, 1989). Non-metric multidimensional scaling (MDS) was used for this analysis because it is considered more robust to non-lineal effects when compared to other ordination techniques (Minchin, 1987). Of the 64 sites where a habitat evaluation was undertaken, similarities between the habitat variables were calculated using the Bray-Curtis similarity measure (Bray and Curtis, 1957). One-way analysis of similarities (ANOSIM) was then performed in order to compare each site and the presence of Tawny Rock Dragon (Minchin 1987) using a 0.05 level of significance.

Results from ANOSIM also calculate a test statistic 'R' identifying the observed differences between the habitats (Clarke and Warwick, 1994). 'R' values are generated for both global and pairwise comparisons and can be interpreted as follows:

R = 1	indicates total separation of areas
R = >0.75	indicates the areas are well separated
R = >0.5	there may be overlap but the areas remain different
R = <0.25	indicates the areas are hardly separated
R = 0	indicates the areas are indistinguishable from one another

Where differences were identified between groups through ANOSIM, these were further examined using SIMPER analysis in PRIMER (Primer Ltd 2001).

To facilitate interpretation of the MDS, Spearman rank correlations were conducted between the scores of each dimension and the habitat variables. This procedure allowed determination of the

variables that were most correlated with each of the two dimensional MDS axes and likely to be important habitat to Tawny Rock Dragon.

2.3.3 *Tawny Rock Dragon 'hot spots' and road management zones*

The study aimed to identify key areas of Tawny Rock Dragon presence in the study area. For the purpose of this study, areas of natural habitat where five or more Tawny Rock Dragon was recorded in close proximity and were not isolated from one another by an inhospitable matrix, were defined as a 'hot spot'.

In addition, road management zones were defined based on the same criteria (with the exception of the inclusion of artificial areas of habitat) after numerous Tawny Rock Dragons were observed using the road spoil as a basking and displaying location.

These areas were determined by undertaking a visual inspection of the distribution data as well as on-ground verification of habitat connectivity between dragon territories and habitat use.

Hot spots and road management zones were mapped using ArcGIS 9.2.

2.3.4 *Tawny Rock Dragon occurrence compared with other rock-obligate species*

Circumstantial evidence suggests that the presence of Tawny Rock Dragons may be influenced by the presence of other rock-obligate species such as Gidgee Skink (DECC, 2008b). In fact, Swan & Foster (2005) in their survey of Mutawinji National Park where the Tawny Rock Dragon also occurs did not locate any Gidgee Skink. This may be due to the likelihood of competition for limited resources such as crevices (Langkilde and Shine, 2004).

Data collected during the habitat assessment included the presence and absence of Gidgee Skink or their signs such as scats.

3 RESULTS

3.1 Tawny Rock Dragon

3.1.1 *Status and distribution across the study area*

Surveys for the Tawny Rock Dragon across the study area revealed 173 individuals (161 in November 2008, 12 in September 2008) (Map 3.1 and 3.2). All of these individuals were recorded within the Stage 1b and 1c area. This is additional to the 36 individuals recorded in the Stage 1a surveys. To date, 209 Tawny Rock Dragon have been recorded across the Stage 1a, 1b and 1c area (Map 3.3). Of the 161 individuals in which population data was recorded (November 2008 surveys), these were comprised of 123 males and 38 females with an obvious bias between adults and yearlings (Figure 1). The detection rate was 0.95 animals every person hour during the November survey.

Distribution across the Stage 1b and 1c areas was highly skewed, with only 31 Tawny Rock Dragons recorded in the Stage 1b area (all in the Mount Franks section) while 142 individuals were recorded in the Stage 1c area (refer to Maps 3.1 & 3.2).

All Tawny Rock Dragon recorded were located on the main ridge systems that comprise the study area. The majority of these were found on the flatter tops of ridges (67%) with the remainder on the downslope away from the ridge top and in one case, in a creek gully (directly to the south of Mt Franks).

The activity observed of each Tawny Rock Dragon showed that 54% were displaying, 44% were basking and 2% were feeding (Figure 2). No mating activity was observed.

Locality searches failed to reveal the presence of Tawny Rock Dragon beyond the boundaries of the proposed development envelope.

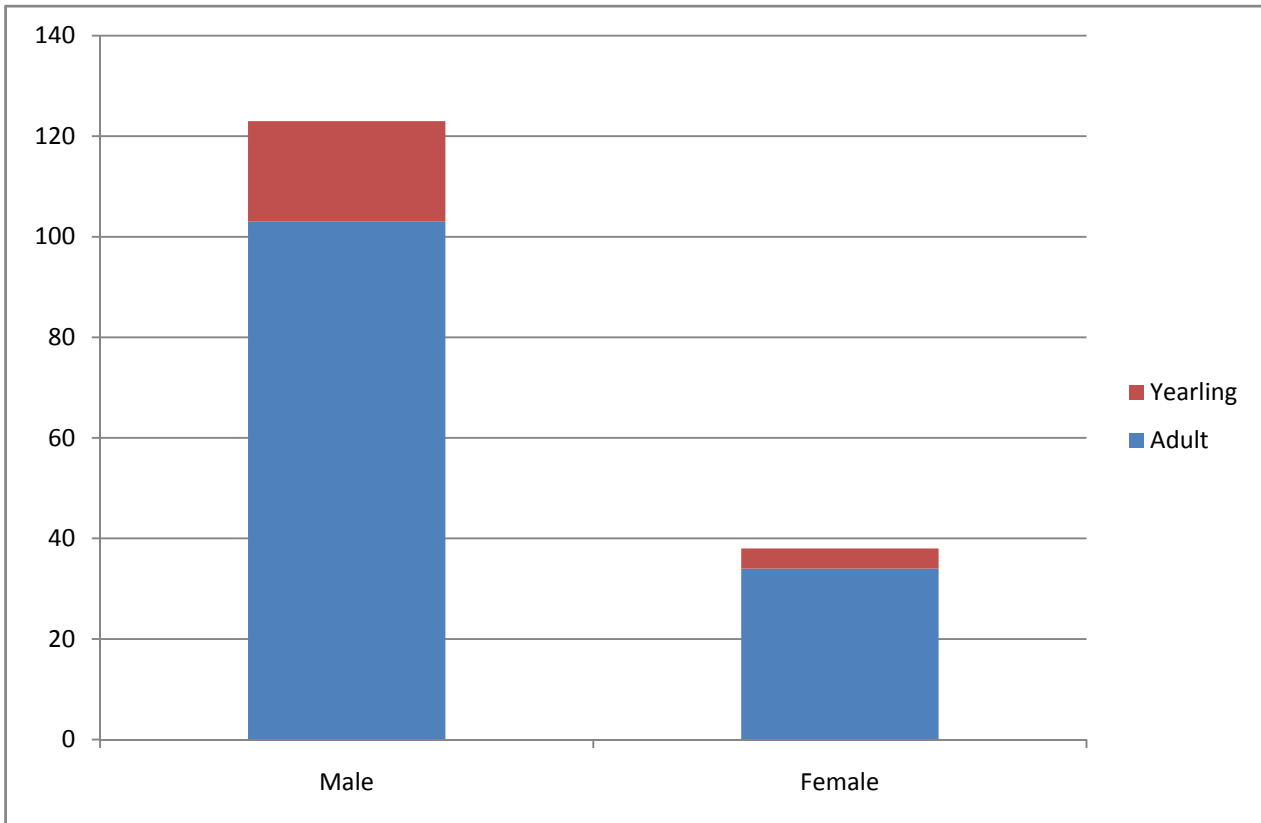


Figure 1: Sex and age structure of Tawny Rock Dragon individuals recorded during the study.

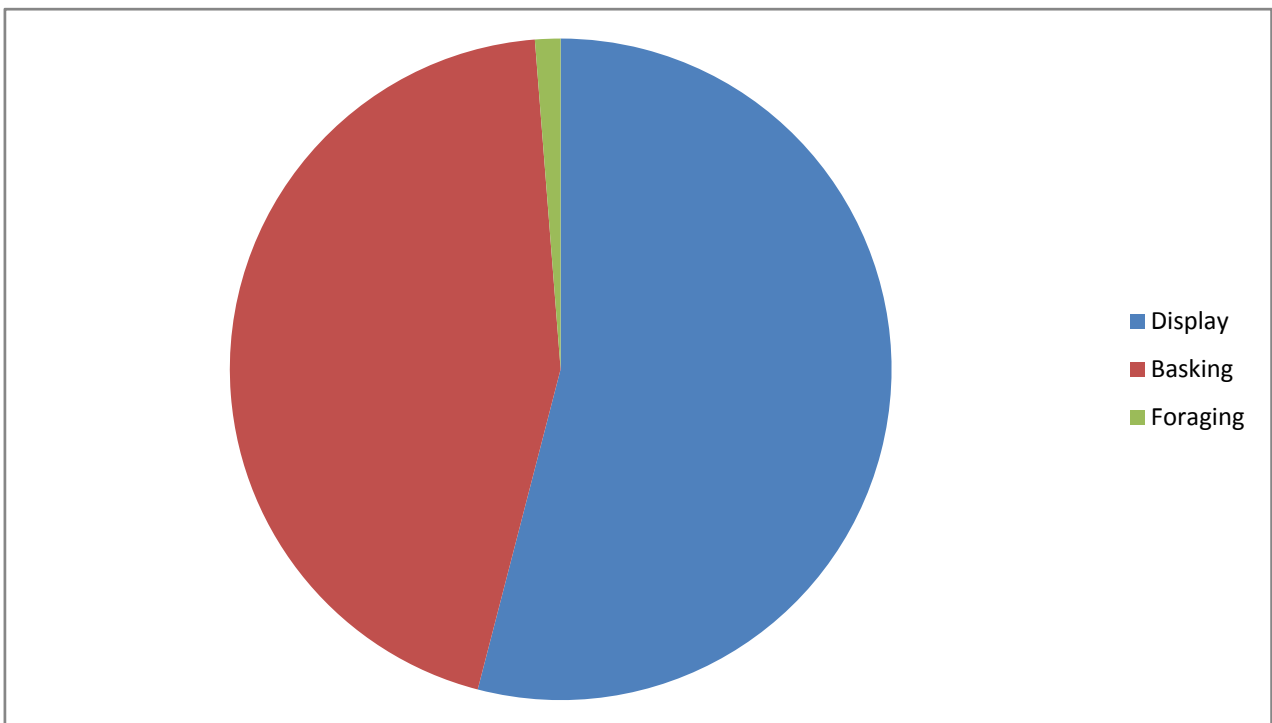


Figure 2: Observed activity of Tawny Rock Dragon during this study.





Tawny Rock Dragon records stage 1b

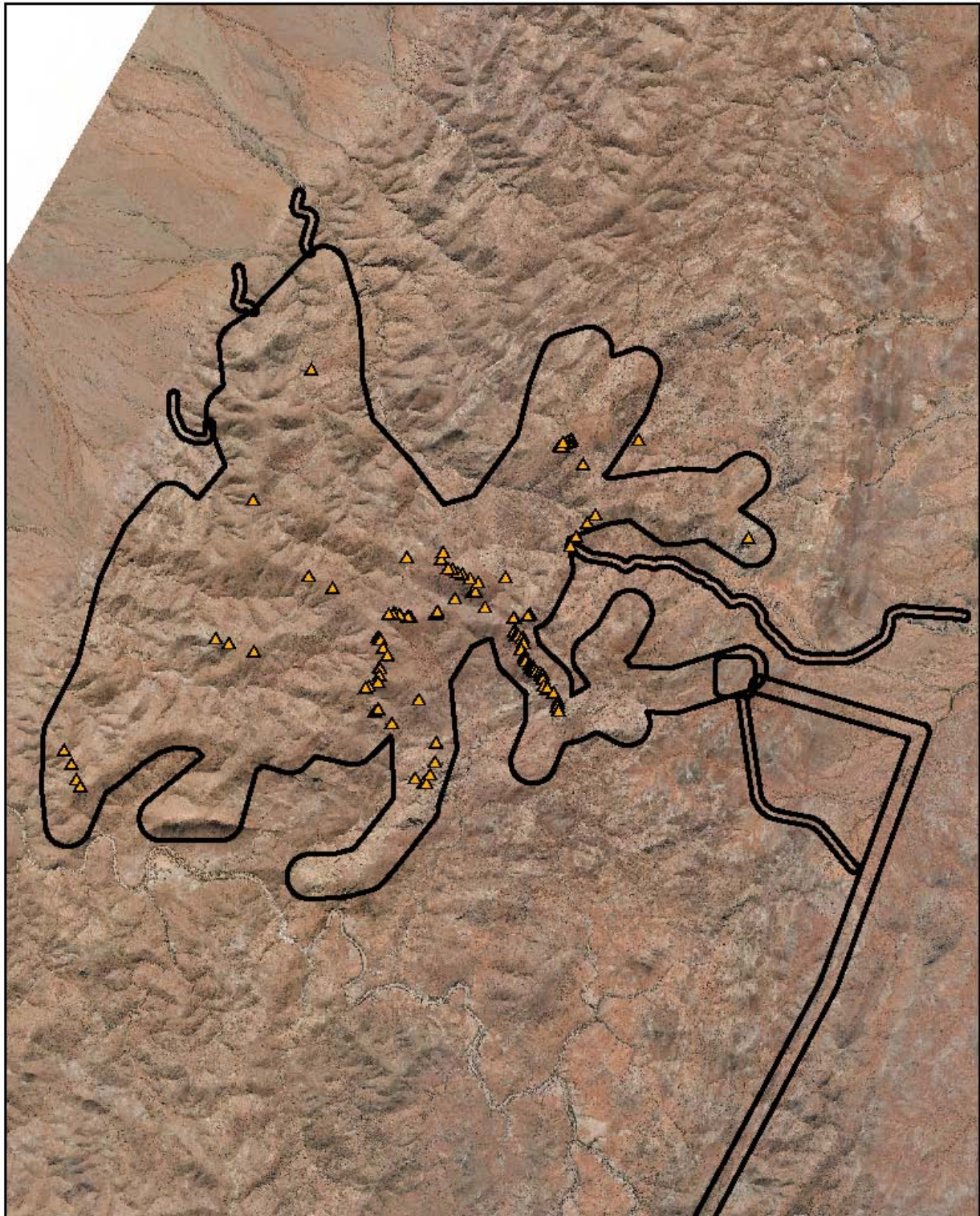


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	All Stage 1b Tawny Rock Dragon Records
	Proposed Development Envelope

Map 3-1: Tawny Rock Dragon records in northern section of Stage 1b (Mount Franks Section)





Tawny Rock Dragon records stage 1c



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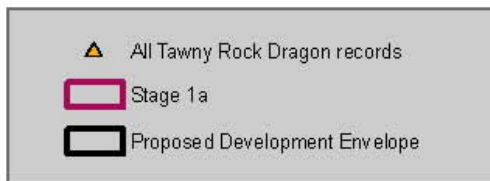
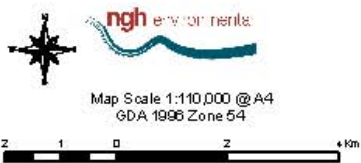


	All Stage 1c Tawny Rock Dragon Records
	Proposed Development Envelope

Map 3-2: Tawny Rock Dragon records in Stage 1c.



Tawny Rock Dragon: Map 3.3



Map 3-3: All Tawny Rock Dragon records across the Stage 1a, 1b and 1c areas.

3.1.2 Occurrence compared with other rock-obligate species

Of the 64 sites where a detailed habitat assessment was undertaken, only four sites were identified that presented evidence of co-occurrence of Gidgee Skink and Tawny Rock Dragon. In all cases, scats were identified that were likely a larger reptile, such as a Gidgee Skink perched on rock outcrop peaks. However, no Gidgee Skinks were recorded and the scats did not appear to be recent.

Conversely, during offsite surveys, individual Gidgee Skinks were commonly observed and no Tawny Rock Dragons were recorded.

3.2 Habitat assessment

The MDS ordination revealed that two dimensions were sufficient to provide a reliable representation of the 17 habitat variables specific to microhabitat analysis (stress value = 0.19). Habitat variables across each of the 64 sites could not be separated based on a visual inspection of the MDS ordinations where the Tawny Rock Dragon was present and sites where none were recorded, however, a slight pattern appears to be emerging with some grouping in the absent sites (Figure 3). Analysis of Similarities (ANOSIM) comparing present and absent sites found a statistically significant difference between habitats (*global R=1, p=0.027*). Further analysis using SIMPER revealed that the percentage cover of exposed rock outcropping contributed to 43% and percentage cover of rocks between 251-500mm contributed to 14% of the differences in habitat.

Where Tawny Rock Dragon was recorded, additional MDS ordination revealed that no particular pattern was evident in habitat variables (Figure 4). The 17 habitat variables were then correlated within each MDS dimension using Spearman-rank correlations (Table 3).

Using a 0.01 level of significance, seven of the 17 habitat variables were significantly correlated to the first dimension, whilst three variables were significantly correlated to the second dimension.

Significant correlations with the first dimension were percent cover of ground vegetation, level of grazing, rock size (101-250mm, 501-1000mm, >1000mm), crevice width (51-100mm) and the degradation of crevices. For the second dimension, the level of grazing, rock size (251-500mm) and degradation of crevices were significant correlations.

Interestingly, some overlap between variables across each dimension occurred. These were the level of grazing and the degradation of crevices which are contributing most to levels of habitat quality.

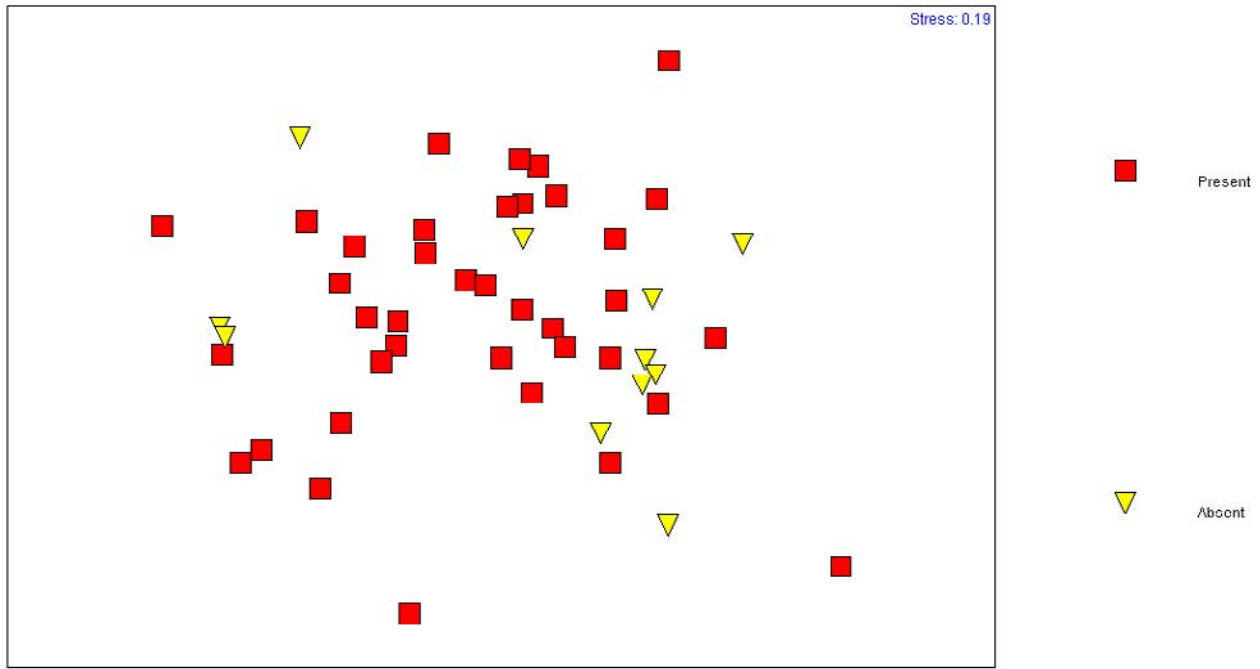


Figure 3: Graphical representation of the MDS ordination of the habitat variables at sites where Tawny Rock Dragon was present, and sites where it was absent.

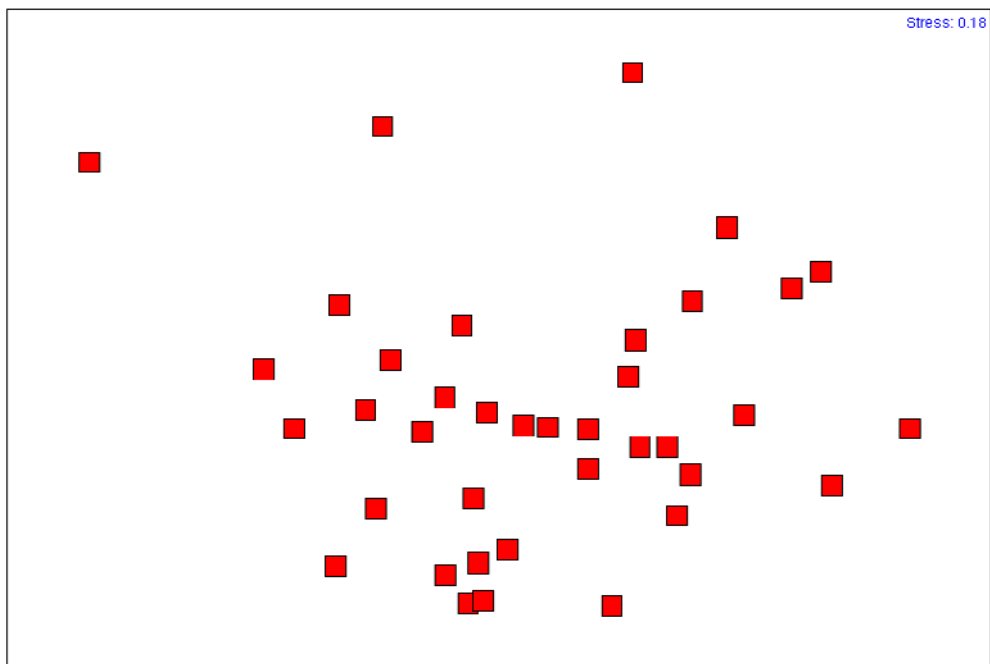


Figure 4: Graphical representation of the MDS ordination of the habitat variables at sites where Tawny Rock Dragon was present.

Table 3: Spearman-rank correlations coefficients of the 17 habitat variables against the two MDS dimensions. Significance at 0.01 is marked with two asterisks, 0.05 with one asterisk (two-tailed).

Habitat variable – fragment	Dimension 1	Dimension 2
1. Vegetation cover	0.376**	0.214
2. Bare ground	-0.075	-0.19
3. Rock outcropping	0.72	-0.218
4. Fallen timber	-0.272*	0.346*
5. Level of grazing	0.469**	0.606**
6. Rock size (0-100mm)	-0.811*	0.190
7. Rock size (101-250mm)	-0.767**	0.211
8. Rock size (251-500mm)	-0.137	-0.486**
9. Rock size (501-1000mm)	0.725**	0.214
10. Rock size (>1000mm)	0.809**	-0.030
11. Crevice width (0-25mm)	-0.42	-0.160
12. Crevice width (26-50mm)	0.298*	0.227
13. Crevice width (51-100mm)	0.589**	0.275*
14. Crevice width (>100mm)	0.527*	0.099
15. Degradation of crevices	0.352**	0.453**
16. Gidgee skinks	-	-
17. Gidgee skink scats	0.290*	0.430*

Tawny Rock Dragons were more often recorded on an aggregation of rocks (89% of records) than a single, isolated rock. Along existing tracks, 15 Tawny Rock Dragons were observed displaying or basking on the road spoil.

The numbers of scat clumps were extremely common at almost all sites (92%). However, the number of scats within the 10m x 10m quadrat varied from low amounts (0-5 clumps) to more than 40 clumps (Figure 5). Feral goat scats contributed to almost all of the scat clumps observed.

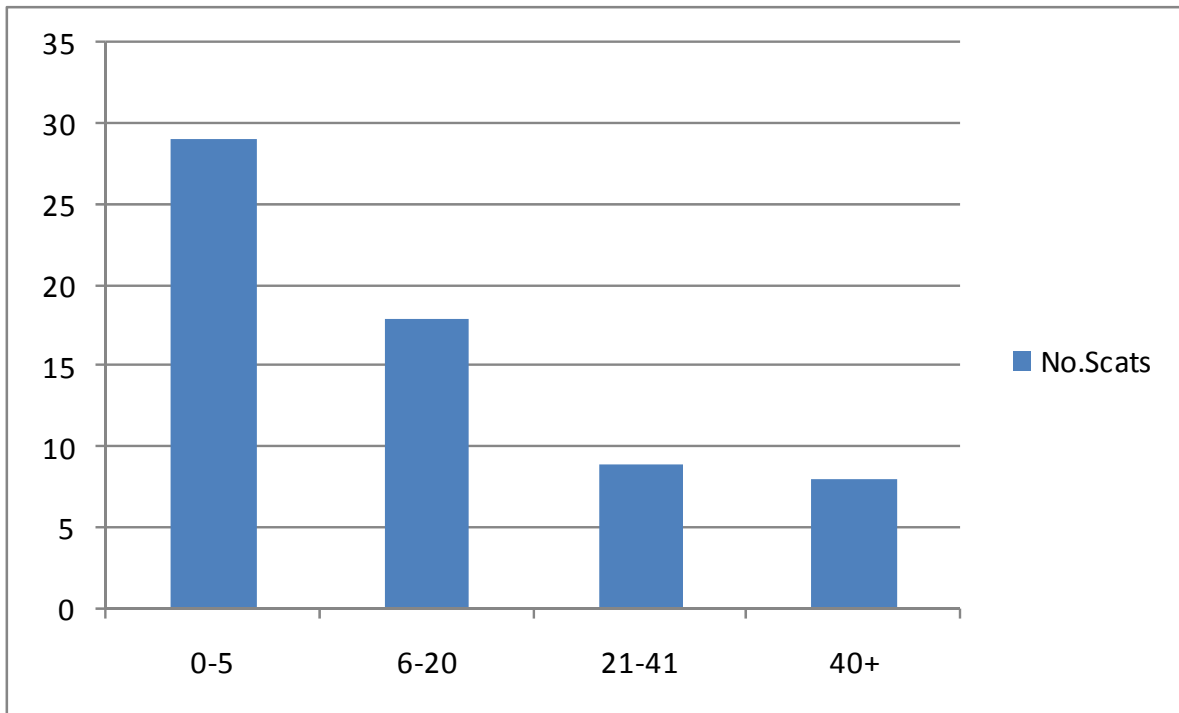


Figure 5: Number of scat clumps recorded within each 10m x 10m quadrat.

3.3 Tawny Rock Dragon ‘hot spots’ and road management zones

Nine hotspots in the Stage 1b area and eight hotspots in the Stage 1c area of varying size were identified (Map 3.4 & 3.5). Road management zones were also defined (see section 2.3.3) after numerous Tawny Rock Dragons were observed using the road spoil as a basking and displaying location. Road management zones were placed around all hotspots and in four other locations (Map 3.4 & 3.5).

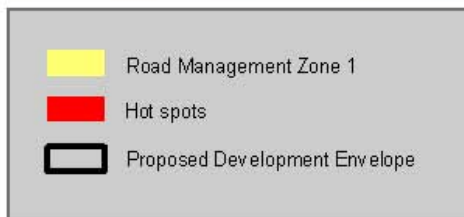
These areas were determined by undertaking a visual inspection of the distribution data as well as on-ground verification of habitat connectivity between dragon territories and habitat use.



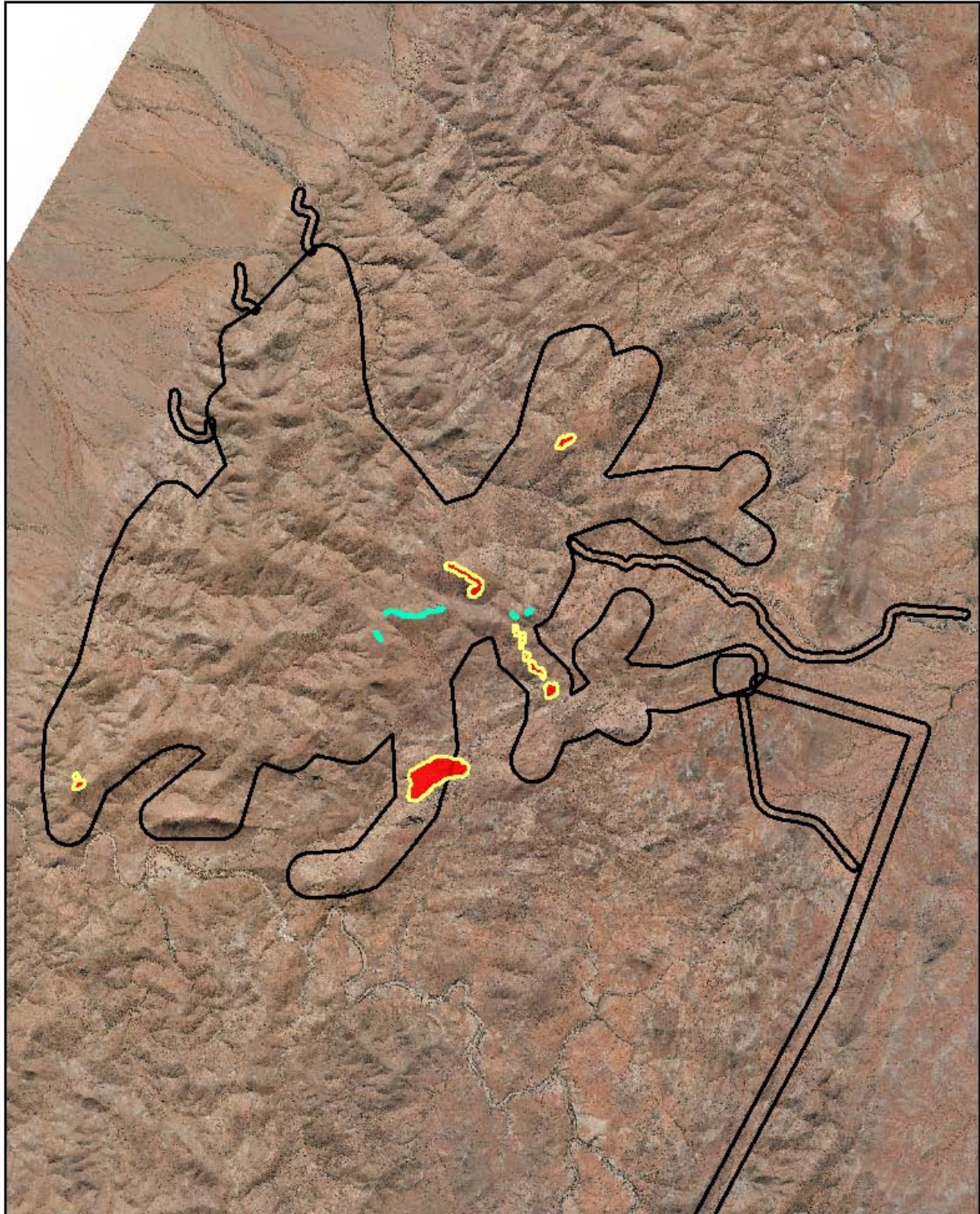
Tawny Rock Dragon: Map 3.4



Map Scale 1:30,000 @ A4
GDA 1994 Zone 54



Map 3-4: Tawny Rock Dragon hot spots and road management zones in Stage 1b



Tawny Rock Dragon: Map 3.5



Map Scale 1:55,000 @ A4
GDA 1998 Zone 54



Map 3-5: Tawny Rock Dragon hot spots and road management zones in Stage 1c

4 DISCUSSION

4.1 Tawny Rock Dragon

Prior to the initial surveys in 2007, the only known records were a population of at least 50 animals at Mutawinji National Park (to the north-east of the study area) (Swan and Foster, 2005), and single museum specimen from Koonaberry Mountain (north of Mutawinji). Subsequent searches of the latter site have not revealed any Tawny Rock Dragon (Gerry Swan, pers.comm) and the Mutawinji population were considered the only known population. However, the population of the study area should now be regarded as the stronghold for the species in NSW considering the moderately restricted national distribution (Sadler and Pressey, 1994).

Their distribution across the study area appears skewed, with only 36 and 41 animals were recorded in the Stage 1a and 1b areas respectively, whilst 142 animals have been recorded in the Stage 1c area. In Stage 1b, Tawny Rock Dragons are only present within the Mt Franks section. Searches of the remaining 1b areas near Umberumberka Dam did not reveal any Tawny Rock Dragons. This is not considered surprising given that no Tawny Rock Dragon were recorded in the southern sections of Stage 1a (NGHEnvironmental, 2008c). The higher abundance of males recorded is likely not reflective of true sexual orientations of the population, rather an artefact of the ability to detect males as they prominently stand high on rocks display to defend their territories. The ability to detect Tawny Rock Dragon presence is made relatively simple by the male's prominent positions on rock when displaying and defending their territory hence, the distribution detected in the field is considered an accurate representation of the male Tawny Rock Dragon distribution.

Several hypotheses could be used to explain the variable distribution pattern of the Tawny Rock Dragon in the study area: suitable habitat, naturally patchy distribution; impacts from goat grazing; or a combination of these.

Goat grazing was found to be a key factor currently determining the level and quality of habitat on the site for many native species (NGHEnvironmental, 2008c). The NSW Scientific Committee has listed 'Competition and habitat degradation by Feral Goats' as a Key Threatening Process. Twenty-three threatened species were listed in the Committee's determination as being at risk due to this process, including the Tawny Rock Dragon (DECC, 2008b). The impacts of grazing on arid Australia are well known (Letnic, 2007, James, 2003). In western NSW, a study on feral goats were found to make daily movements of 3.1 km, focussing movements around intermittent lakes and creeks with abundant tree and shrub cover (Freudenberger and Barber, 1999). Umberumberka Dam is likely to be a key resource to goats in the local area and this could explain an apparent higher abundance of goats and impacts in the southern part of the study area (James et al., 1999). The impacts of heavy grazing by any stock is already known to be detrimental to

reptile fauna (Beutel et al., 2003, Brown et al., 2008, Fischer et al., 2004, Sass, 2004, Hadden and Westbrooke, 1996, Sadlier and Pressey, 1994) and this is also likely to be the case for Tawny Rock Dragon. Hadden & Westbrooke (1996) found that reptile fauna were affected by changes in vegetation structure by overgrazing as these reduce microhabitat availability and subsequently habitat quality. Sadlier & Pressey (1994) identified that grazing is likely to adversely affect reptile species in the western division of NSW.

Faunal distribution patterns are known to be influenced by resource availability; populations are not distributed evenly across landscapes (Dickman et al., 2001, James, 1991, James and Shine, 2000, Morton and James, 1988). For the Tawny Rock Dragon, their patchy distribution across the study area and absence from seemingly suitable habitat may be a result of such resource patchiness.

Nonetheless, it is likely an interaction between both theories that is limiting the distribution of the species in the study area. Only 8% of sites were free of goat scats, which confirm that goats are present where Tawny Rock Dragons are also present. At 23% of the sites, the scat frequency was very high (above 20 clumps of scats). While there is no long-term data on the feral-goat population within the study area, it is difficult to gain a detailed understanding on their effects on the Tawny Rock Dragon population. However, feral goats have already been attributed to the degradation of rocky habitats for other rock-crevice specialists such as the Broad-headed snake (*Hoplocephalus bungaroides*) (Murphy, 1996) and the Centralian Ranges Rock-skink (*Egernia margaretae*) (NPWS, 2000). For the Tawny Rock Dragon, rock crevices filled, or partially filled with goat scats is undoubtedly impacting on both habitat quality and therefore the extent of suitable habitat. As a result, it is hypothesised that combined with their low dispersal capability and low fecundity, seemingly suitable habitat becomes unoccupied likely the result of local extinctions of individuals. These factors could assist in explaining the limited and patchy distribution of the Tawny Rock Dragon across the study area.

Competition with other rock-obligate reptile species for crevices is known to be highly correlated with species' body size in creating a dominance hierarchy (Langkilde and Shine, 2004). DECC (2008a) hypothesise that the presence of the much larger Gidgee Skink may be a limiting factor on the presence of the Tawny Rock Dragon. At all five locations of the off-site locality surveys, Gidgee Skinks were common but no Tawny Rock Dragons were recorded. Within the study area, scats were identified that were likely a larger reptile, such as a Gidgee Skink. However, no Gidgee Skinks were recorded and individual Tawny Rock Dragons were present. These results suggest that Tawny Rock Dragon occurrence could be inversely correlated to the occurrence of Gidgee Skink.

4.2 Tawny Rock Dragon habitat

Differences in habitat qualities were apparent where the Tawny Rock Dragon was present and absent with rock cover and rock size contributed most to these differences. Significant correlations across each MDS dimension were observed including percent cover of ground vegetation, the level of grazing, all rock sizes, rock crevice width (51-100mm) and the degradation of crevices. This provides important information to guide in the management of the Tawny Rock Dragon in the study area with specific regard to habitat restoration and rehabilitation. More significantly, the level of grazing and the degradation of crevices amongst rock outcrops contributed to both dimensions which provide further evidence that feral goat grazing is currently impacting on the qualities of rock outcrops. The majority of sightings of the Tawny Rock Dragon were on an aggregation of rocks and in almost all cases, along the main ridge system. The provision of rock piles obtained when excavating turbine footings and vehicular tracks has the potential to create artificial habitat.

As earlier discussed, the potential for the occurrence of the Tawny Rock Dragon is not necessarily related to the availability of suitable habitat. This study has shown that previous mapping undertaken of significant rock outcrops in the study area (NGHEnvironmental, 2008a) has virtually no relationship to the distribution of the Tawny Rock Dragon across the study area. Rather, that their absence across seemingly suitable habitat may be explained by a number of factors (see section 4.1).

Interestingly, numerous individuals were observed in the vicinity of vehicular tracks in the study area. In all cases, individuals were recorded displaying or basking on the rocks that had been pushed aside for the construction of these tracks. More importantly, these individuals were more commonly observed where soil was absent from this spoil (ie only rocks and crevices). Most of these individuals were yearling Tawny Rock Dragons. Their presence in this environment suggests that disturbance to the rock substrate, which provides 'new' habitat opportunities by creating a rock pile and crevices, may not be detrimental. Pushed soil heaps however, creates no new habitat and may in fact fill rock crevices and thereby remove habitat.

In conclusion, these results confirm that the Tawny Rock Dragon is a rock-obligate species with habitat relationships associated to the level of grazing and rock and crevice size. The occurrence of this species within the rock spoil of recently constructed tracks also suggests potential for habitat creation similar to that which has been accomplished for the conservation of other threatened rock-obligate reptiles such as Broad-headed snake (*Hoplocephalus bungaroides*) and their prey Lesueur's velvet gecko (*Oedura lesueurii*) (Webb and Shine, 2000).

4.3 Tawny Rock Dragon ‘hot spots’ and road management zones

Seventeen hotspots were identified across the Stage 1b and 1c area. These areas of habitat supported a higher abundance of Tawny Rock Dragons than surrounding areas. Resource availability has long been known to be a determinant of reptile diversity and abundance (Pianka, 1973, Pianka, 1966, Pianka, 1974, Pianka, 1968). While the vast majority of the knowledge on Australian reptile fauna is limited to a number of field guides (Cogger 2000; Swan et al. 2004; Wilson & Swan 2003), that although provide an excellent source of background material, they do not provide information on specific ecological requirements that can be translated into studies on a poorly-studied species such as the Tawny Rock Dragon. With a paucity of knowledge of these basic ecological requirements, it is difficult to determine what factors in terms of the coarseness or complexity of the necessary data need to be studied and this is likely to be limiting our understanding of such a species as the Tawny Rock Dragon. Further, reptiles may also be responding differently to the changes across the landscape across the study area as they are known to in other areas. Indeed, reptiles do respond to different factors idiosyncratic to regions and vegetation types (Hadden and Westbrooke, 1996, Ishwar et al., 2003, Jellinek et al., 2004, Smith et al., 1996, Sass, 2007). The hotspot approach allows individual Tawny Rock Dragons themselves to define areas of higher importance to the local population.

Identifying areas of higher abundance also provides an opportunity to protect important resources and interactions. Given the context of prolonged drought and goat grazing pressure, the areas may also be acting as an important refuge such as seen in other landscapes (Michael et al., 2008, Sass, 2003). It will be extremely important to protect these hot spots from any kind of impact, and as such, under no circumstances should any persons, equipment, infrastructure or materials impede on any defined hotspots.

In light of the abundance of individuals along the vehicular tracks within the study area, the concept of road management zones was formulated. Forman & Alexander (1998) revealed that roads are a major source of mortality for fauna and that a local population may suffer decline where the roadkill rate exceeds the rate of reproduction and immigration (Forman and Alexander, 1998). For a low fecundity and low dispersal species such as the Tawny Rock Dragon, road management is particularly relevant. Reducing vehicle speed provides both animals and drivers with longer reaction times to avoid impact (Schaefer et al., 2003). For this reason, road management zones (RMZ) around all hotspots and in four other locations have been developed at times of the year when the species is considered most active. Reducing the speed limit in areas where there is a higher probability of a collision with a Tawny Rock Dragon should result in road-related mortality being minimised, if not avoided. Maximum speed limits of 15km/h in RMZ 1 and 25km/h in RMZ 2 should provide vehicles and Tawny Rock Dragons’ opportunity for avoidance.

4.4 Future management

Given what is understood of the Tawny Rock Dragon population within the study area, appropriate management is considered extremely important for what should now be considered the NSW stronghold for the species.

The study area is considered under extreme pressure by feral goat grazing which is compounding the effects of drought, leading to widespread habitat degradation across the study area to all forms of biodiversity. For the Tawny Rock Dragon, rock crevices filled, or partially filled with goat scats is undoubtedly impacting on both habitat quality and therefore the extent of suitable habitat which is likely to be impacting on the existing population. Grazing is known for its negative impacts on both individual reptile species and communities across a wide variety of landscapes (Fischer et al., 2003, Fischer et al., 2004, Wassens et al., 2005, Sass, 2004, James, 2003). The listing of the key threatening process 'Competition and habitat degradation by Feral Goats' by the NSW Scientific Committee (DECC, 2008b) is particularly relevant to the Tawny Rock Dragon within the study area.

It has been proposed that a goat management plan should be undertaken as part of the proposal and ongoing land management within the development (NGHEnvironmental, 2008b, NGHEnvironmental, 2008c). The continued existence of feral goats within the study area has the potential to cause a catastrophic decline in the Tawny Rock Dragon population considering the impacts this species has directly on rock crevice availability and quality and vegetation quality; all fundamental attributes that the Tawny Rock Dragon are likely to require in maintaining population viability. The absence of Tawny Rock Dragon from many parts of the study area, and in particular in areas where seemingly suitable habitat exists may suggest that feral goats may have already had some negative impacts on this species.

A goat management plan with the aim of reducing feral goat abundance to the lowest possible levels from the study area would only benefit the Tawny Rock Dragon. Improvements in vegetation quality are likely to result in indirect increases to invertebrate availability (Brown et al., 1999) therefore, increasing food availability. Continued degradation of rock crevices would cease, allowing the crevices to slowly rehabilitate themselves as goat scats and nutrient levels passed. These increases in resource availability would almost certainly benefit this species, with the potential for the population to expand and colonise currently absent rock outcrops over the long term. If goat management allows for the expansion of the local Tawny Rock Dragon population into apparently suitable adjacent habitat, this would be a tremendous biodiversity gain resulting from the proposal.

Finally, ongoing monitoring of the Tawny Rock Dragon population should be undertaken during and post-construction which should include determining the effects of the goat management plan.

5 ASSESSMENT OF SIGNIFICANCE

While an Assessment of Significance (or 7-part test) is not required under Part 3A of the Environmental Planning and Assessment Act 1979, it provides a transparent and systematic approach for determining if the proposed activity '*is likely to have a significant effect on the threatened species, populations or ecological communities, or their habitats*' that are listed as under the Schedule 1 & 2 of the *Threatened Species Conservation Act 1995*.

The Assessment of Significance has determined that the proposed Stage 1b and 1c areas of the Silverton Wind Farm is '*unlikely*' to have a '*significant effect*' on the Tawny Rock Dragon or their habitat in concurrence with the recommendations outlined in Section 6.

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

The Tawny Rock Dragon is highly specialised in its habitat requirements, being restricted to rock outcrops in ranges and gorges (Swan et al., 2004, Wilson and Swan, 2008) and prior to the 2007, was known from one current population in Mutawinji National Park. The population of the study area should be considered as an important stronghold in NSW.

Goat grazing was found to be a key factor currently determining the level and quality of habitat on the site for many native species (NGHEnvironmental, 2008c). The NSW Scientific Committee has listed 'Competition and habitat degradation by Feral Goats' as a Key Threatening Process. Twenty-three threatened species were listed in the Committee's determination as being at risk due to this process, including the Tawny Rock Dragon (DECC, 2008b). Feral animal grazing, particularly by goats, is likely to threaten the long-term viability of Tawny Rock Dragons in the study area. Rock crevices filled, or partially filled with goat scats is undoubtedly impacting on both habitat quality and therefore the extent of suitable habitat which would likely result in local extinctions of individuals at some sites. As a result, and combined with their low dispersal capability and low fecundity, seemingly suitable habitat becomes unoccupied. These factors could assist in explaining the limited and patchy distribution of the Tawny Rock Dragon across the study area.

The Tawny Rock Dragon is a short lived animal, which is likely to make them particularly vulnerable to the ongoing degradation by feral goats. Individuals are known to live only a short period of time compared with other dragons, living around two years from birth (Gerry Swan, pers.com. Dec 2007). Adults generally inhabit the higher quality habitat with rock outcrops for

territorial and mating display, while juveniles are forced to occupy the outer fringes of these areas (Gerry Swan, pers. com Dec 2007).

A goat management plan with the aim of reducing goat abundance to the lowest possible levels would only benefit the Tawny Rock Dragon. The continued existence of feral goats within the study area has the potential to cause a catastrophic decline in the Tawny Rock Dragon population considering the impacts this species has directly on rock crevice availability and quality and vegetation quality; all fundamental attributes that the Tawny Rock Dragon are likely to require in maintaining population viability. The absence of Tawny Rock Dragon from many parts of the study area, and in particular in areas where seemingly suitable habitat exists may suggest that feral goats may have already had some negative impacts on this species.

Anticipated improvements in habitat quality and extent from a goat management plan as part of the proposed activity as discussed in section 4.4, are likely to not only avoid having a negative impact on the life cycle of a viable local population of the Tawny Rock Dragon but remove key threats to the life cycle and therefore, improve the long-term survival of this species in the study area.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

There is no listed endangered population of the Tawny Rock Dragon under the TSC Act.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

The Tawny Rock Dragon is not listed as an endangered or critically endangered ecological community under the TSC Act.

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Table 4 of the Biodiversity Addendum provides an estimate of the type and quantum of native vegetation loss required for the development of Stage 1b and 1c of the wind farm not assessed in the initial biodiversity assessment (NGHEnvironmental, 2008b). Based on these calculations, the proposed works would displace approximately 132 hectares of native vegetation. Approximately 11 hectares of native vegetation would be disturbed to enable the construction of the turbines; this could be rehabilitated after the construction phase. An additional 97 hectares could be rehabilitated after the life of the project. Approximately 24 hectares of native vegetation would be permanently displaced (footings would remain insitu after the project is decommissioned).

The Tawny Rock Dragon is loosely distributed across the Stage 1c area, with fewer records in the Stage 1b area suggesting that it occurs in a number of discrete locations. The identification of hotspots ensures that key areas that contain a higher abundance of Tawny Rock Dragon are protected from any direct or indirect impacts. Preliminary data also suggests that Tawny Rock Dragon may be amenable to general construction activities. Numerous Tawny Rock Dragons were observed displaying on rock spoil from vehicular track construction, which have provided vertical habitat ideal for territory guarding. This demonstrates that the species is not likely to be impacted by such levels of disturbance.

It could be considered that the proposed development would result in the removal or modification of habitat for this species. However, the implementation of a goat management plan provides an enormous environmental benefit to all forms of biodiversity, including the Tawny Rock Dragon. The continued existence of feral goats within the study area has the potential to cause a catastrophic decline in the Tawny Rock Dragon population considering the impacts this species has directly on rock crevice availability and quality and vegetation quality; all fundamental attributes that the Tawny Rock Dragon are likely to require in maintaining population viability. The absence of Tawny Rock Dragon from many parts of the study area, and in particular in areas where seemingly suitable habitat exists suggests that feral goats may have already had some negative impacts on this species. This evidence, along with that presented in the scientific literature and DECC key threatening processes determinations, confirms that feral goat grazing has a negative impact on threatened species and habitats in general, and more specifically the Tawny Rock Dragon and their habitats. If goat management allows for the expansion of the local Tawny Rock Dragon population into apparently suitable adjacent habitat, this would be a tremendous biodiversity gain resulting from the proposal.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The current distribution of the Tawny Rock Dragon appears quite patchy across the study area, with many areas existing in isolation from one another. The identification of hotspots provides protections for areas that are considered of high importance to the Tawny Rock Dragon as they present high levels of abundance than other areas across the site. While many of these exist in isolation, the construction and development of turbines and tracks is not considered to be contributing to current levels of isolation and fragmentation that currently occur. Rather, the implementation of a goat management plan that aims to reduce goat abundance to the lowest possible levels from the study area may increase levels of connectivity between existing populations as vegetation condition improves and current barriers to dispersal and genetic exchange lessened.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Given what is now considered to be the NSW stronghold for the species, the study area is regarded as extremely important to the long-term survival of the species in NSW.

However, it is highly likely that the long-term survival of the Tawny Rock Dragon population of the study area is threatened given the extent of feral goat degradation to their habitats. Further, the dragon's absence from seemingly suitable habitat suggests that feral goats may have already had some negative effects. Conversely, the proposed development will improve the management of this landscape, with the implementation of a goat management plan aiming to reduce goat abundance to the lowest possible levels from the study area. This would likely result in improvements to vegetation and habitat quality. Continued degradation of rock crevices would cease, allowing the crevices to slowly rehabilitate themselves as goat scats and nutrient levels passed. These increases in resource availability would almost certainly benefit the Tawny Rock Dragon populations. As such, it is considered that the removal of a small proportion of habitat in comparison to the larger extent of the study area and the environmental benefits gained from a goat management plan would provide greater certainty to the long-term survival of this species than is currently present.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)

There is no critical habitat defined for the Tawny Rock Dragon as listed by the *TSC Act*.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

The Tawny Rock Dragon is not the subject of a final or draft recovery plan. However, 12 priority actions (PA) have been identified to aid in the recovery of this species. Relevant to this proposal are:

1. To conduct long-term monitoring to determine changes in populations
2. Control feral goats at known populations
3. Determine vegetation associations at known populations
4. Encourage the retention and rehabilitation of habitat connectivity between populations
5. Establish the extent and distribution of populations in NSW
6. Research the ecology and habitat requirements of the species
7. Study movement patterns and habitat use.

This study has provided preliminary data on the Tawny Rock Dragon population and their habitats within the study area (PA1,5,6,7) . Given that it should now be considered the NSW stronghold for the species, the implementation of a goat management plan will have positive benefits (PA2,4). This study has made a variety of recommendations to further improve the habitat quality and land management of the population and to implement a longer term monitoring program of the Tawny Rock Dragon (PA1,2,4,5,6,7).

Therefore, it is considered that the proposal is consistent with the objectives of the priority actions identified for the Tawny Rock Dragon.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Several listed Key Threatening Processes (KTPs) are relevant to this species: bushrock removal, clearing of native vegetation, competition and habitat degradation by feral goats, predation by the red fox and human-caused climate change

Bushrock removal can remove or disturb the habitat of many native species, which may find shelter in or under rocks, use rocks for basking, or which grow in rocky areas. This study has confirmed that the Tawny Rock Dragon is a rock-obligate species. The creation of roads and hardstand areas may redistribute but would not remove rocks from the site which, as demonstrated, would not remove habitat if piled with soil.

Clearing of native vegetation constitutes destruction of flora and fauna habitat and is considered the major cause of loss of biological diversity. For species of restricted distribution, clearing of native vegetation may result in total extinction, for more widespread species there may be loss of local genotypes (NSW Scientific Committee 2001). The proposed works would result in approximately 132 hectares of native vegetation loss. Further more, the area is sparsely vegetated. Combined heavy goat grazing and drought are likely to have been responsible for

extensive die back of a large proportion of all vegetation strata onsite; trees, shrubs and ground cover. However, the implementation of a goat management plan as part of the proposal is likely to provide considerable environmental benefits to the study area including the native vegetation.

Competition and habitat degradation by feral goats was listed as a key threatened process in 2004. A goat management plan with the aim of reducing goat abundance to the lowest possible levels from the study area would be of considerable benefit to the Tawny Rock Dragon. Improvements in vegetation quality are likely to result in indirect increases to invertebrate availability therefore, increasing food availability. Continued degradation of rock crevices would cease, allowing the crevices to slowly rehabilitate themselves as goat scats and nutrient levels passed. The removal of goats from the study area would be a significant biodiversity gain resulting from the proposal.

Predation by the red fox has been implicated in limiting habitat choice and population size of a number of medium-sized marsupials. Even at low densities foxes can eliminate remnant populations and instigate localised declines. Foxes are also one of several factors which have been implicated in the disappearance of many medium-sized, ground-dwelling mammals from the arid and semi-arid regions of New South Wales. As discussed, this species is known to occur onsite. While tracks can often be seen to facilitate the movement of this species, the existing openness of the site could already be considered to allow unrestricted access of this species over the site.

Human-caused climate change is recognised as likely to generate a different response from organisms than the climate change that has occurred through geologic history. Modelling suggests that many species will be adversely affected including those with long generations, poor mobility, narrow ranges, specific host relationships, isolate and specialised species and those with large home ranges (Hughes and Westoby 1994). Pest species may also be advantaged by climate change. The proposal to develop a wind farm would not have immediate or local effects in this regard, it constitutes a significant part of NSW's strategy to address climate change.

Conclusion

The Assessment of Significance has determined that the proposed Stage 1b and 1c areas of the Silverton Wind Farm is '*unlikely*' to have a '*significant effect*' on the Tawny Rock Dragon or their habitat in concurrence with the recommendations outlined in Section 6. Further, the proposal provides a unique opportunity to secure the long-term survival of the NSW stronghold of the Tawny Rock Dragon provided a goat management plan is adopted to improve habitat and remove known threats to the species.

6 RECOMMENDATIONS

The following recommendations are provided based on the information detailed within this report.

1. A goat management plan must be adopted for the development envelope. This plan would aim for the reduction of goat numbers at the site to the lowest possible level. As part of the goat management plan, ongoing monitoring of the Tawny Rock Dragon population should be designed and undertaken by a suitably qualified herpetologist. This would provide assistance in determining the effects of the goat management plan and provide scientific data relevant to the priority actions identified for this species (see Section 5, Page 32 & 33).
2. All construction works and associated infrastructure must avoid identified Tawny Rock Dragon hotspots.
3. Road management zones (RMZ) must be included in the final design and enforced during construction and maintenance activities between the 1st October and 30th March inclusive when Tawny Rock Dragon are most likely active. Recommended maximum speed limits of 15km/h in RMZ 1 and 25km/h in RMZ 2 should also be applied.
4. Under no circumstances should any persons, equipment, infrastructure or materials impact directly or indirectly on any mapped hotspots (Map 3-4 & 3-5). For example, where track construction flanks hotspots, no spoil or sedimentation from these activities are permitted to enter the hotspot.
5. Habitat creation could be undertaken when excavating turbine footings and vehicular tracks by utilizing any excess rock waste when it is available. In order of priority, excess rock waste should be placed into rock piles around the vicinity of:
 - Turbines
 - Hotspots (not within the hotspot, but adjacent to)
 - Vehicular tracks

As a general guide, rock piles should be between 0.5 – 1m in height and cover an area as large as 4m x 4m in area. Multiple rock piles can be provided if excess rock waste allows. Soil should not be mixed in with or placed onto these rock piles.

6. Excavated soil should not be placed on top of any existing rocky outcrops. The placement of soil into existing rock crevices will remove potential habitat for the Tawny Rock Dragon.
7. All pre, during and post construction staff should be made aware of the significance of this species in the study area through education and awareness and their obligations in regard to hotspots and road management zones.

7 REFERENCES

- BEUTEL, T. S., BAXTER, G. S. & BEETON, R. J. S. (2003) Geckos and Grazers : A perspective on reptiles in the assessment of rangeland biodiversity.
- BIONET (2008) Fauna Database. www.bionet.nsw.gov.au.
- BLOMBERG, S. & SHINE, R. (1996) Reptiles. IN SUTHERLAND, J. (Ed.) *Ecological Census Techniques: a handbook*. Cambridge University Press.
- BRAY, J. R. & CURTIS, J. T. (1957) An ordination of the upland forest communities of southern Wisconsin. *Ecological Monographs*, 27, 325-349.
- BROWN, G., BROMHAM, L. & BENNETT, A. (1999) *When litter is good... The importance of the forest ground-layer*. Flora and Fauna Notes, State of Victoria, Department of Natural Resources and Environment.
- BROWN, G. W., BENNETT, A. F. & POTTS, J. M. (2008) Regional faunal decline - reptile occurrence in fragmented rural landscapes of south-eastern Australia. *Wildlife Research*, 35, 8-18.
- CLARKE, K. R. (1993) Non-parametric multivariate analyses of changes in community structure. *Australian Journal of Ecology*, 18, 117-143.
- CLARKE, K. R. & WARWICK, R. M. (1994) Changes in Marine Communities: An Approach to Statistical Analysis and Interpretation. *Natural Environment Research Council: Plymouth Marine Laboratory*.
- DECC (2008a) NSW Atlas of Wildlife Database.
- DECC (2008b) Threatened species, populations and ecological communities of NSW. *Department of Environment & Climate Change, Hurstville, N.S.W.*, www.threatenedspecies.environment.nsw.gov.au.
- DICKMAN, C. R., HAYTHORNTHWAITE, A. S., MCNAUGHT, G. H., MAHON, P. S., TAMAYO, B. & LETNIC, M. (2001) Population dynamics of three species of dasyurid marsupials in arid central Australia: a 10-year study. *Wildlife Research*, 28, 493-506.
- FISCHER, J. (2004) Beyond Fragmentation: Lizard distribution patterns in two production landscapes and their implications for conceptual landscape models. *PhD thesis Australian National University*.
- FISCHER, J., LINDENMAYER, D. & COWLING, A. (2003) Habitat models for the four-fingered skink (*Carlia tetradactyla*) at the microhabitat and landscape scale. *Wildlife Research*, 30, 495-504.
- FISCHER, J., LINDENMAYER, D. B. & COWLING, A. (2004) The challenge of managing multiple species at multiple scales : reptiles in an Australian grazing landscape. *Journal of Applied Ecology*, 41, 32-44.
- FORMAN, R. T. T. & ALEXANDER, L. E. (1998) Roads and their major ecological effects. *Annual Review of Ecology and Systematics*, 29, 207-231.
- FREUDENBERGER, D. & BARBER, J. (1999) Movement patterns of feral goats in a semi-arid woodland in eastern Australia. *Rangeland Journal*, 21, 71-81.
- GIBBONS, J. R. H. & LILLYWHITE, H. B. (1981) Ecological Segregation, Color Matching, and Speciation in Lizards of the *Amphibolurus Decresii* Species Complex (Lacertilia: Agamidae). *Ecology*, 62, 1573-1584.
- HADDEN, S. A. & WESTBROOKE, M. E. (1996) Habitat relationships of the herpetofauna of remnant buloke woodlands of the Wimmera Plains, Victoria. *Wildlife Research*, 23, 363-372.
- HECNAR, S. J. & M'CLOSKEY, R. T. (1998) Effects of human disturbance on fived-lined skink, *Eumeces fasciatus*, abundance and distribution. *Biological Conservation*, 85, 213-222.
- ISHWAR, N. M., CHELLAM, R., KUMAR, A. & NOO, B. R. (2003) The response of agamid lizards to rainforest fragmentation in the southern Western Ghats, India. *Conservation and Society*, 1.
- JAMES, C. D. (1991) Population dynamics, demography and life history of sympatric scincid lizards (*Ctenotus*) in central Australia. *Herpetologica*, 47, 194-210.

- JAMES, C. D. (2003) Response of vertebrates to fence-line contrasts in grazing intensity in semi-arid woodlands of eastern Australia. *Austral Ecology*, 28, 137-151.
- JAMES, C. D., LANDSBERG, J. & MORTON, S. R. (1999) Provision of watering points in the Australian arid zone : a review of effects on biota. *Journal of Arid Environments*, 41, 87-121.
- JAMES, C. D. & SHINE, R. (2000) Why are there so many coexisting species of lizards in Australian deserts? *Oecologia*, 125, 127-141.
- JELLINEK, S., DRISCOLL, D. A. & KIRKPATRICK, J. B. (2004) Environmental and vegetation variables have a greater influence than habitat fragmentation in structuring lizard communities in remnant urban bushland. *Austral Ecology*, 29, 294-304.
- LANGKILDE, T. & SHINE, R. (2004) Competing for crevices: interspecific conflict influences retreat-site selection in montane lizards. *Oecologia*, 140, 684-691.
- LETNIC, M. (2007) The impacts of pastoralism on the fauna of arid Australia. IN DICKMAN, C., LUNNEY, D. & BURGIN, S. (Eds.) *Animals of Arid Australia: out on their own?* Mosman, NSW, Royal Zoological Society of New South Wales.
- MICHAEL, D., CUNNINGHAM, R. B. & LINDENMAYER, B. D. (2008) A forgotten habitat? Granite inselbergs conserve reptile diversity in fragmented agricultural landscapes. *Journal of Applied Ecology*, 45, 1742-1752.
- MINCHIN, P. R. (1987) An evaluation of the relative robustness of techniques for ecological ordination. *Vegetatio*, 69, 89-107.
- MORTON, S. R. & JAMES, C. D. (1988) The Diversity and Abundance of Lizards in Arid Australia: A New Hypothesis. *The American Naturalist*, 132, 237-256.
- MURPHY, M. J. (1996) A possible threat to the Broad-headed snake *Hoplocephalus bungaroides*: degradation of habitat by the Feral Goat *Capra hircus*. *Herpetofauna*, 26, 37-38.
- NGHENvironmental (2008a) Biodiversity Constraints Technical Report, Stage 2 Silverton Wind Farm and Broken Hill to Red Cliffs Powerline. *Report prepared by nghenvironmental for Silverton Wind Farm Developments.*
- NGHENvironmental (2008b) Proposed development of Stage 1 Silverton Wind Farm, far western NSW: Biodiversity Addendum. *Report prepared by nghenvironmental for Silverton Wind Farm Developments.*
- NGHENvironmental (2008c) Proposed development of Stage 1 Silverton Wind Farm, far western NSW: Biodiversity Assessment. *Report prepared by nghenvironmental for Silverton Wind Farm Developments.*
- NPWS (2000) Recovery Plan for the Centralian Ranges Rock Skink *Egernia margaretae*. NSW National Parks and Wildlife Service, Hurstville.
- OSBORNE, L. (2005a) Information content of male agonistic displays in the territorial tawny dragon (*Ctenophorus delessii*). *Journal of Ethology*, 23, 189-197.
- OSBORNE, L. (2005b) Rival recognition in the territorial tawny dragon (*Ctenophorus delessii*). *Acta Ethol*, 8, 45-50.
- PIANKA, E. R. (1966) Convexity, desert lizards and spatial heterogeneity. *Ecology*, 47, 1055-1059.
- PIANKA, E. R. (1968) Habitat specificity, speciation, and species diversity in Australian desert lizards. *Ecology*, 50, 498-502.
- PIANKA, E. R. (1973) The structure of lizard communities. *Annual Journal of Ecology and Systematics*, 53-74.
- PIANKA, E. R. (1974) Niche overlap and Diffuse competition. *Proc. Nat. Acad. Sci.*, 71, 2141-2145.
- SADLER, R. A. & PRESSEY, R. L. (1994) Reptiles and amphibians of particular conservation concern in the western division of New South Wales : a preliminary review. *Biological Conservation*, 69, 41-54.
- SASS, S. (2003) A survey of the reptiles of Wagga Wagga, New South Wales. *Herpetofauna*, 33, 18-23.
- SASS, S. (2007) Of Lizards and Logs: Determinants of reptile diversity in a fragmented landscape. *Charles Sturt University, Honours Thesis.*
- SASS, S., WASSENS, S., SWAN, G., THOMPSON, L (2004) Reptile diversity in the Murrumbidgee Irrigation Area : a baseline survey.
- SCHAEFER, J., MAZZOTTI, F. J. & HUEGEL, C. (2003) Highways and Wildlife: Problems and Solutions. *Report by University of Florida.*

- SMITH, G. T., ARNOLD, G. W., SARRE, S. D., ABENSPERG-TRUAN, M. & STEVEN, D. E. (1996) The effect of habitat fragmentation and livestock grazing on animal communities in remnants of gimlet *Eucalyptus salubris* woodland in the Western Australian wheatbelt: Lizards. *Journal of Applied Ecology*, 33, 1302-1310.
- STUART-FOX, D. & OWENS, I. (2003) Species richness in agamid lizards: chance, body size, selection or ecology? *Journal of Evolutionary Biology*, 16, 659-669.
- SWAN, G. & FOSTER, R. (2005) The reptiles and amphibians of Mutawintji National Park, western NSW. *Australian Zoologist*, 33, 39-48.
- SWAN, G., SHEA, G. & SADLIER, R. (2004) *Field guide to the reptiles of New South Wales*, Sydney, Reed New Holland.
- WASSENS, S., SASS, S. & SWAN, G. (2005) Reptile communities in the vegetation remnants of the Murrumbidgee Irrigation Area, New South Wales. *Herpetofauna*, 35.
- WEBB, J. K. & SHINE, R. (2000) Paving the way for habitat restoration : can artificial rocks restore degraded habitats of endangered reptiles? *Biological Conservation*, 92, 93-99.
- WILKINSON, L. (1989) SYSTAT the system for statistics, Version 5.1. *SYSTAT*, Evanston, Illinois, USA.
- WILSON, S. & SWAN, G. (2008) *A Complete Guide to Reptiles of Australia*, 2nd edition, Sydney, Reed New Holland.

APPENDIX A: RELEVANT PHOTOGRAPHS

Plate 1: Male Tawny Rock Dragon *Ctenophorus decressi* (Photo: Steven Sass)



Plate 2: Female Tawny Rock Dragon *Ctenophorus decessi* (Photo:Steven Sass)



Plate 3: Typical Tawny Rock Dragon habitat (Photo:Jacqui Coughlan)



Plate 4: Male Tawny Rock Dragon inside a rock crevice (Photo: Daniela Brozek-Cordier)



APPENDIX B: QUALIFICATIONS AND EXPERIENCE OF PERSONNEL

The following personnel contributed to the field surveys and writing of this report.

Name	Role	Specialist skills and abilities
Nicholas Graham-Higgs	Project Director – Project management and senior review	<p>Nicholas has worked as an environmental planning and resource consultant since 1992, specialising in natural resource management. A wide range of assignments covering diverse natural and modified environments, have enabled Nick to develop a broad knowledge base in the area of natural resource planning and management.</p> <p>Nick is accredited as a Certified Environmental Practitioner by the Environment Institute of Australia and New Zealand.</p>
Brooke Marshall	Project Manager - Internal review	<p>Brooke is a first class honours Natural Resources graduate of the University of New England (UNE). She specialised in wildlife management, ecosystem rehabilitation and natural resource management in developing countries.</p> <p>Brooke has prepared impact assessment and biodiversity assessment reports relating to a variety of infrastructure development (including roads, windfarms, telecommunications, water supply management and residential development) as well as river modification and prescribed burning works. These reports have included threatened floral and fauna species assessments, research, fieldwork and GIS components. Her major projects have included design of monitoring program for a potentially threatened population of Yellow-bellied Gliders on the South Coast, impact assessments and biodiversity assessments for a number of wind farm developments on the Southern Tablelands, a Species Impact Statement involving 33 subject species near Eden, and strategic biodiversity planning reports for the Snowy River Shire and Bega Valley Shire.</p>

Name	Role	Specialist skills and abilities
<p>Steven Sass B. App. Sci. (Env.Sci) (Hons)</p>	<p>Senior Ecologist/ Herpetologist/ Senior Author</p>	<p>Steven joined nghenvironmental in August 2006 with expertise in environmental consulting and biodiversity assessment. In the four years prior, he played a key role at Charles Sturt University, undertaking flora and fauna impact assessment for the Johnstone Centre (Environmental Consulting) and as a senior research officer within the biodiversity research and education team with much of his work in western NSW. Steven is an experienced ecologist having undertaken more than 400 aquatic and terrestrial threatened flora and fauna surveys and habitat assessments. As a Certified Environmental Practitioner by the Environment Institute of Australia and New Zealand and Senior Ecologist, Steven provides technical advice and peer-review to the nghenvironmental ecology team.</p> <p>Steven is a highly experienced herpetologist and provides specialist advice, research and assessment on frog and reptile fauna and their habitats across NSW to a variety of projects and clients. These include studies of frog and reptile populations in the Murrumbidgee Irrigation Area (over 200,000 hectares) through surveys and habitat assessments at 160 sites, the impact of fire on reptile communities in a large reserve system (over 250,000 hectares) in western NSW, threatened frog and reptile surveys for the Hume Highway duplication between Wagga Hill and Albury and specialist advice on reptiles and frogs for the Queensland Hunter Gas Pipeline, a 650km project connecting Newcastle to gas infrastructure in Queensland. Steven, and in collaboration with other researchers, has published, submitted or is currently preparing a number of scientific journal manuscripts, which provide a significant contribution to the ecological knowledge of reptiles and frogs. A poorly studied fauna group, these papers aim to provide natural resource managers with updated inventories and species distribution and ecology which will be an invaluable tool in developing strategies for their future management.</p> <p>He is an Adjunct Associate of the Ecology and Biodiversity group within the Institute for Land, Water and Society, a leading research group at Charles Sturt University, Australia's largest regional university.</p>

Name	Role	Specialist skills and abilities
<p>Jacqui Coughlan B.Sc, PhD (Bird Ecology)</p>	<p>Ecologist</p>	<p>Jacqui's practical ecological skills in terrestrial and freshwater ecology have been developed over 20 years in several states. She has designed, conducted and managed numerous fauna and flora surveys in New South Wales, Queensland and Western Australia and has a thorough working knowledge of State and Commonwealth legislation related to flora and fauna. She has a broad knowledge base of ecological issues and is able to provide clients with sound and practical advice regarding environmental legislation and assessment protocols.</p> <p>Jacqui has conducted several years of research on freshwater ecosystems in mountain rainforest streams. Her PhD focused on the ecology of bird communities in rare dry rainforest vegetation in far north Queensland.</p> <p>Jacqui is experienced in all vertebrate fauna survey techniques including specialist threatened species surveys and habitat assessments and has conducted surveys in a broad range of environments including forest, woodland, grassland, mangrove, wetland, coastal and island communities. Jacqui's specialist skills in bird ecology have been used in impact assessment in Australia and internationally in grasslands and wetlands of Inner Mongolia.</p> <p>Jacqui is currently conducting research on implementation of international biodiversity conventions as part of her Masters in Environmental Law. Jacqui provides project management and mentoring advice for the environment team as well as personally contributing vital technical expertise to environment projects and leading field survey teams for large projects. Her current professional interests and project focus include biodiversity impact assessment, wind farms and linear infrastructure corridors. Jacqui has worked for a broad range of private and government clients including Department of Defence, NSW RTA, British Gas, WWF, Stockland Developments, Landcom and Sydney Water.</p>
<p>Daniela Brozek-Cordier B.Sc (Geo & Env St) Grad Dip Env St (Hons)</p>	<p>Assistant Ecologist</p>	<p>Daniela's interests include environmental planning and management, site rehabilitation, sustainable tourism, environmental education, and also planning for bushfire protection. With nghenvironmental, Daniela has also carried out numerous environmental impact assessments for proposals within Kosciuszko National Park, on the Monaro plains and on the South Coast of NSW. These have included several major water transfer proposals, tourist accommodation developments and provision of other services, often affecting protected areas.</p> <p>Daniela has recently prepared a number of significant Environmental Management Plans (EMPs) for such projects as a cloud seeding trial in the Snowy Mountains, major pipeline works, and the management of six popular walking tracks within the alpine zone of Kosciuszko National Park.</p>

Name	Role	Specialist skills and abilities
<p>Bianca Heinze B.AppSc. (Env Res Mgt & Coastal Mgt)</p>	<p>Assistant Ecologist</p>	<p>Bianca completed her Bachelor of Applied Science (Environmental Resource/Coastal Management) at Southern Cross University, Lismore in 2006.</p> <p>Since joining nghenvironmental Bianca has been mentored in the preparation of Assessments of Significance for threatened biota (7-part tests), Biodiversity Assessments and Review of Environmental Factors for clients including Epuron and Country Energy. Bianca also has field experience in biodiversity assessments including terrestrial fauna surveys and habitat evaluation across a variety of ecosystems.</p> <p>Prior to joining nghenvironmental, Bianca was employed with the Department of Sustainability & Environment, Victoria, in the field of fire management. During her 2 years, she was involved with fire operations planning, community engagement and fire suppression.</p> <p>Bianca has also volunteered on a number of projects including humpback whale and Fleay's barred frog surveys on the NSW North Coast, design of teachers' resources for waste education with Coffs City Council and water quality monitoring. Bianca holds several professional memberships including the Ecological Society of Australia and Birds Australia.</p>
<p>Ally Madden B.Sc (App.Geo) (Hons)</p>	<p>Spatial Analyst</p>	<p>Ally graduated as a first class Honours student at the University of NSW in 2006. Since the completion of her studies she has specialised in Geographic Information Systems (GIS) working with ArcMap version 9.2. Prior to joining nghenvironmental, Ally worked for the National Parks and Wildlife Service managing the design and development of interactive park maps for the NPWS website. Ally was also involved in mapping fire management strategies, Aboriginal Cultural Heritage sites and worked on the mapping and data analysis for the SE Koala Discovery Surveys.</p> <p>Ally is now involved in managing GIS data and the preparation and presentation of maps for biodiversity, heritage and environmental assessment projects, including wind farm projects and other major infrastructure projects across NSW.</p>

APPENDIX C: LOCATIONS OF HABITAT ASSESSMENT

Site No.	EASTING	NORTHING
1	532355	6498962
2	532143	6499013
3	532236	6499105
143	521877	6482844
145	529357	6488072
146	529137	6487988
147	529363	6487419
148	529122	6487343
149	528717	6487540
150	529079	6487348
151	529105	6487334
152	529138	6487322
153	530952	6486794
178	530583	6495253
179	530612	6495251
180	530652	6495347
181	530712	6495489
182	530726	6495700
183	530533	6496185
184	530179	6496677
185	528683	6496724
186	528407	6496810
187	528257	6496869
188	529566	6497436
277	530066	6488911
278	530072	6488908
279	530077	6488906
280	530003	6488907
281	529884	6488916
282	529796	6488926
283	529815	6488971
284	529815	6488971
285	529810	6488970
286	529810	6488969
287	529734	6489062
288	529752	6489057
289	529754	6489048
290	529754	6489048
291	529747	6489011
292	529810	6489017

Site No.	EASTING	NORTHING
293	531121	6488061
307	531607	6496966
308	531606	6496959
309	531606	6496955
310	531601	6496943
311	531618	6496909
312	531618	6496899
313	531617	6496897
315	531694	6496879
316	531680	6496871
317	531697	6496830
319	531675	6496755
320	531673	6496756
322	531709	6496670
327	531788	6496539
328	531793	6496536
334	531901	6496458
338	531926	6496341
342	532037	6496259
349	531594	6497102
354	531128	6497388
355	531128	6497388
360	531099	6497542
364	530910	6497646



4 ARCHAEOLOGY
ADDENDUM

**Silverton Wind Farm NSW Stage 1
Indigenous and Non Indigenous Heritage Assessment**

**Addendum Report
Stages 1b and 1c**

Volume 1

October 2008

A report to
Silverton Wind Farm Developments



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Appendices *(in Volume 2)*

- Appendix 1 Maps of recorded Aboriginal and Non Indigenous sites
- Appendix 2 Aboriginal Objects Sites Gazetteer
- Appendix 3 Non Indigenous Heritage Items Gazetteer
- Appendix 4 Aboriginal and Non Indigenous Heritage Constraints Mapping

1. SUMMARY

This report is an addendum to the Indigenous and Non Indigenous Heritage Assessment of the Silverton Wind Farm (SWF) Stage 1 project undertaken by NSW Archaeology Pty Ltd in 2007 (*as documented in Dibden 2008*).

Following on from the assessment undertaken for the first stage of the SWF a further survey boundary was identified by Silverton Wind Farm Developments (SWFD) for detailed assessment. The intention is to undertake archaeological and cultural heritage survey work for the entire development footprint however given the size of the site it must be undertaken in sections. It is understood the further stage one area which is the subject of this addendum will be part of an expansion of the first stage of the wind farm to be developed. This expansion is related to an increased electrical connection capacity.

This addendum documents the following components of the wind farm infrastructure subject to the current assessment:

- Substation 1A (on *Belmont Station*): areas not already covered in the previous assessment;
- The transmission line from the proposed Switchyard in the SWF proposal area (on *Nine Mile Station*) to Broken Hill not already covered in the previous assessment;
- Substation 2A (on *Purnamoota Station*), transmission line and access road extending south to the Switchyard;
- Ridges for turbines in the 1b (*Purnamoota, Nine Mile and Belmont*) and 1c (*Purnamoota and Eldee*) envelopes; and
- Turbines in the extended 1a envelope (*Nine Mile, Belmont* and the Water Board Land near Umberumberka Reservoir).

The field survey and assessment has been undertaken in partnership with the Broken Hill Local Aboriginal Land Council (BHLALC). Two sites officers and a trainee sites officer conducted the field survey with two archaeologists. A focus of the fieldwork was to assist in developing the heritage assessment capacity of the BHLALC trainee sites officers.

The archaeological and heritage assessment relating to the Silverton Wind Farm Stage 1 project forms the primary basis for the assessment of the expanded Stage 1 area. This assessment is documented in Dibden (2008) and the results from that work will be utilised in this report to provide a heritage context, informed assessment in regard to potential site significance and appropriate strategies of impact mitigation in regard to the expanded Stage 1 area.

Indigenous sites were found to be widespread across the initial Stage 1 proposal area (Dibden 2008). A total of 262 Aboriginal object locales were recorded during the field survey. Stone artefacts were recorded in most of the landforms subject to survey and assessment. The majority (N=166; 63.4%) of locales were very low density quartz stone artefacts distributed across individual survey units. In addition 78 quartz outcrops with evidence of exploitation – Stone Procurement Areas, fourteen locales comprising stone artefacts with heat retaining hearths, three isolated artefacts and a complex of two small circular stone arrangements were recorded (Dibden 2008).

Given the comprehensive nature of the initial field survey a basic pattern in artefact type and distribution across the landscape was found to obtain; - the results indicate a variable use by Aboriginal people of the different landforms in the Barrier Ranges. The ridge crests and slopes in the hills possess primarily quartz artefacts in a widespread but generally low density distribution. The artefact types recorded indicates that the ridges were utilised by both men and women for hunting, gathering and perhaps some food processing activities. By comparison drainage depression landforms and flats associated with creek lines were found to possess a relatively higher artefact density and greater abundance of exotic raw materials and rarer artefacts types. The higher artefact density and greater abundance and range of artefact types (including ovens) indicate that the drainage depression landforms and flats associated with creek lines sustained higher levels of landuse associated with camping.

This pattern of artefact distribution across the landscape of the Barrier Ranges has been confirmed during the most recent field survey of the expanded Stage 1 area.

The results of the current assessment are set out in this addendum in a format comparable to that as outlined in the original report (see Dibden 2008). All relevant methodological and contextual background information can be obtained in the Dibden (2008) report and is not repeated in this addendum document.

Management and mitigation recommendations are outlined in Sections 8, 9 and 10 of this report. The results of this further detailed survey work are consistent with the study in the exhibited EA. However the issue of inadvertent and/or long term impacts to archaeological features resulting from erosional processes being initiated, increased or intensified as a result of construction, maintenance and decommissioning of the proposal SWF needs to be addressed. Erosional processes currently causing impacts, some of which are significant, to archaeological features has been discussed in Dibden 2008 and elaborated further in Section 5 of this report. It is now recognised as a result of the recent field work that this matter was not given adequate consideration during the initial assessment. Accordingly the recommendations set out in Section 10 include attention to this issue and should be included in an amended Statement of Commitments.

2. INTRODUCTION

2.1 Introduction

New South Wales Archaeology Pty Ltd was commissioned in July 2008 by SWFD to undertake an assessment of Indigenous and Non Indigenous heritage values of the expanded area of the proposed Stage 1 Silverton Wind Farm.

This addendum has been prepared for inclusion within a Preferred Project Report prepared by SWFD.

The archaeological and cultural heritage assessment has sought to address the NSW Department of Planning Director-General's Environmental Assessment Requirements in respect of potential impacts and proposed mitigation measures relating to Indigenous and Non Indigenous Heritage.

In accordance with the NSW NPWS guidelines for archaeological reporting (NSW NPWS 1997), the NSW DECC Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (NSW DEC 2005) and the NSW Heritage Manual the assessment has included the following components:

- Aboriginal consultation (as documented in Dibden 2008);
- A description of the proposal and whether or not it has the potential to result in impacts to Indigenous and Non Indigenous cultural heritage (as documented in Dibden 2008);
- A description of the impact history of the proposal area (as documented in Dibden 2008);
- The methodology implemented during the study (as documented in Dibden 2008);
- The landscape and natural resources of the study area in order to establish background parameters (as documented in Dibden 2008);
- A review of archaeological and relevant literature and heritage listings on the NSW DECC Aboriginal Heritage Information Management System (as documented in Dibden 2008);
- A synthesis of local and regional archaeology (as documented in Dibden 2008) and a summary of the initial Stage 1 field survey results;
- A predictive model of Aboriginal object type and location relevant to the proposal area (as documented in Dibden 2008) and expanded upon in this report;
- A review of the historical context of the proposal area and the results of relevant heritage data base searches (as documented in Dibden 2008);
- An outline of historical themes applicable to the proposal area (as documented in Dibden 2008) and expanded upon in this report;
- The results of the current assessment;
- The archaeological significance of Aboriginal objects and Non Indigenous items;
- An assessment of the impact of the proposal on Aboriginal objects, places and Non Indigenous items as documented in Dibden 2008);
- A description and justification of the proposed outcomes and alternatives (as documented in Dibden 2008 and expanded in this addendum report); and
- A series of recommendations based on the results of the current investigation.

NSW Archaeology Pty Ltd is a consultancy specializing in both Indigenous and Non Indigenous Cultural Heritage Management. NSW Archaeology Pty Ltd has conducted assessments of five wind farm projects and numerous other major infrastructure projects in New South Wales. This project has been managed by Julie Dibden.

This project has been undertaken in consultation with NSW DECC and the NSW Heritage Office staff in order to adequately address local and relevant assessment issues (see Dibden 2008).

The Stage 1 - Silverton Wind farm archaeological project has been conducted in partnership with the Broken Hill Local Aboriginal Land Council. The Broken Hill LALC Sites Officers have extensive experience working in the local area and their assistance in the project has been invaluable.

3. ARCHAEOLOGICAL CONTEXT - INDIGENOUS

3.1 The local context

Prior to the survey of the SWF Stage 1 area conducted in 2007 by Dibden (2008) the archaeological context of the study area was not well understood. Indeed the initial SWF Stage 1 survey was the first comprehensive and major study conducted in the local area. The results of that work have provided clarification in regard to the spatial distribution and patterning of Aboriginal objects and concomitantly a greater understanding of the nature of Aboriginal occupation of the area. The results of that work are summarised briefly below in order to provide a predictive model of site type and distribution applicable to the current study of the expanded Stage 1 area:

A total of 262 Aboriginal object locales were recorded within the Stage 1 proposal area as documented in Dibden (2008). Five different Aboriginal object type categories were recorded. The majority of recorded locales are continuous distributions of predominantly quartz stone artefacts across individual survey units (N=166; 63.4%). Quartz outcrops with evidence of exploitation – Stone Procurement Areas (SPA's) account for 78 locales (approximately 30%). Fourteen locales are stone artefacts with heat retaining ovens/hearths (5.34%). One locale is a complex of two small circular stone arrangements, possibly of Aboriginal origin (Dibden 2008).

The majority of locales were found on crest landform elements however this result was a factor of a bias towards the survey of ridges in the proposed turbine envelopes. Stone Procurement Areas were found to be situated predominantly on crests and this result also was a factor, at least in part, of survey bias. Locales containing both stone artefacts in relatively high density and heat retaining oven/hearths were found to be located mostly in open depressions and simple slopes. These locales are all located in the lower landform areas of the proposal area adjacent to creeks; this site locational pattern is significant however not unexpected (Dibden 2008).

The majority of stone artefact locales were found to comprise very low to low density quartz artefact distributions situated on hill crests. The Effective Survey Coverage achieved during the field inspection was relatively high and accordingly could be considered adequate for the purposes of calculating artefact density. Accordingly the low artefact densities encountered was considered to be reasonably accurate; it was however recognised that very small artefacts (such as those measuring <1 cm in overall size) may have been located in subsurface contexts and hence invisible. While the hill crests were expected to contain low artefact densities the extremely low densities generally encountered was however somewhat surprising. It is believed that this result is possibly related, in part, to land degradation and the high levels of erosion that have taken place over the last 150 years or so (see Fanning 1999).

The majority of artefact types recorded in the Stage 1 proposal area were flakes, cores, flaked pieces and flake portions, however a range of other artefact types were observed and recorded. Technological processes evident included both free hand percussion and bipolar flaking. Abundant evidence of blade and microlith production was recorded across all landforms indicating a technology geared towards the manufacture of spear barbs for hunting. Rarer artefact types included retouched artefacts including scrapers, bondi points and adzes. Non-flaked artefacts recorded included mortars, kulkis, and hammerstones. Several slabs of schist were recorded as possible grinding slabs. These items did not contain obvious grinding depressions and this is possibly a result of high levels of erosion of their surfaces; schist is known to have been utilised as grinding slabs in the region.

Based on the above review the following section outlines a model of site type and location applicable to the expanded Stage 1 proposal area.

3.2 Predictive Model of Site Type and Location

Stone Artefacts

Stone artefacts are found either on the ground surface and/or in subsurface contexts. The raw materials used for artefact manufacture in the local area will be locally available quartz with smaller proportions of exotic materials such as silcrete, chert and quartzite.

Stone artefacts will be widely distributed across the landscape in a virtual continuum, with significant variations in density in relation to different environmental factors. Artefact density and site complexity is expected to be greater near water courses and the confluence of a number of different resource zones.

The detection of artefact scatters depends on ground surface factors and whether or not the potential archaeological bearing soil profile is visible. Lack of erosion, vegetation cover and sediment/gravel deposition can act to obscure artefact scatter presence.

Grinding Grooves

Grinding grooves are found in rock surfaces and result from the manufacture and maintenance of ground edge tools. Grinding grooves are only found on sedimentary rocks such as sandstone. Given the absence of suitable rock exposures in the study area grinding groove sites are unlikely to be present; none were recorded during the initial Stage 1 survey.

Burials sites

Burial sites have been recorded within the wider region and are commonly found in riverine or lacustrine contexts.

Although it is not of the question this site type is not expected to be present within the proposed impact areas given the geological and geomorphic context; none were recorded during the initial Stage 1 survey.

Rock Shelter Sites

Rock shelter sites are unlikely to be present in the study area given the absence of large vertical stone outcrops; none were recorded during the initial Stage 1 survey.

Scarred and Carved Trees

Scarred and Carved trees result from either domestic or ceremonial bark removal. Carved trees associated with burial grounds and other ceremonial places have been recorded in the wider region. In an Aboriginal land use context this site type would most likely have been situated on flat or low gradient landform units in areas suitable for either habitation and/or ceremonial purposes.

Bark removal through the entire historic period and by natural processes such as fire blistering and branch fall make the identification of scarring from a causal point of view very difficult. Accordingly, given the propensity for trees to bear scarring from natural causes their positive identification is impossible unless culturally specific variables such as stone hatchet cut marks or incised designs are evident and rigorous criteria in regard to tree species/age/size and its specific characteristics in regard to regrowth is adopted.

Nevertheless, the likelihood of trees bearing cultural scarring remaining extant and *in situ* is low given events such as land clearance and bushfires. Generally scarred trees will only survive if they have been carefully protected (such as the trees associated with Yuranigh's grave at Molong where successive generations of European landholders have actively cared for them).

The study area has been extensively cleared. While not impossible this site type is unlikely to have survived and therefore be extant in the study area; none were recorded during the initial Stage 1 survey.

Stone Procurement Areas (SPAs)

Throughout Australia various stone and mineral substances were collected and sometimes quarried to make stone implements and pigments of various kinds (Hiscock and Mitchell 1993; Mulvaney and Kamminga 1999:27-31). Sandstone also was quarried in large slabs for use as grindstones in milling seeds for flour. Pebble beds in watercourses were often ideal places to collect suitable stone, because there was usually a choice of different stone types; pebbles and cobbles were often a convenient size and shape, and water transport had tested the stones for toughness. In areas where pebbles were collected there often occur rejected pieces of flaked stone and other flaking debris from roughly shaping pieces of stone before these were taken away for final knapping. Where particularly desirable stone was available, the discarded knapping debris may be thousand of items per square metre. Some larger stone collecting localities in the arid zone were extensive rock formations, where knapping debris is scattered over the ground for kilometres. Some collecting sites have quarry pits and shafts following a seam of high quality stone or ochre. Around these pits are knapping floors or 'stone reduction sites', where the early stages of tool manufacture occurred. Often at probable stone procurement places such as small pebble beds in creeks, there is little or no archaeological evidence, in the form of extraction pits or concentrations of preliminary knapping debris, that stone had been selected and knapped in the past.

Certain Aboriginal quarries and mines possessed significance that transcended material needs. People did not always prefer the closest source, but exchanged valuable goods or travelled through arid country to a more distant source for stone they believed was imbued with spiritual power.

Quartz quarries are often recorded during surveys in the Broken Hill area and represent intensive exploitation of the good quality quartz and less intensive exploitation of poorer quality quartz material. The quartz reefs represented an invaluable material to the Aboriginal people of the area who otherwise did not have any suitable material for making artefacts. The reefs with the better quality milky and translucent quartz have often been heavily utilised, sometimes leaving only rounded bedrock from which it was impossible to detach any more suitable pieces. The bedrock displays Hertzian cones or ring cracks from the impact of rocks being thrown against the bedrock anvils in order to smash rocks up into suitable size for further working. The bedrock also displays areas of battering and negative flake scars where rocks have been hit against the bedrock to dislodge large flakes or blocks. These stone procurement areas are often surrounded by a ring of quartz trimming debris.

During the initial Stage 1 survey the majority of quartz outcrops present were found to have been utilised (Dibden 2008). SPAs can be expected to be widespread throughout the expanded Stage 1 area.

Heat Retainer Hearths/Ovens

Heat retainer ovens range in diameter from 50 to 180 cm and are composed of local stone and occasionally with rare pieces of burnt termite mound. This type of fireplace is described in the diary of the explorer Daniel George Brock (Peake-Jones 1988). The feature consists of a shallow pit excavated into the ground surface in which a fire was lit on top of a layer of stones. It is believed that when the stones were hot, food was placed on the stones, and then covered by the excavated dirt (and also possibly vegetation: Martin 2007 pers comm.).

Holdaway *et al.* (2002) report that excavation of hearths reveals a layer of heat cracked stone mixed with soil and in some cases flecks of charcoal. Some hearths have a dense layer of charcoal underneath the stones. Generally however hearths are so eroded that all traces of charcoal have been removed. Excavation of hearths has also shown that most were excavated a few centimetres into the top of the massive, bleached A² horizon, which provided a firm base for the arrangement of stones (Reaves 1997).

Some ovens are found *in situ* and just exposed while others have been affected by erosion and are either on earth pedestals or are left "floating" on the eroded surface. Charcoal and charcoal staining can be seen in some ovens. Ovens are commonly recorded along valley floors (Holdaway *et al.* 2002) and in upper valley/basin contexts. There is high potential for this site type to be recorded in the lower landforms of the proposal area.

Holdaway *et al.* (2002) point out that in their study some concentrations of heat fractured stone, identified to be hearths, possibly did not function as hearths, indicating that caution is required in their identification. Holdaway *et al.* (2002) defined hearths during their field work as concentration of 10 or more stones separated by less than 10 cm, however suggest that a more conservative approach may have been preferable.

Heat Retained Hearths can be expected to be abundant along water courses and other lower landforms throughout the expanded Stage 1 area.

Rock Art

Rock art is found across the continent as paintings, drawings, and pecked or abraded imagery and mechanically produced motifs such as stencils. In the Australian semi-arid zone art is found both within rock shelters on walls, ceilings and other stone features and also in open contexts as pecked or abraded art. In Australia rock art has been produced since the Pleistocene through to the present.

Much of the rock art in the semi-arid zone belongs to the so called Panaramitee style or track and circle motifs. This imagery typically includes animal track motifs. Classic Panaramitee rock art sites are present at Sturts Meadow and Mt Poole both of which are located north of the Barrier Ranges. In the region this site type is often found on large expanses of rock close to water holes and springs.

Providing suitable rock surfaces are present in the proposal area there is potential for this site type to be present.

4. ARCHAEOLOGICAL AND HERITAGE CONTEXT – NON-INDIGENOUS

4.1 Local Context

Searches have been undertaken of historical heritage databases including the NSW Heritage Inventory, the Australian Heritage Database and the National Trust of Australia (NSW) Register; these databases include items of local through to world significance. There are no heritage items present in the expanded Stage 1 project area that are listed on any of these databases (*these searches are documented fully in Dibden 2008*).

In the course of the initial SWF Stage 1 field survey 24 historical features were recorded. These recordings largely include sites that relate to mining activities, although there were also a small number of recordings that relate to pastoral and transport activities.

Available maps for the area indicate that there were hundreds of mines both within and in areas adjacent the study area (Wisehart & Co. 1885; County of Yancowinna Map 1964; 1:25,000 Geological Map; 1:50,000 Geological Map). The majority of these mines were relatively small scale and details of their names and owners are not listed on the abovementioned maps. These sites correspond to mining activities that span both the 19th and 20th centuries. The majority of these mines appear to have been exploratory in nature; none had returns that totaled more than \$10,000 AUD. Traces of these mines are present throughout the Barrier Ranges in the form of costeans, prospecting pits, mine shafts, adits, drives, quarries, mullock and tailing mounds, and pieces of machinery. Additional features exist that are associated with mining including settlements, old roadways, miners' camps, and graves.

Pastoral history and heritage is a fundamental component of the heritage of far western NSW (Hope 2006). The expanded Stage 1 study area encompasses a series of modern pastoral stations that correspond to parts of the earlier Mount Gipps and Mundi Mundi Stations. The modern day stations include Purnamoota, Eldee, Belmont, Limestone and Nine Mile. These stations are the result of a series of subdivisions that have taken place since the late nineteenth century when populations increased as a result of mining developments across the Barrier Ranges.

The expanded Stage 1 turbine envelope includes parts of Purnamoota, Eldee, Belmont and Nine Mile Stations, while the proposed transmission line also crosses parts of Limestone and Stirling Vale. Originally much of the area that comprises the study area was part of the Mount Gipps Station, the history of which is outlined in *The Unincorporated Area of New South Wales: A Heritage Study* (Hope 2006). Limestone and Nine Mile Stations all correspond in part to sections of the original Mount Gipps Station.

Belmont, parts of Limestone and Nine Mile, Eldee and parts of Purnamoota correspond to sections of the original Mundi Mundi Station. The Mundi Mundi Ruins are located between Belmont and Eldee on Dense Camp Creek. These ruins are a site complex that date to the nineteenth century and include homestead remains, a water tank and well and a series of burials; they are located on Eldee Station. While the Mundi Mundi Ruins do not correspond to proposed turbine envelopes there is the potential that future stages of the development project will impact on this item at which stage it will be necessary to document the site and assess the heritage significance and potential impacts. At this stage it can be stated that the Mundi Mundi Ruins are almost definitely of local significance and have the potential to be of state significance. This item will not be materially affected by the expanded Stage 1 development and as such has not been included in the field work for this report.

The Silverton Tramway was a historically significant development within the context of the development of mining at Silverton and Broken Hill. Although not formally listed on any heritage register it was discussed in some detail in Hope's (2006) heritage study. Hope (2006) states:

The Silverton Tramway is of exceptionally high state and national significance. As a private railway of approximately 50 km length, its strategic role in the interstate railway network may be unique. For 80 years it was critical to the economic functioning of Broken Hill, by providing the key transport of ore to the smelters at the Port Pirie sea-port. It played a significant role in the politics and recreation of Broken Hill, and a crucial role at times of water shortage (Hope 2006: 342).

A small portion of the Silverton Tramway is within an area of potential direct impacts associated with Stage 1; this is the area where the proposed transmission line would cross the tramway in the vicinity of Acacia/Limestone Siding.

The water pipe from Umberumberka Reservoir to Broken Hill is traversed by numerous impacts associated with the expanded Stage 1 area and the transmission line to Broken Hill. The complex as a whole has been assessed by Hope (2006) to be of state significance.

4.2 Predictive Model

For the purposes of providing predictive statements regarding the potential existence of additional items of Non Indigenous heritage a series of broad themes have been developed (see Dibden 2008). These themes aim to provide a convenient classificatory system for sites in term of which phase of occupation they relate to. It should be noted that

there will be a degree of chronological overlap in these themes, and that any given site may relate to more than one theme.

Historical themes applicable to the expanded Stage 1 area include:

- Exploration
- Squatters and pastoral stations
- Townships
- Mining
- Road transport and trade

The following section provides predictive statements for each of these historical themes. The predictive statements are based on the reviews of primary and secondary documentary sources and the regional databases of known historical sites documented in Dibden (2008). It should be noted that the potential for sites to exist is not a reflection of their potential significance. That is, a high potential does not necessarily imply high significance.

Exploration

Exploration of the area began in 1829 with the expedition of Captain Charles Sturt. Between then and 1838 when the overland route began to be established European activity in the area would have been negligible. Furthermore, archaeological evidence of such exploration activities would in most cases be very ephemeral. As such the potential in the study area for sites related to this theme is predicted to be low to moderate. Areas of greatest potential would be where the proposed transmission line intersects with rivers and other major water sources where camps might have been made.

Overland route

The overland route was established from the late 1830s onwards. European activity would initially have been quite minimal, consisting of a series of regular or semi-regular camp spots such as the one that developed at the Murray Darling junction. Other activities and events associated with this theme are the grazing of cattle and violent confrontations with Aborigines. Due to the nature of sites associated with such events and activities and the extent of subsequent development in the area, evidence relating to this theme is unlikely to survive. The potential for such sites is thus predicted to be low, although there is a limited potential for locations associated with this theme to still be remembered via oral history.

Squatters and pastoral stations

From the 1840s onwards squatters established homesteads with associated workers residences, stockyards, woolsheds and the like. As the earlier stations were subdivided the number of homesteads and associated infrastructure multiplied. In some cases the original homesteads continued in use, and in others they were abandoned in favour of new locations, as was the case for Mundi Mundi Station where substantial ruins of the original settlement can still be found on Dense Camp Creek, Eldee Station. The potential for sites associated with the various phases of pastoral settlement is high and potential heritage items that might be present include stock watering facilities, tree stumps from clearing, fencing and stock fodder feed, remains of fencing, relict field systems, plantings of introduced tree species, roads, buildings, graves, and building platforms or footings.

Townships

Unofficial and government settlements began to appear in the wider region from the mid 1840s onwards. The establishment of urban settlement usually results in some of the most enduring forms of archaeological evidence. This evidence can include original buildings; structures that have been heavily modified, perhaps masking the existence of original elements; locations that have maintained the same function over time despite any changes to the fabric of buildings; street layouts; cemeteries; elements of services such as water and electricity; parks or commons, including any associated fencing or tree plantings; tree stumps from clearing; middens of glass and other refuse; discarded machinery; and quarries where stone, clay or sand have been exploited. While this list is not exhaustive, it does demonstrate the wide range of forms of archaeological evidence relating to towns and villages. The potential for archaeological evidence such as those listed above is predicted to be high to very high, particularly around current urban centres and in areas adjacent the larger mines such as Day Dream and Apollyon.

Mining

The Barrier Ranges have witnessed both past and current intensive mining activity and traces of these mines are likely to be still evidenced in the form of costeans, prospecting pits, mine shafts, adits, drives, quarries, mullock and

tailing mounds, forges and assaying kilns, and pieces of machinery. There is also the potential for a range of other historical features to exist that are associated with mining. Examples include settlements old roadways, miners' camps, and graves. During the survey of impact areas associated with the Silverton Wind Farm Stage 1 a total of 24 historical features were recorded. These recordings largely include sites that relate to mining activities. Based on information contained on the various geological maps available for the region there are hundreds of former mine leases within the proposal area varying in scale from prospecting pits where no mineralisation was recorded through to larger mines such as Mt Robe where more substantial remains are likely to exist. The potential for archaeological evidence of mining is very high, particularly in the proposed turbine envelopes.

5. SURVEY RESULTS - INDIGENOUS

5.1 Effective Survey Coverage

The study area has been divided into 46 Survey Units as described in Table 1 below. Survey Units have been numbered sequentially from SU233 (*so as to continue logically from the initial Stage 1 recordings*) to SU278.

In the initial Stage 1 study survey units were defined on a fine scale based on landform morphological type. This resulted in the definition of large *and unwieldy* numbers of survey units. Given the high levels of redundancy in these initial recordings it has been determined that such fine levels of landform/archaeological terrain unit categorization is unnecessary for the project at hand.

Accordingly the method of categorizing survey units in the current study has been refined to correspond primarily to landform systems such as hills, low hills, rolling downs and so on. In addition survey units have been broken up further so as to correspond to development footprint areas (such as a discrete clusters of turbines or single transmission line routes) for the purpose of greater simplicity when it comes to implementing management strategies in later stages of the project. In Table 1 both the general area and the development zone encompassed by each survey unit is listed.

Generally ground exposure encountered during the survey was high as a result of low levels of vegetation cover. In the majority of Survey Units ground exposure was estimated to be between 80 and 85 percent. Ground cover was obscured by sparse vegetation and generally high levels of bedrock shatter.

Archaeological visibility was also found to be generally high, especially on the hills. On the hills archaeological visibility was estimated to generally range from 80 to 90 percent of ground exposure. That is, it has been estimated that ground exposures were not sufficiently breached so as to provide a view of the full range of artefacts present in the ground. This result is considered to have been a conservative estimate but took into consideration the fact that soil, while often skeletal, was present and therefore likely to act so as to obscure some artefacts, especially smaller items. In lower landforms, especially alluvial terraces, archaeological visibility was found to be much less than that estimated on the hills. Generally in these landforms it was estimated that while ground exposure was high, it was insufficiently breached by erosional processes to provide high visibility of the potential artefact bearing soil profile. In addition these landforms are subject to aggrading geomorphological processes and so archaeological items and features are likely to be covered with soils deposits, especially Post Settlement Alluvium. The Effective Survey Coverage calculations made in respect of each Survey Unit therefore vary significantly between the hills and the lower landforms reflecting the differences in estimates of archaeological visibility.

During the survey estimates of stone artefact density in individual Survey Units was made and these are listed in the Effective Survey Coverage table (Table 2). These estimates have been based both on artefact density calculations made during the survey (taking into consideration effective survey coverage), and also, a consideration of the environmental context and the predicted nature of Aboriginal land use. Predictions relating to Aboriginal land use and the levels of resulting artefact discard in the different environments of the proposal area have previously been outlined in Section 4.

Based on a consideration of a number of environmental factors including steep gradients and absence of water the hilly areas were predicted to have been utilised for low levels of Aboriginal occupation associated with hunting and gathering forays conducted away from base camp locations. Therefore it was predicted that in the hills artefact discard would have been correspondingly low, commensurate with low levels of utilisation. The hills were predicted to contain stone artefacts distributed in low density. By contrast the lower landforms were considered likely to have been utilised by Aboriginal people as camping places given the presence of more reliable water and a greater range of resources etc. It was predicted that in the open depression landforms and associated relatively flat slopes, artefact discard would have been relatively high as a result of greater levels of utilisation. In addition it was suggested that these locations would contain a greater variety of artefact types reflecting longer periods of habitation and a greater diversity of activities undertaken. It is noted here that these predictions, especially those relating to variable artefact density across the range of landforms in the proposal area, have been found to correspond with the survey results and this is comparable to the findings of the initial Stage 1 survey.

A summary of Effective Survey Coverage is listed in Table 2 below. It is noted that both Indigenous and Non Indigenous items are listed in the Recordings column.

Table 1. Summary description of Survey Units.

SU	Area	Area/ development zone	Landform Pattern	Vegetation	Geology	Rock exposures	Quartz	Soil	Potential for subsurface deposit	Geomorph- ological processes	Geo agents and disturbance	Biodiversity
233	Mt Robe	1c: Turbine envelope P124, P126, P119, P121, P114, P128, P129, P130	low hills	Mulga-Dead finish	pegmatite	high levels of outcrops; large low tors	low levels of outcrops; sparse background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
234	Mt Robe	1c: Turbine envelope P139, P142, P153, P154, P152, P149	low hills	Mulga-Dead finish	pegmatite	high levels of outcrops; large low tors	low levels of outcrops; low/moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
235	Mt Robe	1c: Turbine envelope P101, P110, P112, P120, P133, P136, P144	hills	Mulga-Dead finish	schist	high levels of outcrops	low levels of outcrops; generally sparse background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
236	Mt Robe	1c: Turbine envelope P123, P116, P125, P131, P115, P111	hills	Mulga-Dead finish	schist	high levels of outcrops	low levels of outcrops; generally sparse background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
237	Mt Robe	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P66	hills	Mulga-Dead finish	schist and pegmatite	high levels of outcrops; large low pegmatite tors	moderate levels of outcrops; generally sparse background however higher in pegmatite	skeletal	low	eroded	gravity; precipitation; wind; goats	low
238	Mt Robe	1c: Turbine envelope P73, P76, P74, P82	hills	Mulga-Dead finish	schist and pegmatite	high levels of outcrops	low levels of outcrops; generally sparse background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
239	Mt Robe	1c: Turbine envelope P106, P105, P117	hills	Mulga-Dead finish with Mallee on Mt Robe	schist and pegmatite	high levels of outcrops; large low pegmatite tors	low levels of outcrops; moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats; trig; mining	low

SU	Area	Area/ development zone	Landform Pattern	Vegetation	Geology	Rock exposures	Quartz	Soil	Potential for subsurface deposit	Geomorph- ological processes	Geo agents and disturbance	Biodiversity
240	Mt Robe	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	hills	Mulga-Dead finish	schist	high levels of outcrops	moderate levels of outcrops; moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
241	Mt Robe	1c: Turbine envelope E49, E50, P69	hills	Mulga-Dead finish	schist and pegmatite	high levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
242	Mt Robe	1c: Turbine envelope E60, E59, P92	hills	Mulga-Dead finish	pegmatite	high levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
243	Mt Robe	1c: Turbine envelope P109, E63, E64, E61, E62	hills	Mulga-Dead finish	schist	high levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
244	Mt Robe	1c: Turbine envelope P138, P150, P155, P162, P168	hills	Mulga-Dead finish	schist and pegmatite	high levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats; track	low
245	Mt Robe	1c: Turbine envelope P159, P156	hills	Mulga-Dead finish	schist and pegmatite	high levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
246	Mt Robe	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	low hills	Mulga-Dead finish	pegmatite	high levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats; track	low
247	Mt Franks	1b: Turbine envelope N24, N26, N27 P16	low hills	Mulga-Dead finish	schist	high levels of outcrops	low levels of outcrops; low/moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
248	Mt Franks	1b: Turbine envelope P24, P29, P35, P26, P20	low hills	Mulga-Dead finish	schist	high levels of outcrops	low levels of outcrops; low/moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats	low

SU	Area	Area/ development zone	Landform Pattern	Vegetation	Geology	Rock exposures	Quartz	Soil	Potential for subsurface deposit	Geomorph- ological processes	Geo agents and disturbance	Biodiversity
249	Mt Franks	1b: Turbine envelope B77, B75, B81, B85	hills	Mulga-Dead finish	schist	high levels of outcrops	high levels of outcrops; low/moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
250	Belmont	1b: Turbine envelope B3, B5	hills	Mulga-Dead finish	schist and pegmatite	high levels of outcrops	low levels of outcrops; low/moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats; mining; graded track	low
251	Belmont	1b: Turbine envelope B7, B8, B11, B12, B16, B20, B25	hills	Mulga-Dead finish	schist and pegmatite	moderate levels of outcrops	low levels of outcrops; low/moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats; goat fencing	low
252	Belmont	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	hills	Mulga-Dead finish	schist and pegmatite	moderate levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats; goat fencing; graded track	low
253	Belmont/ Water Board	1b: Turbine envelope B21, WB1, WB2	hills	Mulga-Dead finish	schist and pegmatite	moderate levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats; water pipe construction, track and related works	low
254	Belmont	1b: Turbine envelope B26	hills	Mulga-Dead finish	schist and pegmatite	high levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats; mining, track and related works	low
255	Belmont/?Ni ne mile	1a: Turbine envelope A91, A92, A93, A94, A95	low hills	Mulga-Dead finish	schist	high levels of outcrops	moderate levels of outcrops; low/moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats	low

SU	Area	Area/ development zone	Landform Pattern	Vegetation	Geology	Rock exposures	Quartz	Soil	Potential for subsurface deposit	Geomorph- ological processes	Geo agents and disturbance	Biodiversity
256	Belmont	1a: Turbine envelope A24	hills	Mulga-Dead finish	schist	high levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats; mining, track and related works	low
257	Belmont	1a: Turbine envelope 4 turbines?	low hills	Mulga-Dead finish	pegmatite	high levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats; track	low
258	Nine Mile	1a: Turbine envelope A113	low hills	Mulga-Dead finish, Mallee on spur crest	schist and pegmatite	high levels of outcrops	low/moderate levels of outcrops; low/moderate background	skeletal generally except for area adjacent to creek	low generally except for area adjacent to creek	eroded on hill; aggrading adjacent to creek	gravity; precipitation; wind; goats; mining	low
259	Nine Mile	1a: Turbine envelope A85	low hills	Mulga-Dead finish, Mallee on spur crest	schist	high levels of outcrops	low levels of outcrops; low background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
260	Purnamoota	Substation 2a	rises	Mulga-Dead finish	pegmatite	moderate levels of outcrops	low/moderate levels of outcrops; low/moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
261	Purnamoota	Proposed site access to substation 2a	rises	Mulga-Dead finish	pegmatite	low/moderate levels of outcrops	low levels of outcrops; high background	skeletal generally except for areas adjacent to drainage lines	low	eroded on hills; aggrading/ eroding adjacent to drainage lines	gravity; precipitation; wind; goats; sheep; highly eroded creeklines: entrenched, knick points, surface wash	low/moderate

SU	Area	Area/ development zone	Landform Pattern	Vegetation	Geology	Rock exposures	Quartz	Soil	Potential for subsurface deposit	Geomorph- ological processes	Geo agents and disturbance	Biodiversity
262	Purnamoota	Existing access track	rises	Mulga-Dead finish	pegmatite	low/moderate levels of outcrops	low levels of outcrops; moderate background	skeletal generally except for areas adjacent to drainage lines	low	eroded on hills; aggrading/eroding adjacent to drainage lines	gravity; precipitation; wind; goats; sheep; track; highly eroded creeklines: entrenched, knick points, surface wash	low/moderate
263	Purnamoota	Existing access track	flat/open depression	River Red Gum Open Woodland	alluvium	nil	gravels	desert loam	high	eroding/aggrading	Sandy Gum Ck highly entrenched; alluvium aggrading with surface wash and eroding with knick points and entrenchment	moderate
264	Purnamoota	Transmission line from substation 2a to Switchyard	rises	Mulga-Dead finish	pegmatite	low/moderate levels of outcrops	low levels of outcrops; moderate background	skeletal generally except for areas adjacent to drainage lines	low	eroded on hills; aggrading/eroding adjacent to drainage lines	gravity; precipitation; wind; goats; sheep; highly eroded creeklines: entrenched, knick points, surface wash	low/moderate
265	Purnamoota	Transmission line from substation 2a to Switchyard	flat/open depression	Prickly wattle open shrubland	minimal schist, alluvium	low	gravels	desert loam	moderate, but high natural erosional disturbance	eroding/aggrading	alluvium aggrading with surface wash and eroding with knick points and entrenchment	low/moderate

SU	Area	Area/ development zone	Landform Pattern	Vegetation	Geology	Rock exposures	Quartz	Soil	Potential for subsurface deposit	Geomorph- ological processes	Geo agents and disturbance	Biodiversity
266	Purnamoota	Transmission line from substation 2a to Switchyard	flat/open depression	Prickly wattle open shrubland	alluvium	gravels	high quartz gravels	desert loam	low/moderate; moderate natural erosional disturbance	eroding/aggrading	alluvium aggrading; relatively stable	low/moderate
267	Purnamoota	Transmission line from substation 2a to Switchyard	rises	Mulga-Dead finish	pegmatite	gravels	low/moderate levels of outcrops; moderate background	skeletal generally except for areas adjacent to drainage lines	low generally except for areas adjacent to creeks	eroded on hills and slopes; aggrading/eroding adjacent to drainage lines	gravity; precipitation; wind; goats; sheep; track; highly eroded creeklines: entrenched, knick points, surface wash	moderate
268	Nine Mile	Transmission line from substation 2a to Switchyard	open depression /drainage lines	Mulga-Dead finish; River Red Gum Open Woodland adjacent to creeks	pegmatite /schist; alluvium along creeks	low/moderate levels of outcrops	moderate/high levels of outcrops; moderate background	skeletal generally except for areas adjacent to drainage lines	low generally except for areas adjacent to creeks	eroded on hills and slopes; aggrading/eroding adjacent to drainage lines	gravity; precipitation; wind; goats; sheep; track; highly eroded creeklines: entrenched, knick points, surface wash	moderate
269	Nine Mile	Proposed substation 3a (alternative)	low hills	Mulga-Dead finish	pegmatite	low/moderate levels of outcrops	moderate levels of outcrops; moderate background	skeletal	low	eroded	gravity; precipitation; wind; goats	low
270	Belmont	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard (east end)	low hills	Mulga-Dead finish	schist	low/moderate levels of outcrops	low/moderate levels of outcrops; moderate background	skeletal generally except for areas adjacent to drainage lines	low generally except for areas adjacent to creeks	eroded on hills and slopes; aggrading/eroding adjacent to drainage lines	gravity; precipitation; wind; goats; sheep; highly eroded creeklines: entrenched, knick points, surface wash	low/moderate

SU	Area	Area/ development zone	Landform Pattern	Vegetation	Geology	Rock exposures	Quartz	Soil	Potential for subsurface deposit	Geomorph- ological processes	Geo agents and disturbance	Biodiversity
271	Belmont	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	low hills	Mulga-Dead finish	pegmatite	low/moderate levels of outcrops	low/moderate levels of outcrops; moderate background	skeletal generally except for areas adjacent to drainage lines	low generally except for areas adjacent to creeks	eroded on hills and slopes; aggrading/ eroding adjacent to drainage lines	gravity; precipitation; wind; goats; highly eroded creeklines: entrenched, knick points, surface wash	low/moderate
272	Belmont	Proposed substation 1b (alternative)	rises	Mulga-Dead finish	schist/peg matite	low/moderate levels of outcrops	low levels of outcrops; moderate/high background	skeletal generally except for areas adjacent to drainage lines	low generally except for areas adjacent to creek	eroded on hills and slopes; aggrading/ eroding adjacent to drainage lines	gravity; precipitation; wind; goats; track; goat yards; mining; highly eroded creeklines: entrenched, knick points, surface wash	low/moderate
273	Belmont	Proposed substation 1a	rises	Mulga-Dead finish; River Red Gum Open Woodland adjacent to creek	pegmatite	low/moderate levels of outcrops	low/moderate levels of outcrops; moderate background	skeletal generally except for areas adjacent to drainage lines	low generally except for areas adjacent to creek	eroded on hills and slopes; aggrading/ eroding adjacent to drainage lines	gravity; precipitation; wind; goats; highly eroded creeklines: entrenched, knick points, surface wash	moderate
274	Belmont	Access track to proposed substation 1a	rises	Mulga-Dead finish; River Red Gum Open Woodland adjacent to creek	alluvium	low	low	desert loam	high	aggrading/ eroding	creekline and drainage entrenched, knick points, surface wash	moderate

SU	Area	Area/ development zone	Landform Pattern	Vegetation	Geology	Rock exposures	Quartz	Soil	Potential for subsurface deposit	Geomorph- ological processes	Geo agents and disturbance	Biodiversity
275	Belmont	Feeder 1 alternative	rises	Mulga-Dead finish	schist/peg matite	moderate levels of outcrops	low levels of outcrops; moderate background	skeletal generally except for areas adjacent to drainage lines	low generally except for areas adjacent to creek	eroded on hills and slopes; aggrading/ eroding adjacent to drainage lines	gravity; precipitation; wind; goats; sheep; highly eroded creeklines: entrenched, knick points, surface wash	low/moderate
276	Limestone	Transmission line from Switchyard to Broken Hill	rolling downs and lowlands	chenopod shrublands	schist/peg matite	low/moderate levels of outcrops	low/moderate levels of outcrops; moderate background	skeletal generally except for areas adjacent to drainage lines	low generally except for areas adjacent to creeks and in open depressions	eroded on hills and slopes; aggrading/ eroding adjacent to drainage lines and in open depressions	gravity; precipitation; wind; goats; track; highly eroded creeklines: entrenched, knick points, surface wash	low/moderate
277	Nine Mile	Maintenance and Construction Compound	rolling downs and lowlands	chenopod shrublands	pegmatite	low/moderate levels of outcrops	low/moderate levels of outcrops; moderate background	skeletal generally except for areas adjacent to drainage lines	low generally except for areas adjacent to creek	eroded on hills and slopes; aggrading/ eroding adjacent to creek	gravity; precipitation; wind; goats; sheep; recreational huts; etc highly eroded creekline: entrenched, knick points, surface wash	moderate
278	Stirling Vale (Butchers paddock)	Transmission line from Switchyard to Broken Hill	low hills	chenopod shrublands	pegmatite	low/moderate levels of outcrops	low/moderate levels of outcrops; low/moderate background	skeletal generally except for areas adjacent to drainage lines	low generally except for areas adjacent to creeks and in open depressions	eroded on hills and slopes; aggrading/ero ding adjacent to drainage lines and in open depressions	gravity; precipitation; wind; goats; mechanical ripping; mining; highly eroded creeklines: entrenched,	low/moderate

SU	Area	Area/ development zone	Landform Pattern	Vegetation	Geology	Rock exposures	Quartz	Soil	Potential for subsurface deposit	Geomorph- ological processes	Geo agents and disturbance	Biodiversity
											knick points, surface wash	

Table 2. Effective Survey Coverage.

SU	Area inspected	Exposure %	Exposure area sq m	Visibility %	Net Effective Exposure	ESC	Recordings	Stone artefact density
233	125000	80	100000	80	80000	64	SU233/L1 SU233/L2	very low
234	110000	80	88000	80	70400	64	SU234/L1 SU234/L2 SU234/L3 SU234/L4	very low
235	170000	80	136000	80	108800	64	SU235/L1 SU235/L2 SU235/L3 SU235/HS1 SU235/HS1a	generally very low
236	140000	80	112000	80	89600	64	SU236/L1 SU236/L2 SU236/L3 SU236/L4 SU236/L5 SU236/HS1	generally very low
237	200000	80	160000	80	128000	64	SU237/L1 SU237/L2 SU237/L3 SU237/L4 SU237/L5 SU237/L6 SU237/L7 SU237/L8 SU237/L9 SU237/L10 SU237/L11 SU237/L12 SU237/L13	generally low
238	90000	80	72000	80	57600	64	SU238/L1 SU238/L2	generally low
239	80000	80	64000	80	51200	64	SU239/L1 SU239/L2 SU239/L3 SU239/L4 SU239/L5 SU239/HS1 SU239/HS2	very low
240	225000	80	180000	80	144000	64	SU240/L1 SU240/L2 SU240/L3 SU240/L4 SU240/L5 SU240/L6 SU240/L7 SU240/L8 SU240/L9 SU240/L10 SU240/L11 SU240/L12 SU240/L13 SU240/L14 SU140/HS1 SU140/HS2 SU140/HS3	generally low
241	45000	80	36000	80	28800	64	SU241/L1 SU241/L2 SU241/L3 SU241/L4	very low
242	75000	80	60000	80	48000	64	SU242/L1 SU242/L2 SU242/L3	very low
243	90000	80	72000	80	57600	64	SU243/L1	very low

SU	Area inspected	Exposure %	Exposure area sq m	Visibility %	Net Effective Exposure	ESC	Recordings	Stone artefact density
							SU243/L2 SU243/L3 SU243/L4 SU243/L5	
244	100000	80	80000	80	64000	64	SU244/L1 SU244/HS1	very low
245	40000	80	32000	80	25600	64	SU245HS1	negligible
246	225000	80	180000	80	144000	64	SU246/L1 SU246/L2 SU246/L3 SU246/L4 SU246/HS1	very low
247	70000	80	56000	80	44800	64	SU247/L1	very low
248	100000	80	80000	80	64000	64	SU248/L1 SU248/L2 SU248/L3 SU248/L4 SU248/L5 SU248/L6 SU248/L7 SU248/L8	very low
249	200000	80	160000	80	128000	64	SU249/L1 SU249/L2 SU249/L3 SU249/L4 SU249/L5 SU249/L6 SU249/L7 SU249/L8 SU249/L9 SU249/L10 SU249/L11 SU249/L12 SU249/L13 SU249/L14 SU249/L15 SU249/L16 SU249/L17 SU249/L18 SU249/HS1 SU249/HS2 SU249/HS3	very low
250	60000	80	48000	80	38400	64	SU250/L1 SU250/HS1	very low
251	175000	80	140000	80	112000	64	SU251/L1 SU251/L2 SU251/L3 SU251/L4 SU251/L5 SU251/L6 SU251/L7 SU251/L8 SU251/L9 SU251/L10	very low
252	175000	80	140000	80	112000	64	SU252/1 SU252/2 SU252/3 SU252/HS1 SU252/HS2	very low
253	35000	80	28000	80	22400	64	SU253/L1 SU253/HS1 SU253/HS2	very low
254	35000	80	28000	80	22400	64	SU254/HS1 SU254/HS2 SU254/HS3	negligible

SU	Area inspected	Exposure %	Exposure area sq m	Visibility %	Net Effective Exposure	ESC	Recordings	Stone artefact density
							SU254/HS4 SU254/HS5	
255	100000	80	80000	80	64000	64	SU255/L1 SU255/L2 SU255/L3	very low
256	30000	80	24000	80	19200	64	SU256/HS1	negligible
257	50000	80	40000	80	32000	64	SU257/L1 SU257/L2 SU257/HS1 SU257/HS2	very low
258	100000	70	70000	60	42000	42	SU258/L1 SU258/L2 SU258/L3 SU258/L4 SU258/HS1 SU258/HS2 SU258/HS3	very low generally except adjacent to creek where it is predicted to be moderate in a subsurface context
259	50000	80	40000	80	32000	64	SU259/HS1	negligible
260	160000	75	120000	70	84000	52.5	SU260/L1 SU260/L2	very low
261	130000	80	104000	80	83200	64	SU261/L1 SU261/L2 SU261/L3 SU261/L4 SU261/L5	low/very low
262	100000	75	75000	50	37500	37.5	SU262/L1 SU262/L2 SU262/L3 SU262/L4 SU262/L5 SU262/L6 SU262/HS1	low
263	135000	90	121500	5	6075	4.5	SU263/L1	potentially moderate/high in subsurface context
264	90000	80	72000	70	50400	56	SU264/L1 SU264/L2 SU264/L3 SU264/L4 SU264/HS1 SU264/HS2	very low generally except adjacent to drainage lines where it is predicted to be moderate in a subsurface context
265	100000	95	95000	70	66500	66.5	SU265/L1 SU265/HS1	low
266	40000	85	34000	34	11560	28.9	SU266/L1 SU266/L2 SU266/HS1 SU266/HS2	moderate
267	480000	75	360000	75	270000	56.25	SU267/L1 SU267/L2 SU267/L3 SU267/L4 SU267/L5 SU267/L6 SU267/L7 SU267/L8 SU267/L9 SU267/L10 SU267/L11 SU267/L12 SU267/L13 SU267/HS1 SU267/HS2 SU267/HS3	very low generally except adjacent to drainage lines where it is predicted to be moderate or moderate high in a subsurface context
268	900000	75	675000	65	438750	48.75	SU268/L1 SU268/L2	very low generally except adjacent to

SU	Area inspected	Exposure %	Exposure area sq m	Visibility %	Net Effective Exposure	ESC	Recordings	Stone artefact density
							SU268/L3 SU268/L4 SU268/L5 SU268/L6 SU268/L7 SU268/L8 SU268/L9 SU268/L10 SU268/L11 SU268/L12 SU268/L13 SU268/L14 SU268/L15 SU268/L16 SU268/HS1 SU268/HS2 SU268/HS3 SU268/HS4 SU268/HS5 SU268/HS6 SU268/HS7 SU268/HS8 SU268/HS9 SU268/HS10 SU268/HS11 SU268/HS12	drainage lines where it is predicted to be moderate or moderate high in a subsurface context
269	90000	80	72000	80	57600	64	SU269/L1 SU269/L2 SU269/L3 SU269/L4 SU269/L5	very low
270	75000	80	60000	80	48000	64	SU270/L1 SU270/L2 SU270/L3 SU270/L4	very low generally except adjacent to drainage line where it is predicted to be moderate in a subsurface context
271	125000	75	93750	65	60937.5	48.75	SU271/L1 SU271/L2 SU271/L3 SU271/L4 SU271/L5 SU271/L6 SU271/L7 SU271/L8 SU271/L9 SU271/HS1	low generally except adjacent to drainage lines where it is predicted to be low/moderate in a subsurface context
272	90000	70	63000	65	40950	45.5	SU272/L1 SU272/L2 SU272/HS1 SU272/HS2 SU272/HS3	low generally except adjacent to drainage lines where it is predicted to be low/moderate in a subsurface context
273	160000	50	80000	35	28000	17.5	SU273/L1 SU273/L2 SU273/L3	low generally except adjacent to drainage lines where it is predicted to be moderate/high in a subsurface context
274	100000	50	50000	5	2500	2.5	SU274/L1	predicted to be moderate/high in a subsurface context
275	60000	60	36000	50	18000	30	SU275/L1	low generally

SU	Area inspected	Exposure %	Exposure area sq m	Visibility %	Net Effective Exposure	ESC	Recordings	Stone artefact density
							SU275/L2 SU275/L3 SU275/L4 SU275/L5 SU275/L6 SU275/L7	except adjacent to drainage line where it is predicted to be moderate in a subsurface context
276	700000	75	525000	45	236250	33.75	SU276/L1 SU276/L2 SU276/L3 SU276/L4 SU276/L5 SU276/L6 SU276/L7 SU276/L8 SU276/L9 SU276/L10 SU276/L11 SU276/L12 SU276/L13 SU276/HS1 SU276/HS2 SU276/HS3 SU276/HS4	low generally except adjacent to drainage line where it is predicted to be moderate in a subsurface context
277	160000	75	120000	45	54000	33.75	SU277/L1 SU277/L2	low generally except adjacent to drainage line where it is predicted to be moderate/high in a subsurface context
278	800000	75	600000	45	270000	33.75	SU278/L1 SU278/L2 SU278/L3 SU278/L4 SU278/L5 SU278/L6 SU278/L7 SU278/L8 SU278/L9 SU278/HS1 SU278/HS2 SU278/HS3	low generally except adjacent to drainage lines where it is predicted to be moderate in a subsurface context

5.2 Survey Results - Indigenous

A total of 221 Aboriginal object locales were recorded within the proposal area. Each locale is listed in summary form in Table 4 and described in further detail in Appendix 2. Their location is shown in Appendix 1.

During the current assessment Aboriginal object locales have been categorized slightly differently to the methodology implemented in the initial Stage 1 assessment. This has resulted in both fewer site recordings and a greater number of Aboriginal object locale types. In the initial Stage 1 study survey units were defined on a fine scale based primarily on landform morphological type. This resulted in far greater numbers of survey units and concomitantly a greater number of object locale recordings; these being the continuous sparse quartz stone artefact recordings. Given the high levels of redundancy in these recordings in the first survey the method of categorizing survey units in the current study has been refined as described in Section 5.1 above. This refinement in categorizing survey units has resulted in far fewer recordings of Continuous Sparse Quartz Stone Artefact locales.

Eleven different Aboriginal object type categories were recorded in the current study (as summarised in Table 3 and listed in Table 4). In table 4 the location of these recordings is indicated under the heading Development Zone. The GDA grid reference is also included. It is also indicated under the heading (Impact Type) whether or not the recording is located within a zone of proposed impact.

A total of 36 Aboriginal object locale recordings are very low (<1 per square metre) or low density (between 1 per square metre and 10 per square metre) continuous distributions of quartz stone artefacts extending across survey units including both ridge crests in hill or low hill land systems or lower rises in rolling downs and lowlands. These recordings account for the *background scatter* present across the impact area. 26 discrete quartz artefact recordings were made. Many of these are likely to be representative of single knapping events given their small area (often no more than c. 5 x 5 m). This pattern of sparse quartz artefact distribution with occasional small, discrete scatters on bedrock landforms is entirely consistent with the results obtained during the initial Stage 1 survey.

Similarly the current survey results confirm the presence of relatively higher artefact density in alluvial terraces and flats in lower contexts adjacent to water courses; it is probable that the availability of seasonal water in these areas is likely to be the major factor influencing this pattern. However it does not seem clearer as a result of the survey of the expanded Stage 1 area that artefact density in these geomorphological contexts can be considerable, irrespective of the stream order sequence; even 1st and 2nd order stream contexts which may not have held water for long, can contain moderate artefact density.

Additionally it is noted that the geomorphological context (and the nature of the sediment) in valleys has a significant influence on the presence or otherwise of higher density artefact distributions. In valleys such as that occupied by Lakes Grave Creek (along which part of the TL from substation 2a to the switchyard traverses), alluvial sedimentary features adjacent to the creek (within c. 50 – 100 m) contain moderate to high artefact density while low rise, bedrock landforms situated within comparable proximity to the creek will contain very sparse artefact density. Favoured camp site locations appear to be those on soft sediments rather than lithosols or rocky landforms.

During the current survey long lengths of sedimentary landforms along creeks were inspected. It is now clear that where relatively flat alluvial sediments are present along creek courses and in some wide open depressions the distribution of higher density artefacts will be continuous across that landform. Apart from high artefact density these landforms generally contain high numbers of heat retainer hearths, relatively high frequency of exotic raw materials and rarer artefact types (see Appendix 2). If intact and stable these deposits are of high archaeological significance as their research potential is significant.

While these landforms can be relatively stable, aggrading landforms, generally they contain extensive areas in which high levels of active erosional processes (such as knick point retreat, gullying, entrenchment of creek beds and minor erosional features, rilling and surface wash) occur. These erosional processes act to expose archaeological materials and also, more significantly, to cause their erosion and either their ultimate destruction/removal and/or seriously compromise the integrity of archaeological deposit. The following series of photographs exemplify this process.



Plate 1. Entrenched creek: upper tributary of Lakes Creek on Nine Mile Station showing the sharp contact 30 cm below the ground surface between a recent deposit of Post Settlement Alluvium and a truncated B horizon.

Plate 1 above shows a section of highly entrenched (c. 1.5 m deep) creekline on Nine Mile Station. The section reveals a 30 cm deposit of Post Settlement Alluvium (PSA) overlying a truncated B horizon. The 30 cm deposit of PSA is comprised of sediments transported from higher landforms since European occupation and overgrazing. The phenomenon of creek entrenchment shown in the photo is common throughout the Barrier Ranges and it poses significant threats to archaeological features and deposit. Photo 2 below shows a similar entrenchment of a part Sandy Gum Creek which is actively removing the adjacent alluvial flat. Two intact heat retainer hearths are situated at a distance of 2.5 and 3.5 m to the south of the eroding channel; their long term future is threatened by this process.



Plate 2. Entrenched creek: upper tributary of Sandy Gum Creek on Purnamoota Station looking 45°. Note actively collapsing creek bank and location (as denoted by arrow) of two heat retainer hearths located 2.5 m from the edge of the creek channel. Note also the collapsed section of the landform in the creek bed on the left of the photo.

Processes of knick point retreat in flat alluvial deposits, many of which contain significant archaeological deposit, is also common throughout the region. The highly erosive and destruction nature of this process is shown in Plates 3 and 4. Additional erosional processes occur within these landforms. During the current fieldwork the high potential for these processes to be increased or activated as a result of the construction of the wind farm became evident. This matter is addressed further below in Section 8.



Plate 3. Process of knick point retreat at Purnamoota (SU251) looking south at a distance of c. 20 m from the camera. The arrow denotes the retreating, initiation point of the actively eroding land surface.



Plate 4. Looking north from the same location as Plate 3 showing the extensive, erosion of the alluvial landform 30 m below the knick point.

SPAs were the most frequent site type found during the current survey; this site type was similarly found in high numbers during the initial Stage 1 field work. Again, given that a greater amount of survey has now been conducted in valleys and lower landform contexts a pattern emerging is that quartz outcrops located in these landforms appear to contain greater evidence of extraction in the form of Hertzian cone fractures, batter marks and higher density associated artefacts (for example SU268/L9).

A rock art site was recorded during the current assessment (see Appendix 2). This is a rare site type in the immediate local level.

Table 3. Frequency of Aboriginal object recordings.

Feature	Total
hearth	10
hearths	3
Isolated artefact	1
Rock art	1
SPA	116
stone artefacts (continuous sparse distribution)	36
stone artefacts (discrete)	26
stone artefacts and hearth	1
stone artefacts and hearths	3
stone artefacts and PAD	3
stone artefacts, PAD and hearths	21
Total	221

Table 4. Summary description of Aboriginal Object Locales.

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
SU233/L1	1c: Turbine envelope P124, P126, P119, P121, P114, P128, P130	stone artefacts (continuous sparse distribution)	533600	6498250	Quartz stone artefacts; <1/50 m ²	partial impacts associated with construction of access road and turbines
SU233/L2	1c: Turbine envelope P124, P126, P119, P121, P114, P128, P130	SPA	534227	6497991	quartz outcrop with batter marks	outside proposed impacts
SU234/L1	1c: Turbine envelope P139, P142, P153, P154, P152, 149	stone artefacts (continuous sparse distribution)	532480	6499360	Quartz stone artefacts; <1/50 m ²	partial impacts associated with construction of access road and turbines
SU234/L2	1c: Turbine envelope P139, P142, P153, P154, P152, 149	SPA	532628	6499233	quartz outcrop with associated stone artefacts	impacts from road and P139 construction
SU234/L3	1c: Turbine envelope P139, P142, P153, P154, P152, 149	SPA	532443	6499386	quartz outcrop with batter marks	impacts from road construction
SU234/L4	1c: Turbine envelope P139, P142, P153, P154, P152, 149	SPA	532565	6499565	quartz outcrop with batter marks and Hertzian cone fractures and associated artefacts	impacts from road construction
SU235/L1	1c: Turbine envelope P101, P110, P112, P120, P133, P136, P144	stone artefacts (continuous sparse distribution)	528650	6498150	Quartz stone artefacts; <1/20 m ²	partial impacts associated with construction of access road and turbines
SU235/L2	1c: Turbine envelope P101, P110, P112, P120, P133, P136, P144	stone artefacts (discrete)	529650	6497330	Quartz stone artefacts; 1/1 m ²	partial impacts associated with construction of access road and P101
SU235/L3	1c: Turbine envelope P101, P110, P112, P120, P133, P136, P144	SPA	528682	6498510	quartz outcrop with associated stone artefacts	impacts from road construction
SU236/L1	1c: Turbine envelope P123, P116, P125, P131, P115, P111,	stone artefacts (discrete)	529552	6498130	Quartz stone artefacts; 5/1 m ²	impacts from road construction
SU236/L2	1c: Turbine envelope P123, P116, P125, P131, P115, P111,	stone artefacts (discrete)	529975	6497983	Quartz stone artefacts; 5/1 m ²	impacts from road construction

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
SU236/L3	1c: Turbine envelope P123,P116, P125, P131, P115, P111,	SPA	530166	6498581	quartz outcrop/scree with associated stone artefacts	outside proposed impacts
SU236/L4	1c: Turbine envelope P123,P116, P125, P131, P115, P111,	stone artefacts (discrete)	530083	6497907	Quartz stone artefacts; 3/1 m ²	impacts from road construction
SU236/L5	1c: Turbine envelope P123,P116, P125, P131, P115, P111,	SPA	530147	6497912	quartz outcrop/scree with associated stone artefacts	impacts associated with construction of access road and P115
SU237/L1	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P66	stone artefacts (continuous sparse distribution)	530800	6495490	Quartz stone artefacts; 1/1 m ²	partial impacts associated with construction of access road and turbines
SU237/L2	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P67	stone artefacts (discrete)	530088	6496968	Quartz stone artefacts; 30/1 m ²	impacts associated with construction of access road and P93
SU237/L3	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P68	SPA	530553	6496105	quartz outcrop with Hertzian cone fractures and associated artefacts	outside proposed impacts
SU237/L4	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P69	SPA	530577	6496069	quartz outcrop with Hertzian cone fractures and associated artefacts	outside proposed impacts (off crest)
SU237/L5	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P70	SPA	530604	6496069	quartz outcrop and associated artefacts	outside proposed impacts
SU237/L6	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P71	SPA	530616	6496005	quartz outcrop with one Hertzian cone fracture; nil artefacts observed	outside proposed impacts
SU237/L7	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P72	SPA	530676	6495829	quartz outcrop and associated artefacts	impacts from road construction
SU237/L8	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P73	SPA	530715	6495698	quartz outcrop with batter marks and Hertzian cone fractures; nil artefacts observed	outside proposed impacts
SU237/L9	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P74	SPA	530742	6495688	quartz outcrop; no extraction marks however with large quartz hammerstone	outside proposed impacts
SU237/L10	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P75	SPA	530549	6495156	quartz outcrop and associated artefacts	outside proposed impacts
SU237/L11	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P76	SPA	530563	6495096	quartz outcrop with batter marks nil artefacts observed	outside proposed impacts
SU237/L12	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P77	SPA	530248	6494706	quartz outcrop with batter marks and 1 Hertzian cone fracture; nil	impacts from road construction

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
					artefacts observed	
SU237/L13	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P78	SPA	530172	6494511	quartz outcrop and associated artefacts	impacts associated with construction of access road and P68
SU238/L1	1c: Turbine envelope P73, P76, P74, P82	stone artefacts (continuous sparse distribution)	529800	6495850	Quartz stone artefacts; 1/1 m ²	partial impacts associated with construction of access road and turbines
SU238/L2	1c: Turbine envelope P73, P76, P74, P83	SPA	529772	6495803	quartz outcrop and associated artefacts	outside proposed impacts
SU239/L1	1c: Turbine envelope P106, P105, P117	stone artefacts (continuous sparse distribution)	531100	6497500	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU239/L2	1c: Turbine envelope P106, P105, P118	SPA	531178	6497638	quartz outcrop with batter marks and associated artefacts	outside proposed impacts
SU239/L3	1c: Turbine envelope P106, P105, P119	SPA	530929	6497624	quartz outcrop with batter marks, Hertzian cone fractures; no observed artefacts	outside proposed impacts
SU239/L4	1c: Turbine envelope P106, P105, P120	SPA	530805	6497760	quartz outcrop and associated artefacts in saddle to west	outside proposed impacts
SU239/L5	1c: Turbine envelope P106, P105, P121	SPA	530756	6497947	quartz outcrop with Hertzian cone fractures; no observed artefacts	outside proposed impacts
SU240/L1	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	stone artefacts (continuous sparse distribution)	527250	6495650	quartz stone artefacts; 1/1 m ²	partial impacts associated with construction of access road and turbines
SU240/L2	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	SPA	526685	6494753	quartz outcrop with Hertzian cone fractures, batter marks, flake scars and associated artefacts	impacts associated with construction E48
SU240/L3	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	SPA	526670	6494777	quartz outcrop with batter marks and associated artefacts	impacts associated with access road construction
SU240/L4	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	SPA	526670	6494777	quartz outcrop with Hertzian cone fracture, batter marks, flake scars and associated artefacts	impacts associated with access road construction
SU240/L5	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	SPA	526651	6495168	quartz scree with associated artefacts	outside proposed impacts
SU240/L6	1c: Turbine envelope E48, E52, E55, E53,	SPA	527213	6495462	quartz outcrop and associated	outside proposed impacts

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
	E54, E58, E56, E57, P77, P75, P72				artefacts	
SU240/L7	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	SPA	527236	6495463	quartz outcrop with batter marks and associated artefacts	outside proposed impacts
SU240/L8	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	SPA	527301	6495633	quartz outcrop with Hertzian cone fractures, batter marks and flake scars; no observed artefacts	impacts associated with construction of access road and E54
SU240/L9	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	SPA	527015	6496431	quartz outcrop with Hertzian cone fractures; no observed artefacts	outside proposed impacts
SU240/L10	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	stone artefacts (discrete)	527462	6495738	Quartz stone artefacts; 5/1 m ²	impacts from road construction
SU240/L11	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	SPA	527691	6495786	quartz outcrop with associated stone artefacts	outside proposed impacts
SU240/L12	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	stone artefacts (discrete)	527800	6495900	Quartz stone artefacts; 5/1 m ²	impacts associated with construction of access road and E57
SU240/L13	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	SPA	528569	6495529	quartz outcrop with batter marks and associated artefacts	outside proposed impacts
SU240/14	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	SPA	526616	6495510	quartz outcrop with batter marks; no observed artefacts	impacts associated with construction of access road
SU241/L1	1c: Turbine envelope E49, E50, P69	stone artefacts (discrete)	528542	6495464	Quartz stone artefacts; 15/1 m ²	outside proposed impacts
SU241/L2	1c: Turbine envelope E49, E50, P69	stone artefacts (discrete)	528341	6495227	Quartz stone artefacts; 10/1 m ²	outside proposed impacts
SU241/L3	1c: Turbine envelope E49, E50, P69	stone artefacts (discrete)	528137	6495068	Quartz stone artefacts; 5/1 m ²	impacts associated with construction of access road
SU241/L4	1c: Turbine envelope E49, E50, P69	SPA	527700	6494853	quartz outcrop with batter marks; no observed artefacts	impacts associated with construction of access road
SU242/L1	1c: Turbine envelope E60, E59, P92	stone artefacts (continuous sparse distribution)	527780	6497200	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU242/L2	1c: Turbine envelope E60, E59, P92	SPA	527430	6497254	quartz outcrop with associated stone artefacts	outside proposed impacts
SU242/L3	1c: Turbine envelope E60, E59, P92	SPA	528063	6496900	quartz outcrop with batter marks; no	impacts associated with construction of access road

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
					observed artefacts	
SU243/L1	1c: Turbine envelope P109, E63, E64, E61, E62	stone artefacts (continuous sparse distribution)	528090	6498000	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU243/L2	1c: Turbine envelope P109, E63, E64, E61, E62	stone artefacts (discrete)	528291	6497698	Quartz stone artefacts; 10/1 m ²	impacts associated with construction of access road and P109
SU243/L3	1c: Turbine envelope P109, E63, E64, E61, E62	stone artefacts (discrete)	527945	6498218	Quartz stone artefacts; 5/1 m ²	outside proposed impacts
SU243/L4	1c: Turbine envelope P109, E63, E64, E61, E62	SPA	527884	6498250	quartz outcrop with batter marks; no observed artefacts	outside proposed impacts
SU243/L5	1c: Turbine envelope P109, E63, E64, E61, E62	SPA	527513	6497929	quartz outcrop with Hertzian cone fractures and associated artefacts	outside proposed impacts
SU244/L1	1c: Turbine envelope P138, P150, P155, P162, P168	stone artefacts (continuous sparse distribution)	529670	6500080	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU246/L1	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	stone artefacts (continuous sparse distribution)	531800	6496500	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU246/L2	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	SPA	530932	6497271	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of access road
SU246/L3	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	SPA	530921	6497243	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of access road
SU246/L4	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	SPA	531598	6496948	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of access road
SU247/L1	1b: Turbine envelope N24, N26, N27 P16	stone artefacts (continuous sparse distribution)	531100	6486800	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU248/L1	1b: Turbine envelope P24, P29, P35, P26, P20	stone artefacts (continuous sparse distribution)	530600	6487900	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU248/L2	1b: Turbine envelope P24, P29, P35, P26, P20	Rock art	531046	6487438	small rock shelter with 2 red pigment emu footprint motifs	outside proposed impacts
SU248/L3	1b: Turbine envelope P24, P29, P35, P26, P20	stone artefacts (discrete)	530958	6487468	Quartz stone artefacts; 10/1 m ²	outside proposed impacts
SU248/L4	1b: Turbine envelope P24, P29, P35, P26, P20	SPA	531005	6488054	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of access road

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
SU248/L5	1b: Turbine envelope P24, P29, P35, P26, P20	stone artefacts (discrete)	530936	6488067	Quartz stone artefacts; 15/1 m ²	impacts associated with construction of access road
SU248/L6	1b: Turbine envelope P24, P29, P35, P26, P20	stone artefacts (discrete)	530798	6488059	Quartz stone artefacts; 5/1 m ²	impacts associated with construction of access road
SU248/L7	1b: Turbine envelope P24, P29, P35, P26, P20	stone artefacts (discrete)	530244	6487422	Quartz stone artefacts; 1/1 m ²	outside proposed impacts
SU248/L8	1b: Turbine envelope P24, P29, P35, P26, P20	stone artefacts (discrete)	530241	6487334	Quartz stone artefacts; 5/1 m ²	outside proposed impacts
SU249/L1	1b: Turbine envelope B77, B75, B81, B85	stone artefacts (continuous sparse distribution)	529100	6488500	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU249/L2	1b: Turbine envelope B77, B75, B81, B85	stone artefacts (discrete)	529685	6487238	Quartz stone artefacts; 1/1 m ²	outside proposed impacts
SU249/L3	1b: Turbine envelope B77, B75, B81, B85	SPA	529332	6487662	quartz outcrop with batter marks and associated artefacts	outside proposed impacts
SU249/L4	1b: Turbine envelope B77, B75, B81, B85	SPA	529301	6487694	quartz outcrop with Hertzian cone fractures; no observed artefacts	impacts associated with construction of access road
SU249/L5	1b: Turbine envelope B77, B75, B81, B85	stone artefacts (discrete)	529158	6488270	Quartz stone artefacts; 5/1 m ²	impacts associated with construction of access road
SU249/L6	1b: Turbine envelope B77, B75, B81, B85	SPA	528891	6488609	quartz outcrop with batter marks, negative scars and associated artefacts	outside proposed impacts
SU249/L7	1b: Turbine envelope B77, B75, B81, B85	SPA	528881	6488628	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of access road
SU249/L8	1b: Turbine envelope B77, B75, B81, B85	SPA	528754	6488714	quartz outcrop with batter marks, Hertzian cone fractures and associated artefacts	outside proposed impacts
SU249/L9	1b: Turbine envelope B77, B75, B81, B85	SPA	528746	6488749	quartz outcrop with batter marks, Hertzian cone fractures and associated artefacts	impacts associated with construction of access road
SU249/L10	1b: Turbine envelope B77, B75, B81, B85	SPA	528731	6488658	quartz outcrop with batter marks, Hertzian cone fractures and associated artefacts	impacts associated with construction of access road
SU249/L11	1b: Turbine envelope B77, B75, B81, B85	SPA	528462	6488777	quartz outcrop with Hertzian	outside proposed impacts

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
					cone fractures; no artefacts observed	
SU249/L12	1b: Turbine envelope B77, B75, B81, B85	SPA	528394	6488858	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of access road
SU249/L13	1b: Turbine envelope B77, B75, B81, B85	SPA	528337	6488998	quartz outcrop with batter marks, Hertzian cone fractures and associated artefacts	impacts associated with construction of access road
SU249/L14	1b: Turbine envelope B77, B75, B81, B85	SPA	528304	6489121	quartz outcrop with batter marks and associated artefacts	outside proposed impacts
SU249/L15	1b: Turbine envelope B77, B75, B81, B85	SPA	528260	6489113	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of access road
SU249/L16	1b: Turbine envelope B77, B75, B81, B85	SPA	528220	6489296	quartz outcrop with batter marks and associated artefacts	outside proposed impacts
SU249/L17	1b: Turbine envelope B77, B75, B81, B85	SPA	528220	6489296	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of access road
SU249/L18	1b: Turbine envelope B77, B75, B81, B85	SPA	528202	6489322	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of access road
SU250/L1	1b: Turbine envelope B3, B5	stone artefacts (continuous sparse distribution)	520300	6482650	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU251/L1	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	stone artefacts (continuous sparse distribution)	521300	6483450	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU251/L2	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	stone artefacts (discrete)	521797	6482878	Quartz stone artefacts; 10/1 m ²	impacts associated with construction of access road
SU251/L3	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	SPA	521480	6483343	quartz outcrops with associated stone artefacts	impacts associated with construction of access road
SU251/L4	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	stone artefacts (discrete)	521422	6483469	Quartz stone artefacts; 5/1 m ²	impacts associated with construction of access road
SU251/L5	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	stone artefacts (discrete)	521170	6483557	Quartz stone artefacts; 3/1 m ²	impacts associated with construction of access road
SU251/L6	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	SPA	521118	6483582	quartz outcrops with associated stone artefacts	impacts associated with construction of access road
SU251/L7	1b: Turbine envelope	SPA	521079	6483595	quartz outcrop	impacts associated with

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
	B7, B8, B11,B12, B16, B20, B25				with associated stone artefacts	construction of access road
SU251/L8	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	SPA	521052	6483600	quartz outcrop with Hertzian cone fractures and associated artefacts	impacts associated with construction of access road
SU251/L9	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	stone artefacts (discrete)	520863	6483812	Quartz stone artefacts; 5/1 m ²	impacts associated with construction of access road
SU251/L10	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	SPA	520803	6483912	quartz outcrop with batter marks and associated artefacts	outside proposed impacts
SU252/L1	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	stone artefacts (continuous sparse distribution)	521800	6481250	Quartz stone artefacts; 1/100 m ²	partial impacts associated with construction of access road and turbines
SU252/L2	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	Isolated artefact	521368	6480750	Broken quartzite pebble with ground face consistent with top stone (pestle) use wear	outside proposed impacts
SU252/L3	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	SPA	521429	6480804	quartz outcrop with batter marks and associated artefacts	outside proposed impacts
SU253/L1	1b: Turbine envelope B21, WB1, WB2	stone artefacts (continuous sparse distribution)	521450	6479250	Quartz stone artefacts; 1/100 m ²	partial impacts associated with construction of access road and turbines
SU255/L1	1a: Turbine envelope A91, A92, A93, A94, A95	stone artefacts (continuous sparse distribution)	529870	6486220	Quartz stone artefacts; 1/10 m ²	partial impacts associated with construction of access road and turbines
SU255/L2	1a: Turbine envelope A91, A92, A93, A94, A95	SPA	529927	6485796	quartz outcrop with associated stone artefacts	impacts associated with construction of access road and A94
SU255/L3	1a: Turbine envelope A91, A92, A93, A94, A95	SPA	529881	6486704	quartz outcrop with minor batter marks and associated stone artefacts	impacts associated with construction of access road
SU257/L1	1a: Turbine envelope Sth Belmont	stone artefacts (continuous sparse distribution)	523150	6477200	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbines
SU257/L2	1a: Turbine envelope Sth Belmont	SPA	523152	6477024	quartz outcrop with batter marks and associated stone artefacts	partial impacts associated with construction of access road
SU258/L1	1a: Turbine envelope A113	stone artefacts (continuous sparse distribution)	527950	6481750	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of access road and turbine
SU258/L2	1a: Turbine envelope A113	stone artefacts and PAD	528298	6481397	Area 150 m N/S x 50 m E/W on west side of Lakes Knob Ck	nil

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
SU258/L3	1a: Turbine envelope A113	SPA	528177	6481619	Area 60 x 60 m of quartz outcrops with extensive Hertzian cone fractures, batter marks and moderate density artefacts	nil
SU258/L4	1a: Turbine envelope A113	stone artefacts and PAD	528210	6481220	Area on west side of Lakes Knob Ck	nil
SU260/L1	Substation 1b	stone artefacts (continuous sparse distribution)	534080	6496450	Quartz stone artefacts; 1/100 m ²	partial impacts associated with construction of access road and substation
SU260/L2	Substation 1b	SPA	533966	6496506	quartz outcrop with batter marks; no observed artefacts	impacts associated with construction of substation
SU261/L1	Proposed site access to substation 2a	stone artefacts (continuous sparse distribution)	534380	6495000	Quartz stone artefacts; 1/100 m ²	partial impacts associated with construction of access road to substation 2a
SU261/L2	Proposed site access to substation 2a	SPA	534247	6495233	quartz outcrop with minor batter marks and associated stone artefacts	impacts associated with construction of access road to substation 2a
SU261/L3	Proposed site access to substation 2a	SPA	534614	6494764	quartz outcrop with associated stone artefacts	outside proposed impacts
SU261/L4	Proposed site access to substation 2a	stone artefacts and hearth	534499	6494832	one eroded stone hearth and sparse artefacts	impacts associated with construction of access road to substation 2a
SU261/L5	Proposed site access to substation 2a	stone artefacts and hearths	534655	6494832	three eroded stone hearths and sparse artefacts	impacts associated with construction of access road to substation 2a
SU262/L1	Existing access track	stone artefacts (continuous sparse distribution)	533800	6497490	Quartz stone artefacts; 10/1 m ²	impacts associated with construction of access road to Mt Robe turbines (1c)
SU262/L2	Existing access track	hearths	533376	6497716	2 possible hearths: intact	impacts associated with construction of access road to Mt Robe turbines (1c)
SU262/L3	Existing access track	hearth	533796	6497432	hearth: intact	impacts associated with construction of access road to Mt Robe turbines (1c)
SU262/L4	Existing access track	hearth	533877	6497411	hearth: intact	impacts associated with construction of access road to Mt Robe turbines (1c)
SU262/L5	Existing access track	hearth	533911	6497369	hearth: intact	impacts associated with construction of access road to Mt Robe turbines (1c)
SU262/L6	Existing access track	hearth	533931	6497376	hearth: intact	impacts associated with construction of access road to Mt Robe turbines (1c)

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
SU263/L1	Existing access track	stone artefacts, PAD and hearths	535550	6496750	Flat adjacent to Sandy Gum Creek with deep sandy deposit. Sparse artefacts visible, however high potential for moderate to high density artefacts relatively undisturbed; numerous hearths	impacts associated with construction of access road to Mt Robe turbines (1c)
SU264/L1	Transmission line from substation 2a to Switchyard	stone artefacts (continuous sparse distribution)	534750	6496200	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of transmission line
SU264/L2	Transmission line from substation 2a to Switchyard	stone artefacts, PAD and hearths	534719	6496369	Surface scatter of stone artefacts including a wide range of exotic materials; potential for PAD but highly eroded; numerous hearths	partial impacts associated with construction of transmission line
SU264/L3	Transmission line from substation 2a to Switchyard	SPA	534950	6496118	quartz outcrop with batter marks and associated stone artefacts	partial impacts associated with construction of transmission line
SU264/L4	Transmission line from substation 2a to Switchyard	SPA	535047	6495991	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	partial impacts associated with construction of transmission line
SU265/L1	Transmission line from substation 2a to Switchyard	stone artefacts and hearths	535650	6495900	stone artefacts and hearths	partial impacts associated with construction of transmission line
SU266/L1	Transmission line from substation 2a to Switchyard	stone artefacts and hearths	535520	6494100	stone artefacts: 5/1m ² and hearths	partial impacts associated with construction of transmission line
SU266/L2	Transmission line from substation 2a to Switchyard	stone artefacts, PAD and hearths	535400	6493900	Surface scatter of stone artefacts including a range of exotic materials and artefact types; potential for PAD but eroded; numerous hearths	partial impacts associated with construction of transmission line
SU267/L1	Transmission line from substation 2a to Switchyard	stone artefacts (continuous sparse distribution)	534600	6492000	Quartz stone artefacts; 1/10 m ²	partial impacts associated with construction of

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
						transmission line
SU267/L2	Transmission line from substation 2a to Switchyard	SPA	535063	6493086	quartz outcrop with batter marks and associated stone artefacts	partial impacts associated with construction of transmission line
SU267/L3	Transmission line from substation 2a to Switchyard	hearths	534884	6492573	3 hearths: intact	partial impacts associated with construction of transmission line
SU267/L4	Transmission line from substation 2a to Switchyard	hearth	534750	6492338	hearth: intact	partial impacts associated with construction of transmission line
SU267/L5	Transmission line from substation 2a to Switchyard	SPA	534689	6492354	quartz outcrop with batter marks and associated stone artefacts	partial impacts associated with construction of transmission line
SU267/L6	Transmission line from substation 2a to Switchyard	stone artefacts, PAD and hearths	534696	6492177	Surface scatter of stone artefacts including exotic materials; potential for PAD; 2 hearths	partial impacts associated with construction of transmission line
SU267/L7	Transmission line from substation 2a to Switchyard	hearth	534619	6492049	hearth: relatively intact	impacts associated with construction of transmission line
SU267/L8	Transmission line from substation 2a to Switchyard	SPA	534120	6491382	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU267/L9	Transmission line from substation 2a to Switchyard	hearth	533962	6490789	hearth: relatively intact	impacts associated with construction of transmission line
SU267/L10	Transmission line from substation 2a to Switchyard	SPA	533887	6490943	quartz outcrop with associated stone artefacts	impacts associated with construction of transmission line
SU267/L11	Transmission line from substation 2a to Switchyard	SPA	533570	6490326	quartz outcrop with Hertzian cone fractures and associated stone artefacts	impacts associated with construction of transmission line
SU267/L12	Transmission line from substation 2a to Switchyard	stone artefacts, PAD and hearths	533716	6490260	Surface scatter of stone artefacts; potential for PAD but highly eroded; numerous hearths some of which made from quartz	partial impacts associated with construction of transmission line
SU267/L13	Transmission line from substation 2a to Switchyard	stone artefacts, PAD and hearths	533600	6490150	Surface scatter of stone artefacts including exotic materials and rare artefact types; potential for stable and	partial impacts associated with construction of transmission line

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
					relatively undisturbed PAD	
SU268/L1	Transmission line from substation 2a to Switchyard	stone artefacts (continuous sparse distribution)	530200	6484000	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of transmission line
SU268/L2	Transmission line from substation 2a to Switchyard	SPA	531325	6485906	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU268/L3	Transmission line from substation 2a to Switchyard	SPA	531476	6486232	A complex of 3 quartz outcrops with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU268/L4	Transmission line from substation 2a to Switchyard	stone artefacts, PAD and hearths	531680	6486600	Surface scatter of stone artefacts; potential for relatively stable and undisturbed PAD including hearths	partial impacts associated with construction of transmission line
SU268/L5	Transmission line from substation 2a to Switchyard	stone artefacts, PAD and hearths	531767	6487032	Surface scatter of stone artefacts; potential for relatively stable and undisturbed PAD including hearths	partial impacts associated with construction of transmission line
SU268/L6	Transmission line from substation 2a to Switchyard	SPA	531816	6486973	quartz outcrop with batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU268/L7	Transmission line from substation 2a to Switchyard	SPA	531287	6485802	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU268/L8	Transmission line from substation 2a to Switchyard	SPA	531325	6485608	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU268/L9	Transmission line from substation 2a to Switchyard	SPA	531088	6485066	complex of quartz outcrops with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU268/L10	Transmission line from substation 2a to	SPA	531027	6484915	complex of quartz	impacts associated with construction of

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
	Switchyard				outcrops with Hertzian cone fractures, batter marks and associated stone artefacts	transmission line
SU268/L11	Transmission line from substation 2a to Switchyard	SPA	530953	6484795	complex of quartz outcrops with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU268/L12	Transmission line from substation 2a to Switchyard	SPA	530877	6484633	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU268/L13	Transmission line from substation 2a to Switchyard	SPA	530776	6484446	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU268/L14	Transmission line from substation 2a to Switchyard	stone artefacts, PAD and hearths	527050	6479480	Surface scatter of stone artefacts; hearths, potential PAD however high natural erosion	partial impacts associated with construction of transmission line
SU268/L15	Transmission line from substation 2a to Switchyard	SPA	527821	6480415	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line
SU268/L16	Transmission line from substation 2a to Switchyard	stone artefacts, PAD and hearths	526200	6481050	Surface scatter of stone artefacts; hearths, potential PAD areas of both high natural erosion and relative intact deposit	partial impacts associated with construction of transmission line
SU269/L1	Proposed substation 3a (alternative)	stone artefacts (continuous sparse distribution)	530380	6486680	Quartz stone artefacts; 1/5 m ²	impacts associated with construction of transmission line and proposed substation 3a (alt)
SU269/L2	Proposed substation 3a (alternative)	SPA	530405	6486772	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	impacts associated with construction of transmission line and proposed substation 3a (alt)
SU269/L3	Proposed substation 3a (alternative)	SPA	530433	6486640	quartz outcrop with batter marks and associated stone artefacts; additional	impacts associated with construction of transmission line and proposed substation 3a (alt)

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
					small outcrop 20 m to SE	
SU269/L4	Proposed substation 3a (alternative)	SPA	530396	6486573	quartz outcrop and associated artefacts	impacts associated with construction of transmission line and proposed substation 3a (alt)
SU269/L5	Proposed substation 3a (alternative)	SPA	530420	6486583	quartz outcrop and associated artefacts	impacts associated with construction of transmission line and proposed substation 3a (alt)
SU270/L1	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard	stone artefacts (continuous sparse distribution)	530400	6485300	Quartz stone artefacts; 1/50 m ²	impacts associated with construction of feeder
SU270/L2	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard	stone artefacts, PAD and hearths	530802	6485119	Surface scatter of stone artefacts; hearths, potential PAD areas of both high natural erosion and relatively intact deposit	partial impacts associated with construction of feeder
SU270/L3	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard	SPA	530500	6485168	quartz outcrop with batter marks and associated stone artefacts	partial impacts associated with construction of feeder
SU270/L4	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard	SPA	530311	6485245	quartz outcrop with associated stone artefacts	partial impacts associated with construction of feeder
SU271/L1	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	stone artefacts (continuous sparse distribution)	528230	6488200	Quartz stone artefacts; 1/1 m ²	impacts associated with construction of feeder
SU271/L2	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	SPA	528021	6489351	quartz outcrop with batter marks and associated stone artefacts	impacts associated with construction of feeder
SU271/L3	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	stone artefacts and PAD	527907	6489343	Surface scatter of stone artefacts; potential PAD areas of both high natural erosion and relatively intact deposit	partial impacts associated with construction of feeder
SU271/L4	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	SPA	528042	6488934	quartz outcrop with batter marks and associated stone artefacts	impacts associated with construction of feeder
SU271/L5	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	SPA	528052	6488893	quartz outcrop with batter marks; nil artefacts observed	impacts associated with construction of feeder
SU271/L6	Feeder 3 between substation 3 and TL from Mt Robe to	SPA	528395	6487843	quartz outcrop with Hertzian cone fractures	impacts associated with construction of feeder

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
	Switchyard: west end				and associated artefacts	
SU271/L7	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	SPA	528404	6487802	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of feeder
SU271/L8	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	SPA	528420	6487806	quartz outcrop with Hertzian cone fractures and associated artefacts	impacts associated with construction of feeder
SU271/L9	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	SPA	528406	6487784	quartz outcrop with associated stone artefacts	impacts associated with construction of feeder
SU272/L1	Proposed substation 1b (alternative)	stone artefacts (continuous sparse distribution)	522270	6482350	Quartz stone artefacts; 1/5 m ²	impacts associated with construction of substation, roads and feeder TL
SU272/L2	Proposed substation 1b (alternative)	SPA	522125	6482440	quartz outcrop with Hertzian cone fractures, batter marks, negative flake scars and associated artefacts	impacts associated with construction of substation, roads and feeder TL
SU273/L1	Proposed substation 1a	stone artefacts (continuous sparse distribution)	524900	6483850	Quartz stone artefacts; 1/10 m ²	impacts associated with construction of substation, roads and feeder TL
SU273/L2	Proposed substation 1a	SPA	525005	6483888	quartz outcrop with Hertzian cone fractures, batter marks and associated artefacts	impacts associated with construction of substation
SU273/L3	Proposed substation 1a	stone artefacts, PAD and hearths	525180	6483800	Surface scatter of stone artefacts; hearths, potential PAD areas of both high natural erosion and relative intact deposit	impacts associated with construction of substation, roads and feeder TL
SU274/L1	Access track to proposed substation 1a	stone artefacts, PAD and hearths	525300	6483280	Surface scatter of stone artefacts; hearths, potential PAD areas of both high natural erosion and relative intact deposit	impacts associated with construction of access road to substation 1a
SU275/L1	Feeder 1 alternative	stone artefacts (continuous sparse distribution)	524580	6481560	Quartz stone artefacts; 1/50 m ²	impacts associated with construction of feeder 1 (alt) TL
SU275/L2	Feeder 1 alternative	SPA	524241	6481692	quartz outcrop with batter marks and associated artefacts	impacts associated with construction of feeder 1 (alt) TL

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
SU275/L3	Feeder 1 alternative	stone artefacts (discrete)	524432	6481648	Quartz stone artefacts; 5/1 m ²	impacts associated with construction of feeder 1 (alt) TL
SU275/L4	Feeder 1 alternative	stone artefacts, PAD and hearths	524524	6481579	Surface scatter of stone artefacts; hearths, potential PAD areas of both high natural erosion and relative intact deposit	impacts associated with construction of feeder 1 (alt) TL
SU275/L5	Feeder 1 alternative	stone artefacts (discrete)	524768	6481520	Quartz stone artefacts; 5/1 m ²	impacts associated with construction of feeder 1 (alt) TL
SU275/L6	Feeder 1 alternative	SPA	524825	6481567	quartz outcrop with associated artefacts	impacts associated with construction of feeder 1 (alt) TL
SU275/L7	Feeder 1 alternative	SPA	524974	6481500	quartz outcrop with associated artefacts	impacts associated with construction of feeder 1 (alt) TL
SU276/L1	Transmission line from Switchyard to Broken Hill	stone artefacts (continuous sparse distribution)	531550	6472000	Quartz stone artefacts; 1/10 m ²	impacts associated with construction of TL
SU276/L2	Transmission line from Switchyard to Broken Hill	SPA	532624	6468945	quartz outcrop with Hertzian cone fractures, batter marks and associated artefacts	impacts associated with construction of TL
SU276/L3	Transmission line from Switchyard to Broken Hill	SPA	532500	6468946	quartz outcrop with Hertzian cone fractures, batter marks; nil artefacts observed	impacts associated with construction of TL
SU276/L4	Transmission line from Switchyard to Broken Hill	stone artefacts, PAD and hearths	532718	6469412	Surface scatter of stone artefacts; hearth, potential PAD areas of both high natural erosion and relative intact deposit	impacts associated with construction of TL
SU276/L5	Transmission line from Switchyard to Broken Hill	hearths	532724	6470002	hearths: eroded	impacts associated with construction of TL
SU276/L6	Transmission line from Switchyard to Broken Hill	hearth	532710	6470391	hearth: intact	impacts associated with construction of TL
SU276/L7	Transmission line from Switchyard to Broken Hill	SPA	532811	6470908	quartz outcrop with associated artefacts	impacts associated with construction of TL
SU276/L8	Transmission line from Switchyard to Broken Hill	SPA	532123	6471580	quartz outcrop with Hertzian cone fractures, batter marks and associated artefacts	impacts associated with construction of TL
SU276/L9	Transmission line from Switchyard to Broken Hill	hearth	531756	6471741	hearth: eroded	impacts associated with construction of TL
SU276/L10	Transmission line	SPA	531695	6471752	quartz outcrop	impacts associated with

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
	from Switchyard to Broken Hill				with batter marks and associated artefacts	construction of TL
SU276/L11	Transmission line from Switchyard to Broken Hill	SPA	531299	6472120	quartz outcrop with Hertzian cone fractures, batter marks; nil artefacts observed	impacts associated with construction of TL
SU276/L12	Transmission line from Switchyard to Broken Hill	SPA	531272	6472098	quartz outcrop with batter marks; nil artefacts observed	impacts associated with construction of TL
SU276/L13	Transmission line from Switchyard to Broken Hill	SPA	529474	6473638	quartz outcrop with Hertzian cone fractures, batter marks and associated artefacts	impacts associated with construction of TL
SU277/L1	Maintenance and construction compound	stone artefacts (continuous sparse distribution)	528000	6477350	Quartz stone artefacts; 1/50 m ²	impacts associated with construction of Maintenance and Construction Compound
SU277/L2	Maintenance and construction compound	stone artefacts, PAD and hearths	528100	6477180	Surface scatter of stone artefacts exotic materials and rare artefact types; numerous hearths, potential PAD areas of both high natural erosion and relative intact deposit	impacts associated with construction of Maintenance and Construction Compound
SU278/L1	Transmission line from Switchyard to Broken Hill	stone artefacts (continuous sparse distribution)	535050	6465050	Quartz stone artefacts; 1/50 m ²	partial impacts associated with construction of TL
SU278/L2	Transmission line from Switchyard to Broken Hill	stone artefacts, PAD and hearths	536594	6463675	Surface scatter of stone artefacts; hearths, potential PAD area but high natural erosion	partial impacts associated with construction of TL
SU278/L3	Transmission line from Switchyard to Broken Hill	SPA	534497	6465509	quartz outcrop with Hertzian cone fractures, batter marks and associated artefacts	impacts associated with construction of TL
SU278/L4	Transmission line from Switchyard to Broken Hill	hearth	534265	6465627	hearth: eroded	impacts associated with construction of TL
SU278/L5	Transmission line from Switchyard to Broken Hill	stone artefacts (discrete)	534049	6465974	Quartz stone artefacts; 1/1 m ²	impacts associated with construction of TL
SU278/L6	Transmission line from Switchyard to Broken Hill	stone artefacts, PAD and hearths	533403	6466597	Surface scatter of stone artefacts including exotic	partial impacts associated with construction of TL

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impact Type
					materials; hearths, potential PAD area but high natural erosion	
SU278/L7	Transmission line from Switchyard to Broken Hill	stone artefacts, PAD and hearths	532606	6467353	Surface scatter of stone artefacts including exotic materials; hearths, potential PAD area but high natural erosion	partial impacts associated with construction of TL
SU278/L8	Transmission line from Switchyard to Broken Hill	stone artefacts, PAD and hearths	532636	6467482	Surface scatter of stone artefacts; hearths, potential PAD area	partial impacts associated with construction of TL
SU278/L9	Transmission line from Switchyard to Broken Hill	stone artefacts, PAD and hearths	537658	6462606	Surface scatter of stone artefacts including exotic materials and rare artefacts; hearths, potential PAD	partial impacts associated with construction of TL

6. SURVEY RESULTS – NON INDIGENOUS

6.1 Survey Results – Non Indigenous

There are no previously recorded historical sites within the proposal area that are listed on any of the local or State heritage registers. However, in the course of the survey 63 historical features were recorded. These recordings largely include sites that relate to mining activities, although there are also a small number of recordings that relate to pastoral and transport activities. A summary of the historical recordings and their grid references is provided below in Table 5. Their location is shown in Appendix 1 and more complete site descriptions and photographs are provided in Appendix 3.

Table 5. Summary description of Non Indigenous features

Name	Development zone	Feature	GDA Easting	GDA Northing	Description	Impacts
SU235/L1	1c: Turbine envelope P101, P110, P112, P120, P133, P136, P144	Mine site: <i>Mount Eltie Fluorite</i>	528836	6498922	<i>Mount Eltie Fluorite</i> Mine: complex of shafts (some with mulga collars), costeans, mullock heaps, stone platforms and retaining walls, hearth/forge, metal, mulga beams and posts and tracks. Extends along crest a distance of c. 200 m and adjoining slopes to east and west.	impacts associated with access road construction
SU235/L1(a)	1c: <i>in valley to east of</i> Turbine envelope P101, P110, P112, P120, P133, P136, P145	Mine camp: probably associated with <i>Mt Eltie Fluorite</i> : mulga post hut frame and stone hearth	529278	6498864	Mine camp complex: Mulga post framed hut site: 7.5 x 4 m; and associated stone domestic hearth. Surface scatter of tins, metal, ceramic and glass; mulga stumps in surrounding scrub; potential subsurface material. Vehicle track immediately east leads south along valley and provides access to <i>Mt Eltie Fluorite</i>	nil
SU236/L1	1c: Turbine envelope P123, P116, P125, P131, P115, P111,	Mine site: possibly part of <i>Mt Eltie Fluorite</i>	529143	6498420	Single shaft (with mulga collar), mullock, platform with metal picks, additional platform with series of mulga 'conveyor rollers', some joined with wire, on 10 m long track, scattered mulga posts	nil
SU239/HS1	1c: Turbine envelope P106, P105, P120	Mine site: <i>Mt Robe</i>	530714	6498190	<i>Mt Robe Mine</i> : Shafts (some with mulga collars), adits, costeans, mullock heaps, forge, various stone platforms and tracks, machinery, extensive scatter metal: evidence of recent operation. Extends from grid ref to NW to 530592.6498421; c. 100 m wide	impacts associated with access road construction
SU239/HS1	1c: Turbine envelope P106, P105, P120	Mine settlement: <i>Mt Robe</i>	531296	6497941	<i>Mt Robe Mine</i> Settlement. Area c. 150 x 150 m including numerous hut and house platforms, stone chimneys, forge	nil
SU240/HS1	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	Wood post: marker	527216	6496222	Mulga post with axe cut pointy end; 0.7 m high; stuck in ground and reinforced with cobbles at base	impacts associated with access road construction
SU240/HS2	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	Wood survey peg	527141	6496322	fallen survey peg; 0.6 m long	impacts associated with access road construction
SU240/HS3	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	Mulga fence	528464	6495743	Mulga post, plain wire fence line; 6 strand; c. 300 m long	impacts associated with access road construction
SU244/HS1	1c: Turbine envelope P138,	Wood post: marker	529765	6499237	Mulga post with axe cut pointy end; 0.6 m high; stuck in ground and reinforced with cobbles at base	impacts associated with access road construction and P138

	P150, P155, P162, P168					
SU245/HS1	1c: Turbine envelope P159, P156	Mine site: <i>Great Northern Proprietary</i>	528745	6499867	Shafts and inclines, mullock, stone platforms	nil
SU246/HS1	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	Mine site: shaft and prospecting pit	531717	6496597	Mine shaft and prospecting pit (apparently unnamed: not listed on metallogenic map; however shown on Purnamoota Geological map)	outside proposed impacts
SU249/HS1	1b: Turbine envelope B77, B75, B81, B85	Mulga fence	529476	6487268	Mulga post, plain wire fence line; 6 strand; c. 400 m long; boundary fence	impacts associated with access road construction
SU249/HS2	1b: Turbine envelope B77, B75, B81, B85	Mulga stumps	528343	6488965	from grid ref extending west Mulga stumps; cutting for fence posts or stock fodder	impacts associated with access road construction
SU249/HS3	1b: Turbine envelope B77, B75, B81, B85	Mulga fence	528206	6489360	from grid ref extending west: Mulga post, plain wire fence line; 6 strand; c. 400 m long	impacts associated with access road construction
SU250/HS1	1b: Turbine envelope B3, B5	Mine site: shaft and mullock	519849	6482774	copper mine shaft: 2 x 2 diameter; depth unknown (apparently unnamed: not listed on metallogenic map; not shown on Umberumberka geological map)	outside proposed impacts
SU252/HS1	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	Mulga fence	521279	6480719	from grid ref extending north and south; Mulga post, plain wire fence line; 5 strand; c. 300 m long	impacts associated with access road construction
SU252/HS2	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	Mulga stumps	521280	6480700	from grid ref extending west Mulga stumps; cutting for fence posts or stock fodder	impacts associated with access road construction
SU253/HS1	1b: Turbine envelope B21, WB1, WB2	Water pipe (previously recorded as SU53/HS1)	521034	6479319	from grid ref extending east along survey unit	impacts associated with access road construction
SU253/HS2	1b: Turbine envelope B21, WB1, WB2	Mulga fence	521127	6479220	from grid ref extending east and west; Mulga post, plain wire fence line; 5 strand; c. 600 m long	impacts associated with access road construction and WB1
SU254/HS1	1b: Turbine envelope B26	Mine site: prospecting pit	522460	6482655	prospecting pit (close to <i>King Gunnia</i> mine)	impacts associated with access road construction
SU254/HS2	1b: Turbine envelope B26	Track	522395	6482744	track extending north from valley to <i>King Gunnia Mine</i> on north/south alignment: sth end: 522377.6482702; nth end: 522412.6482801	impacts associated with access road construction
SU254/HS3	1b: Turbine envelope B26	Track	522159	6483035	track extending northwest from valley unnamed mine site in location of B26	impacts associated with access road construction

SU254/HS4	1b: Turbine envelope B26	Mine site: prospecting pit	522167	6483088	costean: 12 x 3 x 2m (deep)	impacts associated with construction of B26
SU254/HS5	1b: Turbine envelope B26	Mine site: prospecting pit	522188	6483109	costean: 6 x 1.5 x 0.5m (deep)	impacts associated with construction of B26
SU256/HS1	1a: Turbine envelope A24	Mine site: <i>King Gunnia Mine</i>	522544	6482865	<i>King Gunnia Mine</i> ; Shafts, mullock heaps, forge, various stone platforms, metal, and associated whip	impacts associated with access road construction
SU257/HS1	1a: Turbine envelope Sthn Belmont	Mine site: prospecting pit	523229	6477445	small prospecting pit measuring 2 x 2 x 0.4m (deep)	impacts associated with access road construction
SU257/HS2	1a: Turbine envelope Sthn Belmont	Mine site: prospecting pit	523224	6477435	small prospecting pit measuring 3 x 2 x 0.8m (deep)	impacts associated with access road construction
SU258/HS1	1a: Turbine envelope A113	Mine site: prospecting pit	528216	6481225	small prospecting pit measuring 5 x 3 x 1m (deep)	nil
SU258/HS2	1a: Turbine envelope A113	Mine site: <i>Tower Hill Mine</i>	527937	6481264	<i>Tower Hill Mine</i> ; Shafts, Adit, mullock heaps, forges, various stone platforms, metal artefacts	nil
SU258/HS3	1a: Turbine envelope A113	Mine camp: stone hearth	527990	6481301	stone hearth (domestic form) associated with <i>Tower Hill Mine</i>	nil
SU259/HS1	1a: Turbine envelope A85	Mulga fence	529021	6482431	from grid ref extending north; Mulga post, plain wire fence line; 5 strand; c. 200 m long	impacts associated with access road construction
SU262/HS1	Existing access track	Mine site: prospecting pit	532640	6497726	small prospecting pit measuring 4 x 2 x 0.3m (deep)	impacts associated with access road construction
SU264/HS1	Transmission line from substation 2a to Switchyard	Mine site: <i>Consolation</i>	534435	6496463	mine shaft: 1 x 2 diameter; depth unknown; mullock, pits and forge. 2nd Shaft and pits c. 50 m to east; on Purnamoota geological map	nil
SU264/HS2	Transmission line from substation 2a to Switchyard	Mine camp: two stone hearths	534536	6496432	stone hearths (1 has domestic form; the other possible forge); glass and metal debris associated with <i>Consolation Mine</i>	nil
SU265/HS1	Transmission line from substation 2a to Switchyard	Mulga fence	535365	6495940	Mulga post, plain wire fence line; extends south for c. 400m	partial impacts associated with construction of transmission line
SU266/HS1	Transmission line from substation 2a to Switchyard	Mulga fence	535353	6494249	Mulga post, 6 strand plain wire fence line; extends south for c. 400m into SU267	partial impacts associated with construction of transmission line
SU266/HS2	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	535337	6493967	small prospecting pit measuring 6 x 4 x 1m (deep)	impacts associated with construction of transmission line
SU267/HS1	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	534222	6491183	small prospecting pit measuring 5 x 5 x 1.8m (deep)	impacts associated with construction of transmission line
SU267/HS2	Transmission line from substation 2a	Mine site: prospecting pit	534076	6490835	small prospecting pit measuring 5 x 4 x 1m (deep) and associated row of stones	impacts associated with construction of transmission line

	to Switchyard					
SU267/HS3	Transmission line from substation 2a to Switchyard	Mine site: prospecting pits	533268	6489691	cluster of 4 prospecting pits in area 50 x 50 m.	impacts associated with construction of transmission line
SU268/HS1	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	532051	6487229	small prospecting pit measuring 5 x 5 x 2m (deep)	impacts associated with construction of transmission line
SU268/HS2	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	531283	6485558	small prospecting pit measuring 5 x 5 x 1m (deep); sparse glass and metal artefacts	impacts associated with construction of transmission line
SU268/HS3	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	531301	6485481	small prospecting pit measuring 2 x 2 x 0.3m (deep)	impacts associated with construction of transmission line
SU268/HS4	Transmission line from substation 2a to Switchyard	Mine site: shaft and stone hearth	531213	6485388	mine shaft and mullock measuring 2.5 x 2.5 x 2 m deep; stone hearth at west end of mullock: uncertain whether or not domestic of forge	impacts associated with construction of transmission line
SU268/HS5	Transmission line from substation 2a to Switchyard	surface artefacts	527946	6480502	sparse scatter of late 19th century glass and ceramic	impacts associated with construction of transmission line
SU268/HS6	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	528386	6481281	small prospecting pit measuring 4 x 4 x 1m (deep)	impacts associated with construction of transmission line
SU268/HS7	Transmission line from substation 2a to Switchyard	Mine camp: complex of stone features (function unclear, sparse scatter of late 19th century glass, metal)	528550	6481398	complex of stone features (function unclear), sparse scatter of late 19th century glass, metal	impacts associated with construction of transmission line
SU268/HS8	Transmission line from substation 2a to Switchyard	Possible mine camp: 2 stone perimeter hut platforms	528486	6481415	1 rectangular stone hut platform measuring 5 x 3 m; 1 square stone hut platform measuring 3 x 3 m with pile of stone at one end and a post in one corner.	impacts associated with construction of transmission line
SU268/HS9	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	528670	6481658	small prospecting pit measuring 4 x 4 x 1m (deep)	impacts associated with construction of transmission line
SU268/HS10	Transmission line from substation 2a to Switchyard	Possible mine camp: 1 stone perimeter hut platform	529342	6482509	1 rectangular stone hut platform measuring 4 x 2.5 m; sparse metal artefacts including tin billy; probably associated with prospecting pits SU268/HS11	impacts associated with construction of transmission line
SU268/HS11	Transmission line	Mine site: cluster	529391	6482504	#1 pit measuring 5 x 5 x 1m (deep); #2 pit measuring 3 x 3 x 1m (deep); #3 pit	impacts associated with

	from substation 2a to Switchyard	of prospecting pits			measuring 4 x 3 x 0.5m (deep); some with survey pegs	construction of transmission line
SU268/HS12	Transmission line from substation 2a to Switchyard	Mine site: cluster of prospecting pits	529581	6482741	#1 pit measuring 4 x 4 x 0.7m (deep); #2 pit measuring 3 x 3 x 1m (deep)	impacts associated with construction of transmission line
SU271/HS1	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	Mulga fence	528206	6489360	Mulga post, 6 strand plain wire fence line; reinforced in places with double posts; extends west for c. 500m	partial impacts associated with construction of feeder
SU272/HS1	Proposed substation 1b (alternative)	Mine camp probably associated with King Gunnia Mine: complex of stone hut platforms	522315	6482578	Three stone hut platforms, one with hearth; additional piles of stones (function unclear); scatter of metal and glass artefacts; subsurface potential in hearth platforms	possible impacts associated with construction of substation or road
SU272/HS2	Proposed substation 1b (alternative)	Mine camp: small complex of stone features including a large domestic hearth and smaller hearth	522234	6482155	Mine camp: probably associated with an unnamed mine located to the south at c. 522250. 6481900; small complex of stone features including a large domestic hearth and smaller hearth (possibly an assaying forge), sparse scatter of late 19th century glass, metal	possible impacts associated with construction of substation or road
SU272/HS3	Proposed substation 1b (alternative)	Stone work (uncertain function)	522368	6482465	Stone platform (function uncertain however possible assaying kiln associated with King Gunnia Mine)	possible impacts associated with construction of substation or road
SU276/HS1	Transmission line from Switchyard to Broken Hill	Silverton Tramway and Acacia Siding (Limestone Siding)	532707	6468654	Well preserved section of the Tramway and Acacia Siding. The siding was utilised for transportation of limestone from Acacia Vale to Broken Hill. Site includes section of tramway, the siding, evidence of construction in the form of pits for earthen embankments; building platforms and telephone line	impacts associated with construction of TL
SU276/HS2	Transmission line from Switchyard to Broken Hill	scatter of glass, crockery and metal	532495	6468760	concentrated scatter of late 19th century glass, crockery and metal (part of camp oven); also scatter of coke in area 2 x 2 m	impacts associated with construction of TL
SU276/HS3	Transmission line from Switchyard to Broken Hill	Stone work (uncertain function)	532507	6468756	small stone feature; function uncertain however possible kiln	impacts associated with construction of TL
SU276/HS4	Transmission line from Switchyard to Broken Hill	scatter of glass, crockery and metal	532750	6469531	surface scatter of late 19th century glass, crockery and metal	impacts associated with construction of TL
SU278/HS1	Transmission line from Switchyard to	Mine site: prospecting pit	535370	6464994	small prospecting pit measuring 2 x 2 x 1m (deep)	impacts associated with construction of TL

	Broken Hill					
SU278/HS2	Transmission line from Switchyard to Broken Hill	Mine site: limestone pits	532685	6467341	pits and mounds in area 25 x 25 m; stone retaining wall in mullock	impacts associated with construction of TL
SU278/HS3	Transmission line from Switchyard to Broken Hill	Hut site	532696	6467749	complex of stone features (domestic structures: poor condition), sparse scatter of late 19th century glass, metal	impacts associated with construction of TL

7. SIGNIFICANCE ASSESSMENT

The information provided in this report and the assessment of significance of Aboriginal objects provides the basis for the proponent to make informed decisions regarding the management and degree of protection which should be undertaken in regard to the Aboriginal objects and Non Indigenous items located within the study area.

7.1 Significance Assessment Criteria - Indigenous

The NPWS (1997) defines significance as relating to the meaning of sites: “meaning is to do with the values people put on things, places, sites, land”. The following significance assessment criteria is derived from the relevant aspects of ICOMOS Burra Charter and NSW Department of Urban Affairs and Planning’s ‘State Heritage Inventory Evaluation Criteria and Management Guidelines’.

Aboriginal archaeological sites are assessed under the following categories of significance:

- cultural value to contemporary Aboriginal people,
- archaeological value,
- aesthetic value,
- representativeness, and
- educational value.

Aboriginal cultural significance

The Aboriginal community will value a place in accordance with a variety of factors including contemporary associations and beliefs and historical relationships. Most heritage evidence is valued by Aboriginal people given its symbolic embodiment and physical relationship with their ancestral past.

Archaeological value

The assessment of archaeological value involves determining the potential of a place to provide information which is of value in scientific analysis and the resolution of potential archaeological research questions. Relevant research topics may be defined and addressed within the academy, the context of cultural heritage management or Aboriginal communities. Increasingly, research issues are being constructed with reference to the broader landscape rather than focusing specifically on individual site locales. In order to assess scientific value sites are evaluated in terms of nature of the evidence, whether or not they contain undisturbed artefactual material, occur within a context which enables the testing of certain propositions, are very old or contain significant time depth, contain large artefactual assemblages or material diversity, have unusual characteristics, are of good preservation, or are a part of a larger site complex. Increasingly, a range of site types, including low density artefact distributions, are regarded to be just as important as high density sites for providing research opportunities.

Representativeness

Representative value is the degree to which a “class of sites are conserved and whether the particular site being assessed should be conserved in order to ensure that we retain a representative sample of the archaeological record as a whole” (NPWS 1997). Factors defined by NPWS (1997) for assessing sites in terms of representativeness include defining variability, knowing what is already conserved and considering the connectivity of sites.

Educational value

The educational value of cultural heritage is dependent on the potential for interpretation to a general visitor audience, compatible Aboriginal values, a resistant site fabric, and feasible site access and management resources.

Aesthetic value

Aesthetic value relates to aspects of sensory perception. This value is culturally contingent.

7.2 Significance Value of the Aboriginal Objects in the Study Area

The predominant Aboriginal object found in the proposal area is distributions of stone artefacts and Stone Procurement Areas (SPAs). Stone artefact scatters and SPAs are common site types in the local area and wider region. In the proposal area stone artefacts have been found to be distributed in a virtual continuum and occur in all environmental contexts. Similarly most quartz outcrops in the local area possess evidence of Aboriginal exploitations and accordingly given their widespread occurrence SPAs also occur in a widespread distribution.

However both Aboriginal object locale types vary significantly in terms of their nature and hence their research potential. The density of stone artefact distribution varies significantly from very low (<1 per square metre) to moderate (30 - 50 per square metre). It is also likely that in some landforms such as alluvial flats adjacent to major creeks artefact density will be found to be present in high density in a subsurface context. The density of the stone artefact distribution is assumed to be related, at least in part, to environmental factors such as the nature of the terrain (landform element, gradient and slope), proximity to water and other resources.

The stone artefact distributions have also been found to be variable in terms of the types of raw materials present and the nature of the artefacts. These differences are likely to reflect differences in site function ie different activities undertaken in different places. Therefore, stone artefact distributions, while common, will each have the potential to provide unique archaeological data and hence interpretive value within a research context.

Furthermore if each stone artefact locale is considered to be a component of a broader network of site types and distribution in the wider landscape they can then be considered to be of a higher research value.

Quartz stone procurement areas are common sites in the proposal area. Similarly to stone artefact distributions these sites vary greatly in the flaking quality of quartz, their size, the nature of procurement evidence and their relationship to associated stone artefacts. The majority of these sites in the proposal area possess very low levels of obvious use and extraction while some have extensive evidence of use. This site type has the potential for research projects looking at reduction analysis, technology and patterns of landuse.

Heat retainer hearths possess relatively high research potential both individually and as clustered suites. A number of recent studies relating to heat retainer hearths have been conducted in the region. These studies have been focused on dating of charcoal fragments in the hearths for the purposes of analyzing occupational patterns in the region. Accordingly those hearths situated within the proposal area have high potential for use within comparative research programs.

It is noted that Aboriginal heritage sites often have high cultural value to the local Aboriginal community given that they provide direct physical and symbolic linkages to their ancestral past and to the landscape. The cultural values of the identified sites may possibly differ to the archaeological significance values.

Table 6 below sets out the archaeological values of each of the recorded Aboriginal object locales recorded during the study; a brief description of the reasoning behind the significance assessment is included in the table. It is emphasized that the majority of the locales are assessed to be of low or low/moderate. Some are assessed to be of moderate significance; several locales are assessed to be of high significance.

While the archaeological significance of each locale has necessarily been assessed on individual merits it is emphasized that when considered as a suite of sites reflecting the occupation of a larger landscape context, the overall archaeological potential of the archaeological resource in the project area is increased.

Table 6. Archaeological significance assessment of Aboriginal object locales.

Name	feature	description	Significance	Criteria
SU233/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; <1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU233/L2	SPA	quartz outcrop with batter marks	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU234/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; <1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated

Name	feature	description	Significance	Criteria
				soil; limited excavation potential
SU234/L2	SPA	quartz outcrop with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU234/L3	SPA	quartz outcrop with batter marks	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU234/L4	SPA	quartz outcrop with batter marks and Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU235/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; <1/20 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU235/L2	stone artefacts (discrete)	Quartz stone artefacts; 1/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential
SU235/L3	SPA	quartz outcrop with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU236/L1	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential
SU236/L2	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential
SU236/L3	SPA	quartz outcrop/scree with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU236/L4	stone artefacts (discrete)	Quartz stone artefacts; 3/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential
SU236/L5	SPA	quartz outcrop/scree with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/1 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: low artefact density; skeletal/deflated soil; limited excavation potential
SU237/L2	stone artefacts (discrete)	Quartz stone artefacts; 30/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: moderate artefact density;

Name	feature	description	Significance	Criteria
				skeletal/deflated soil; limited excavation potential
SU237/L3	SPA	quartz outcrop with Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L4	SPA	quartz outcrop with Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L5	SPA	quartz outcrop and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L6	SPA	quartz outcrop with one Hertzian cone fracture; nil artefacts observed	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L7	SPA	quartz outcrop and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L8	SPA	quartz outcrop with batter marks and Hertzian cone fractures; nil artefacts observed	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L9	SPA	quartz outcrop; no extraction marks however with large quartz hammerstone	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L10	SPA	quartz outcrop and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at local; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L11	SPA	quartz outcrop with batter marks nil artefacts observed	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L12	SPA	quartz outcrop with batter marks and 1 Hertzian cone fracture; nil artefacts observed	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU237/L13	SPA	quartz outcrop and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU238/L1	stone artefacts (continuous sparse)	Quartz stone artefacts; 1/1 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential:

Name	feature	description	Significance	Criteria
	distribution)			low artefact density; skeletal/deflated soil; limited excavation potential
SU238/L2	SPA	quartz outcrop and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU239/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU239/L2	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU239/L3	SPA	quartz outcrop with batter marks, Hertzian cone fractures; no observed artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU239/L4	SPA	quartz outcrop and associated artefacts in saddle to west	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU239/L5	SPA	quartz outcrop with Hertzian cone fractures; no observed artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU240/L1	stone artefacts (continuous sparse distribution)	quartz stone artefacts; 1/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential
SU240/L2	SPA	quartz outcrop with Hertzian cone fractures, batter marks, flake scars and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU240/L3	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU240/L4	SPA	quartz outcrop with Hertzian cone fracture, batter marks, flake scars and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU240/L5	SPA	quartz scree with associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU240/L6	SPA	quartz outcrop and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation

Name	feature	description	Significance	Criteria
				potential however a certain analytical potential
SU240/L7	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU240/L8	SPA	quartz outcrop with Hertzian cone fractures, batter marks and flake scars; no observed artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU240/L9	SPA	quartz outcrop with Hertzian cone fractures; no observed artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU240/L10	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetics value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential
SU240/L11	SPA	quartz outcrop with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU240/L12	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential
SU240/L13	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU240/L14	SPA	quartz outcrop with batter marks; no observed artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU241/L1	stone artefacts (discrete)	Quartz stone artefacts; 15/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low/moderate artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU241/L2	stone artefacts (discrete)	Quartz stone artefacts; 10/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU241/L3	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU241/L4	SPA	quartz outcrop with	Low/moderate	Common site type; low educational value,

Name	feature	description	Significance	Criteria
		batter marks; no observed artefacts	local archaeological	low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU242/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU242/L2	SPA	quartz outcrop with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU242/L3	SPA	quartz outcrop with batter marks; no observed artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU243/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU243/L2	stone artefacts (discrete)	Quartz stone artefacts; 10/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential
SU243/L3	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU243/L4	SPA	quartz outcrop with batter marks; no observed artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU243/L5	SPA	quartz outcrop with Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU244/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU246/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU246/L2	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU246/L3	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential

Name	feature	description	Significance	Criteria
				potential
SU246/L4	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU247/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU248/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU248/L2	Rock art	small rock shelter with 2 red pigment emu footprint motifs	Moderate/high local archaeological	Rare site type in local area; moderate educational value; moderate aesthetic value; moderate research potential
SU248/L3	stone artefacts (discrete)	Quartz stone artefacts; 10/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; moderate excavation potential
SU248/L4	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU248/L5	stone artefacts (discrete)	Quartz stone artefacts; 15/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low/moderate density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU248/L6	stone artefacts (discrete)	Quartz stone artefacts; 1/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU248/L7	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU248/L8	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU249/L2	stone artefacts (discrete)	Quartz stone artefacts; 1/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L3	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation

Name	feature	description	Significance	Criteria
				potential however a certain analytical potential
SU249/L4	SPA	quartz outcrop with Hertzian cone fractures; no observed artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L5	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L6	SPA	quartz outcrop with batter marks, negative scars and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L7	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L8	SPA	quartz outcrop with batter marks, Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L9	SPA	quartz outcrop with batter marks, Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L10	SPA	quartz outcrop with batter marks, Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L11	SPA	quartz outcrop with Hertzian cone fractures; no artefacts observed	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L12	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L13	SPA	quartz outcrop with batter marks, Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L14	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential

Name	feature	description	Significance	Criteria
				potential
SU249/L15	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L16	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L17	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU249/L18	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU250/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU251/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU251/L2	stone artefacts (discrete)	Quartz stone artefacts; 10/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU251/L3	SPA	quartz outcrops with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU251/L4	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU251/L5	stone artefacts (discrete)	Quartz stone artefacts; 3/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU251/L6	SPA	quartz outcrops with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU251/L7	SPA	quartz outcrop with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation

Name	feature	description	Significance	Criteria
				potential however a certain analytical potential
SU251/L8	SPA	quartz outcrop with Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU251/L9	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU251/L10	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU252/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/100 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU252/L2	Isolated artefact	Broken quartzite pebble with ground face consistent with top stone (pestle) use wear	Low/moderate local archaeological	Isolated artefact, however uncommon artefact type; low/moderate educational value, low/moderate aesthetic value; low/moderate research potential: nil associated artefacts
SU252/L3	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU253/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/100 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU255/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/10 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU255/L2	SPA	quartz outcrop with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU255/L3	SPA	quartz outcrop with minor batter marks and associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU257/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU257/L2	SPA	quartz outcrop with batter marks and associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU258/L1	stone artefacts (continuous sparse)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential:

Name	feature	description	Significance	Criteria
	distribution)			very low artefact density; skeletal/deflated soil; limited excavation potential
SU258/L2	stone artefacts and PAD	Area 150 m N/S x 50 m E/W on west side of Lakes Knob Ck	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: predicted moderate density artefacts in subsurface context at locale; excavation potential
SU258/L3	SPA	Area 60 x 60 m of quartz outcrops with extensive Hertzian cone fractures, batter marks and moderate density artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate density artefacts; some excavation potential and high analytical potential
SU258/L4	stone artefacts and PAD	Area on west side of Lakes Knob Ck	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: predicted low/moderate density artefacts in subsurface context at locale; excavation potential
SU260/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/100 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU260/L2	SPA	quartz outcrop with batter marks; no observed artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU261/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/100 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil generally; limited excavation potential
SU261/L2	SPA	quartz outcrop with minor batter marks and associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU261/L3	SPA	quartz outcrop with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU261/L4	stone artefacts and hearth	one eroded stone hearth and sparse artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; eroded soil; hearth has some excavation potential
SU261/L5	stone artefacts and hearths	three eroded stone hearths and sparse artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; eroded soil; 2 hearths have excavation potential
SU262/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 10/1 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: low artefact density; skeletal/deflated soil; some, but generally limited excavation potential
SU262/L2	hearths	2 possible hearths: intact	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential
SU262/L3	hearth	hearth: intact	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential
SU262/L4	hearth	hearth: intact	Low/moderate local	Common site type; low educational value, low aesthetic value; excavation potential

Name	feature	description	Significance	Criteria
			archaeological	
SU262/L5	hearth	hearth: intact	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential
SU262/L6	hearth	hearth: intact	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential
SU263/L1	continuous stone artefacts, PAD and hearths	Flat adjacent to Sandy Gum Creek with deep sandy deposit. Sparse artefacts visible, however high potential for moderate to high density artefacts relatively undisturbed; numerous hearths	moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential
SU264/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil generally; limited excavation potential
SU264/L2	stone artefacts, PAD and hearths	Surface scatter of stone artefacts including a wide range of exotic materials; potential for PAD but highly eroded; numerous hearths	moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; eroded soil; hearths have excavation potential
SU264/L3	SPA	quartz outcrop with batter marks and associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU264/L4	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: moderate artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU265/L1	continuous stone artefacts and hearths	stone artefacts and hearths	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts; eroded soil; some hearths have excavation potential
SU266/L1	continuous stone artefacts and hearths	stone artefacts: 5/1m ² and hearths	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; eroded soil; some hearths have excavation potential
SU266/L2	stone artefacts, PAD and hearths	Surface scatter of stone artefacts including a range of exotic materials and artefact types; potential for PAD but eroded; numerous hearths	moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; eroded soil; hearths have excavation potential
SU267/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/10 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU267/L2	SPA	quartz outcrop with batter marks and associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU267/L3	hearths	3 hearths: intact	Low/moderate	Common site type; low educational value,

Name	feature	description	Significance	Criteria
			local archaeological	low aesthetic value; excavation potential
SU267/L4	hearth	hearth: eroded	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low excavation potential
SU267/L5	SPA	quartz outcrop with batter marks and associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU267/L6	stone artefacts, PAD and hearths	Surface scatter of stone artefacts including exotic materials; potential for PAD; 2 hearths	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: potentially low/moderate density artefacts at locale; hearths have excavation potential
SU267/L7	hearth	hearth: relatively intact	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential
SU267/L8	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: moderate artefact density at locale; skeletal/deflated soil; excavation potential
SU267/L9	hearth	hearth: relatively intact	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential
SU267/L10	SPA	quartz outcrop with associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU267/L11	SPA	quartz outcrop with Hertzian cone fractures and associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU267/L12	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; potential for PAD but highly eroded; numerous hearths some of which made from quartz	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; hearths have excavation potential
SU267/L13	stone artefacts, PAD and hearths	Surface scatter of stone artefacts including exotic materials and rare artefact types; potential for stable and relatively undisturbed PAD	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential
SU268/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU268/L2	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU268/L3	SPA	A complex of 3 quartz outcrops with Hertzian cone fractures, batter	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate artefact density at locale;

Name	feature	description	Significance	Criteria
		marks and associated stone artefacts		some excavation potential
SU268/L4	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; potential for relatively stable and undisturbed PAD including hearths	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential
SU268/L5	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; potential for relatively stable and undisturbed PAD including hearths	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential; associated with small SPA (SU268/L6)
SU268/L6	SPA	quartz outcrop with batter marks and associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: predicted moderate/high artefact density at locale; excavation potential
SU268/L7	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate/high artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU268/L8	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential
SU268/L9	SPA	complex of quartz outcrops with Hertzian cone fractures, batter marks and associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential
SU268/L10	SPA	complex of quartz outcrops with Hertzian cone fractures, batter marks and associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate artefact density at locale; some excavation potential
SU268/L11	SPA	complex of quartz outcrops with Hertzian cone fractures, batter marks and associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential
SU268/L12	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: moderate/high artefact density at locale; skeletal/deflated soil; however some excavation potential
SU268/L13	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential
SU268/L14	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; hearths, potential PAD however high natural erosion	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential
SU268/L15	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU268/L16	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; hearths, potential PAD	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density

Name	feature	description	Significance	Criteria
		areas of both high natural erosion and relative intact deposit		artefacts at locale; hearths have excavation potential
SU269/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/5 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU269/L2	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU269/L3	SPA	quartz outcrop with batter marks and associated stone artefacts; additional small outcrop 20 m to SE	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU269/L4	SPA	quartz outcrop and associated artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential
SU269/L5	SPA	quartz outcrop and associated artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential
SU270/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU270/L2	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; hearths, potential PAD areas of both high natural erosion and relatively intact deposit	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; hearths have excavation potential
SU270/L3	SPA	quartz outcrop with batter marks and associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU270/L4	SPA	quartz outcrop with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU271/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/1 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential generally
SU271/L2	SPA	quartz outcrop with batter marks and associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU271/L3	stone artefacts and PAD	Surface scatter of stone artefacts; potential PAD areas of both high natural erosion and relatively intact deposit	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale
SU271/L4	SPA	quartz outcrop with	Low/moderate	Common site type; low educational value,

Name	feature	description	Significance	Criteria
		batter marks and associated stone artefacts	local archaeological	low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU271/L5	SPA	quartz outcrop with batter marks; nil artefacts observed	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU271/L6	SPA	quartz outcrop with Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU271/L7	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU271/L8	SPA	quartz outcrop with Hertzian cone fractures and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU271/L9	SPA	quartz outcrop with associated stone artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU272/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/5 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential except adjacent to drainage line
SU272/L2	SPA	quartz outcrop with Hertzian cone fractures, batter marks, negative flake scars and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU273/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/10 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU273/L2	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU273/L3	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; hearths, potential PAD areas of both high natural erosion and relative intact deposit	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential
SU274/L1	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; hearths, potential PAD areas of both high natural erosion and	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential

Name	feature	description	Significance	Criteria
		relative intact deposit		
SU275/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU275/L2	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU275/L3	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential
SU275/L4	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; hearths, potential PAD areas of both high natural erosion and relative intact deposit	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; hearths have excavation potential
SU275/L5	stone artefacts (discrete)	Quartz stone artefacts; 5/1 m ²	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential
SU275/L6	SPA	quartz outcrop with associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; some excavation potential
SU275/L7	SPA	quartz outcrop with associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU276/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/10 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU276/L2	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU276/L3	SPA	quartz outcrop with Hertzian cone fractures, batter marks; nil artefacts observed	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU276/L4	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; hearth, potential PAD areas of both high natural erosion and relative intact deposit	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: potentially low/moderate density artefacts at locale; hearth has excavation potential
SU276/L5	hearths	hearths: eroded	Low local archaeological	Common site type; low educational value, low aesthetic value; low excavation potential
SU276/L6	hearth	hearth: intact	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential
SU276/L7	SPA	quartz outcrop with associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale;

Name	feature	description	Significance	Criteria
				skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU276/L8	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential
SU276/L9	hearth	hearth: eroded	Low local archaeological	Common site type; low educational value, low aesthetic value; low excavation potential
SU276/L10	SPA	quartz outcrop with batter marks and associated artefacts	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; excavation potential
SU276/L11	SPA	quartz outcrop with Hertzian cone fractures, batter marks; nil artefacts observed	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; excavation potential
SU276/L12	SPA	quartz outcrop with batter marks; nil artefacts observed	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; excavation potential
SU276/L13	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate artefact density at locale; excavation potential
SU277/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU277/L2	stone artefacts, PAD and hearths	Surface scatter of stone artefacts exotic materials and rare artefact types; numerous hearths, potential PAD areas of both high natural erosion and relative intact deposit	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential
SU278/L1	stone artefacts (continuous sparse distribution)	Quartz stone artefacts; 1/50 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential
SU278/L2	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; hearths, potential PAD area but high natural erosion	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: potentially low/moderate density artefacts at locale; hearths have excavation potential
SU278/L3	SPA	quartz outcrop with Hertzian cone fractures, batter marks and associated artefacts	Moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: moderate artefact density at locale; excavation potential
SU278/L4	hearth	hearth: eroded	Low local archaeological	Common site type; low educational value, low aesthetic value; low excavation potential
SU278/L5	stone artefacts (discrete)	Quartz stone artefacts; 1/1 m ²	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: low artefact density at locale; highly eroded; limited excavation potential
SU278/L6	stone artefacts, PAD and hearths	Surface scatter of stone artefacts including exotic materials; hearths, potential PAD area but high natural erosion	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: potentially low/moderate density artefacts at locale; hearths have excavation potential
SU278/L7	stone artefacts,	Surface scatter of	Low/moderate	Common site type; low educational value,

Name	feature	description	Significance	Criteria
	PAD and hearths	stone artefacts including exotic materials; hearths, potential PAD area but high natural erosion	local archaeological	low aesthetic value; low research potential: potentially low/moderate density artefacts at locale
SU278/L8	stone artefacts, PAD and hearths	Surface scatter of stone artefacts; hearths, potential PAD area	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; relatively stable deposit
SU278/L9	stone artefacts, PAD and hearths	Surface scatter of stone artefacts including exotic materials and rare artefacts; hearths, potential PAD area	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; relatively stable deposit

7.3 Significance Assessment Criteria – Non Indigenous

The NSW Heritage Office and Planning NSW have defined a set of criteria and methodology for the assessment of cultural heritage significance for items and places, where these do not include Aboriginal heritage from the pre-contact period (NSW Heritage Office & DUAP 1996, NSW Heritage Office 2000).

The following heritage assessment criteria are those set out for Listing on the State Heritage Register. In many cases items will be significant under only one or two criteria. The State Heritage Register was established under Part 3A of the Heritage Act (as amended in 1999) for listing of items of environmental heritage which are of state heritage significance. Environmental heritage means those places, buildings, works, relics, moveable objects, and precincts, of state or local heritage significance (section 4, Heritage Act 1977).

An item will be considered to be of State (or local) heritage significance if, in the opinion of the Heritage Council of NSW, it meets one or more of the following criteria:

- Criterion (a) an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area);
- Criterion (b) an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area);
- Criterion (c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area);
- Criterion (d) an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons;
- Criterion (e) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);
- Criterion (f) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);
- Criterion (g) an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments (or a class of the local areas).

An item is not to be excluded from the Register on the ground that items with similar characteristics have already been listed on the Register. Only particularly complex items or places will be significant under all criteria.

In using these criteria it is important to assess the values first, then the local or State context in which they may be significant. Different components of a place may make a different relative contribution to its heritage value. For example, loss of integrity or condition may diminish significance. In some cases it is constructive to note

the relative contribution of an item or its components. Table 7 below provides a guide to ascribing relative values.

Table 7. Significance grading.

Grading	Justification	Status
Exceptional	Rare or outstanding item of local or State significance. High degree of intactness Item can be interpreted relatively easily.	Fulfil criteria for local or State listing.
High	High degree of original fabric. Demonstrates a key element of the item's significance. Alterations do not detract from significance.	Fulfil criteria for local or State listing.
Moderate	Altered or modified elements. Elements with little heritage value, but which contribute to the overall significance of the item.	Fulfil criteria for local or State listing.
Little	Alterations detract from significance. Difficult to interpret.	Does not fulfil criteria for local or State listing.
Intrusive	Damaging to the item's heritage significance.	Does not fulfil criteria for local or State listing.

In instances where a heritage site is complex and/or comprises numerous elements a hierarchy of significance may be useful in assigning significance to individual elements or areas of a site. A commonly used four level hierarchy is: considerable, some, little, and intrusive (NSW Heritage Management Guidelines – Heritage terms and Abbreviations).

7.4 Significance – Non Indigenous

The sites recorded during this survey have been assessed against the State Heritage Register criteria and have been guided by the NSW Heritage Office update *Assessing Heritage Significance* (2001) and the Heritage Council of NSW update *Levels of Heritage Significance* (2008); Pearson and McGowans (2000) *Mining Heritage Places Assessment Manual* has also guided the significance assessment. A statement of significance for each site is provided below in Table 8; a brief description of the reasoning behind the significance assessment is included in the table. Further details regarding the heritage assessment are also discussed below in terms of the thresholds for each significance category and individual site details where appropriate.

Table 8. Significance values of historical features.

Name	Feature	Significance	Criteria
SU235/HS1	Mine site: <i>Mount Eltie Fluorite</i>	Local significance; meets the requirements for listing against criteria d	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. Extensive workings; well preserved
SU235/HS1a	Mine camp: probably associated with <i>Mt Eltie Fluorite</i> : mulga post hut and stone hearth	Local significance; meets the requirements for listing against criteria d and f	This item is a rare site type in the local region and is associated with a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. The site is well preserved, has research potential and aesthetic qualities
SU236/HS1	Mine site: possibly part of <i>Mt Eltie Fluorite</i> : shaft	Local significance; meets the requirements for	This item is a common site type in the local region and possibly part of the <i>Mt Eltie Fluorite</i>

Name	Feature	Significance	Criteria
		listing against criteria d	mine complex. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry.
SU239/HS1	Mine site: <i>Mt Robe</i>	Local significance; meets the requirements for listing against criteria d and f	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. It possesses evidence of numerous periods of operation
SU239/HS2	Mine settlement: <i>Mt Robe</i>	Local significance; meets the requirements for listing against criteria c, d and f	This item is a rare site type in the local region and is associated with a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. The site has research potential and strong aesthetic qualities
SU240/HS1	Wood post: marker	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU240/HS2	Wood survey peg	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU240/HS3	Mulga fence	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU244/HS1	Wood post: marker	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU245/HS1	Mine site: Great Northern Proprietary	Does not meet criteria for heritage listing	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry.
SU246/HS1	Mine site: shaft and prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU249/HS1	Mulga fence	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU249/HS2	Mulga stumps	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU249/HS3	Mulga fence	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU250/HS1	Mine site: shaft and mullock	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU252/HS1	Mulga fence	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU252/HS2	Mulga stumps	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU253/HS1	Water pipe (previously recorded as SU53/HS1)	Local significance; meets the requirements for listing against criteria a and c	This item is part of a larger complex that was important in the course of the local area's cultural history (ie securing a reliable water supply for Broken Hill) It is also part of a complex that demonstrates considerable technical achievement
SU253/HS2	Mulga fence	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU254/HS1	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU254/HS2	Track	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU254/HS3	Track	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU254/HS4	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU254/HS5	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU256/HS1	Mine site: <i>King Gunnia Mine</i>	Local significance; meets the requirements for listing against criteria d and f	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. It possesses a relatively rare and well preserved whip.
SU257/HS1	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance

Name	Feature	Significance	Criteria
SU257/HS2	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU258/HS1	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU258/HS2	Mine site: <i>Tower Hill Mine</i>	Local significance; meets the requirements for listing against criteria d and f	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. It possesses a relatively rare and well preserved unusual forge
SU258/HS3	Mine camp: stone hearth	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU259/HS1	Mulga fence	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU262/HS1	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU264/HS1	Mine site: <i>Consolation</i>	Does not meet criteria for heritage listing	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry.
SU264/HS2	Mine camp: two stone hearths	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU265/HS1	Mulga fence	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU266/HS1	Mulga fence	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU266/HS2	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU267/HS1	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU267/HS2	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU267/HS3	Mine site: prospecting pits	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS1	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS2	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS3	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS4	Mine site: shaft and stone hearth	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS5	surface artefacts	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS6	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS7	Mine camp: complex of stone features (function unclear, sparse scatter of late 19th century glass, metal)	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS8	Possible mine camp: 2 stone perimeter hut platforms	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS9	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS10	Possible mine camp: 1 stone perimeter hut platform	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS11	Mine site: cluster of prospecting pits	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU268/HS12	Mine site: cluster of prospecting pits	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU271/HS1	Mulga fence	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU272/HS1	Mine camp probably	Local significance; meets	This item is associated with a named mine. It is a

Name	Feature	Significance	Criteria
	associated with <i>King Gunnia</i> Mine: complex of stone hut platforms	the requirements for listing against criteria d	component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. The site has research potential and strong aesthetic qualities
SU272/HS2	Mine camp: small complex of stone features including a large domestic hearth and smaller hearth	Local significance; meets the requirements for listing against criteria d	This item is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. The site has research potential and aesthetic qualities
SU272/HS3	Stone work (uncertain function)	Local significance; meets the requirements for listing against criteria d	This item is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. The site has research potential
SU276/HS1	Silverton Tramway and Acacia Siding (Limestone Siding)	Local, state and potentially national significance; meets the requirements for listing against criteria a, b, e, f and g	The Tramway has strong associations with the STC and its construction was of importance to the local region and critical to the economic functioning of Broken Hill. The Acacia Siding was utilised for transportation of limestone from Acacia Vale to Broken Hill; the siding is well preserved, is representative of its type and retains good evidence of its function.
SU276/HS2	scatter of glass, crockery and metal	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU276/HS3	Stone work (uncertain function)	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU276/HS4	scatter of glass, crockery and metal	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU278/HS1	Mine site: prospecting pit	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU278/HS2	Mine site: limestone pits	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance
SU278/HS3	Hut site	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance

8. MITIGATION AND MANAGEMENT STRATEGIES – ABORIGINAL OBJECTS

The aim of this study has been to identify Aboriginal objects within the proposal area, to assess their significance and thereafter, to give consideration to their management within the context of the proposed impacts.

In the following sections a variety of strategies that can be considered for the mitigation and management of development impact to the recorded Aboriginal object locales within the proposal area are listed and discussed. Table 9 lists recommended management and mitigation strategies in regard to all Aboriginal object locales recorded during the assessment.

8.1 Management and Mitigation Strategies

Further Investigation

The current field survey has been focused on recording artefactual material present on visible ground surfaces. Further archaeological investigation entails subsurface excavation which is generally undertaken as test pits for the purposes of identifying the presence of artefact bearing soil deposits and their nature, extent, integrity and significance.

Further archaeological investigation in the form of sub-surface test excavation can be appropriate in certain situations. Such situations generally arise when the proposed development is expected to involve ground disturbance in areas which are assessed to have potential to contain high density artefactual material and when the Effective Survey Coverage achieved during a survey of a project area is low due to ground cover, vegetation etc. In certain situations subsurface investigation provides a level of surety in regard to the archaeological status of a place so that informed management decisions can be duly made.

Test excavation can be undertaken in a variety of ways including hand excavation, shovel pits, auger holes, mechanically excavated trenches or surface scrapes. Such a strategy is pro-active and enables the proponent to properly understand the nature of archaeological sites prior to development activity occurring.

However no Survey Units have been identified in the proposal area to warrant further archaeological investigation. The Effective Survey Coverage achieved during the field survey was relatively high and can be considered to have been generally adequate for the purposes of determining the archaeological status of the proposed impact areas.

The ridges in which the turbines and their associated impacts will be located contain skeletal soil as a result of high levels of erosion and disturbance; accordingly these soils have low potential to contain intact and/or stratified archaeological deposit. Given the skeletal nature of these soils the potential to physically conduct subsurface excavation is limited. Elsewhere in locations which contain deeper soil deposits such as landforms located in the lower landform contexts a number of additional factors have been taken into consideration to determine whether or not further investigation is necessary. Proposed impacts in these landforms are small scale, discrete and generally linear impacts (road access, transmission line construction etc). In addition, it is considered that in regard to the archaeology itself, subsurface testing is unlikely to produce results much different to predictions made in respect of the subsurface potential of these landforms. Accordingly a program of subsurface testing is not considered to be necessary or warranted in regard to the proposal.

Conservation

Conservation is a suitable management option in any situation, however, is not always feasible. Such a strategy is generally adopted in relation to Aboriginal objects which are assessed to be of high cultural and scientific significance, but can be adopted in relation to any object irrespective of its significance.

When conservation is adopted as a management option it may be necessary to implement various strategies to ensure Aboriginal objects are not inadvertently destroyed or disturbed during construction works or within the context of *the life* of the development project. Such procedures are essential when development works are to proceed within close proximity to identified sites.

None of the Survey Units in the proposal area have been identified to surpass scientific significance thresholds which would act to entirely preclude proposed impacts. However a small number of discrete locales and

discrete areas within locales have been identified to warrant total exclusion of impacts and the implementation of a strategy of conservation. These locales are listed individually below.

SU248/L2 (outside proposed impacts)
SU264/L4 (in TL easement from substation 2a to Switchyard)
SU267/L8 (in TL easement from substation 2a to Switchyard)
SU267/L11 (in TL easement from substation 2a to Switchyard)
SU268/L2 (in TL easement from substation 2a to Switchyard)
SU268/L3 (in TL easement from substation 2a to Switchyard)
SU277/L2 (in east end of Construction and Maintenance Compound)

It is recommended that an active conservation strategy is implemented in regard to these locales to ensure that they are not inadvertently impacted during the construction, operation and decommissioning of the wind farm. It is noted that the majority of these locales are either situated outside areas in which impacts are proposed or within areas in which a strategy of conservation, and hence impact avoidance, is expected to be highly feasible.

Unmitigated Impacts

Unmitigated impacts to an Aboriginal object can be given consideration when it is assessed to be of low or low/moderate archaeological and cultural significance and otherwise in situations where conservation is simply not feasible.

Many of the Aboriginal object locales are very low (<1 per artefact square metre) or low density (between 1 artefacts per square metre and 10 artefacts per square metre) distributions of quartz stone artefacts. The archaeological significance of the locales is assessed to be low. Accordingly unmitigated impact is considered to be appropriate in regard to the majority of locales in the proposal area (see Table 9).

Mitigated Impacts

Mitigated impact usually takes the form of partial impacts only (ie conservation of part of the Survey Unit) and/or salvage in the form of further research and archaeological analysis prior to impacts. Such a management strategy is generally appropriate when Aboriginal objects are assessed to be of moderate or high significance to the scientific and/or Aboriginal community and when avoidance of impacts and hence full conservation is not feasible. Salvage can include the surface collection or sub-surface excavation of Aboriginal objects and subsequent research and analysis.

Many of the Aboriginal object locales and/or discrete areas within wider stone artefact distribution locales (including those which are predicted to contain subsurface archaeological deposit), stone procurement areas and locales with heat retainer ovens, are assessed to be of low/moderate or moderate archaeological significance. Accordingly it is generally recommended that avoidance of impacts, or limiting the extent of impacts to these locales, if at all feasible, should be given consideration.

In regard to these locales for which it is recommended that avoidance of impacts be considered, further recommendations are made in the event that avoidance of impacts is not feasible. In some cases especially those relating to small stone procurement locales it is recommended that if avoidance is not feasible unmitigated impacts are appropriate. However, in other cases such as locales containing deep soils and hence potential subsurface archaeological deposit with predicted moderate density artefact distribution, locales containing heat retaining hearths and larger and more complex stone procurement areas (and which are assessed to be of low/moderate or moderate archaeological potential), it is recommended that if impact avoidance is not feasible a strategy of impact mitigation is appropriate.

It is proposed that where necessary an appropriate impact mitigation strategy would be a program of archaeological excavation and analysis. Ideally such a program would entail an adequately designed research program which would aim to address research questions similar to those currently being pursued in the region.

8.2 Management options - Summary

The table below summarises the management and mitigation strategies considered to be relevant to proposal area. The assessed archaeological significance of each Aboriginal object locale is listed given that site significance forms the basis for rationalizing the proposed management strategy. The recommended management strategy listed for each Aboriginal object locale is selected from the various management options as discussed above in Section 8.1. Finally the rationale behind each recommendation is outlined, taking into

consideration the nature of the Aboriginal object and its archaeological significance rating. Constraints mapping is provided in Appendix 4.

Table 9. Recommendations for the management and mitigation of impact to Aboriginal Object locales

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
SU233/L1	1c: Turbine envelope P124, P126, P119, P121, P114, P128, P130	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU233/L2	1c: Turbine envelope P124, P126, P119, P121, P114, P128, P130	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU234/L1	1c: Turbine envelope P139, P142, P153, P154, P152, 149	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU234/L2	1c: Turbine envelope P139, P142, P153, P154, P152, 149	impacts from road and P139 construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU234/L3	1c: Turbine envelope P139, P142, P153, P154, P152, 149	impacts from road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU234/L4	1c: Turbine envelope P139, P142, P153, P154, P152, 149	impacts from road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU235/L1	1c: Turbine envelope P101, P110, P112, P120, P133, P136, P144	partial impacts associated with construction of access road and	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
		turbines			excavation potential		low
SU235/L2	1c: Turbine envelope P101, P110, P112, P120, P133, P136, P144	partial impacts associated with construction of access road and P101	part	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Mitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low/moderate
SU235/L3	1c: Turbine envelope P101, P110, P112, P120, P133, P136, P144	impacts from road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU236/L1	1c: Turbine envelope P123,P116, P125, P131, P115, P111,	impacts from road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Mitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low/moderate
SU236/L2	1c: Turbine envelope P123,P116, P125, P131, P115, P111,	impacts from road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Mitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low/moderate
SU236/L3	1c: Turbine envelope P123,P116, P125, P131, P115, P111,	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU236/L4	1c: Turbine envelope P123,P116, P125, P131, P115, P111,	impacts from road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Mitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low/moderate
SU236/L5	1c: Turbine envelope P123,P116, P125, P131, P115, P111,	impacts associated with construction of access road and P115	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					analytical potential		
SU237/L1	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P66	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low
SU237/L2	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P67	impacts associated with construction of access road and P93	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Mitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low/moderate
SU237/L3	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P68	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU237/L4	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P69	outside proposed impacts (off crest)	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU237/L5	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P70	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU237/L6	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P71	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU237/L7	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P72	impacts from road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low	No constraints however avoid if feasible No further investigation	Small discrete feature with low density artefact distribution.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	Unmitigated impacts	Archaeological significance low/moderate only.
SU237/L8	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P73	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU237/L9	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P74	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU237/L10	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P75	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU237/L11	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P76	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU237/L12	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P77	impacts from road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU237/L13	1c: Turbine envelope P93, P86, P83, P70, P68, P67, P78	impacts associated with construction of access road and P68	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					analytical potential		
SU238/L1	1c: Turbine envelope P73, P76, P74, P82	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low
SU238/L2	1c: Turbine envelope P73, P76, P74, P83	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU239/L1	1c: Turbine envelope P106, P105, P117	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU239/L2	1c: Turbine envelope P106, P105, P118	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU239/L3	1c: Turbine envelope P106, P105, P119	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU239/L4	1c: Turbine envelope P106, P105, P120	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU239/L5	1c: Turbine envelope P106, P105, P121	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential;	No constraints however avoid if feasible No further investigation	Small discrete feature. Archaeological significance low/moderate

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					skeletal/deflated soil; limited excavation potential however a certain analytical potential	Unmitigated impacts	only.
SU240/L1	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	partial impacts associated with construction of access road and turbines	part	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Mitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low/moderate
SU240/L2	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	impacts associated with construction E48	part - on break of slope off crest	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU240/L3	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	impacts associated with access road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU240/L4	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	impacts associated with access road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU240/L5	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU240/L6	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					excavation potential however a certain analytical potential		only.
SU240/L7	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU240/L8	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	impacts associated with construction of access road and E54	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature; no artefacts. Archaeological significance low/moderate only.
SU240/L9	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature; no artefacts. Archaeological significance low/moderate only.
SU240/L10	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	impacts from road construction	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Mitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low/moderate
SU240/L11	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU240/L12	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	impacts associated with construction of access road and E57	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Mitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low/moderate
SU240/L13	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57,	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low	No constraints however avoid if feasible No further investigation	Small discrete feature with low density artefact distribution.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	P77, P75, P72				artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	Unmitigated impacts	Archaeological significance low/moderate only.
SU240/14	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature; no artefacts. Archaeological significance low/moderate only.
SU241/L1	1c: Turbine envelope E49, E50, P69	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low/moderate artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low/moderate density artefact distribution. Archaeological significance low/moderate.
SU241/L2	1c: Turbine envelope E49, E50, P69	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate.
SU241/L3	1c: Turbine envelope E49, E50, P69	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU241/L4	1c: Turbine envelope E49, E50, P69	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature; no artefacts. Archaeological significance low/moderate only.
SU242/L1	1c: Turbine envelope E60, E59, P92	partial impacts associated with construction of access road and	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
		turbines			excavation potential		low
SU242/L2	1c: Turbine envelope E60, E59, P92	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU242/L3	1c: Turbine envelope E60, E59, P92	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature; no artefacts. Archaeological significance low/moderate only.
SU243/L1	1c: Turbine envelope P109, E63, E64, E61, E62	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU243/L2	1c: Turbine envelope P109, E63, E64, E61, E62	impacts associated with construction of access road and P109	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Mitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low/moderate
SU243/L3	1c: Turbine envelope P109, E63, E64, E61, E62	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU243/L4	1c: Turbine envelope P109, E63, E64, E61, E62	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature; no artefacts. Archaeological significance low/moderate only.
SU243/L5	1c: Turbine envelope P109, E63, E64, E61, E62	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale;	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					skeletal/deflated soil; limited excavation potential however a certain analytical potential		significance low/moderate only.
SU244/L1	1c: Turbine envelope P138, P150, P155, P162, P168	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU246/L1	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU246/L2	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU246/L3	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU246/L4	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU247/L1	1b: Turbine envelope N24, N26, N27 P16	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU248/L1	1b: Turbine envelope P24, P29, P35, P26,	partial impacts associated with	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low	No constraints No further investigation	Very low density artefact distribution.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	P20	construction of access road and turbines			research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	Unmitigated impacts	Archaeological significance assessed to be low
SU248/L2	1b: Turbine envelope P24, P29, P35, P26, P20	outside proposed impacts	nil	Moderate/high local archaeological	Rare site type in local area; moderate educational value; moderate aesthetic value; moderate research potential	Avoid impacts	Rare site type; moderate/high significance
SU248/L3	1b: Turbine envelope P24, P29, P35, P26, P20	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; moderate excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only - associated with rock shelter and art.
SU248/L4	1b: Turbine envelope P24, P29, P35, P26, P20	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU248/L5	1b: Turbine envelope P24, P29, P35, P26, P20	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low/moderate density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low/moderate density artefact distribution. Archaeological significance low/moderate only.
SU248/L6	1b: Turbine envelope P24, P29, P35, P26, P20	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU248/L7	1b: Turbine envelope P24, P29, P35, P26, P20	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
SU248/L8	1b: Turbine envelope P24, P29, P35, P26, P20	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L1	1b: Turbine envelope B77, B75, B81, B85	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU249/L2	1b: Turbine envelope B77, B75, B81, B85	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L3	1b: Turbine envelope B77, B75, B81, B85	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L4	1b: Turbine envelope B77, B75, B81, B85	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU249/L5	1b: Turbine envelope B77, B75, B81, B85	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L6	1b: Turbine envelope B77, B75, B81, B85	outside proposed impacts	nil	Low/moderate local	Common site type; low educational value, low aesthetic value;	No constraints however avoid if feasible	Small discrete feature with low density artefact

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
				archaeological	low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No further investigation Unmitigated impacts	distribution. Archaeological significance low/moderate only.
SU249/L7	1b: Turbine envelope B77, B75, B81, B85	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L8	1b: Turbine envelope B77, B75, B81, B85	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L9	1b: Turbine envelope B77, B75, B81, B85	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L10	1b: Turbine envelope B77, B75, B81, B85	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L11	1b: Turbine envelope B77, B75, B81, B85	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU249/L12	1b: Turbine envelope B77, B75, B81, B85	impacts associated with construction	yes	Low/moderate local	Common site type; low educational value, low aesthetic value;	No constraints however avoid if feasible	Small discrete feature with low density artefact

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
		of access road		archaeological	low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No further investigation Unmitigated impacts	distribution. Archaeological significance low/moderate only.
SU249/L13	1b: Turbine envelope B77, B75, B81, B85	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L14	1b: Turbine envelope B77, B75, B81, B85	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L15	1b: Turbine envelope B77, B75, B81, B85	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L16	1b: Turbine envelope B77, B75, B81, B85	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L17	1b: Turbine envelope B77, B75, B81, B85	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU249/L18	1b: Turbine envelope	impacts associated	yes	Low/moderate	Common site type; low educational	No constraints however avoid if	Small discrete feature with

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	B77, B75, B81, B85	with construction of access road		local archaeological	value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	feasible No further investigation Unmitigated impacts	low density artefact distribution. Archaeological significance low/moderate only.
SU250/L1	1b: Turbine envelope B3, B5	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU251/L1	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU251/L2	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU251/L3	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU251/L4	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU251/L5	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale;	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					skeletal/deflated soil; limited excavation potential however a certain analytical potential		significance low/moderate only.
SU251/L6	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU251/L7	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU251/L8	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU251/L9	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU251/L10	1b: Turbine envelope B7, B8, B11,B12, B16, B20, B25	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU252/L1	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	partial impacts associated with construction of	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
		access road and turbines			density; skeletal/deflated soil; limited excavation potential		significance assessed to be low
SU252/L2	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	outside proposed impacts	nil	Low/moderate local archaeological	Isolated artefact, however uncommon artefact type; low/moderate educational value, low/moderate aesthetic value; low/moderate research potential: nil associated artefacts	No constraints however avoid if feasible No further investigation Mitigated impacts	Isolated artefact; archaeological significance assessed to be low/moderate
SU252/L3	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU253/L1	1b: Turbine envelope B21, WB1, WB2	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU255/L1	1a: Turbine envelope A91, A92, A93, A94, A95	partial impacts associated with construction of access road and turbines	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU255/L2	1a: Turbine envelope A91, A92, A93, A94, A95	impacts associated with construction of access road and A94	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU255/L3	1a: Turbine envelope A91, A92, A93, A94, A95	impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU257/L1	1a: Turbine envelope Sth Belmont	partial impacts associated with	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low	No constraints No further investigation	Very low density artefact distribution.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
		construction of access road and turbines			research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	Unmitigated impacts	Archaeological significance assessed to be low
SU257/L2	1a: Turbine envelope Sth Belmont	partial impacts associated with construction of access road	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU258/L1	1a: Turbine envelope A113	partial impacts associated with construction of access road and turbine	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU258/L2	1a: Turbine envelope A113	nil	nil	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: predicted moderate density artefacts in subsurface context at locale; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Excavation potential. Archaeological significance moderate
SU258/L3	1a: Turbine envelope A113	nil	nil	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate density artefacts; some excavation potential and high analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Excavation and analytical potential. Archaeological significance moderate
SU258/L4	1a: Turbine envelope A113	nil	nil	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: predicted low/moderate density artefacts in subsurface context at locale; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Excavation potential. Archaeological significance low/moderate
SU260/L1	Substation 1a	partial impacts associated with construction of access road and substation	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU260/L2	Substation 1a	impacts associated with construction of substation	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: nil artefacts at locale; skeletal/deflated soil; limited excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature; no artefacts. Archaeological significance low/moderate only.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					however a certain analytical potential		
SU261/L1	Proposed site access to substation 2a	partial impacts associated with construction of access road to substation 2a	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential generally	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU261/L2	Proposed site access to substation 2a	impacts associated with construction of access road to substation 2a	possible	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; some excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate.
SU261/L3	Proposed site access to substation 2a	outside proposed impacts	nil	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU261/L4	Proposed site access to substation 2a	impacts associated with construction of access road to substation 2a	possible	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; eroded soil; hearth has some excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only. Hearth has some excavation potential
SU261/L5	Proposed site access to substation 2a	impacts associated with construction of access road to substation 2a	yes	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; eroded soil; 2 hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only. Hearths have excavation potential
SU262/L1	Existing access track	impacts associated with construction of access road to Mt Robe turbines (1c)	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: low artefact density; skeletal/deflated soil; some, but generally limited excavation potential	No constraints No further investigation Unmitigated impacts	Low density artefact distribution. Archaeological significance assessed to be low
SU262/L2	Existing access track	impacts associated with construction	yes, but possible	Low/moderate local	Common site type; low educational value, low aesthetic value; excavation	No constraints however avoid if feasible	Small discrete feature. Archaeological

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
		of access road to Mt Robe turbines (1c)	to avoid	archaeological	potential	No further investigation Mitigated impacts	significance low/moderate only. Hearths have excavation potential
SU262/L3	Existing access track	impacts associated with construction of access road to Mt Robe turbines (1c)	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature. Archaeological significance low/moderate only. Hearth has excavation potential
SU262/L4	Existing access track	impacts associated with construction of access road to Mt Robe turbines (1c)	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature. Archaeological significance low/moderate only. Hearth has excavation potential
SU262/L5	Existing access track	impacts associated with construction of access road to Mt Robe turbines (1c)	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature. Archaeological significance low/moderate only. Hearth has excavation potential
SU262/L6	Existing access track	impacts associated with construction of access road to Mt Robe turbines (1c)	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature. Archaeological significance low/moderate only. Hearth has excavation potential
SU263/L1	Existing access track	impacts associated with construction of access road to Mt Robe turbines (1c)	yes	moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Archaeological significance moderate. Excavation potential of deposit and hearths
SU264/L1	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil generally; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU264/L2	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	part; but possible to avoid: keep impacts Sth of 534675.6 496242	moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; eroded soil; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with potentially moderate density artefact distribution. Archaeological significance moderate. Hearths have excavation potential

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
SU264/L3	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low/moderate density artefact distribution. Archaeological significance moderate.
SU264/L4	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	nil	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: moderate artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	Avoid impacts	Small discrete feature with moderate density artefact distribution. Archaeological significance moderate/high.
SU265/L1	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	part	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts; eroded soil; some hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Low density artefact distribution; high erosion. Archaeological significance low/moderate only. Hearths have excavation potential
SU266/L1	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	part	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low density artefacts at locale; eroded soil; some hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Low density artefact distribution; moderate erosion. Archaeological significance low/moderate only. Hearths have excavation potential
SU266/L2	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	part; but possible to avoid	moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; eroded soil; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with potentially moderate density artefact distribution. Archaeological significance moderate. Hearths have excavation potential
SU267/L1	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU267/L2	Transmission line from substation 2a to	partial impacts associated with	yes, but possible	Low/moderate local	Common site type; low educational value, low aesthetic value;	No constraints however avoid if feasible	Small discrete feature with low density artefact

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	Switchyard	construction of transmission line	to avoid	archaeological	low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No further investigation Unmitigated impacts	distribution. Archaeological significance low/moderate only.
SU267/L3	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature. Archaeological significance low/moderate only. Hearths have excavation potential
SU267/L4	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature. Archaeological significance low/moderate only. Hearth has excavation potential
SU267/L5	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU267/L6	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: potentially low/moderate density artefacts at locale; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with potentially low/moderate density artefact distribution. Archaeological significance low/moderate. Hearths have excavation potential
SU267/L7	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature. Archaeological significance low/moderate only. Hearth has excavation potential
SU267/L8	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: moderate artefact density at locale; skeletal/deflated soil; excavation potential	Avoid impacts	Small discrete feature with moderate density artefact distribution. Archaeological significance moderate/high.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
SU267/L9	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature. Archaeological significance low/moderate only. Hearth has excavation potential
SU267/L10	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with moderate density artefact distribution. Archaeological significance moderate.
SU267/L11	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	Avoid impacts	Discrete feature with low density artefact distribution. Archaeological significance moderate.
SU267/L12	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with potentially moderate density artefact distribution. Archaeological significance moderate. Hearths have excavation potential
SU267/L13	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with potentially moderate/high density artefact distribution. Archaeological significance moderate/high. Hearths have excavation potential
SU268/L1	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU268/L2	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low artefact density	Avoid impacts	Discrete feature with low density artefact distribution.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
		line			at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential		Archaeological significance moderate.
SU268/L3	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate artefact density at locale; some excavation potential	Avoid impacts	Discrete feature with moderate density artefact distribution. Archaeological significance moderate.
SU268/L4	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes, but possible to avoid	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with potentially moderate/high density artefact distribution. Archaeological significance moderate/high. Hearths have excavation potential
SU268/L5	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes, but possible to avoid	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential; associated with small SPA (SU268/L6)	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with potentially moderate/high density artefact distribution. Archaeological significance moderate/high. Hearths have excavation potential
SU268/L6	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: predicted moderate/high artefact density at locale; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with predicted moderate/high density artefact distribution. Archaeological significance moderate.
SU268/L7	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate/high artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with moderate/high artefact density. Archaeological significance moderate.
SU268/L8	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with low/moderate artefact density. Archaeological significance moderate.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					excavation potential		
SU268/L9	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with low/moderate artefact density. Archaeological significance moderate.
SU268/L10	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate artefact density at locale; some excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with moderate artefact density. Archaeological significance moderate.
SU268/L11	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with low/moderate artefact density. Archaeological significance moderate.
SU268/L12	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: moderate/high artefact density at locale; skeletal/deflated soil; however some excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with moderate/high density artefact distribution. Archaeological significance moderate/high.
SU268/L13	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with low/moderate artefact density. Archaeological significance moderate.
SU268/L14	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with potentially moderate/high density artefact distribution. Archaeological significance moderate/high. Hearths have excavation potential
SU268/L15	Transmission line from substation 2a to Switchyard	impacts associated with construction of transmission line	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					analytical potential		
SU268/L16	Transmission line from substation 2a to Switchyard	partial impacts associated with construction of transmission line	yes	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with potentially moderate/high density artefact distribution. Archaeological significance moderate/high. Hearths have excavation potential
SU269/L1	Proposed substation 3a (alternative)	impacts associated with construction of transmission line and proposed substation 3a (alt)	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU269/L2	Proposed substation 3a (alternative)	impacts associated with construction of transmission line and proposed substation 3a (alt)	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU269/L3	Proposed substation 3a (alternative)	impacts associated with construction of transmission line and proposed substation 3a (alt)	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU269/L4	Proposed substation 3a (alternative)	impacts associated with construction of transmission line and proposed substation 3a (alt)	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with low/moderate artefact density. Archaeological significance moderate.
SU269/L5	Proposed substation 3a (alternative)	impacts associated with construction of transmission line and proposed substation 3a (alt)	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: low/moderate artefact density at locale; some excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with low/moderate artefact density. Archaeological significance moderate.
SU270/L1	Feeder 3 between substation 3 and TL from Mt Robe to	impacts associated with construction of feeder	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	Switchyard				density; skeletal/deflated soil; limited excavation potential		significance assessed to be low
SU270/L2	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard	partial impacts associated with construction of feeder	yes	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with potentially moderate density artefact distribution. Archaeological significance moderate. Hearths have excavation potential
SU270/L3	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard	partial impacts associated with construction of feeder	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU270/L4	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard	partial impacts associated with construction of feeder	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU271/L1	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	impacts associated with construction of feeder	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential generally	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU271/L2	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	impacts associated with construction of feeder	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU271/L3	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	partial impacts associated with construction of feeder	yes	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with potentially moderate density artefact distribution. Archaeological

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
							significance moderate.
SU271/L4	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	impacts associated with construction of feeder	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU271/L5	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	impacts associated with construction of feeder	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU271/L6	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	impacts associated with construction of feeder	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU271/L7	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	impacts associated with construction of feeder	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU271/L8	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	impacts associated with construction of feeder	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU271/L9	Feeder 3 between substation 3 and TL from Mt Robe to Switchyard: west end	impacts associated with construction of feeder	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					excavation potential however a certain analytical potential		only.
SU272/L1	Proposed substation 1b (alternative)	impacts associated with construction of substation, roads and feeder TL	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential except adjacent to creek	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU272/L2	Proposed substation 1b (alternative)	impacts associated with construction of substation	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU273/L1	Proposed substation 1a	impacts associated with construction of substation, roads and feeder TL	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU273/L2	Proposed substation 1a	impacts associated with construction of substation	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU273/L3	Proposed substation 1a	impacts associated with construction of substation, roads and feeder TL	yes	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with potentially moderate/high density artefact distribution. Archaeological significance moderate/high. Hearths have excavation potential
SU274/L1	Access track to proposed substation 1a	impacts associated with construction of access road to substation 1a	yes	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with potentially moderate/high density artefact distribution. Archaeological significance

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
							moderate/high. Hearths have excavation potential
SU275/L1	Feeder 1 alternative	impacts associated with construction of feeder 1 (alt) TL	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU275/L2	Feeder 1 alternative	impacts associated with construction of feeder 1 (alt) TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU275/L3	Feeder 1 alternative	impacts associated with construction of feeder 1 (alt) TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU275/L4	Feeder 1 alternative	impacts associated with construction of feeder 1 (alt) TL	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; hearths have excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Discrete feature with potentially moderate density artefact distribution. Archaeological significance moderate. Hearths have excavation potential
SU275/L5	Feeder 1 alternative	impacts associated with construction of feeder 1 (alt) TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU275/L6	Feeder 1 alternative	impacts associated with construction of feeder 1 (alt) TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; some excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU275/L7	Feeder 1 alternative	impacts associated	yes, but	Low/moderate	Common site type; low educational	No constraints however avoid if	Small discrete feature with

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
		with construction of feeder 1 (alt) TL	possible to avoid	local archaeological	value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	feasible No further investigation Unmitigated impacts	low density artefact distribution. Archaeological significance low/moderate only.
SU276/L1	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU276/L2	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU276/L3	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU276/L4	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: potentially low/moderate density artefacts at locale; hearth has excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Discrete feature with potentially low/moderate density artefact distribution. Archaeological significance low/moderate. Hearth has excavation potential
SU276/L5	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low local archaeological	Common site type; low educational value, low aesthetic value; low excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low only. Hearths eroded: low excavation potential
SU276/L6	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature. Archaeological significance low/moderate only. Hearth has

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
							excavation potential
SU276/L7	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU276/L8	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; skeletal/deflated soil; limited excavation potential however a certain analytical potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU276/L9	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low local archaeological	Common site type; low educational value, low aesthetic value; low excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low only. Hearth eroded: low excavation potential
SU276/L10	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: low artefact density at locale; excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low/moderate only.
SU276/L11	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU276/L12	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential; excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low/moderate only.
SU276/L13	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: moderate artefact density at locale; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with moderate density artefact distribution. Archaeological significance moderate.
SU277/L1	Maintenance and construction	impacts associated with construction	yes	Low local archaeological	Common site type; low educational value, low aesthetic value; low	No constraints No further investigation	Very low density artefact distribution.

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	compound	of Maintenance and Construction Compound			research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	Unmitigated impacts	Archaeological significance assessed to be low
SU277/L2	Maintenance and construction compound	impacts associated with construction of Maintenance and Construction Compound	yes	Moderate/high local archaeological	Common site type; low educational value, low aesthetic value; moderate/high research potential: potentially moderate/high density artefacts at locale; hearths have excavation potential	Avoid impacts	Discrete feature with potentially moderate/high density artefact distribution. Archaeological significance moderate/high. Hearths have excavation potential
SU278/L1	Transmission line from Switchyard to Broken Hill	partial impacts associated with construction of TL	part	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: very low artefact density; skeletal/deflated soil; limited excavation potential	No constraints No further investigation Unmitigated impacts	Very low density artefact distribution. Archaeological significance assessed to be low
SU278/L2	Transmission line from Switchyard to Broken Hill	partial impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: potentially low/moderate density artefacts at locale; hearths have excavation potential	No constraints No further investigation Mitigated impacts	Discrete feature with potentially low/moderate density artefact distribution. Archaeological significance low/moderate.
SU278/L3	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential: moderate artefact density at locale; excavation potential	No constraints however avoid if feasible No further investigation Mitigated impacts	Small discrete feature with low/moderate density artefact distribution. Archaeological significance moderate.
SU278/L4	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low local archaeological	Common site type; low educational value, low aesthetic value; low excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature. Archaeological significance low only. Hearth eroded: low excavation potential
SU278/L5	Transmission line from Switchyard to Broken Hill	impacts associated with construction of TL	yes, but possible to avoid	Low local archaeological	Common site type; low educational value, low aesthetic value; low research potential: low artefact density at locale; highly eroded; limited excavation potential	No constraints however avoid if feasible No further investigation Unmitigated impacts	Small discrete feature with low density artefact distribution. Archaeological significance low only.
SU278/L6	Transmission line from Switchyard to Broken Hill	partial impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low/moderate research potential:	No constraints No further investigation Mitigated impacts	Discrete feature with potentially low/moderate density artefact

Name	Development zone	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
					potentially low/moderate density artefacts at locale; hearths have excavation potential		distribution. Archaeological significance low/moderate. Hearths has excavation potential
SU278/L7	Transmission line from Switchyard to Broken Hill	partial impacts associated with construction of TL	yes, but possible to avoid	Low/moderate local archaeological	Common site type; low educational value, low aesthetic value; low research potential: potentially low/moderate density artefacts at locale	No constraints No further investigation Unmitigated impacts	Discrete feature with potentially low/moderate density artefact distribution. Archaeological significance low due to high erosion.
SU278/L8	Transmission line from Switchyard to Broken Hill	partial impacts associated with construction of TL	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; relatively stable deposit	No constraints No further investigation Mitigated impacts	Discrete feature with potentially moderate density artefact distribution. Archaeological significance moderate. Hearths have excavation potential
SU278/L9	Transmission line from Switchyard to Broken Hill	partial impacts associated with construction of TL	yes, but possible to avoid	Moderate local archaeological	Common site type; low educational value, low aesthetic value; moderate research potential: potentially moderate density artefacts at locale; relatively stable deposit	No constraints No further investigation Mitigated impacts	Discrete feature with potentially moderate density artefact distribution. Archaeological significance moderate. Hearths have excavation potential

9. MITIGATION AND MANAGEMENT STRATEGIES – NON INDIGENOUS

The management recommendations for the historical recordings can be broken down into three basic categories: those for which there are no constraints and those where conservation is recommended. A summary of mitigation strategies and management recommendations is provided in Table 10 below. Constraints mapping is provided in Appendix 4.

Essentially there are no constraints to impact with regard to those sites that are assessed not to meet the criteria for heritage listing. Nonetheless, in most cases it has been recommended that impacts be avoided if possible. The reasoning behind this is that all of the historical recordings contribute to the overall heritage of the region and have varying degrees of importance within the local community. Furthermore, while they have not at this stage been assessed to be of sufficient significance to warrant heritage listing, there remains the possibility that future generations might view these sites differently and so it is prudent to conserve sites where practicable.

The Silverton Tramway is a heritage item that is of state if not national significance (Hope 2006); it extends for approximately 50 km and is potentially subject to direct physical impacts in respect of the proposed transmission line to Broken Hill (this point also coincides with the location of the Acacia/Limestone Siding). Given the importance of the tramway at local through to state and potentially national levels, it is an example of a heritage item that should be conserved. As such all direct impacts associated with the transmission line should be kept at least 100 m off the permanent way of the tramway.

Ten mine sites have been recorded in the expanded Stage 1 area that are assessed to warrant heritage listing at a local level. These sites should be excluded from all impacts associated with the proposal.

While the table below details specific management options with regard to heritage items recorded within the proposal area there remains the consideration of management and mitigation of impacts to the broader cultural landscape of the Barrier Ranges. This includes all those heritage items discussed in Section 8 that are outside areas of direct impact but are within the visual catchment of the wind farm.

Within the Heritage Council's Wind Farm policy document it states that:

An impact is any effect on heritage items, including cultural landscapes, which would not have occurred in the absence of the development. An adverse impact is one that leads to the loss of heritage value (Coleman 2003b: 12).

It goes on to discuss that the construction of a wind farm will change the landscape in which it sits and if this landscape is of heritage value, it can be said that the wind farm might *Materially Affect* the significance of that heritage landscape.

Materially Affect is defined as: The changes proposed to a heritage item that will have an affect on the heritage significance of the item. This is not restricted to changes to the built fabric.

A wind farm does not automatically have a negative effect on a cultural landscape, but its potential impacts must be considered by consent authorities, and changes in the design of the wind farm to lessen such impacts may be required.

Section 6 of the *Wind Farms and Heritage* policy document deals with assessing potential impacts of proposed wind farms at or near heritage items; that is, it details considerations that are pertinent to developments within the curtilage of a heritage item and impacts that might occur where wind farms are located in the vicinity of heritage items. There is a particular emphasis in this section on the need to consider the historical and geographical context of heritage items and the historical influences that have shaped and continue to shape the area (Coleman 2003b). One component of this is consideration of the *viewshed*:

Viewshed: If the values of a heritage landscape lie in the significant views that it offers, a wind farm development can potentially materially affect the views of a place.

A viewshed can be thought of similarly to a watershed, but in terms of what can be seen from a set point. A viewshed is an area composed of land, water, biotic and cultural elements which may be viewed and mapped from one or more viewpoints and which has scenic qualities and/or aesthetic values.

An assessment of visual impacts of the Silverton Wind Farm has been undertaken independently of this heritage study (Green Bean Design 2008). The visual impacts assessment has dealt with issues surrounding Silverton, its listing on the Register of the National Estate and potential impacts on aesthetic values at the site. The assessment considered the fact that Silverton comprises both extant buildings and empty spaces where structures once stood, all of which contributes to the aesthetic qualities of the site and hence to its listing on the Register of the National Estate.

Although a number of wind turbines will be visible from areas within Silverton, as well as more extensive views toward the wind farm from areas to the south of Silverton, it is not considered

that the wind farm will have a direct impact on the immediate aesthetic qualities contained within the area defined by the Register of the National Estate (Green Bean Design 2008: 14).

The report goes on to detail the visibility ratings from 51 different viewing locations including numerous locations in and around Silverton. The results indicate that the wind farm will have a low to moderate impact on landscape character (Green Bean Design 2008: 76).

Nonetheless, it is undeniable that the wind farm will have an impact on the landscape. Accordingly, it is worthwhile to consider the heritage impacts to what is essentially a cultural landscape of mining, pastoralism and human occupation. The history of that landscape might only extend into the nineteenth century however the landscape also bears testimony to a much lengthier human occupation and indeed an older exploitation of natural resources.

As this report has detailed there are a series of management strategies that will serve to minimise impacts to the heritage of the Barrier Ranges and while the cumulative effects of the wind farm may result in a low to moderate impact on landscape character, there are ways in which impacts might be mitigated and there are ways in which the proposed development could be seen to be complementary to the existing cultural landscape.

One aspect of this relates to the concept of *compatible use* which is defined within the HO&DUAP *Heritage Terms and Abbreviations* (1996) as:

A use for a heritage item which involves no change to its culturally significant fabric, changes which are substantially reversible or changes which make a minimal impact.

Given that the Silverton Wind Farm proposal entails both construction and decommissioning of wind turbines, it is a change within the landscape that is substantially reversible with regard to visual impacts and that is temporary in terms of major changes in traffic patterns. Furthermore, since there remains the possibility that direct impacts might be avoided with regard to heritage items within the Stage 1 study area and, since any indirect impacts to heritage items in the vicinity of the wind farm would be limited, thus resulting in minimal impacts, the proposed use of the Barrier Ranges as a wind farm is in many ways a compatible use.

It could also be argued that the Silverton Wind Farm proposal contributes to an *adaptive reuse* of the mining landscape of the Barrier Ranges. The stone resources within this landscape have been exploited by Aboriginal peoples for thousands of years, while the historical period has seen a much more intense exploitation of mineral wealth across the region. Both these phases of stone procurement and mining have left considerable physical signatures and together they contribute to the heritage significance of the landscape. Similarly, the proposed Silverton Wind Farm aims to harness a natural resource within that landscape. The construction of the wind farm would add another dimension to the history of resource exploitation in the Barrier Ranges. Furthermore, there is the potential for this development to contribute to tourism by creating a new dimension to the visual identity of the place, as has been the case at other wind farms promoted as tourist attractions both nationally (eg Crookwell, NSW (Pacific Power no date) and internationally (eg Tarifa, Spain). Potential such as this could be embraced at Silverton through public education about the history of land use and the theme of resource exploitation. In this way the Silverton Wind Farm might help raise awareness of the heritage resources in the region and further serve to identify and protect these resources for future generations.

Indeed it is worth noting that the mining history and heritage of the local region has suffered a surprising amount of neglect in terms of historical research, field surveys, significance assessments and formal listing of heritage items. While the recent study by Hope (2006) has added considerably to what is known about the heritage of the region it also highlights areas that are deserving of further attention and, given the broad nature of the study, provides very limited details concerning the myriad of smaller heritage items that are scattered across the Barrier Ranges. The field results detailed in this report provide an insight into the nature and extent of heritage items present within the landscape and demonstrate the potential information that could be gathered through a research project. A commitment to such a project would ensure that a much more comprehensive picture be compiled of the history and heritage of the Barrier Ranges. This would in turn serve to raise awareness of and aid protection of the elements that comprise this broader cultural landscape.

Table 10. Recommendations for the management and mitigation of impact to Non Indigenous features

Name	Development zone	Feature	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
SU235/HS1	1c: Turbine envelope P101, P110, P112, P120, P133, P136, P144	Mine site: <i>Mount Eltie Fluorite</i>	impacts associated with access road construction	yes	Local significance; meets the requirements for listing against criteria d	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. Extensive workings; well preserved	Conservation: avoid impacts	Site is assessed to be of local significance.
SU235/HS1a	1c: <i>in valley to east of</i> Turbine envelope P101, P110, P112, P120, P133, P136, P145	Mine camp: probably associated with <i>Mt Eltie Fluorite</i> : mulga post hut frame and stone hearth	nil	nil	Local significance; meets the requirements for listing against criteria d and f	This item is a rare site type in the local region and is associated with a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. The site is well preserved, has research potential and aesthetic qualities	Conservation: avoid impacts	Site is assessed to be of local significance.
SU236/HS1	1c: Turbine envelope P123, P116, P125, P131, P115, P111,	Mine site: possibly part of <i>Mt Eltie Fluorite</i> : shaft	nil	nil	Local significance; meets the requirements for listing against criteria d	This item is a common site type in the local region and possibly part of the <i>Mt Eltie Fluorite</i> mine complex. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry.	Conservation: avoid impacts	Site is assessed to be of local significance.
SU239/HS1	1c: Turbine envelope P106, P105, P120	Mine site: <i>Mt Robe</i>	impacts associated with access road construction	yes	Local significance; meets the requirements for listing against criteria d and f	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. It possesses evidence of numerous periods of operation	Conservation: avoid impacts	Site is assessed to be of local significance.
SU239/HS1	1c: Turbine envelope P106, P105, P120	Mine settlement: <i>Mt Robe</i>	nil	nil	Local significance; meets the requirements for listing against criteria c, d and f	This item is a rare site type in the local region and is associated with a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. The site has research potential and strong aesthetic qualities	Conservation: avoid impacts	Site is assessed to be of local significance.
SU140/HS2	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75,	Wood post: marker	impacts associated with access road construction	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing

Name	Development zone	Feature	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	P72							
SU140/HS2	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	Wood survey peg	impacts associated with access road construction	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU140/HS3	1c: Turbine envelope E48, E52, E55, E53, E54, E58, E56, E57, P77, P75, P72	Mulga fence	impacts associated with access road construction	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU244/HS1	1c: Turbine envelope P138, P150, P155, P162, P168	Wood post: marker	impacts associated with access road construction and P138	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU245/HS1	1c: Turbine envelope P159, P156	Mine site: <i>Great Northern Proprietary</i>	nil	nil	Does not meet criteria for heritage listing	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry.	Conservation: avoid impacts	Does not meet criteria for heritage listing but avoidance feasible
SU246/HS1	1c: Turbine envelope P99, P103, P95, P97, P98, P88, P85, P78, P71, P80, P81, P79	Mine site: shaft and prospecting pit	outside proposed impacts	nil	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU249/HS1	1b: Turbine envelope B77, B75, B81, B85	Mulga fence	impacts associated with access road construction	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU249/HS2	1b: Turbine envelope B77, B75, B81, B85	Mulga stumps	impacts associated with access road construction	yes; but possible to avoid whole sale clearance	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing

Name	Development zone	Feature	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
SU249/HS3	1b: Turbine envelope B77, B75, B81, B85	Mulga fence	impacts associated with access road construction	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU250/HS1	1b: Turbine envelope B3, B5	Mine site: shaft and mullock	outside proposed impacts	nil	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU252/HS1	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	Mulga fence	impacts associated with access road construction	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU252/HS2	1b: Turbine envelope B27, B24, B22, B17, B13, B9, B15	Mulga stumps	impacts associated with access road construction	yes; but possible to avoid whole sale clearance	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU253/HS1	1b: Turbine envelope B21, WB1, WB2	Water pipe (previously recorded as SU53/HS1)	impacts associated with access road construction	yes; but possible to avoid	Local significance; meets the requirements for listing against criteria a and c	This item is part of a larger complex that was important in the course of the local area's cultural history (ie securing a reliable water supply for Broken Hill) It is also part of a complex that demonstrates considerable technical achievement	Conservation: avoid all impacts. Detailed recording of exact location of pipeline prior to construction.	Structural evidence of this feature is relatively well preserved. Site is assessed to be of local significance and is part of a broader complex that is potentially of state significance.
SU253/HS2	1b: Turbine envelope B21, WB1, WB2	Mulga fence	impacts associated with access road construction and WB1	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU254/HS1	1b: Turbine envelope B26	Mine site: prospecting pit	impacts associated with access road construction	yes	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU254/HS2	1b: Turbine	Track	impacts	part	Does not meet	Limited research potential; cannot be	Avoid impacts as	Does not meet

Name	Development zone	Feature	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	envelope B26		associated with access road construction		criteria for heritage listing	directly linked to people or events of importance	much as practicable; otherwise unmitigated impacts	criteria for heritage listing
SU254/HS3	1b: Turbine envelope B26	Track	impacts associated with access road construction	part	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts as much as practicable; otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU254/HS4	1b: Turbine envelope B26	Mine site: prospecting pit	impacts associated with construction of B26	yes	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts as much as practicable; otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU254/HS5	1b: Turbine envelope B26	Mine site: prospecting pit	impacts associated with construction of B26	yes	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts as much as practicable; otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU256/HS1	1a: Turbine envelope A24	Mine site: <i>King Gunnia Mine</i>	impacts associated with access road construction	yes	Local significance; meets the requirements for listing against criteria d and f	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. It possesses a relatively rare and well preserved whip.	Conservation: avoid impacts	Site is assessed to be of local significance.
SU257/HS1	1a: Turbine envelope Sthn Belmont	Mine site: prospecting pit	impacts associated with access road construction	yes	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU257/HS2	1a: Turbine envelope Sthn Belmont	Mine site: prospecting pit	impacts associated with access road construction	yes	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU258/HS1	1a: Turbine envelope A113	Mine site: prospecting pit	nil	nil	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU258/HS2	1a: Turbine	Mine site: <i>Tower</i>	nil	nil	Local	This item is a common site type in the	Conservation: avoid	Site is assessed to be

Name	Development zone	Feature	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	envelope A113	<i>Hill Mine</i>			significance; meets the requirements for listing against criteria d and f	local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. It possesses a relatively rare and well preserved unusual forge	impacts	of local significance.
SU258/HS3	1a: Turbine envelope A113	Mine camp: stone hearth	nil	nil	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Conservation: avoid impacts	Does not meet criteria for heritage listing but avoidance feasible
SU259/HS1	1a: Turbine envelope A85	Mulga fence	impacts associated with access road construction	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU262/HS1	Existing access track	Mine site: prospecting pit	impacts associated with access road construction	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU264/HS1	Transmission line from substation 2a to Switchyard	Mine site: <i>Consolation</i>	nil	nil	Does not meet criteria for heritage listing	This item is a common site type in the local region albeit a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry.	Conservation: avoid impacts	Does not meet criteria for heritage listing but avoidance feasible
SU264/HS2	Transmission line from substation 2a to Switchyard	Mine camp: two stone hearths	nil	nil	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Conservation: avoid impacts	Does not meet criteria for heritage listing but avoidance feasible
SU265/HS1	Transmission line from substation 2a to Switchyard	Mulga fence	partial impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU266/HS1	Transmission line from substation 2a	Mulga fence	partial impacts associated	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing

Name	Development zone	Feature	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	to Switchyard		with construction of transmission line					
SU266/HS2	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU267/HS1	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU267/HS2	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU267/HS3	Transmission line from substation 2a to Switchyard	Mine site: prospecting pits	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU268/HS1	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing

Name	Development zone	Feature	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
SU268/HS2	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU268/HS3	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU268/HS4	Transmission line from substation 2a to Switchyard	Mine site: shaft and stone hearth	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU268/HS5	Transmission line from substation 2a to Switchyard	surface artefacts	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU268/HS6	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU268/HS7	Transmission line from substation 2a to Switchyard	Mine camp: complex of stone features (function unclear, sparse	impacts associated with construction of	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise mitigated impacts	Does not meet criteria for heritage listing

Name	Development zone	Feature	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
		scatter of late 19th century glass, metal	transmission line					
SU268/HS8	Transmission line from substation 2a to Switchyard	Possible mine camp: 2 stone perimeter hut platforms	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU268/HS9	Transmission line from substation 2a to Switchyard	Mine site: prospecting pit	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU268/HS10	Transmission line from substation 2a to Switchyard	Possible mine camp: 1 stone perimeter hut platform	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU268/HS11	Transmission line from substation 2a to Switchyard	Mine site: cluster of prospecting pits	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU268/HS12	Transmission line from substation 2a to Switchyard	Mine site: cluster of prospecting pits	impacts associated with construction of transmission line	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU271/HS1	Feeder 3 between	Mulga fence	partial impacts	yes; but possible to	Does not meet criteria for	Limited research potential; cannot be directly linked to people or events of	Avoid impacts if feasible otherwise	Does not meet criteria for heritage

Name	Development zone	Feature	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
	substation 3 and TL from Mt Robe to Switchyard: west end		associated with construction of feeder	avoid	heritage listing	importance	unmitigated impacts	listing
SU272/HS1	Proposed substation 1b (alternative)	Mine camp probably associated with King Gunnia Mine: complex of stone hut platforms	possible impacts associated with construction of substation or road	yes; but possible to avoid	Local significance; meets the requirements for listing against criteria d	This item is associated with a named mine. It is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. The site has research potential and strong aesthetic qualities	Conservation: avoid impacts	Site is assessed to be of local significance.
SU272/HS2	Proposed substation 1b (alternative)	Mine camp: small complex of stone features including a large domestic hearth and smaller hearth	possible impacts associated with construction of substation or road	yes; but possible to avoid	Local significance; meets the requirements for listing against criteria d	This item is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. The site has research potential and aesthetic qualities	Conservation: avoid impacts	Site is assessed to be of local significance.
SU272/HS3	Proposed substation 1b (alternative)	Stone work (uncertain function)	possible impacts associated with construction of substation or road	yes; but possible to avoid	Local significance; meets the requirements for listing against criteria d	This item is a component of the Barrier Ranges Mine workings in operation early in the course of the local mining industry. The site has research potential	Conservation: avoid impacts	Site is assessed to be of local significance.
SU276/HS1	Transmission line from Switchyard to Broken Hill	Silverton Tramway and Acacia Siding (Limestone Siding)	impacts associated with construction of TL	yes; but possible to avoid	Local, state and potentially national significance; meets the requirements for listing against criteria a, b, e, f and g	The Tramway has strong associations with the STC and its construction was of importance to the local region and critical to the economic functioning of Broken Hill. The Acacia Siding was utilised for transportation of limestone from Acacia Vale to Broken Hill; the siding is well preserved, is representative of its type and retains good evidence of its function.	Conservation: avoid impacts	Site is assessed to be of local, state and potentially national significance
SU276/HS2	Transmission line from Switchyard to Broken Hill	scatter of glass, crockery and metal	impacts associated with construction	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing

Name	Development zone	Feature	Impacts type	Impacts	Significance	Criteria	Recommended management strategy	Rationale
			of TL					
SU276/HS3	Transmission line from Switchyard to Broken Hill	Stone work (uncertain function)	impacts associated with construction of TL	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU276/HS4	Transmission line from Switchyard to Broken Hill	scatter of glass, crockery and metal	impacts associated with construction of TL	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU278/HS1	Transmission line from Switchyard to Broken Hill	Mine site: prospecting pit	impacts associated with construction of TL	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Avoid impacts if feasible otherwise unmitigated impacts	Does not meet criteria for heritage listing
SU278/HS2	Transmission line from Switchyard to Broken Hill	Mine site: limestone pits	impacts associated with construction of TL	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Conservation: avoid impacts	Does not meet criteria for heritage listing
SU278/HS3	Transmission line from Switchyard to Broken Hill	Hut site	impacts associated with construction of TL	yes; but possible to avoid	Does not meet criteria for heritage listing	Limited research potential; cannot be directly linked to people or events of importance	Conservation: avoid impacts	Does not meet criteria for heritage listing

10. RECOMMENDATIONS

It is concluded that the results of this further detailed survey work are consistent with the study in the exhibited EA. However the issue of inadvertent and/or long term impacts to archaeological features resulting from erosional processes being initiated, increased or intensified as a result of construction, maintenance and decommissioning of the proposal SWF needs to be addressed. Erosional processes currently causing impacts, some of which are significant, to archaeological features has been discussed in Dibden 2008 and elaborated further in Section 5 of this report. It is now recognised as a result of the recent field work that this matter was not given adequate consideration during the initial assessment. Accordingly the recommendations below include attention to this issue and should be included in an amended Statement of Commitments.

Conclusions - Indigenous

As previously noted the majority of the Aboriginal object locales recorded in the proposal area are low or very low density stone artefact distributions assessed to be of low archaeological significance or SPAs assessed to be of low/moderate significance only. In addition a number of Aboriginal object locales have been identified which are assessed to be of low/moderate, moderate or high archaeological significance.

The construction of the Silverton Wind Farm will result in substantial physical impacts to any Aboriginal objects which may be located within direct impact areas - *irrespective of their archaeological significance*. That is, any Aboriginal object situated within an area of direct impact will be comprehensively disturbed, and/or destroyed during construction.

As with any development the chances of impacting Aboriginal objects, particularly stone artefacts, is high given that they are present in a continuum across the landscape and located on or within ground surfaces. Silverton Wind Farm is no exception in this regard and it would be impossible to have a development of this nature without causing direct physical impact.

However in regard to the majority of Aboriginal object locales such as artefact scatters assessed to be of low significance, the impacts can be viewed as being of correspondingly low significance. On the other hand, impacts to any object locales which are assessed to be of higher archaeological significance can be viewed as being of correspondingly higher significance. This assessment forms the basis for the formulation of management strategies which aim to mitigate impacts.

Conclusions - Non-Indigenous

A variety of items have been recorded in the course of fieldwork undertaken for this project. It should be noted however that there are no previously recorded heritage items within the proposal area that are on any statutory lists. The vast majority of identified items are assessed to be of insufficient heritage value to warrant any sort of formal listing and eight of the recordings are assessed to be of local significance. The Silverton Tramway is assessed to be of state significance and potentially national significance. However this feature is not formally listed on any current heritage register. Impacts to this site can be minimised, and effectively avoided.

Direct impacts can be avoided to the majority of the heritage items within the proposal area. Given that none of the identified heritage items have been assessed to have a significant aesthetic component to their heritage value and, given that the development could effectively avoid all physical impacts to heritage items within the proposal area, the overall impact on items of Non-Indigenous heritage would be minimal.

Impacts to the broader cultural landscape are unavoidable. Nonetheless, the visual impacts assessment indicates that the cumulative impact on landscape character would be low to moderate only (Green Bean Designs 2008). Furthermore, the proposed development fits within a theme of previous landuse, i.e. exploitation of natural resources and could usefully contribute to an adaptive reuse of the landscape. A result such as this could be ensured if the development was accompanied by a more comprehensive research project on the history and heritage of the area. Primary objectives of such a study would be to fill in the gaps in the existing history of mining for the region and compilation of a more complete record of heritage items in the Barrier Ranges. This would in turn aid in conservation of heritage values across the landscape, which would serve as a considerable mitigation of the abovementioned impacts to that landscape.

The following recommendations are made:

Indigenous

- Management and mitigation recommendations are listed in respect of each Aboriginal object locale in Table 9 in Section 8. Constraints mapping is provided in Appendix 4. It is noted this mapping has been provided to the proponent as GIS layers for implementation and use in heritage management planning.
- No Survey Units have been identified in the proposal area to warrant further archaeological investigation such as subsurface test excavation; the Effective Survey Coverage achieved during the field survey was relatively high and can be considered to have been generally adequate for the purposes of determining the archaeological status of the proposed impact areas.
- None of the Survey Units in the proposal area have been assessed to surpass scientific significance thresholds which would act to entirely preclude proposed impacts. However a number of discrete Aboriginal object locales have been identified to warrant total exclusion of impacts:

SU248/L2 (outside proposed impacts)
SU264/L4 (in TL easement from substation 2a to Switchyard)
SU267/L8 (in TL easement from substation 2a to Switchyard)
SU267/L11 (in TL easement from substation 2a to Switchyard)
SU268/L2 (in TL easement from substation 2a to Switchyard)
SU268/L3 (in TL easement from substation 2a to Switchyard)
SU277/L2 (in east end of Construction and Maintenance Compound)

It is recommended that an active conservation strategy is implemented in regard to these locales to ensure that they are not inadvertently impacted during the construction, operation and decommissioning of the wind farm. It is noted that these locales are either situated outside areas in which impacts are proposed or within areas in which a strategy of conservation, and hence impact avoidance, is expected to be highly feasible.

- Many (#36) of the Aboriginal object locale recordings are very low (<1 per square metre) or low density (between 1 per square metre and 10 per square metre) continuous distributions of quartz stone artefacts extending across survey units. These recordings account for the *background scatter* present across the impact area. The archaeological significance of these locales is assessed to be low. Accordingly unmitigated impact is considered to be appropriate.
- A total of 102 Aboriginal object locales have been recorded for which it has been recommended that avoidance of impacts be considered if feasible but that unmitigated impact is appropriate if avoidance cannot be achieved. The majority of these sites are SPAs which are assessed to be of low/moderate significance only.
- A total of 62 Aboriginal object locales have been recorded for which it has been recommended that avoidance of impacts be considered if feasible (*where it is assumed that this is possible such as on broad landforms where there is sufficient room to accommodate both construction impacts and a conservation strategy*) and if not Mitigated Impacts should be implemented. This recommendation applies to sites of sufficient significance and research potential to warrant the implementation of mitigation measures.
- A total of 14 Aboriginal object locales have been recorded for which it has been recommended Mitigated Impacts should be implemented (*where it is assumed that accommodating both construction and a conservation strategy is unlikely to be feasible given the size of the landform ie very narrow crests*). This recommendation applies to sites of sufficient significance and research potential to warrant the implementation of mitigation measures.
- Impact mitigation could entail surface collection and sub-surface excavation of Aboriginal objects and subsequent analysis and research. Such a program would entail an adequately designed research program which would aim to address research questions compatible to those currently being pursued within the region.

- It is recommended additional archaeological assessment is conducted in any areas which are proposed for impacts that have not been surveyed during the current assessment. It is predicted that significant Aboriginal objects can occur anywhere in the landscape and accordingly if present they need to be identified and impact mitigation strategies implemented prior to impacts.
- The proponent should, in consultation with an archaeologist, develop a Cultural Heritage Management Protocol, which documents the procedures to be followed for impact avoidance or mitigation measures as recommended in this report.
- Personnel involved in the construction and management phases of the project should be trained in procedures to recognise and avoid disturbance to any recorded (if necessary) and/or unrecorded cultural heritage places and items.
- The issue of inadvertent and/or long term impacts to archaeological features resulting from erosional processes being initiated, increased or intensified as a result of construction, maintenance and decommissioning of the proposal SWF needs to be given consideration by the proponent. It is advised that this issue be incorporated in strategic planning relating to the broader construction program relating to ameliorating the effects of construction and access on erodible landforms and soils.

Historical

- Management and mitigation recommendations are listed in respect of each historical item in Table 10 in Section 9. It is noted this mapping has been provided to the proponent as GIS layers for implementation and use in heritage management planning.
- There are no constraints with regard to those items that are assessed not to meet the criteria for heritage listing. Nonetheless, in most cases it has been recommended that impacts be avoided if possible.
- For the recordings which it is assessed meet the criteria for heritage listing it has been recommended that impacts be avoided.
- The water pipeline which extends between Umberumberka Reservoir and Broken Hill is associated with a larger site complex that is arguably of state significance and that is listed as an indicative place on the Register of the National Estate. While the water tank and pipeline themselves may not be of the same heritage value they do contribute to the overall significance of the Umberumberka Reservoir. Accordingly, it is recommended impacts to the water pipeline be avoided.
- The Silverton Tramway and the Acacia/Limestone Siding is a heritage item that is of state if not national significance (Hope 2006); it extends for approximately 50 km and is potentially subject to direct physical impacts as a result of the construction of the transmission line between the Switchyard and Broken Hill. Given the importance of the tramway at local through to state and potentially national levels it is an example of a heritage item that should be conserved. As such all direct impacts associated with the transmission line should be kept at least 100 m off the permanent way of the tramway and the Limestone Siding.
- It is recommended that additional heritage assessment is conducted in any areas which are proposed for impacts that have not been surveyed during the current assessment. It is predicted that significant Non Indigenous heritage items can occur anywhere in the landscape and accordingly if present they need to be identified and impact mitigation strategies implemented prior to impacts.
- The proponent should, in consultation with an archaeologist, develop a Cultural Heritage Management Protocol, which documents the procedures to be followed for impact avoidance or mitigation.
- Personnel involved in the construction and management phases of the project should be trained in procedures to recognise and avoid disturbance to any recorded (if necessary) and/or unrecorded cultural Non Indigenous heritage places and items.

11. REFERENCES

- Coleman, V. 2003a *Cultural Landscape Charette: Background Paper*. NSW Heritage Office.
- Coleman, V. 2003b *Windfarms and Heritage: Heritage Council Advice*. Heritage Council of NSW.
- Department of Lands, *County of Yancowinna Map* 1964; accessed on 30th October 2007 from http://www.lands.nsw.gov.au/survey_maps/maps_and_imagery/parish_maps
- Dibden, J. 2008 *Silverton Wind Farm NSW Indigenous and Non Indigenous Heritage Assessment*. A report to nghenvironmental on behalf of Silverton Wind Farm Developments.
- Fanning, P. 1999 Recent Landscape History in Arid Western New South Wales, Australia: a model for regional change. *Geomorphology*. Vol. 29; pp 191 – 209.
- Green Bean Design 2008 DRAFT *Silverton Wind Farm Stage 1 and 2 Landscape and Visual Impact Assessment*.
- Heritage Office n.d., *Heritage Office Website – The State Heritage Register* accessed 12th March 2008 from http://www.heritage.nsw.gov.au/07_subnav_04b.htm
- Heritage Office and Department of Urban Affairs and Planning (HO & DUAP) 1996 *Regional histories: regional histories of New South Wales*, Sydney: Department of Urban Affairs and Planning.
- Heritage Council of New South Wales 2008 *Levels of Heritage Significance*. Heritage Council of New South Wales.
- Heritage Office and Department of Urban Affairs 2001 *Assessing Heritage Significance*. NSW Heritage Office.
- Hiscock, P. & Mitchell, S. 1993 *Stone Artefact Quarries and Reduction Sites in Australia: Towards a Type Profile*. AGPS: Canberra. Holdaway, S. J., P. C. Fanning, M. Jones, J. Shiner, D. Witter, and G. Nicholls. 2002 Variability in the Chronology of Late Holocene Aboriginal Occupation on the Arid Margin of Southeastern Australia. *Journal of Archaeological Science* 29:351-363.
- Hope, J. 2006 *The Unincorporated Area of New South Wales A Heritage Study*. A Report for the Department of Natural Resources and the Heritage Office of NSW 2006.
- Latona Masterman & Associates 1987, *Silverton Heritage Study*, report for Western Lands Commission and Heritage Council of NSW
- Mulvaney, J. and J. Kamminga 1999 *Prehistory of Australia*. Allen and Unwin: St Leonards.
- McDougall & Vines Conservation and Heritage Consultants 2005 *Silverton, New South Wales Heritage Management Plan*. Prepared for the Heritage Council of NSW and Silverton Village Committee.
- New South Wales National Parks and Wildlife Service 1997 DRAFT *Aboriginal cultural heritage standards and guidelines kit*.
- New South Wales Department of Environment and Conservation 2004 *Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants*.
- Pacific Power no date Wind Farm Clean Energy Naturally.
- Peake-Jones, K. 1988 *To the Desert with Sturt: A Diary of the 1844 Expedition*. South Australian Government Printer, Adelaide.
- Pearson, M. and B. McGowan 2000 *Mining Heritage Places Assessment Manual*. Australian Council of National Trusts and Australian Heritage Commission.
- Wisehart & Co. 1885 *Wiseheart & Co's map of Silverton, carefully compiled from actual surveys, showing all the present mineral leases & mineral conditional purchases*, accessed on 29th October.