Historic Cultural Heritage Assessment

Red Hill Mining Lease

URS **11048C/2013**

converge
heritage + community

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6	17/10/2013	Final Draft Report	SS	-
7	18/11/2013	Final Report	SS	-

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Executive Summary

This report presents the results of an updated cultural heritage assessment undertaken by Converge Heritage + Community (Converge) to clarify the nature of historic cultural heritage significance relevant to the Red Hill Mining Lease (the project) Environmental Impact Statement (EIS) study area along with the potential impacts and required mitigation as a result of the proposed the project. The EIS study area is located approximately 30 kilometres north of Moranbah. This assessment includes:

- Historical background for the EIS study area;
- Further contextual research as required from the abovementioned review;
- The results of the cultural heritage field survey;
- The nature of cultural heritage significance within the EIS study area and potential impacts; and
- Specific management recommendations for the protection of potentially significant areas.

A.1 Significance Assessment for the EIS study area

The cultural heritage significance of the EIS study area (**Figure 1.2**) was evaluated using recognised benchmarks such as the *Burra Charter* and the *Queensland Heritage Act 1992*. An assessment was conducted to determine whether the EIS study area would threshold for Local (Isaac Regional Council Heritage Register), State (Queensland Heritage Register) or National (National or Commonwealth Heritage List(s) heritage listing. The results are summarised below in **Table A** as follows:

Table A: *Summary of cultural heritage significance for the EIS study area.*

Value	Rating	Justification	Legislative Status
Aesthetic	Low	Surviving today as what has remained a relatively rural setting, the EIS study area presents a basic level of aesthetic qualities related to natural and historic nature of the site (relevant to the local community).	The site does not satisfy listing on the Local, State or National Heritage Registers for its aesthetic values (*the EIS study area is not currently recognised on any heritage registers*).
Historic	Low-Moderate	Representing pastoral lease and settlement activities commonplace to the area from the 1850s, including the many challenges and activities associated with pastoral pursuits from this time. More recent mining pursuits east of the EIS study area are overtaking these earlier pursuits.	Aspects of the EIS study area ***may*** satisfy criteria for listing on the Local Heritage Register for its historic values. The EIS study area does not satisfy listing on State or National Heritage Registers for its historic values (*the EIS study area is not currently recognised on any heritage registers*).
Scientific	Low	Many elements survive as remnants of the EIS study area's pastoral pursuits, which collectively have potential to contribute to an understanding of the local areas history. No elements of the EIS study area display any significant level of technical flare or ingenuity for their time.	Aspects of the EIS study area ***may*** satisfy criteria for listing on the Local Heritage Register for its scientific values. The EIS study area does not satisfy listing on State or National Heritage Registers for its scientific values (*the EIS study area is not currently recognised on any heritage registers*).
Social	Low-Moderate	Properties in the EIS study area have a connection with the families who have lived and worked on them. The Riverside Pastoral Company has been in the same family for five generations.	Aspects of the EIS study area satisfy criteria for listing on the Local Heritage Register for its social values. The EIS study area does not satisfy listing on State or National Heritage Registers for its social values (*the EIS study area is not currently recognised on any heritage registers*).

A.2 Historic Sites and Places located within the EIS study area

Nine historical archaeological sites (HAS) were identified within the EIS study area. Although not heritage sites, a further six sites of 'historical interest' (HI) were also noted for contextual purposes. HI sites do not usually contain enough value to warrant

mitigation strategies. Information regarding HAS and HI sites and places located within the EIS study area are included as site cards in **Appendix 1 and 2**.

The survey of the EIS study area was undertaken in stages. Owing to changing EIS study area boundaries, some sites identified and reported in earlier phases of assessment are not located within the current EIS study area (previously cited in *Historic Cultural Heritage Assessment, Goonyella Riverside Mine Expansion Project*, Converge 2009). As such, sites outside the current EIS study area boundary have been removed from this technical report's list of identified sites. Locations of sites in relation to the current EIS study area are noted in **Section 3.4**. These finds are presented below in **Table B** and mapped in **Figure 3.5**.

Table B: *Location data for items and/or places of historical archaeological significance and/or interest*

Site ID	GPS co-ordinates		Comments
	Eastings	Northings	
RHHAS-01	608203	7599742	Dump.
RHHAS-02	608200	7599740	Corrugated iron water tank with bottles.
RHHAS-03	608543	7600098	Surveyor's mark.
RHHAS-04	605482	7596813	Dump in drainage channel.
RHHAS-05	604639	7590255	Survey tree. (**Located in current BRM footprint**)
RHHAS-06	597922	7583632	Broadmeadow Homestead Complex.
RHHAS-07	597853	7583268	Broadmeadow Cottage.
RHHAS-08	604845	7598092	Old Riverside Homestead Complex.
RHHAS-09	607149	7598311	Current Riverside Homestead Complex.
RHHI-01	603060	7588413	Historic property boundary fence 1. (**Located in current BRM footprint**)
RHHI-02	606399	7590012	Historic property boundary fence 2.
RHHI-03	608201	7599796	Telegraph tree.
RHHI-04	Not confirmed	Not confirmed	Possible Former Native Police Camp.
RHHI-05	597180	7585251	Former holding yard and associated bore.
RHHI-06	604067	7601976	Dead Tree

Note: GPS co-ordinates - Geodetic datum = WGS84. Position format = UTM/UPS grid. Grid Zone = 55K

A.3 Sites for Nomination onto the Queensland Heritage Register

No sites or places located within the EIS study area were identified as containing levels of cultural heritage significance important to Queensland under Section 34 of the *Queensland Heritage Act 1992*. This situation may change if the Possible Former Native Police Camp (RHHI-04) is located within the EIS study area.

No sites or places are recommended at this point for nomination to the Queensland Heritage Register as a result of this Cultural Heritage Survey.

A.4 Project Impact on Sites and Places of Historical Archaeological Significance

Reviews of the proposed project indicate that three HAS sites (RHHAS-04, RHHAS-08 and RHHAS-09) may potentially be impacted by the project (**Table C**). All of these sites are located within the proposed footprint of the potential Red Hill underground incremental expansion option.

Predicted subsidence contours indicate that RHHAS-04, RHHAS-08 and RHHAS-09 may be impacted by up to -6.0 metres of subsidence as a result of underground mining (see **Figure 6.2**). If subsidence occurs in the area, impacts on vegetation and historic features can vary markedly. If subsidence approaches the -6.0 metre end of the predicted levels, then RHHAS-04, RHHAS-08 and RHHAS-09 may be severely impacted. These sites are considered to be of low – moderate levels of local heritage significance.

Table C: *Significant historic archaeology sites potentially impacted by the project*

Impact type	Impacted site/s	Individual Significance Rating
Potential impact (underground mining)	RHHAS-04 (Dump in drainage channel)	Low-Moderate
Potential impact (underground mining)	RHHAS-08 (Old Riverside Homestead Complex)	Low-Moderate
Potential impact (underground mining)	RHHAS-09 (Current Riverside Homestead Complex)	Moderate

A.5 Project Impact on Sites and Places of Historical Interest (HI)

Six sites of HI have also been identified in the EIS study area. Two of these sites may be impacted by the proposed project, these include;

- RHHI-02 (Historic property boundary fence 2); and
- RHHI-04 (Possible Former Native Police Camp).

Whilst HI sites are usually not considered to contain enough heritage value to warrant impact assessment or mitigation, RHHI-04 is included in the impact and mitigation discussion as it may require further investigation to clarify its existence and nature (see Recommendation 1).

A.6 Conclusions and Recommendations

Potential for additional historic sites and places to exist within the EIS study area:

From a heritage perspective (and aside from the abovementioned RHHI-04 - Possible Former Native Police Camp discussion) this report has concluded that the EIS study area is likely to contain, at best, individual sites and places of moderate levels of local cultural heritage significance. Overall, the EIS study area has been assessed as having 'low to moderate' levels of cultural heritage significance.

There is some potential for further historic sites and places of local heritage significance to exist within the EIS study area. These are likely to be remnant sites relating to pastoral and settlement activities, such as historic survey trees, remnant boundary fence lines, and 'Old Station Yard', which is a site with potential heritage values.

Acceptability of Potential Impacts and Recommendations:

Assuming the recommendations below are suitably implemented, this report finds the nature and level of potential impacts by the project is acceptable from a heritage perspective.

Table D: *Recommendations for the potential impacts by the project*

Type	Recommendations	Reference
1. Further Survey of 'Old Station Yard' and Archaeological Monitoring of RHHI-04	The area identified as the location of the 'Old Station Yard' site will likely be impacted by the mine development and associated infrastructure. Due to the potential for archaeological material to remain *in situ* in the vicinity of this site, it is recommended that a survey of this area be conducted to ensure that the type and extent of any surviving archaeological material is researched, investigated, recorded and mitigated (if required). This should be done using acceptable archaeological methods prior to any development or impact on or below ground in these areas. **RHHI-04** This area is identified as a potential former Native Police Camp. Repeated efforts could not locate any evidence of the site. However, to ensure potential subsurface remains are not impacted by the project, brief archaeological monitoring of the area noted as RHHI-04 should be undertaken during any ground disturbing works.	**Sections 3.2; 4.2.2** and **4.2.3**

Type	Recommendations	Reference
2. Record significant sites which may be impacted by the project	Three sites (**RHHAS-04** – *Dump*, **RHHAS-08** – *Old Riverside Homestead* and **RHHAS-09** – *Current Riverside Homestead*) of cultural heritage significance may potentially be impacted by the project. Each of these three sites could be impacted by subsidence of as much as -6 m. It is recommended that a basic level of photographic recording is conducted for these sites, which captures the nature of the item and their context within the cultural environment and within the EIS study area, prior to works commencing in the area.	**Table 4.3** **Figure 3.5** and Appendix-Site cards
3. Avoidance of Significant sites	The best form of cultural heritage management is to avoid impact on sites and places of significance. It is recommended that the project take into account each of the HAS sites and places discussed in this report, and, where possible, avoids impacting on these sites. If this is not possible, relevant mitigation measures should be implemented as recommended in this report. In the case of this project, impact may not always be avoidable. If avoidance of HI sites is not possible, then HI sites can be cleared and disposed of in a manner suitable to the project.	-

Type	Recommendations	Reference
4. Cultural Heritage Management	Management strategies are required in order to mitigate impact and potential impact to unexpected cultural heritage material or sites found during the construction stage of the project. In particular: – Workers involved in vegetation clearing and ground disturbance must be made aware of the potential to identify unexpected items of cultural heritage significance – In the event that items of possible cultural heritage significance are identified, work in the area should cease and mine environmental officers contacted – Mine environmental officers will determine whether archaeological assessment is required and make arrangements for this assessment as well as notification to Queensland Department of Environment and Heritage Protection. These measures can be combined with measures related to inadvertent finds of Indigenous cultural heritage significance.	-
5. Further Variation to the project Design	This study has assessed the impacts within the EIS study area. Any further variation to the project which places mining, inundation or infrastructure outside the assessed area would require reassessment to determine the nature of the impact on sites and places of cultural heritage significance.	-
6. Cultural Heritage Awareness Training	In order to educate construction and mine workers about tangible cultural heritage which may exist in the area, cultural heritage induction awareness training, inductions and 'tool box talks' should take place in addition to the general safety inductions for workers who are activated for project works in the vicinity of the EIS study area.	-

1.0 Introduction

URS Australia Pty Ltd (URS) commissioned Converge to conduct an assessment of the non-Indigenous (historic) cultural heritage potential of a portion of land to be impacted upon by proposed mine development at Red Hill Mining Lease (the project), Central Queensland. The Red Hill Mining Lease is located 20 kilometres north of Moranbah (**Figures 1.1** & **1.2**). This report presents the results of a five stage cultural heritage study completed over the previous six years. The study is necessary to determine the level of historic cultural heritage significance relevant to the EIS study area and make appropriate recommendations about the management of cultural heritage values in relation to the proposed project.

Stage One: The initial survey (Stage 1) was undertaken by Converge (ARCHAEO) in December 2005 and was completed as a component of the project being considered at that time (see ARCHAEO 2006a).

Stage Two: The second survey (Stage 2) was conducted by Converge (ARCHAEO) in September 2007, with survey and assessment focused on additional areas not previously surveyed within the eastern sections of the defined EIS study area at the time.

Stage Three: The third phase of historic cultural heritage assessment (Stage 3) was completed in May 2009, with the survey and assessment focused around the western sections of the defined EIS study area not previously surveyed.

Stage Four: Due to the changing footprint and details of the proposed project, the technical report was updated to reflect the new project design (June 2011). This includes reviews of current documentation in relation to the previously identified sites of cultural heritage interest.

Stage Five: The proposed EIS study area boundary was slightly reduced, and as such, the technical report was updated to reflect this (November 2011 – May 2012). As with Stage four, stage five also included reviews of the updated project, specifically in relation to the previously identified sites of cultural heritage interest within the EIS study area.

Stage Six: The technical report was updated to reflect additional minor changes to the project description and name (July 2013).

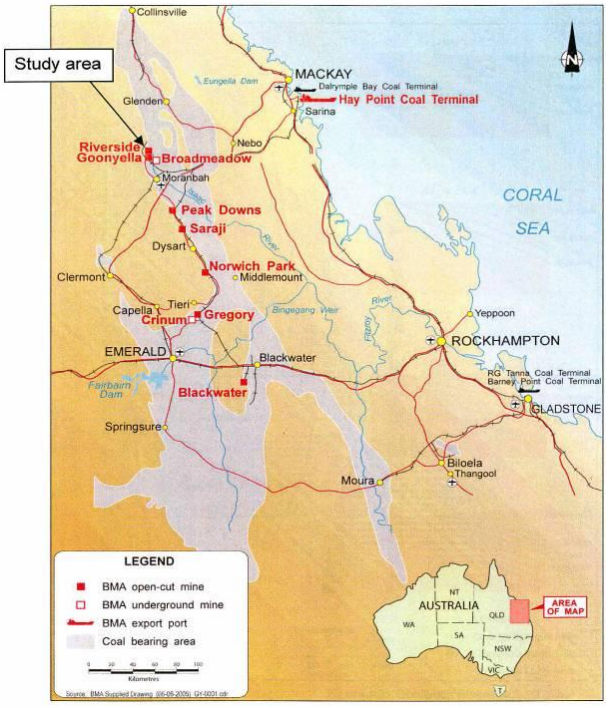
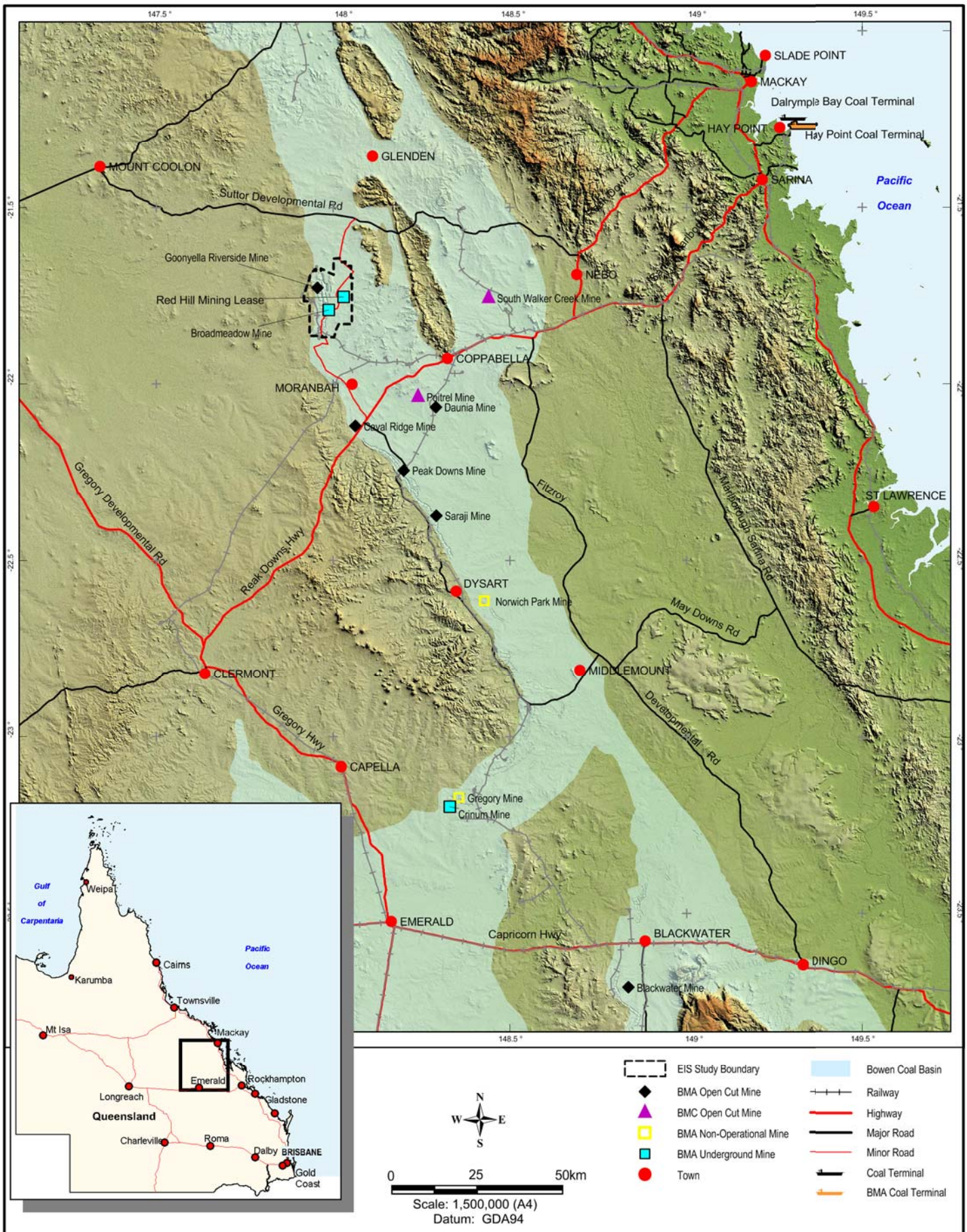


Figure 1.1: *Location of RHM* (ARCHAEO 2007)



Client	Project	Title
URS	RED HILL MINING LEASE CULTURAL HERITAGE	**REGIONAL LOCATION**

converge heritage + community

Drawn: VH	Approved: SS	Date: 26-11-2013	Figure: **1.2**	Rev:C
Job No:	File No: URS 42627136-g-2041c.wor			**A4**

1.1 Purpose of the Study

The purpose of this report is to qualify the level of cultural heritage significance relevant to the area directly affected by the project, and recommend the suitable management of these heritage values. Contextual research was undertaken to determine the existence, extent and probable levels of significance of the area prior to the field survey taking place.

This report presents the results of the historical cultural heritage survey, and includes:

- A summary of existing research completed for the history and environment of the Moranbah and north Bowen Basin coal mining area;
- The results of the cultural heritage field survey;
- The nature of cultural heritage significance within the EIS study area and the potential impacts of the project in relation to the EIS study area; and
- Specific management recommendations for the protection of potential areas of cultural heritage significance.

The scope of this study acknowledges that the archaeological record is both fragile and non-renewable. Any major disturbance of the environment poses a potential threat to this valuable cultural resource.

1.2 Field Work

Prior to the current assessment, Converge were commissioned by URS to undertake this historic heritage assessment in December 2008 and background research was undertaken at this time (Stage 3). Fieldwork, along with consultation with landowners and leaseholders, was conducted in three stages between December 2005 and May 2009, as outlined in **Section 1** of this report. The fourth and fifth stages of the report (June 2011 and November 2011, respectively) did not include any further field work as the project footprint became increasingly smaller from the original area(s) surveyed. Final impacts to the EIS study area were determined using data collated from previous surveys, overlaid on current project maps.

1.3 Personnel

Stage One (2006): Graham Knuckey (ARCHAEO / Converge) undertook the visual inspection of the EIS study area, consulted the land owners and assisted with the preparation of this stage of fieldwork and reporting. Geoff Ginn (Historico) completed the historical background research and the final draft of the report was completed by Graham Knuckey.

Stage Two (2008): Benjamin Gall and Stefani Blackmore of ARCHAEO / Converge undertook the visual inspection of the EIS study area, consulted the land owners and assisted with the preparation of this report. Geoff Ginn completed the historical background research and the final draft of the report was completed by Benjamin Gall with the abovementioned assistance.

Stage Three (2009): Fiona Calladine and Anna Nelson, of Converge, undertook the visual inspection of the EIS study area and consultation with land owners, accompanied by URS representative Neil Clarke. Historical background research was based on Stage One and Two results, with additional specific archival research undertaken by Fiona Calladine. The final consolidated draft of the report was completed by Fiona Calladine and Anna Nelson. Benjamin Gall provided advice and direction for the project generally.

Stage Four (2011): Samantha Syrmis of Converge updated the existing technical report (Converge 2009 – Stage 3) to reflect the changed project description. Impacts to the identified areas of cultural heritage interest were determined through previous assessments of sites in relation to changed project details. Benjamin Gall provided general advice and direction for the project.

Stage Five (2011 - 2012): Owing to further project changes, Samantha Syrmis updated the technical report (Converge 2011 – Stage 4) to reflect the revised EIS study area boundary. Impacts to the identified areas of cultural heritage interest were determined through previous assessments of the sites in relation to current project details.

Stage Six (2013): Samantha Syrmis of Converge updated the existing technical report (Converge 2012) to reflect the changed project description and name.

1.4 Nature of the Impact (The Project)

BMA previously required cultural heritage surveys to be carried out over portions of the following mining tenements:

Table 1.1: *Stages of the Survey*

Stage One and Two Surveys	Stage Three Surveys
– mining lease (ML) 1763, the main Goonyella mining lease granted in 1971; – ML1764, the main Riverside mining lease granted in 1978; – ML1900; – EPC928; – EPC953; – exploration permit coal (EPC) 554 (part of MLA70421); – mine development lease application (MDLA) 307 (part of MLA70421); and – MDLA358 (part of MLA70421).	– MLA70194; – MLA70287; – ML1900; – EPC985; and – EPC928.

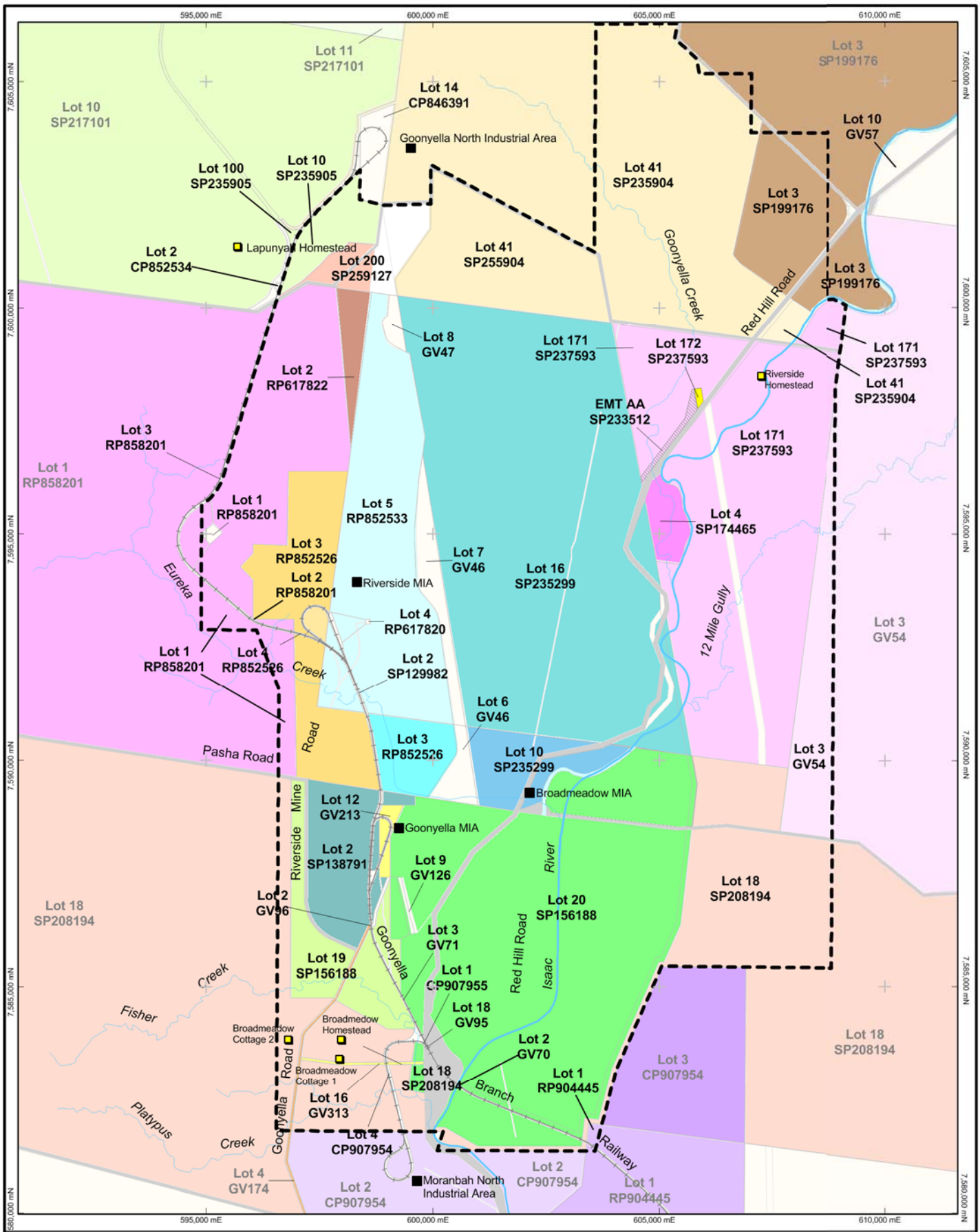
The project may potentially directly or indirectly impact upon land to the east, south and west of the current mining operation. The properties potentially affected by the proposed project are listed in **Table 1.1** and shown in **Figure 1.3**.

Note: Components of some of these properties are already impacted by current mining activities; therefore these areas were not surveyed and are outside the scope of this study.

Table 1.2: *Properties within the EIS study area*

Potentially Impacted Properties	Associated Historic Property Name
Lot 1/RP858201 (partial)	Riverside
Lot 1/GV334	Red Hill
Lot 10/GV52	Riverside
Lot 16/SP174465	Riverside
Lot 17/SP156189	Riverside
Lot 2/SP138791	Broadmeadow
Lot 3/CP852527	Denham Park

Potentially Impacted Properties	Associated Historic Property Name
Lot 3/RP852526	Riverside
Lot 5/RP852533	Riverside
Lot 19/SP156188	Broadmeadow
Lot 18/SP15688	Broadmeadow



NOTE: The property polygons have been coloured according to the RP description

N W E S

0 1.25 2.5km

Scale 1:115 000 (A4)

Projection: MGA94 Zone 55, (GDA94)

Client	Project	Title
URS	RED HILL MINING LEASE CULTURAL HERITAGE	**LAND TENURE WITHIN THE EIS STUDY AREA**

converge heritage + community

Drawn: VH	Approved: SS	Date: 24-06-2013	Figure: **1.3**	Rev:A
Job No:	File No: URS 42627136-g-2001.wor			**A4**

1.5 Organisation of the Report

The report discusses:

- Background information relevant to the project, including historical research and register searches;
- Cultural heritage investigation, including site survey;
- Levels of significance of and likely impacts on identified cultural heritage; and
- The potential impact of the project on historical cultural heritage and recommendations and guidelines relating to the management of such impacts.

1.6 Historic Cultural Heritage Legislation

Knowledge of cultural heritage legislation is essential when assessing sites, places or items of cultural heritage significance. The following section discusses both National and State Legislation relevant to (specifically) non-Indigenous, land-based cultural heritage.

1.6.1 National

At the national level, the ***Environment Protection and Biodiversity Conservation Act 1999*** is the key national heritage legislation which is administered by the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC). In addition, the following legislation is relevant to heritage:

The ***Australian Heritage Council Act 2003*** provides for the establishment of the Australian Heritage Council, which is the principal advisory group to the Australian Government on heritage issues. The AHC Act also provides for registration of places considered of national significance on the National Heritage Register, the Commonwealth Heritage Register and the administration of the former Register of the National Estate (former RNE) or the Australian Heritage Places Inventory (AHPI).

1.6.2. State (Queensland)

Historical cultural heritage matters are covered in the ***Queensland Heritage Act 1992*** (and subsequent amendments). This legislation provides for a listing of places within the

Queensland Heritage Register (QHR). Protection is offered to places that have been entered on the QHR according to a set of criteria as prescribed under the Act (s.34).

The *Queensland Heritage Act 1992* and subsequent amendments do not apply to:

a) a place that is of cultural significance solely through its association with Aboriginal tradition or Island custom; or

b) a place situated on Aboriginal or Torres Strait Islander land unless the place is of cultural heritage significance because of its association with Aboriginal tradition or Islander custom and with European or other culture, in which case this Act applies to the place if the trustees of the land consent (**Section 3**).

Amendments to the ***Queensland Heritage Act* 1992** have strengthened the provisions attached to the discovery and protection of non-Indigenous archaeological artefacts in Queensland. The relevant section is Part 9 (s. 88-90), as follows;

88 Definition for div 1

In this division- *interfere with* includes damage, destroy, disturb, expose or move.

89 Requirement to give notice about discovery of archaeological artefact

(1) A person who discovers a thing the person knows or ought reasonably to know is an archaeological artefact that is an important source of information about an aspect of Queensland's history must give the chief executive a notice under this section.

(2) The notice must—

(a) be given to the chief executive as soon as practicable after the person discovers the thing;

(b) state where the thing was discovered; and

(c) include a description or photographs of the thing.

90 Offence about interfering with discovery

(1) This section applies to a thing for which a person has, under section 56, given the chief executive a notice.

(2) A person who knows that the notice has been given must not, without the chief executive's written consent or unless the person has a reasonable excuse, interfere with the thing until at least 20 business days after the giving of the notice.

1.6.3. Local Government Legislation (Isaac Regional Council)

The EIS study area falls within the boundaries of Isaac Regional Council, following the amalgamation of the Shire of Belyando with Broadsound and Nebo Shires. The *Belyando Shire Planning Scheme (2008)* came into effect on 31 January 2009.

1.7 Previous Assessments

The following reports provide additional information related to the EIS study area and were regularly consulted throughout the course of work (**Table 1.3**).

Table 1.3: *Consultancy Studies undertaken in proximity to the EIS study area.*

Cultural Heritage Consultant	Year	Project Title
Alfredson, G	1990	Report on an archaeological survey of the North Goonyella Mining Lease.
	1991	Report on an archaeological inspection of the Moranbah North Coal Project Area for AGC Woodward-Clyde.
	1992	Report on a preliminary archaeological survey of a proposed dam site and access road for the North Goonyella Mine.
	1994a	Moranbah North Coal Mine: A cultural heritage assessment.
	1994b	A Cultural Heritage assessment of the Burton Coal Project.
	1995	A cultural heritage assessment of the section of the mine path between Suttor Creek Development Road and the Isaac River, part of the Teviot Dam and sections of the proposed haul road for Burton Coal Project.
ARCHAEO Cultural Heritage Services Pty Ltd	2005	Preliminary Cultural Heritage Assessment Goonyella Riverside Coalmine Expansion Project.
	2006	Cultural Heritage Surveys of the proposed Goonyella Riverside Expansion Project: Portions of EPC 928, MDLA 307 and MDLA 358
	2006b	A Cultural Heritage Assessment of the Moranbah Ammonium Nitrate Project, Central Queensland.
	2007	Cultural Heritage Surveys of the proposed Goonyella Riverside Expansion Project: Portions of ML1763, ML1764, ML1900, EPC928, EPC953, EPC554, MDLA307 and MDLA358.
	2008	Cultural Heritage Survey of the Ellensfield Project, Moranbah,

Cultural Heritage Consultant	Year	Project Title
		Central Queensland.
Brayshaw, H.	1976	Archaeological investigation of underground mining leases at Goonyella, Peak Downs, Norwich park and Blackwater and their environs.
Hatte, E.	1996	An archaeological assessment of the proposed route of a water pipeline, Eungella to Moranbah, Central Queensland.
	1997a	A Cultural heritage assessment of the North Bowen Basin Rail Link.
	1997b	Report on an archaeological assessment of the Hail Creek Coal Project for Birri Gubba Aboriginal Corporation, South Brisbane.

2.0 Background Information

The following background information is not intended to be a comprehensive report on the north Bowen Basin region; rather it provides a suitable platform for discussions regarding cultural heritage significance and management recommendations in compliance with the (former) *EPA Guidelines for Historical Archaeological Studies*. Although the Project only affects a small area in the north of the Bowen Basin, it is important to provide background information to guide discussions later in the report.

2.1 Environmental Background

2.1.1 Biogeographical Information

The Bowen Basin is an area of coal reserves that covers approximately 60,000 kilometres in Central Queensland. This coal rich basin was formed through a combination of volcanic forces, and has been typified by subtropical to tropical climate featuring predominantly grasslands, woodlands, and scrub vegetation types (Gunn 1967: 13-15). Land use throughout the years has been dominated by pastoral activities, mostly grazing, and mining of gold, copper and most recently coal (Killin 1984). The Basin is roughly triangular in shape, and extends from the town of Collinsville in the north to Theodore in the south.

The Northern Bowen Basin biogeographical sub-region (as described by Sattler and Willliams 1999), within which the Goonyella Riverside mining leases are situated, contains areas of outcrop where sediments were laid down during the Mesozoic period (250-65 million years) and older. However, Cainozoic-aged (or Tertiary Period - 65-1.5 million years) sedimentary rocks such as silcretes and siliceous sandstones dominate the geology of the province, with sporadic exposures of igneous (basalts) dykes and/or plugs of the same age, also occurring. Exposure of the land surface to the elements during this period in time promoted 'lateralisation', and this involved the leaching away of minerals (other than iron oxides) forming a laterite 'duricrust'. Remnants of this Tertiary land

surface now occur as weathered areas of exposed iron oxide gibbers and as small, dissected tablelands and mesas with silcrete caps.

2.1.2 Climate

The EIS study area is subject to a hot dry climate, characterised by warm winters and hot humid summers (BOM 2011a). Average temperatures range from 21.1°C to 34°C in summer and from 9.9°C to 23.8°C in winter (BOM 2011b). The area receives an average of 583.6 millimetres of rain per annum, with the majority of rain falling over the summer months (BOM 2011b).

2.1.3 Non-Indigenous Environmental Modifications

The EIS study area has undergone significant changes since the arrival of Europeans and consequent settlement of the area in the 19th century. The EIS study area has been all but cleared of native vegetation due to pastoral activities linked to this event. Construction of a utility easement (telecommunication and gas) and a railway line have also occurred.

2.2 Historical Background

The following section is not intended to be an exhaustive historical treatment of EIS study area. It is based on library and archival research in relevant documents and secondary sources, and is intended to provide an historical overview of the broad areas under consideration. Further research and analysis of specific areas and sites may be required to assist with assessment of particular cultural heritage issues arising in relation to the present project.

2.2.1 European Exploration and Pastoralism

German explorer Ludwig Leichhardt was the first European to enter the northern Bowen Basin (Killin 1984: 1). Leichhardt spent January and February 1845 camped in and exploring the region that he later named Peak Downs and noted that it contained a number of both well grassed luxuriant plains and scrubby sandstone ridges (Leichhardt

1964: 134). Leichhardt also noted the presence of coal after his party attempted to sink a waterhole, however this was not of prime concern, as he sought areas for pastoral use (Murray 1996: 13).

While passing through the area of modern Moranbah in February 1845, Leichhardt encountered a river that he named 'Isaac' in honour of his friend and supporter F. Isaacs from the Darling Downs (Leichhardt 1964: 149).

Encouraged by the reports of Leichhardt and other explorers, various figures took up pastoral leases in the area in the decade that followed. In 1854 Leichhardt's friend Jeremiah Rolfe squatted on a run he called 'Belyando Waters' until it later became a part of a legal pastoral division (Killin 1984: 3). Rolfe's unauthorised squatting was by no means unique as 'during the 1850s land acquisitions in inland central Queensland had been a free-for-all' (Murray 1996: 15).

After the Leichhardt District was officially opened for pastoral settlement in 1856, a number of other runs were taken up. The Archer brothers, also acquaintances of Leichhardt's, took up 'Capella', 'Boree', 'Upper Crinum', 'Lower Crinum', and 'Laguna' (O'Donnell c1989: 9). Oscar de Satge gained 'Wolfgang' in 1861 and John Muirhead established a 'massive sheep run at "Banchory"' in May 1860 (O'Donnell c1989: 10). These holdings established a pattern of private pastoral leases that typified the region for the first 100 years of its settlement.

Early development was tempered by a tendency of some settlers to claim land purely for speculation with no intent to improve or make productive use of the land (Murray 1996: 15). This practice was eventually prohibited by Queensland colonial government legislation forcing settlers to 'occupy and work their properties' (Murray 1996: 15).

The encroachment of these settlers caused significant disruption to the existing patterns of life among the Aboriginal inhabitants of the area, and significant 'racial disharmony' followed (Killin 1984: 14). Contemporary records noted a number of massacres of pastoralists by Aboriginal groups in the region (O'Donnell c1989: 11). Reports of European brutality toward Aboriginal people included a number of incidents associated

with the notorious Lieutenant Fredrick Wheeler of the Native Mounted Police in the mid-1870s (Lack & Stafford 1965: 132-136). The unease caused by this racial tension meant that as late as 1895 station managers were choosing to live in 'fort like dwellings … with slits for fighting blacks' (O'Donnell c1989: 11).

Much of the area around what became the town of Moranbah was dedicated to pastoral activity during the 1860s and 1870s. Most land was available in leases granted for one to two years, but unfortunately records of these early leases remain sparse. Mr Andrew Scott is credited with taking up 'Moranbah' as a pastoral lease prior to 1880 (Belyando Shire Council 2006). After the 1880s, Scott's Moranbah was combined with other local leases to form 'Grosvenor Downs' station (Murray 1996: 16). However 'Moranbah Holding' appears in the official records again in 1920, as grazing homestead for Mr H.R. Hart, and again in 1929 when Mr C.H. Clements acquired the station and renamed it simply 'Moranbah' (Belyando Shire Council 2006).

Although there was some early optimism about farming in the Moranbah district, sustainable agriculture proved difficult to establish. The Queensland State Farm at Gindie that ran from 1897-1932 failed to encourage widespread agriculture in the district (Killin 1984).

2.2.2 Early Mining

Gold and copper were the first minerals to be extracted from the Bowen Basin mineral field in large quantities. Although the existence of coal had been known since Leichhardt's first explorations, the absence of reliable transport infrastructure retarded development of this resource. Since the first discovery of gold in 1861 (Killin 1984: 11) mining has substantially dictated the fortunes of the region alongside the pastoral industry, and many small towns and settlements appeared to capitalise on the mineral deposits.

Following the discovery of gold, the area experienced its first gold rush centred on the town of Clermont in August 1863 (Killin 1984: 11). Commensurate with the perception of quickly earned fortunes the town became renowned as 'an enterprising little township'

remarkable only for its 'debauchery and bad language' (Bolton 1963: 28). The gold deposits were soon exhausted and by 1887 Queensland Mining Warden Edmund Morey concluded that the area was no more than a 'poor man's field' where 'washing-up' and 'fossicking' were the only remaining activities (Morey 1888).

Copper soon replaced gold as the 'life-blood' of the Bowen Basin (O'Donnell c1989: 24). The first discovery of copper was made by Jack Mollard in 1861 (O'Donnell c1989: 55). Reflecting the future trend in mining operations in the region, Sydney entrepreneur John Manton formed the Peak Downs Copper Mining Company with £100,000 capital in 1862 (Killin 1984: 28). Although this was the largest copper mining concern in the area, copper was still largely mined by individuals.

In concert with the discovery of copper and gold there was a 'boom and bust' cycle in many of the Bowen Basin settlements. Small towns situated at or close to gold and copper fields relied heavily on minerals for their well-being. Often when the deposits were exhausted the town ended too. Copperfield, Birimgan, Blackridge, Douglas Creek, McDonald's Flat and Theresa Creek were all mining towns that once were large enough to have schools and other basic services, but which eventually were deserted (O'Donnell c1989: 55,61, 89-110).

2.2.3 Coal Mining to 1968

From the time of Leichhardt's explorations there were 'tantalizing reports of coal' in the region (Whitmore 1991: 318). However, there was little incentive to extract these reserves as there was limited local demand and no reliable means of transporting coal to the coastal markets. With the extension of the railways into central Queensland before the end of the nineteenth century the 'impetus for extending coal mining' in the area grew (Whitmore 1985: 281).

Following the exhaustion of the gold fields, the town of Blair Athol began to produce coal in a limited capacity for the central railways (Killin 1984: 37). The lack of a local market and absence of a rail link made the mine uncompetitive (Whitmore 1985: 284-291). With the extension of the Northern (later Central) railway line to Clermont in 1884,

a small market for local coal evolved. Although this development was not enough to generate large-scale production, the Chief Inspector of Mines, C.F.V. Jackson, estimated that there were '44,000,000 tonnes' of coal in the Clermont coal fields (Jackson 1909: 46-49).

To this point underground mining had been the dominant technique in the Bowen Basin, but this method proved dangerous, costly, and inefficient. In order to competitively extract coal, John William Hetherington committed his Blair Athol Coal and Timber Company to experiment with open-cut mining methods in 1921 (Whitmore 1991: 381-384). Beset by a variety of technological, weather, and transportation problems and coupled with a low world demand for coal this experiment in open-cut mining was ended suddenly in 1923 (Whitmore 1991: 384).

It was not until Blair Athol Opencut Collieries Limited that the open-cut method was successfully applied to the coal seams of the northern Bowen Basin. Assisted by technological developments Blair Athol Opencut Collieries began open-cut mining in 1937 (Killin 1984: 56). This decision was rewarded with increased demand caused by improved world markets and World War II. Following 1945 Blair Athol Coal and Timber also reverted to open-cut mining at their mines with some success (Killin 1984: 59).

However, the economic viability of coal from the region was beset by the same problems; distance from large markets and lack of reliable transportation. These traditional problems were exacerbated when Queensland Rail changed to diesel locomotives in 1952 (Killin 1984: 66). These developments forced Blair Athol Opencut Collieries and the Blair Athol Coal and Timber Company to merge and form Blair Athol Coal Pty. Ltd. in 1965 (Killin 1984: 67). Despite technological advances, coal from Blair Athol was not competitive on the international market leading to large amounts of stockpiling (Martin & Hargraves 1993: 155).

1968 – 1990s

With the purchase of Blair Athol Coal by a joint venture of Conzinc Riotinto of Australia (CRA) and Clutha in 1968, the era of multi-national companies in the Bowen Basin began

(Killin 1984: 67). In a move that was to have direct implications for the Belyando Shire the US multinational Utah Development Corporation (UDC) opened their first open-cut coal mine in Blackwater in 1968, 290 kilometres south-east of current day Moranbah (Martin & Hargraves 1993: 158). These large multinationals bought the necessary capital to modernise mining, ready access to large domestic and international markets, and enough political influence to ensure the necessary infrastructure developments.

By 1990 Queensland had taken the mantle of Australia's largest coal producing state (Martin & Hargraves 1993: 163) and by 1997 two thirds of Queensland's $10 billion production of coal came from the Bowen Basin (Anon 1997: 16).

2.2.4 Development of Moranbah

Located 191 kilometres west of Mackay the township of Moranbah has developed as the main town in the vicinity of the EIS study area. The origin of the word Moranbah remains somewhat unclear. The earliest recorded use of the term was to describe Andrew Scott's run prior to the 1880s. By the 1920s the designation had changed to 'Morambah', but when the town name was gazetted in 1969 the original 'Moranbah' had returned (Murray 1996: 16).

Moranbah is built on part of the former pastoral run known as Grosvenor Downs. Grosvenor, Grosvenor North, and Grosvenor East all appeared on the Queensland Surveyor's General Office Run Map for the Leichhardt District (Surveyor General's Office 1882). By 29 April 1885 the registered lessee of Grosvenor Downs was Alexander Boner McDonald ("'Grosvenor Downs' Run File: Held by the Queensland State Archives service (File Number: LAN/AF 388)"). McDonald's holding began with the original Grosvenor runs, but he was able to consolidate a number of other runs into an enlarged Grosvenor Downs (Grosvenor Downs' Run File: Held by the Queensland State Archives service (File Number: LAN/AF 388). By the time McDonald's death in 1907 Grosvenor Downs included Winchester, Teviot Bank, Broadmeadow, Roseylie, Broadlee, Hermitage Forest and Harrow.

Records show that McDonald ran mainly cattle on his property. This was the preferred use for the property throughout the rest of the twentieth century even though it underwent a number of lessee changes. By 27 November 1953 Arthur David, Adrienne Kathleen, and John Mitchell Muirhead had taken up the pastoral lease on the property ('Grosvenor Downs' Run File: held by the Queensland State Archives service [File Number: LAN/AF 388]).

Although there were reports of high grade coal in vast quantities in central Queensland (Chas. R. Hetherington & Co. Ltd. 1964), it was not until 1968, with the discovery of a large seam of coal at Goonyella near the Isaac River, that the town of Moranbah was built (Williams 1979: i). UDC took up the mining rights to the land with the forecast of approximately 400 employees. Subsequently, 1100 acres the 'Moranbah' lease was purchased and became crown land (Belyando Shire Council 2006). On 4 October 1969 the Queensland Government Gazette announced 'notification of intention to assign a place name, Moranbah, in the Parish of Moranbah, County of Grosvenor, in the shire of Belyando' (Murray 1996: 16). This action was complete on 22 January 1970 when the land for both Moranbah and Goonyella was transferred from the Nebo Shire Council to the Belyando Shire Council (Nebo Shire Council 2005).

The town of Moranbah was purpose built as a supportive town for the Goonyella mine (Bertoldi 1978: 55). Ullman and Nolan Consulting Engineers of Mackay were contracted to design a town 30 kilometres south of the proposed mine site (Kingston 1986: 1). The estimated cost of the town, between $2,142,000 and $2,242,000, was borne by UDC, with the Belyando Shire Council supplying some infrastructure (Kingston 1986: 1).

Although the town was planned with a 'community focus' (Bertoldi 1978: 57), Moranbah was beset by a number of early difficulties. For the early residents Moranbah was not a welcoming location to live. The town resembled a 'construction site' and many of the employees and their families had to live in one of the two short term caravan parks established as temporary housing (Murray 1996: 42). This housing shortage was a cause of some industrial disputes between UDC and the peak mining unions (Williams 1979: 114).

In addition to the lack of suitable accommodation the isolation of the town meant that most residents were transitory. Many public servants, police officers, and teachers remained in Moranbah for the minimum required period and the Salvation Army reported that a number of miners wives 'ran away' from their husbands due to the hardships of living in an isolated location (Murray 1996: 86).

The Belyando Shire Council and the UDC sought to reverse the trend that saw only 18 per cent home ownership in Moranbah (Bertoldi 1978: 62). A 'home purchasing scheme' was begun in October 1977, allowing residents to buy their current rental home at a 20 per cent discount off the market price (Bertoldi 1978: 67-68). This scheme was not an initial success, for as one local put it 'most people never really thought that mining would last' so there was no point in purchasing a house (Murray 1996: 88). Nonetheless, infrastructure and service improvements were made to the town and a number of essential and recreational services were added. By the mid 1970s the town boasted a shopping centre, a little athletics club, dentists, air charter service, Australian rules football club, 14 bed Moranbah Hospital, race track, and golf course (Murray 1996:82). With the growth in mining operations the town continued to develop and by the late 1990s Moranbah was 'a slow and easy going place' with 'a shopping centre, hospital, library, banks, video rental stores, a travel agency, churches, and even a modest zoo' (Murray 1996: ix). By 1996 a small pensioner housing development, a high school, and increased home ownership showed that some residents in the town had come to see Moranbah as home (Murray 1996).

2.2.5 Coal Mining at Goonyella Riverside

Goonyella Riverside Mine (GRM) is located on portions of a number of original pastoral runs. The runs of Goonyella, Annadale, Broadmeadow, Wotonga, Lenton, Fisher, and Eureka all appear on pastoral run maps from 1882 onwards (Queensland State Archives 1885; Surveyor General's Office 1882). Although specific records of Goonyella are sparse it is mentioned sporadically throughout the historical record.

Aware of the need for 'efficient, reliable and economic transportation' to sustain mining operations in the region Queensland Rail built a $36.3 million 124 mile rail line linking

Goonyella with the Hay Point coal loading facility. Construction began on 13 August 1969 and the first trains ran on 24 June 1971 (Queensland Railways Journalistic and Photographic Sections 1971). This link has been vital to the areas' continued mining expansion.

Located 30 kilometres north of Moranbah, the original operation consisted of two separate mines, the Goonyella Mine and the Riverside Mine. Goonyella was developed during the period 1969-1971 by UDC.

UDC began open-cut mining operations at Goonyella in January 1971 (Williams 1979: 111) and by 1975 Goonyella employed 362 manual workers, 34 office and clerical staff and 32 managers and engineers (Williams 1981: 9). Although by 1975 UDC was forced to close a number of its other central Queensland mines due to industrial action and an international recession (Richards 2005: 19-20), at the Goonyella mine a fifth dragline was installed to increase production (DME 1976: 82).

In her social study of Goonyella and Moranbah between June 1974 and July 1975 Claire Williams concluded that there was an 'atmosphere of mutual hostility' between the Unions and UDC management in the period up to 1975 (Williams 1979: 129). This resulted in 34 work stoppages due to industrial disputes at the mine in 1974 alone (Williams 1979: 141). Despite these industrial disputes, by 1983 the mine was producing 4.249 million tonnes of saleable coal (DME 1984: 33).

Thiess Dampier Mitsui Coal Pty Ltd (TDM) developed the Riverside mine and the first coal was extracted there in 1983. In April 1989 Goonyella and Riverside mines were amalgamated and re-registered as the GRM. In 1981 BHP Mitsui Coal Pty Ltd began development of Riverside on a site adjacent to the Goonyella mine (DME 1981: 1). Riverside came online with five other mines throughout Queensland in the 1983/84 financial year. With an initial workforce of 400 people it produced 2.021 million tonnes of saleable coal by the close of its first financial year of operation (DME 1984: 6, 43). In a move that had important implications for Moranbah, BHP took over UDC on April 2 1984; BHP later merged the operations of the Goonyella and Riverside in 1989 (Murray 1996:

107). By then the two mines combined to produce over six million tonnes of saleable coal per year and employed over 600 people (DME 1989: 44).

In an important shift away from traditional practices the Sumitomo Corporation began long wall (underground) mining at their North Goonyella lease in 1993 with an annual output of three million tonnes ('Contract Awarded for Goonyella Project' 1999: 53). This site was eventually purchased by RAG Australia Coal in 2000. In 1999 Shell Coal had constructed 8.5 kilometres of underground tunnels for long wall mining at their Moranbah North site ('Contract Awarded for Goonyella Project' 1999). These operations paved the way for underground exploration in an area that had been typified by open-cut, above ground mining.

In 2001, a strategic alliance agreement created the Central Queensland Coal Associates (CQCA). This is an unincorporated joint venture between BHP Billiton (50 per cent) and Mitsubishi Corp (50 per cent). CQCA Operations is managed by BMA on behalf of the CQCA Joint Venturers under a management agreement dated 28 June 2001.

In 2005 Broadmeadow underground mine (BRM), an underground mining operation, commenced at Goonyella Riverside.

2.2.6 The EIS study area

Survey maps of the EIS study area from 1923 identify boundary fences, roads, holding yards and associated springs, bores, tanks and associated troughing areas (see **Figure 2.1**). The landscape was described as well grassed with scrub and large areas of dense vegetation of Blackbutt, Lapunya, Brigalow, Gidya, Ironbark, Moreton Bay Ash and Bloodwood (GV 19, DK 25, QSA 1923). An earlier map (c. 1884 -1888) documents the location of blazed trees across the EIS study area in association with creeks. Unfortunately, these have not been identified on the 1923 maps and the assumption is that these trees have been removed by the time of this later survey.

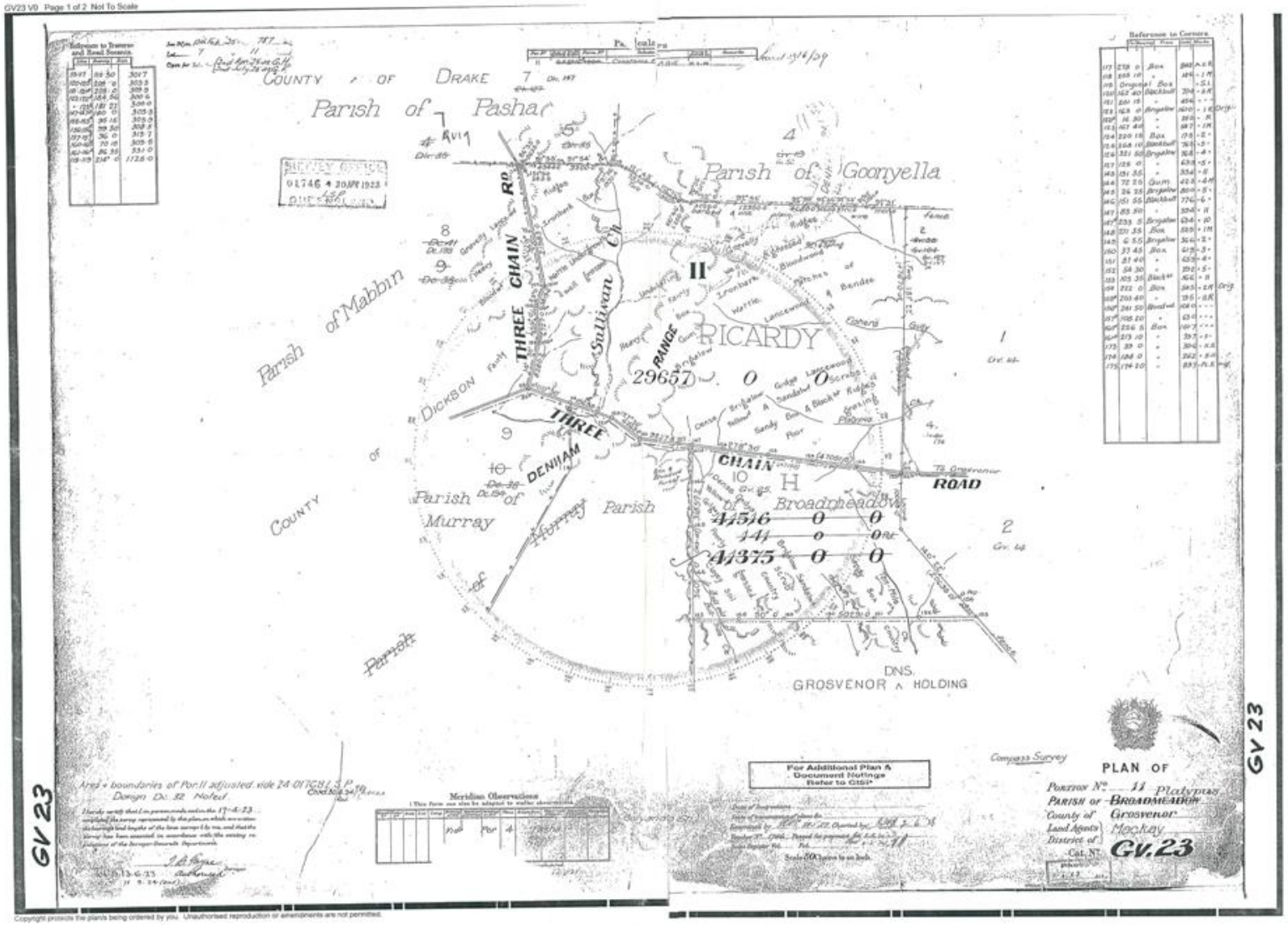


Figure 2.1: *Historic map of the EIS study area (GV23)*

2.3 Register Searches

2.3.1 Federal

On-line searches of the National and Commonwealth Heritage Register and former Register of the National Estate websites were conducted to identify places and sites of cultural heritage significance located within the EIS study area. The National and Commonwealth Heritage Registers, along with the former Register of the National Estate, is compiled by the Australian Heritage Commission and is an inventory of Australia's natural and cultural heritage places that are worth conserving for the future.

No sites were identified on the National or Commonwealth Heritage List within the EIS study area.

2.3.2 State (Queensland)

2.3.2.1 Queensland Heritage Register (QHR)

A search of the QHR was conducted in an attempt to locate any non-Indigenous sites of significance. The QHR is maintained by the Department of Environment and Heritage Protection (EHP), with the aim of protecting historic cultural heritage for future generations. All places, trees, natural formations and buildings of historic (non-Indigenous) cultural heritage significance listed on the register are protected under the *Queensland Heritage Act 1992*.

No sites were identified on the Queensland Heritage Register within the EIS study area.

2.3.2.2 National Trust of Queensland

Although the Queensland National Trust Register does not attribute any legislative protection, places listed on the register can contribute to the discussion of heritage and can often include places which have been overlooked for entry onto other heritage registers. One historic site, located within the vicinity (approx 20 kilometres south) of the EIS study area, was identified on the National Trust list. It is **not,** however, within the EIS study area. Refer to Table 2.1.

Table 2.1: *National Trust Queensland search results*

ID	Description	Location	Comments
BEL 4/1	Moranbah Cemetery	Moranbah	Identified in a 2007 survey

No sites were identified on the National Trust (Qld) listings within the EIS study area.

2.3.3 Local Government Legislation (Isaac Regional Council)

Cultural Heritage is discussed briefly in the former Belyando Shire Planning Scheme (July 2008, adopted 21 January 2009). One site (the same as the abovementioned) located within the vicinity (approx 20 kilometres south) of the EIS study area was identified that is of cultural heritage significance. It is **not,** however, within the EIS study area. Refer to Table 2.2.

Table 2.2: *(Former) Belyando Shire Planning Scheme search results*

ID	Description	Location	Comments
	Moranbah Cemetery	Lot 310/ USL39908	Schedule 2, Division 7.1(BSC 2008)

No sites were identified within the relevant Local Government planning scheme within the EIS study area.

2.3.4 Summary of Results

As presented above, searches of the various heritage registers and databases did not identify any registered heritage sites within the EIS study area. One heritage place, the Moranbah Cemetery, is the located in the township of Moranbah, some 20 kilometres away from the EIS study area – this is the closest known heritage site to the proposed mine.

No registered heritage sites were identified within the EIS study area.

3.0 Cultural Heritage Investigation

This section provides an overview of the methodology; constraints and overall results of all three stages of the field survey (refer **Section 1**). Fieldwork undertaken by Converge staff is based on universally understood and accepted forms of assessment that occur in a series of clearly defined steps including sampling, surveying, site evaluation, recording, impact assessment, and management recommendations.

As discussed in **Section 1**, ARCHAEO / Converge have undertaken both Indigenous (Stage 1) and historical cultural heritage assessments (Stage 2 and Stage 3) of the proposed project. The techniques used for both Indigenous and non-Indigenous survey do not vary a great deal, other than for historical survey it is more common to use a purposive sampling strategy because historical records and community consultation often provides information about specific areas that can be targeted for investigation.

3.1 Survey Methodology

The survey methodology adopted for all three stages of this cultural heritage study incorporated a vehicle and pedestrian survey across the EIS study area. Landmark areas were targeted across the EIS study area, for example property boundaries, easements, and known locations of homesteads, dams and holding yards. It is estimated that approximately 55 per cent of the entire proposed EIS study area was surveyed. Given the landscape of the area, this is common and acceptable methodology from a 'best practice' heritage perspective.

All survey data was recorded in field notebooks and locations of any items or place of historical cultural heritage significance was captured via a hand help global positioning system (GPS) receiver, accurate to ±4 metres. This information was then utilised to create maps outlining the location of sites and features noted during the survey. Areas of interest were photographed using a digital camera (Nikon Coolpix P5100) with 12.1 effective mega-pixels, and all photographs were logged in a field notebook to be downloaded to a laptop computer for initial storage at the end of each day. Upon

completion of the report, these photographs will be stored on disk (CD) in the ARCHAEO / Converge office.

3.1.1 Sampling Strategy

Sampling strategies (where to look) can be either *purposive*, where specific areas are targeted (for whatever reason), as is done with predictive modelling; or *probabilistic*, where decisions are made to survey without any prior knowledge or predictive model of what heritage resources might exist in the landscape to be surveyed. So it is that archaeological survey strategies usually involve transects across the EIS study area chosen at random (probabilistic) to avoid possible bias in the results; or transects within areas (purposive) known to be historically significant, or those designated areas specifically earmarked for development.

For this particular survey, a purposive sampling strategy was employed. Historical research and consultation with the land owners enabled a comprehensive survey of areas known to be of historical interest and significance whilst remaining inside the survey timeframes.

Noted historical cultural heritage sites were recorded with reference to site title, location, environmental context, levels of previous impact, condition and relevant comments including project details.

Archaeological excavation was not conducted as it was not deemed necessary.

3.2 Constraints to the Survey

3.2.1 Ground Surface Integrity

An assessment of ground integrity (GI) provides an indicator of whether or not the land surface within a landscape under study has been modified or not, and if so, the degree of disturbance encountered. Landscape modification may influence the context (and therefore integrity) of areas of historical cultural heritage interest. Levels of GI were determined using a percentage range between 0-100 per cent where 0 per cent indicates

all GI is gone, and 100 per cent represents excellent preservation of the original context. Therefore: **Zero – 0 per cent; Poor - 1-25 per cent; Moderate - 26-50 per cent; Fair - 51-75 per cent; Good - 76-85 per cent; Excellent - 86-100 per cent**.

Much of the EIS study area demonstrated poor GI, exhibiting clear evidence of long term clearing associated with the pastoral history of the area coupled with severe erosion precipitated by grazing and the effects of rain at the time of the survey. This was particularly noticeable in the general lack of mature vegetation and the predominance of dense grass and regrowth scrub. Notable areas of higher integrity included small remnant corridors of woodland (predominantly Box, Brigalow, Morton Bay Ash, Ironbark and various other Eucalypt species) along the banks of the Isaac River and the few creek banks encountered.

3.2.2 Ground Surface Visibility

Assessments of ground surface visibility (GSV) provide an indication of how much of the ground surface can actually be seen. GSV is most commonly inhibited by vegetation but other inhibitors may include concrete, gravel and bitumen. Levels of GSV were determined using a percentage scale in that 0 per cent represents zero visibility and 100 per cent represents maximum visibility (bare ground). Therefore: **Zero - 0 per cent; Poor - 1-25 per cent; Moderate - 26-50 per cent; Fair - 51-75 per cent; Good - 76-85 per cent; Excellent - 86-100 per cent**. The better the visibility, the more potential there is for locating historical/archaeological material.

Stage One and Two

Much of the EIS study area demonstrated excellent GSV primarily as a result of long term clearing in the area and erosion around dry creeks and channels. Areas where GSV was notably lower included areas of dense grass and scrub regrowth (refer to **Figures 3.1** and **3.2**).

Figure 3.1: *Moderate GSV. Pastoral activity*

Figure 3.2: *Poor GSV. Dense grass and regrowth.*

Stage Three

Areas of the EIS study area also demonstrated poor to moderate GSV primarily consisting of dense grass, weed varieties and scrub (refer to **Figures 3.3** and **3.4**). Areas where GSV was notably higher included areas around holding stations, tracks, easements and erosion around dry creeks and channels.

Figure 3.3: *Poor GSV. Dense grass and weed varieties.*

Figure 3.4: *Good GSV on track, dense grass & regrowth.*

3.2.3 Access

Access to some of the EIS study area was limited due to dense undergrowth of grasses and a few eroded gullies. The entire survey was generally conducted along visible tracks and fence lines, however as stated above, a purposive sampling strategy was employed, which negated the need for 100 per cent coverage of the EIS study area. 'Old Station

Yard' was not assessed during the survey as the area was inaccessible at the time. A recommendation is included in **Section 6** with regards to further survey of 'Old Station Yard' prior to ground disturbing works occurring in the area.

3.3 Leaseholder Consultation

The following consultation was conducted as part of the research for this assessment:

Stage Two:

Discussions were held on 6 September 2007 with the leaseholders of the Riverside Homestead. The family have owned and lived on the property for five generations and are, the only family within the EIS study area that has remained continuously on their property for more than 100 years. The Riverside Homestead leaseholders provided information and location details for the original site of the Riverside Homestead, Broadmeadow Homestead, and for a possible former Native Police camp within the EIS study area.

A discussion was held with the leaseholder of Burton Downs on 7 September 2007. The leaseholder relayed information concerning the location of graves up in the hills of the Burton Ranges (outside the EIS study area), and a camping ground by the creek near his current homestead. The Burton Downs leaseholder's original homestead was located well within the GRM current operation and therefore no longer exists.

Stage Three:

A further discussion was held with the leaseholders of the Riverside Homestead on 22 May, 2009. They provided information and location details for the relocated site of a stockman's hut and its current location, historic bullock tracks, the former 'Old Station Yard' site, former fence lines and spear gates within the EIS study area. The relocated stockman's hut was originally part of the 'Old Station' site, which was not investigated in this assessment as the area was inaccessible. The hut was relocated around the 1950s, and again in the 1990s. These sites were not investigated due to dense grass and eroded gullies. There was no surface evidence of the historic bullock track observed, however a current track located near a holding yard and dam could be based on this route.

Additional consultation was undertaken on the afternoon of Friday 22 May 2009 with the caretaker for the Riverside property during the field survey. The caretaker identified the location of the 'Old Station Yard' as being east of the railway line (inaccessible – refer **Section 3.2.3**).

3.4 Survey Outcomes

This section summarises the results of the cultural heritage survey undertaken by Converge. As discussed in the introduction, only non-Indigenous sites were investigated for the final stages of the report.

Using a purposive sampling strategy (as discussed in **Section 3.1.1**) for identifying places of historic interest, an estimated 55 per cent of the EIS study area was traversed using vehicle and pedestrian transects during the combined surveys. This represents a standard methodology for cultural heritage survey of this nature. The location of any materials and/or places of historical archaeological significance and/or interest were noted and grid co-ordinates were captured via GPS.

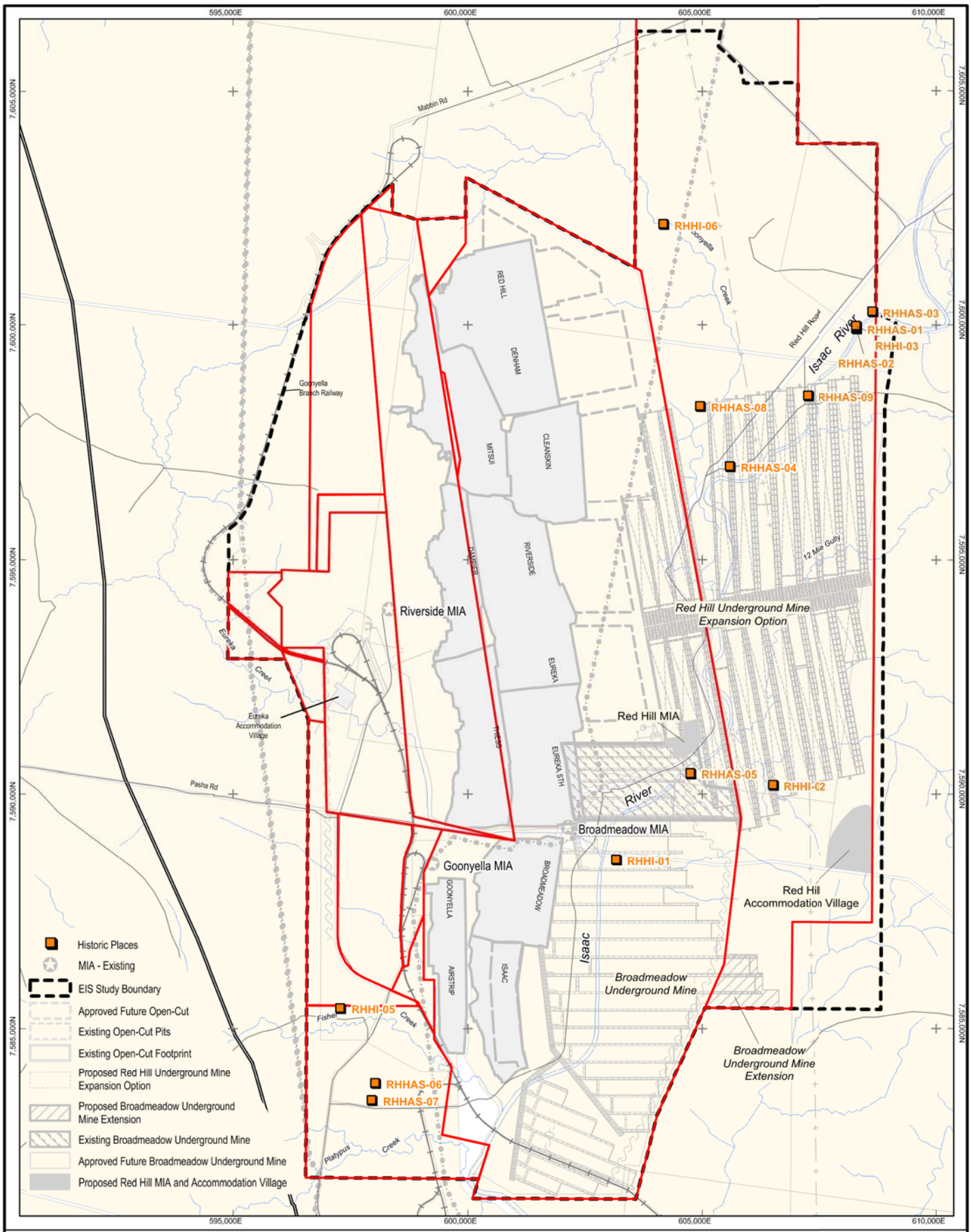
All material found is listed in **Table 3.1** and mapped in **Figure 3.5**. Historical sites of cultural heritage significance are identified by the prefix RHHAS (Red Hill Heritage or Archaeological Site). Locations of objects and/or places of 'historical interest'[1] are identified by the prefix RHHI (Red Hill Historical Interest).

Table 3.1: *Location data for items and/or places of historical archaeological significance and/or interest*

Site ID	GPS co-ordinates		Comments	Location
	Eastings	Northings		
RHHAS-01	608203	7599742	Dump.	Within MLA70421, outside the underground footprint.
RHHAS-02	608200	7599740	Corrugated iron water tank with bottles.	Within MLA70421, outside the underground footprint.
RHHAS-03	608543	7600098	Surveyor's mark.	Within MLA70421, outside the underground footprint.

Note: HI sites are of contextual relevance to the report, however, they are generally not managed to the same level as HAS.

Site ID	GPS co-ordinates		Comments	Location
	Eastings	Northings		
RHHAS-04	605482	7596813	Dump in drainage channel.	Within MLA70421 and the underground footprint.
RHHAS-05	604639	7590255	Survey tree.	Located in current BRM footprint
RHHAS-06	597922	7583632	Broadmeadow Homestead Complex.	Located in the south-western EIS study area, outside of the proposed areas of disturbance.
RHHAS-07	597853	7583268	Broadmeadow Cottage.	Located in the south-western EIS study area, outside of the proposed areas of disturbance.
RHHAS-08	604845	7598092	Old Riverside Homestead Complex.	Located within MLA70421 and within the underground footprint.
RHHAS-09	607149	7598311	Current Riverside Homestead Complex.	Located within MLA70421 and within the underground footprint.
RHHI-01	603060	7588413	Historic property boundary fence 1.	Located in current BRM footprint.
RHHI-02	606399	7590012	Historic property boundary fence 2.	Within southern area of proposed underground footprint.
RHHI-03	608201	7599796	Telegraph tree.	Just north of the underground footprint.
RHHI-04	Not confirmed	Not confirmed	Possible Former Native Police Camp.	Possibly within underground footprint.
RHHI-05	597180	7585251	Former holding yard and associated bore.	In the southeast corner of the EIS study area.
RHHI-06	604067	7601976	Dead Tree.	Within the northern area of the EIS study area
Note: GPS co-ordinates - Geodetic datum = WGS84. Position format = UTM/UPS grid. Grid Zone = 55K				



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Datum: GDA 94, MGA Zone 55

Client: URS	Project: RED HILL MINING LEASE CULTURAL HERITAGE	Title: **LOCATION OF PLACES OF HISTORIC SIGNIFICANCE AND HISTORIC INTEREST IN THE EIS STUDY AREA**	
converge heritage + community	Drawn: VH	Approved: SS	Date: 24-06-2013
	Job No:	File No: URS 42627136-g-2002.wor	Figure: **3.5**

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3.5 Conclusion of Field Survey Results

The field surveys identified nine sites and places of historic cultural heritage significance (RHHAS) which contain suitable value to warrant further significance assessment. In addition to the HAS sites identified, six places of historic interest (RHHI) were identified within the EIS study area.

There are three RHHAS and two RHHI sites in the direct underground footprint. The RHHI places do not provide a suitable level of cultural heritage significance to validate further assessment and for this reason will not be subject to a significance assessment.

Significant attempts were unable to locate the possible former native police camp, mainly due to extremely low ground surface visibility as a result of dense grass cover. There is some potential for further historic places/items to exist within the EIS study area. These could be remnant sites relating to pastoral and settlement activities, such as historic survey trees and remnant boundary fence lines. The possible location where the stockman's hut that had been located before or around the 1950s was also not identified. This may have been due to extremely low ground surface visibility as a result of dense grass cover.

Detailed discussion relating to mitigation of items and potential items of cultural heritage significance within the EIS study area are discussed in Section 6 - Recommendations.

4.0 Cultural Heritage Significance Assessment

Cultural heritage significance relates to people's perspective of place and sense of value, within the context of history, environment, aesthetics and social organisation.

Nine historic sites of cultural heritage significance (RHHAS) were identified during the field survey and will be attributed an individual significance rating in this section. Of these, three are within the underground footprint of the proposed RHM.

Further, six places of historic interest were located during the survey, however these are not generally assessed for significance as these places do not retain enough value to warrant further assessment or specific mitigation strategies. The places of historic interest do nevertheless provide an insight into the pastoral history of the region and therefore guide the discussions relating to the historic value of the landscape within the EIS study area.

All HAS and HI sites and places located within the EIS study area are included as sites cards in **Appendix 1 and 2**.

4.1 Determining Cultural Heritage Significance

A range of standards and criteria are available to assist with determining cultural heritage significance. The following sections discuss *the Burra Charter (ICOMOS Australia*) and incorporate aspects from the recognised legislative frameworks, such as the *Queensland Heritage Act 1992*. This discussion enables an insight into the discussions made in relation to significance levels discussed in the following section.

4.1.1 Historic Heritage Significance

The *Burra Charter* (Marquis-Kyle and Walker 1999) guides cultural heritage management in Australia. First adopted in 1979 by Australia ICOMOS (International Council on Monuments and Sites), the charter was initially designed for the conservation and management of historic heritage. However, after the addition of further guidelines that

defined cultural significance and conservation policy, use of the charter was extended to Indigenous studies.

The charter defines conservation as 'the processes of looking after a place so as to retain its cultural significance' (Article 1.4). A place is considered significant if it possesses aesthetic, historic, scientific or social value for past, present or future generations (Article 1.2). The definition given for each of these values is as follows (Articles 2.2 to 2.5).

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture and material of the fabric; the smells and sounds associated with the place and its use.

Historic value encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, an historic figure, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives *in situ*, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.

Scientific research value of a place will depend upon the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute further substantial information.

Social value embraces the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group.

Article 2.6 of the Guidelines notes that other categories of cultural significance may become apparent during the course of assessment of particular sites, places or precincts. A range of cultural significance values may apply.

Every place has a history, aesthetic value or a social meaning to some member of a community. Most places therefore meet some of the criteria prescribed above. It is,

however, neither possible nor desirable to conserve every place. Some measures must be applied to these broad criteria in order to determine the degree of significance. The degree to which a place is significant will determine the appropriate forms of conservation management for that place.

Assessing cultural heritage significance against set criteria is a widely recognised method of achieving consistent, rational and unbiased assessments. Various authorities and bodies involved in heritage conservation adopt assessment criteria including the Australian Heritage Council, the National Trust, Australia, ICOMOS, EHP and the Queensland Heritage Council.

4.1.2 Significance Assessment and Relevant Legislation

Whilst consistent with the notions of cultural heritage significance inherent in these bodies' criteria, the *Queensland Heritage Act 1992* sets out specific tests for considering places of State heritage value. Under Section 35(1) of this Act, a place may be entered in the State heritage register if it satisfies one or more of the following criteria:

a) the place is important in demonstrating the evolution or pattern of Queensland's history;
b) the place demonstrates rare, uncommon or endangered aspects of Queensland's cultural heritage;
c) the place has potential to yield information that will contribute to an understanding of Queensland's history;
d) the place is important in demonstrating the principal characteristics of a particular class of cultural places;
e) the place is important because of its aesthetic significance;
f) the place is important in demonstrating a high degree of creative or technical achievement at a particular period;
g) the place has a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
h) the place has a special association with the life or work of a particular person, group or organisation of importance in Queensland's history.

Under Section 60 of this Act, a place may also be entered in the Queensland heritage register as an archaeological place if the place:

a) is not a State heritage place; and
b) has potential to contain an archaeological artefact that is an important source of information about Queensland's history.

4.2 Nature of Significance

This section discusses the relevant levels of cultural heritage significance for the EIS study area, concluding with a statement of cultural heritage significance for the site. This significance assessment provides the final layer for the management of the relevant sites and places within the EIS study area in **Section 6**.

4.2.1 Aesthetic Value

Aside from the spoil piles from mining activities across the landscape, aesthetic appeal is evident throughout the EIS study area, including:

- The rural setting and open landscape including homesteads and cottages, stockman's hut, sheds, stock yards, vegetation, fencing and associated elements;
- The Isaac River, Goonyella Creek and various other creek systems running through the EIS study area; and
- Indigenous vegetation, most notable surrounding the above mentioned river and creek.

Travel within the district at the time of the field surveys revealed that these abovementioned values are similarly represented in many parts of the local area. In light of these observations, this assessment considers the EIS study area to have **low levels of aesthetic value.**

4.2.2 Historic Value

Aspects of the EIS study area represents settlement and pastoral pursuits relevant to the area from the 1850s, when settlers took up pastoral leases in the vicinity of the EIS study

area. Most especially, the area known today as Riverside Pastoral Company has been in the same family for five generations and exhibits remnants from a variety of these earlier generations.

From settlement, incidents between Aboriginal people and early settlers were recorded in the area. These include associations in the area to the notorious Lieutenant Fredrick Wheeler of the Native Mounted Police and a reported Native Police camp that may have once existed in the vicinity of the EIS study area.

The presence of coal in the area was confirmed by early explorers. However, it was not mined on a large scale until the 1970s. The nearby town of Moranbah was purpose built as a "supportive town" for the Goonyella Mine located to the east of the EIS study area. From this time coal mining has clearly overshadowed pastoral activities in the EIS study area and the district.

In conclusion, the EIS study area is considered by this assessment to have **low to moderate levels of historic value** to the local area. However, identification of the location of the 'Old Station' and 'Native Police Camp' remnants within the EIS study area has the potential to alter this assessment (Refer to Recommendation 1).

4.2.3 Scientific Value

A number of sites were recorded which have the potential to reveal scientific value related to the local area, including but not limited to:

- Existing homestead complexes;
- A former homestead site;
- A relocated stockman's hut;
- Survey trees;
- Dumps;
- Holding yards and associated gate;
- Associated fences; and
- Various pastoral remnants.

Although none of these elements display any significant level of technical flare or ingenuity for their time, they do collectively provide a good cross section of cultural record of settlement and pastoral pursuits in the area since settlement.

In conclusion, the EIS study area is considered by this assessment to have **low levels of scientific value** to the local area. However, identification of the location of the 'Old Station' and 'Native Police Camp' remnants within the EIS study area has the potential to alter this assessment.

4.2.4 Social value

The area known today as Riverside Pastoral Company has been in the same family for five generations. Additionally, properties within and surrounding the EIS study area have associations with other families within the local community who have resided or worked on them in historic times. Previous assessments in the surrounding area however, have revealed similar values within the district, suggesting that these values are well represented in the region.

For this reason, this report considers the EIS study area, most especially the Stockman's Hut and spear gate to display **low to moderate levels of social significance** to the local community.

4.3 Statement of Cultural Heritage Significance

The following statement of significance has been provided to reflect the EIS study area's cultural heritage significance within the current legislative frameworks.

The EIS study area is considered significant as:

- It represents settlement and pastoral pursuits within the district from early times and more recently coal mining activities, aspects of the EIS study area *is important in demonstrating the evolution or pattern of the local areas history*;
- It contains a working pastoral enterprise and their associated remnants, including a series of station dumps, a former homestead, stockman's hut, former fence

alignments and spear gates *the place has potential to yield information that will contribute to an understanding of the local area's history;*

- It survives today in a rural setting, including the historic environment associated with pastoral activities and the natural setting along the Isaac River, Goonyella Creek and various associated creek lines, aspects of the EIS study area exhibit a level of *aesthetic* value *considered important to the local community;* and
- Properties in the EIS study area retain local connections with those families who have lived and worked there, including the Riverside Pastoral Company, which has remained in the same family for five continuous generations. These places *have a special association with the life or work of a particular person, group or organisation of importance in the local areas history.*

Please note that a recommendation (Recommendation 1) has been made in Section 6 in relation to:

- *The further investigation of a former homestead site ('Old Station' site) reported to be located in the north east of the EIS study area (east of the railway line) as well as a reported former Native Police Camp in the eastern section of the EIS study area. The abovementioned statement of significance may require revision on the results of this identification.*

4.4 Significance Ratings for the EIS study area

Using the methodology for significance assessment outlined earlier in this section, the EIS study area has been assessed by this report to have the following levels of cultural heritage significance:

Table 4.1: Summary of cultural heritage significance for the EIS study area

Value	Rating	Justification	Legislative Status
Aesthetic	Low	Surviving today as what has remained a relatively rural setting, aspects of the EIS study area presents a basic level of aesthetic qualities related to natural and historic nature of the site (relevant to the local community).	The site does not satisfy listing on the local, State or National Heritage Registers for its aesthetic values (the EIS study area is not currently recognised on any heritage registers).
Historic	Low-Moderate	Representing pastoral lease and settlement activities commonplace to the area from the 1850s, including the many challenges and activities associated with pastoral pursuits from this time. More recent mining pursuits east of the EIS study area are overtaking these earlier pursuits.	Aspects of the EIS study area may satisfy criteria for listing on the local Heritage Register for its historic values. The EIS study area does not satisfy listing on State or National Heritage Registers for its historic values (the EIS study area is not currently recognised on any heritage registers).
Scientific	Low	Many elements survive as remnants of the EIS study area's pastoral pursuits, which collectively have potential to contribute to an understanding of the local areas history. No elements of the EIS study area display any significant level of technical flare or ingenuity for their time.	Aspects of the EIS study area ***may*** satisfy criteria for listing on the local Heritage Register for its scientific values. The EIS study area does not satisfy listing on State or National Heritage Registers for its scientific values (*the EIS study area is not currently recognised on any heritage registers*).
Social	Low-Moderate	Properties in the EIS study area have a connection with the families who have lived and worked on them. The Riverside Pastoral Company has been in the same family for five generations.	Aspects of the EIS study area satisfy criteria for listing on the local Heritage Register for its social values. The EIS study area does not satisfy listing on State or National Heritage Registers for its social values (the EIS study area is not currently recognised on any heritage *registers*).

4.5 Significance Ratings Individual Sites and Places

Alongside the abovementioned statement of significance provided for the broader EIS study area, it is important to discuss the individual sites and places potentially impacted by the project. These significance ratings for individual sites and places provide the final layer of assessment and allow informed decisions regarding management of potential impact by the project in the following sections.

Table 4.2: *Significance criteria - Adapted from Grades of internal site significance (NSW Heritage Office: 11)*

Rating	Justification
Exceptional	Rare or outstanding element directly contributing to a place's local, State (or potentially National) significance. High degree of intactness.
High	High degree of original fabric. Demonstrates a key element of the item's significance. Alterations do not detract from significance. Relatively high degree of intactness.
Moderate	Altered or modified elements. Elements with little heritage value, but which contribute to the overall significance of the item. Moderate degree of intactness.
Low	Alterations detract from significance or contain limited heritage value individually and within the site's broader context. Minimal degree of intactness.
Intrusive	Damaging to the item's heritage significance.

This section attributes individual significance ratings for the individual sites and places identified in **Table 4.1**, which are potentially affected by the project.

Assessment of these sites and places is completed using information gathered during background research, field survey and other relevant information, along with significance assessment frameworks discussed in **Section 4.2**.

The following levels of significance are attributed to the abovementioned sites:

Table 4.3: *Significance ratings for individual sites and places within the EIS study area*

Site ID	Description	Individual Significance Rating	Comments
RHHAS-01	Dump	Low-Moderate	Old dump with potential items of interest
RHHAS-02	Old water tank	Low	Corrugated iron water storage, disused
RHHAS-03	Surveyor's mark	Moderate	Indicator of period in time when land selection began and in fair condition
RHHAS-04	Dump in drainage channel.	Low-Moderate	Old dump with potential items of interest
RHHAS-05	Survey tree.	Low-Moderate	1922 survey tree, fair to poor condition with no marks evident Located in current BRM site.
RHHAS-05	Broadmeadow Homestead	Low	Homestead, recently relocated as a result of earlier mine expansion
RHHAS-07	Broadmeadow Cottage	Low	Cottage recently relocated as a result of earlier mine expansion
RHHAS-08	Old Riverside Homestead Complex	Low-Moderate	Former homestead complex with scientific historic and value
RHHAS-09	Current Riverside Homestead Complex	Moderate	Early station that demonstrates long term pastoral pursuits by predominantly the same family. Part of the main homestead is believed to date back into the nineteenth century and relocated from RHHAS-08.

4.6 Cultural Heritage Potential within the EIS study area

This report suggests that there is potential for further historic items to exist within the EIS study area. In particular, potential exists for surface and/or subsurface elements in the location of the 1950s siting of the Stockman's Hut and the earlier 'Old Station' site maybe other elements associated with early pastoral activities present in the area.

Elements associated with older stock routes from times past may also exist in this area. Other potential sites and places may include survey trees, historic camp remnants and associated exotic vegetation, remote graves and old station dumps.

Detailed discussion relating to impact on items and potential items of cultural heritage significance by the project will be discussed in the Section 6 – Recommendations.

5.1 The Nature of the Proposed Development

BMA operates the existing Goonyella Riverside and Broadmeadow (GRB) mine complex. The Goonyella Riverside Mine (GRM) is an open-cut operation. The BRM is a punch longwall underground mine which has been developed from former open cut mine pits in the open-cut operation. In addition to the mining operation, the GRB mine complex includes two coal handling and preparation plants (CHPPs) which are located at the Goonyella Mine Infrastructure Area (MIA) and the Riverside MIA. The CHPPs remove the non-coal materials and reduce the coal to the specified size range. Rejects are placed into designated reject dumps. Tailings are pumped to licensed tailings storage facilities and the water is reclaimed for re-use in the CHPPs and for dust suppression. There is also a third MIA at BRM (URS 2011: 8).

BMA proposes to convert the existing Red Hill Mining Lease Application (MLA 70421) to enable the continuation of mining operations associated with the existing GRB mine complex. Specifically, the mining lease conversion will allow for:

- An incremental expansion of the existing GRM;
- An extension of three longwall panels (14, 15 and 16) of the existing BRM; and
- A future incremental underground expansion option on the Red Hill Mining Lease (Red Hill Mine (RHM))

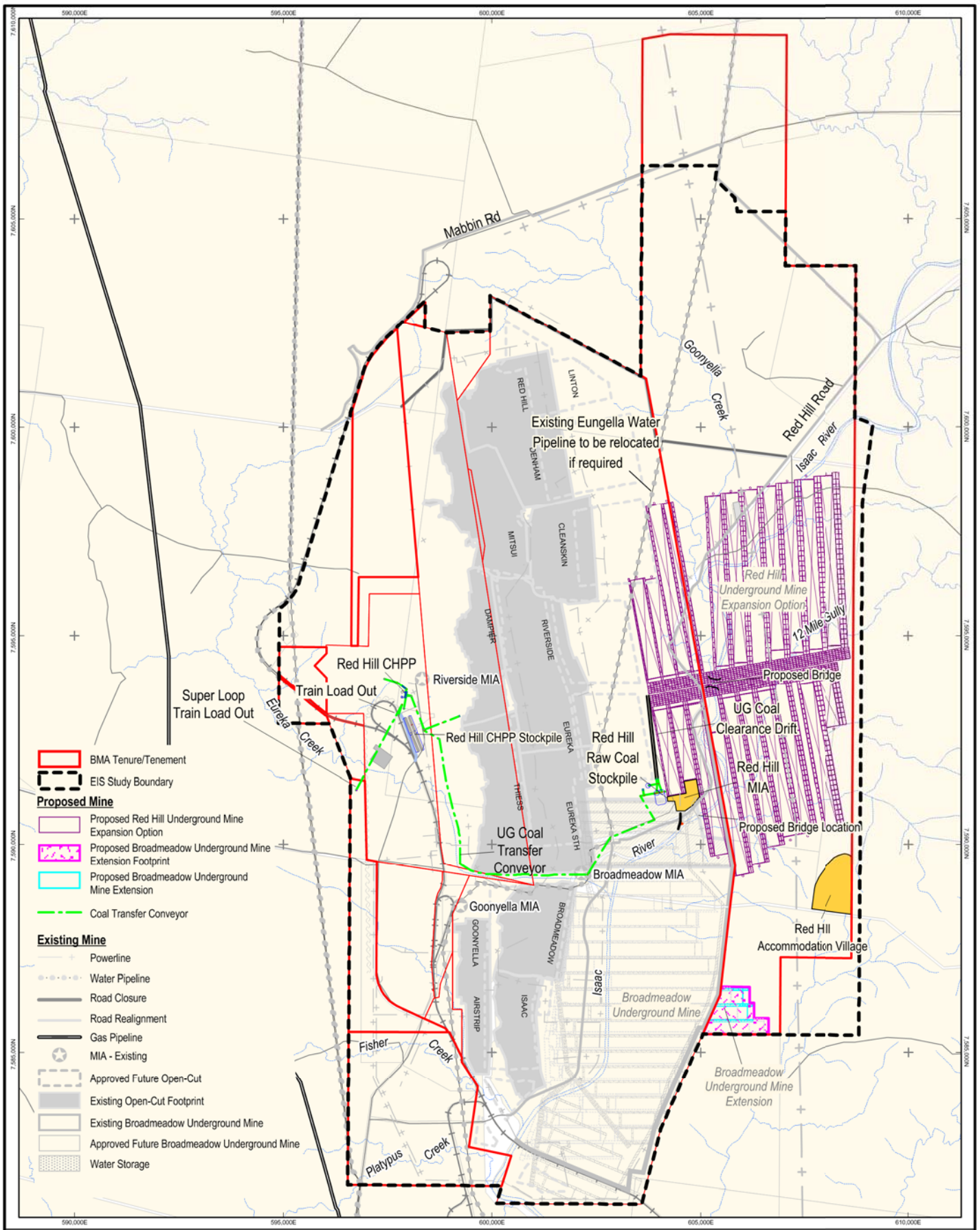
These 3 elements are collectively referred to as the project.

This new mine, combined with the GRB mine complex, has the potential to increase the product coal production rate for the GRB mine complex to 32 million tonnes per annum over an estimated 25 year Life of Mine. The project will produce a hard coking coal product for the export market. The project will include the following components:

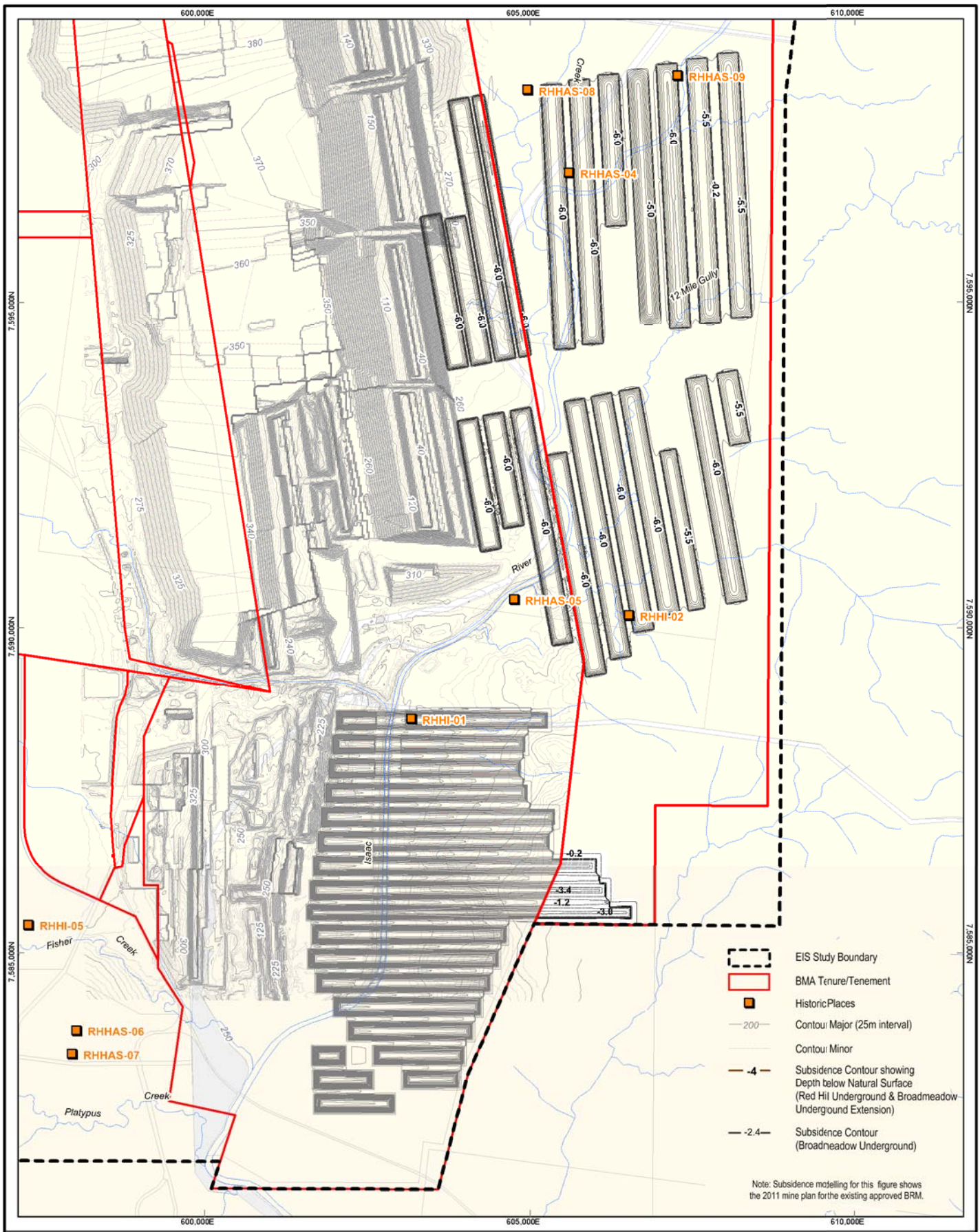
- Construction of a new underground mine (RHM) within ML1763 and MLA70421, to the east of GRB mine complex, to target the Goonyella Middle Seam (GMS).

- Extension of the existing BRM into MLA70421.
- Establishing a gas management system comprising a bore network over the underground mine footprint.
- Development of a new MIA for the new RHM.
- Development of a new CHPP (called Red Hill CHPP) at the expanded Riverside MIA.
- Development of associated mining infrastructure for the RHM including a new coal clearance system, coal handling infrastructure, and coal stockpiles.
- Integration of the project water with the GRB mine complex site water management system.
- A new accommodation facility will be provided which will accommodate the construction and operational workforces (URS 2011: 8-9).

As coal is extracted from the GMS, subsidence will occur in the overlying strata, including the GUS. There will be a surface expression of this subsidence, greatest in the extracted panels and less above the remaining pillars.



Client: URS	Project: RED HILL MINING LEASE CULTURAL HERITAGE		Title: **PROPOSED PROJECT**
converge heritage + community	Drawn: VH	Approved: CP	Date: 24-06-2013
	Job No:	File No: URS 42627136-g-2153.wor	Figure: **5.1**
			Rev:A **A4**



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Projecton MGA94 Zone 55 (GDA94)

Client: URS

converge heritage + community

Project: RED HILL MINING LEASE
CULTURAL HERITAGE

Title: **PREDICTED SUBSIDENCE CONTOURS WITH HISTORIC PLACES OVERLAID**

Drawn: VH	Approved: SS	Date: 24-06-2013	Figure: **5.2**	Rev:A
Job No:	File No: URS 42627136-g-2007.wor			**A4**

5.2 Types of Potential Impacts

Potential impacts on non-Indigenous cultural heritage from the project will arise due to vegetation clearance and surface and sub-surface disturbance related to underground mining and development of associated above ground facilities and infrastructure, including incidental mine gas management infrastructure.

Subsidence is also expected within the immediate area above any underground workings identified in **Figure 6.2**. Subsidence modelling estimates that the approximate depths of subsidence will be as much as six metres in areas where RHHAS-04, RHHAS-08 and RHHAS-09 are located.

Indirect impacts may occur from day to day operation of vehicles across the broader site.

5.3 Project Timeframes

The timing for commencement, the rate of development and scale of future production on the Red Hill Mining Lease has not been determined and is subject to the owner's approvals. Upon completion of the mine's construction, the operational period of the mine is expected to be approximately 25 years.

Development work for the extension of panels 14, 15 and 16 is due to commence in Financial Year (FY) 2016. The mining of these extensions will utilise existing mine infrastructure and extend the Life of Mine by approximately 1 year.

5.4 Project Impact on Sites and Places of Cultural Heritage Significance (RHHAS)

The field surveys identified nine sites of low, low-moderate or moderate levels of cultural heritage significance within the EIS study area. Reviews of the proposed project indicate that three historical archaeological sites (RHHAS-04, RHHAS-08 and RHHAS-09) may potentially be impacted by the project. These sites are located within the proposed footprint of the underground mine operation. Predicted subsidence contours indicate that impacts are likely to reach subsidence levels of six metres (see **Figure 5.2**).

If subsidence occurs in the area, impacts on vegetation and historic features can vary markedly. If actual subsidence is around six metres, then RHHAS-04 (dump), RHHAS-08 (Old Riverside Homestead) and RHHAS-09 (Current Riverside Homestead Complex) may be severely impacted.

Table 5.1: *Significant historical archaeological sites potentially impacted by the project*

Impact type	Impacted site/s	Significance Rating
Potential impact (underground mining)	RHHAS-04 (Dump in drainage channel)	Low-Moderate
Potential impact (underground mining)	RHHAS-08 (Old Riverside Homestead Complex)	Low-Moderate
Potential impact (underground mining)	RHHAS-09 (Current Riverside Homestead Complex)	Moderate

5.5 Project Impact on Places of Historic Interest (HI)

The field survey identified six places of historic interest, of these two may potentially be impacted by the project through installation of incidental mine gas management infrastructure and subsidence. These places are not usually considered to contain enough heritage value to warrant further assessment or specific mitigation strategies. However, they will be subject to potential direct impact by the project. A recommendation to manage these places is provided in **Section 6**.

Table 5.2: *Historic interest sites potentially impacted by the project*

Impact type	Impacted site/s
Potential impact (underground mining)	RHHI-02 (Historic property boundary fence 2)
Potential impact (underground mining)	RHHI-04 (Possible former Native Police Camp)

5.6 Project Impact on Potential Sites and Places of Cultural Heritage Significance

It is concluded that there is some potential for further historic places/items to exist within the EIS study area. These are likely to be remnant sites relating to pastoral and settlement activities, such as the 'Old Station' site, historic survey trees, stock routes,

remnant boundary fence lines and old station dumps that might exist across the EIS study area. Historic sites and places such as mile markers, remote graves and historic camp remnants and associated exotic vegetation, may also potentially be impacted by the project. Recommendations to manage project impacts on unexpected finds are provided in the following section.

6.0 Recommendations

This section provides specific recommendations to manage identified heritage sites potentially impacted by the project. General mitigation recommendations are provided in order to manage unknown and unexpected historic cultural heritage sites located within the EIS study area which may potentially be impacted by the proposed project. Management recommendations are also provided for the identified HI places listed in **Table 5.2**. As outlined in **Section 4.7**, unknown historic cultural sites or places may include or be related to:

- An important historic event that took place;
- Remains from early settlement activities
- Remains of old mines or early camps;
- Remains of early camps;
- Remnants from stock routes and early roads;
- Remote graves;
- Survey trees; or
- Old Station dumps.

Assuming the recommendations below are suitably implemented, this report finds the nature and level of impact by the project is acceptable from a heritage perspective.

6.1 Recommendation 1 – Further Survey of 'Old Station Yard' and Archaeological Monitoring of RHHI-04

Recommendation 1	Reference
The area identified as the location of the 'Old Station Yard' site will likely be impacted by the mine development and associated infrastructure. Due to the potential for archaeological material to remain *in situ* in the vicinity of this site, it is recommended that a survey of this area be conducted to ensure that the type and extent of any surviving archaeological material is researched, investigated, recorded and mitigated (if required). This should be done using acceptable archaeological methods prior to any development or impact on or below ground in these areas. **RHHI-04** This area is identified as a potential former Native Police Camp. Repeated efforts could not locate any evidence of the site, however, to ensure potential subsurface remains are not impacted by the project, archaeological monitoring of the area noted as RHHI-04 should be undertaken during any ground disturbing works.	**Sections 3.2; 4.2.2** and **4.2.3**

6.2 Recommendation 2 – Recording of Significant Sites and Places Potentially Impacted by the Project

Recommendation 2	Reference
Three sites (**RHHAS-04** – *Dump*, **RHHAS-08** – *Old Riverside Homestead* and **RHHAS-09** – *Current Riverside Homestead*) of cultural heritage significance may potentially be impacted by the project. Each of these three sites could be impacted by subsidence of as much as -6 m. It is recommended that a basic level of photographic recording is conducted for these sites, which captures the nature of the item and their context within the cultural environment and within the EIS study area, prior to works commencing in the area.	**Table 4.3** **Figure 3.5** and Appendix-Site cards

6.3 Recommendation 3 – Avoidance of Sites

Recommendation 3	Reference
The best form of cultural heritage management is to avoid impact on sites and places of significance. It is recommended that the project take into account each of the HAS sites and places discussed in this report, and, where possible, avoids impacting on these sites, or if this is not possible, implements the relevant mitigation measures as recommended in this report. In the case of this project, impact may not always be avoidable. If avoidance of HI sites is not possible, then HI sites can be cleared and disposed of in a manner suitable to the project.	-

6.4 Recommendation 4 – Cultural Heritage Management

Recommendation 4	Reference
Management strategies are required in order to mitigate impact and potential impact to unexpected cultural heritage material or sites found during the construction stage of the project. In particular: – Workers involved in vegetation clearing and ground disturbance must be made aware of the potential to identify unexpected items of cultural heritage significance – In the event that items of possible cultural heritage significance are identified, work in the area should cease and mine environmental officers contacted – Mine environmental officers will determine whether archaeological assessment is required and make arrangements for this assessment as well as notification to Queensland Department of Environment and Heritage Protection. These measures can be combined with measures related to inadvertent finds of Indigenous cultural heritage significance.	-

6.5 Recommendation 5 – Variation to the Project Design

Recommendation 5	Reference
This study has assessed the impacts within the EIS study area. Any further variation to the project which places mining, inundation or infrastructure outside the assessed area would require reassessment to determine the nature of the impact on sites and places of cultural heritage significance.	-

6.6 Recommendation 6 – Cultural Heritage Awareness Training

Recommendation 6	Reference
In order to educate construction and mine workers about tangible cultural heritage which may exist in the area, cultural heritage induction awareness training, inductions and 'tool box talks' should take place in addition to the general safety inductions for workers who are activated for project works in the vicinity of the EIS study area.	-

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8.0 Appendices

Appendix 1 – Site Inventory for Heritage or Archaeology Sites (HAS)

SITE NAME	**RHHAS-01 Dump**
LOCATION	Located on the western bank of the Isaac River, 2 kilometres NNE of the Riverside Homestead. Within MLA70421, outside the underground footprint. Adjacent to GRHAS-03 and GRHAS-04.
ENVIRONMENTAL CONTEXT	River Red Gum-Coolabah associations along what remains of the riparian fringe.
GI	0-25% - Areas of extreme erosion.
GSV	75-100%
SITE DESCRIPTION	The dump contains items associated with life around the home; bottles, household furniture, kitchen items; and also materials from farm life around the house; fence posts, car bodies, fencing wire for example. The dump is found in association with an old water tank (RHHAS 2) with associated stone structure to allay run-off from the overflow pipe, and a dead tree (still standing) with extensive scarring as a result of the attentions of a steel axe (Refer to **Figure 4.1**).
PREVIOUS IMPACTS	Environmental impacts such as erosion.
ADDITIONAL COMMENTS	There is evidence to suggest the dwelling that originally stood at this location had fallen into disrepair and then been pushed, in total, over the riverbank into the dump itself.

Figure A.1: *Old dump at RHHAS-01 with RHHAS-02 (old tank) visible in the background.*

SITE NAME	**RHHAS-02 Corrugated iron water tank with bottles**
LOCATION	Located on the western bank of the Isaac River, 2 kilometres NNE of the Riverside Homestead. Adjacent to RHHAS-01 and RHHAS-03.
ENVIRONMENTAL CONTEXT	River Red Gum-Coolabah associations along what remains of the riparian fringe.
GI	0-25% - Areas of extreme erosion.
GSV	75-100%
SITE DESCRIPTION	An old corrugated iron water tank. Associated with this tank were a number of old condiment bottles and jars, four of which had an Australian Glass Manufacturer's (AGM) mark on the base dating them to the 1930s. This date range alone does not elucidate much on the timescale through which the dwelling was active and probably represents a time toward the middle of the 'life' of the homestead rather than its beginnings and/or when it was abandoned.
PREVIOUS IMPACTS	N/A

SITE NAME	**RHHAS-03 Surveyor's Mark**
LOCATION	Located toward the northern margin of the survey area covered in MDL358 on the western bank of the Isaac River. Adjacent to RHHAS-01 and RHHAS-03.
ENVIRONMENTAL CONTEXT	River Red Gum-Coolabah associations along what remains of the riparian fringe. Areas of extreme erosion.
GI	0-25%
GSV	75-100%
SITE DESCRIPTION	A Dawson Gum tree (*Blackbutt – Eucalyptus cambageana*) with a surveyor's mark blazed upon it. The tree faces away from the river. The mark itself had three components interpreted as follows: Top – the broad arrow 'logo' identifies the mark as that of a government surveyor; Middle – this inscription identifies the initials of the surveyor; Bottom – the figure at the base identifies the surveyor station number at that location (Refer to **Figure A.2**).
PREVIOUS IMPACTS	N/A

Figure A.2: *The surveyor's mark on the western bank of the Isaac River, 2 kilometres north of "Riverside" homestead.*

SITE NAME	**RHHAS-04 Dump in drainage channel**
LOCATION	Located within the walls and bed of a drainage channel intersecting the Isaac River, 2 kilometres southwest of Riverside Homestead. Within MLA70421 and the underground footprint.
ENVIRONMENTAL CONTEXT	Dense Mitchell and Blue Grass. Dry and heavily eroded channel bank. Evidence of grazing and land clearing. Remnant woodland of Box, Ironbark, Coolabah and occasional exotic plant species. White ants are prevalent in many of the trees.
GI	0-25%
GSV	25-100% - A clear view of landscape only occurred within the drainage channel itself.
SITE DESCRIPTION	The southern wall and bed of the drainage channel contained evidence of general household refuse; layers of iron sheets, fibro, glass bottles, a cast iron pot, broken ceramics and piping. The dump extends for approximately 50m west within the channel (Refer to **Figures A.3** and **A.4**).
PREVIOUS IMPACTS	Environment impacts; evidence of recent rainfall and erosion.
ADDITIONAL COMMENTS	The dump's contents do not predate the late 1940s.

Figure A.3: *Layers of iron sheeting, bottles and ceramic in the channel wall at RHHAS-04*

Figure A.4: *A cast iron pot in the channel wall at RHHAS-04*

SITE NAME	**RHHAS-05 Survey Tree**
LOCATION	Located approximately 100 m from the eastern bank of the Isaac River. **Within the current Broadmeadows area, outside of the Red Hill underground footprint.**
ENVIRONMENTAL CONTEXT	The scarred tree (MB Ash) is situated within a heavily cleared lay down area. Older trees remain in situ. The surrounding woodland consists mainly of Moreton Bay Ash, Coolabah, Ironbark and Box trees. Regrowth vegetation includes Brigalow and Sandalwood scrub. Much of the vegetation is severely affected by white ants.
GI	0-25%
GSV	100%
SITE DESCRIPTION	A living MB Ash with two scars; one directly below the other. The upper scar has a triangular pattern typical of survey scars of the early 20th Century. A blazed mark could not be identified. There is however evidence of severe deterioration of the internal structure of the trunk. The second scar is positioned at the base of the tree and has clear diagonal axe marks at the top of the scar (Refer to **Figures A.5, A.6, A.7** and **A.8**).
PREVIOUS IMPACTS	Heavy clearing in the area.
ADDITIONAL COMMENTS	The location of this tree is consistent with the location of a survey tree (MB Ash) on a 1922 survey plan of the area (see **Figures A.7** and **A.8**). NB- It is difficult to distinguish between Aboriginal scarred trees and historic survey trees where there is no discernable survey blaze. Inferences can be made about a scar based on historical records and maps.

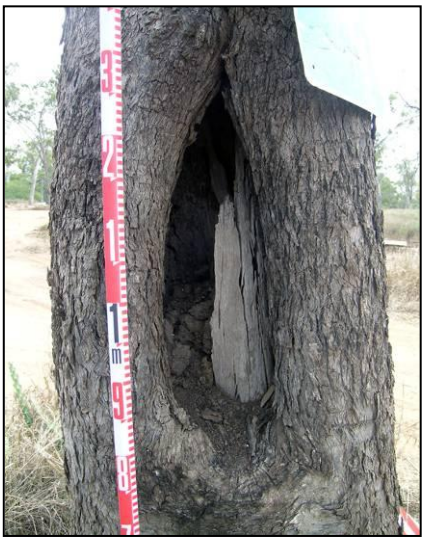
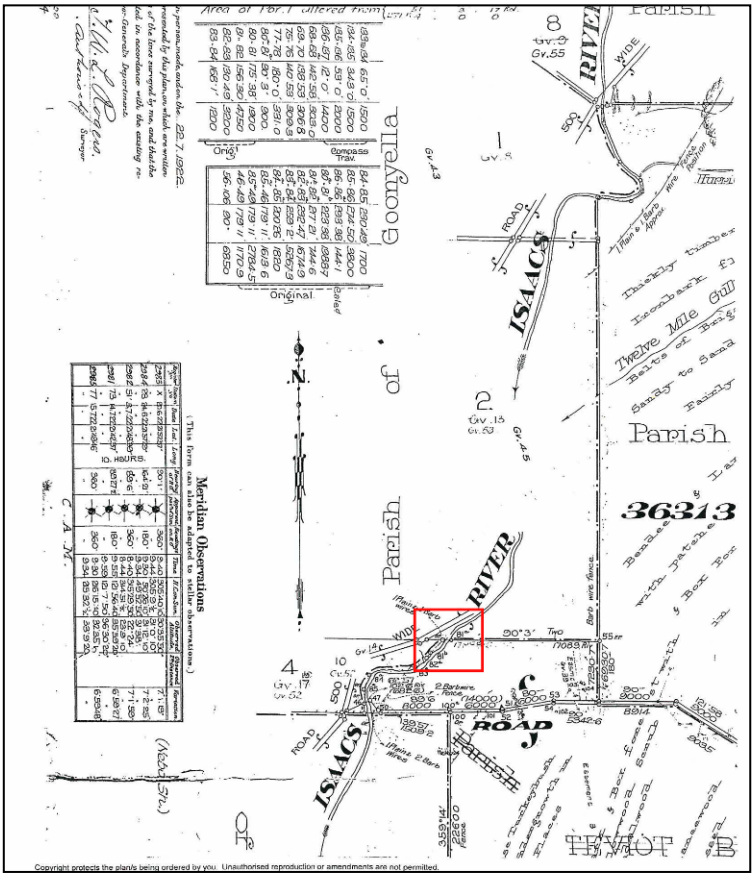


***Figure A.5**: RHHAS-05, Scar 1.*

***Figure A.6**: RHHAS-06, Scar 2.*



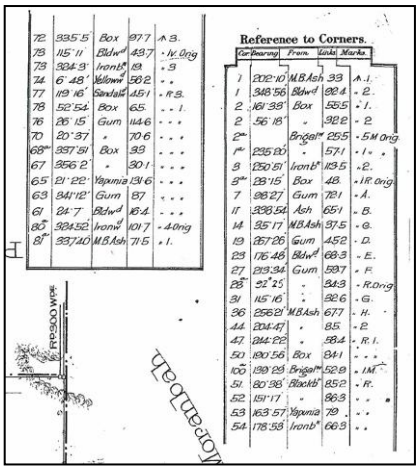


***Figure A.8:** A section of the same 1922 survey plan of GV 21 showing the details of the survey tree markings and location.*

***Figure A.7:** (Above) A section of the 1922 survey plan of GV 21 'Goonyella' showing a survey tree marked by the reference 81a on the east side of the Isaac River.*

SITE NAME	**RHHAS-06 Broadmeadow Homestead Complex**
LOCATION	The homestead complex is located in the south west of the mine's proposed expansion area between Platypus Creek and Fisher Creek. Located in the south-western EIS study area, outside of the proposed areas of disturbance.
ENVIRONMENTAL CONTEXT	Mostly cleared with a few trees of varying maturity. Bottle trees, Mango trees and a large Poinciana dominate the area. The complex is transacted by vehicular tracks.
GI	0-25%
GSV	100%
SITE DESCRIPTION	The complex consists of a bungalow homestead most likely constructed in the 1920s, a second smaller more recent Hardiplank house, stockman quarters, 8 bay shed, fences, gate, stables with associated carrels, a high standing water tank and an outhouse/shed. Ten Bottle trees line the driveway from the entrance of the complex. Three mango trees are positioned at the front of the second smaller house, a large Poinciana tree is positioned on the western side of the bungalow and three Hibiscus trees are located on the northern side of the bungalow (Refer to **Figures A.9, A.10, A.11** and **A.12).**
PREVIOUS IMPACTS	The complex was moved from the original site (within the current mining pit) to this site in 1981 (pers comm. Riverside Homestead leaseholder 2007).
ADDITIONAL COMMENTS	N/A

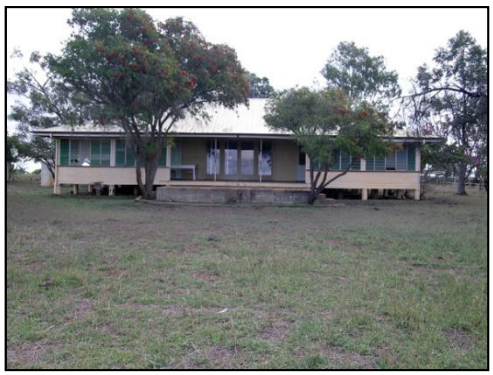


Figure A.9: *RHHAS-06 – Bungalow.*

Figure A.10: *RHHAS-06 – House.*

Figure A.11: *RHHAS-06, stables and associated carrels.*

Figure A.12: *RHHAS-06, bottle trees.*

SITE NAME	**RHHAS-07 Broadmeadows Cottage**
LOCATION	The cottage is located approximately 500 m south of the Broadmeadow Homestead Complex. Located in the south-western EIS study area, outside of the proposed areas of disturbance.
ENVIRONMENTAL CONTEXT	Mostly cleared. Vehicular track in the form of a driveway. Large mango tree to the west of the cottage. Red clayey soil.
GI	0-25%
GSV	100%
SITE DESCRIPTION	Timber bungalow cottage raised on 5 foot stumps most likely constructed in the interwar period, associated car port, fence, gate and water tank (Refer to **Figure A.13**).
PREVIOUS IMPACTS	The cottage is associated with the Broadmeadow Homestead Complex and is believed to have been moved from its original location in 1981 with the Homestead.
ADDITIONAL COMMENTS	N/A

Figure A.13: *GRHAS-07, The Cottage.*

SITE NAME	**RHHAS-08 Old Riverside Homestead Complex**
LOCATION	Approximately 250 m west of Goonyella Creek and 2 kilometres west of the current Riverside Homestead Complex (within the Goonyella Riverside Property). Located within MLA70421 and within the underground footprint.
ENVIRONMENTAL CONTEXT	Mostly cleared, remnant vegetation. Most of the trees in the area are dead. Currently being used as a horse paddock. Vehicular tracks.
GI	0-25%
GSV	100%
SITE DESCRIPTION	Nine stumps remain of the original homestead. These foundations are in association with stone foundations for 2 structures, a wooden cattle trough, pieces of an old cast iron Etna stove, and flat riveted sheets of iron (Refer to **Figures A.14** and **A.15**).
PREVIOUS IMPACTS	The site was removed from this location to the current location sometime between 1900 and 1916 (pers comm. [Riverside Homestead leaseholder] 2007). The few remains of the Homestead Complex are in relatively poor condition. The cattle trough is a later addition (1970s) to this site (pers comm. Riverside Homestead Complex leaseholder 2007). Evidence of clearing and grazing.
ADDITIONAL COMMENTS	An abundance of petrified wood in the area. Some of the wood was used as the original house stumps.

Figure A.14: *GRHAS-09, House Stumps.*

Figure A.15: *GRHAS-09, Pieces of Etna Stove.*

SITE NAME	**RHHAS-09 Current Riverside Homestead Complex**
LOCATION	Riverside Station – Located on the west bank of the Isaac River off Red Hill Road to the east. The Homestead Complex is generally located in the north east of the EIS study area (within the Goonyella Riverside Property). Located within MLA70421 and within the underground footprint.
ENVIRONMENTAL CONTEXT	Mostly cleared with remnant older gums and some exotic plantings. Transected by a number of vehicular tracks.
GI	25%
GSV	100%
SITE DESCRIPTION	The original Homestead (relocated from its original location at RHHAS-08) with added extensions to the west (possibly the integration with another cottage). The homestead is associated with a smaller house to the north, a tennis court, two buildings likely to be stockman quarters, 3 large sheds and associated lean to, a timber post and rail fence, a few smaller tin sheds, water tanks and a grain silo (Refer to **Figures A.16, A.17** and **A.18**).
PREVIOUS IMPACTS	Clearing and introduced exotic vegetation
ADDITIONAL COMMENTS	N/A

Figure A.16: *RHHAS-09, House on the N side of the homestead.*

Figure A.17: *RHHAS-09, Stockman quarters.*

Figure A.18: *RHHAS-09, Oldest part of the Homestead (relocated from its original setting at RHHAS-08).*

Appendix 2 – Site Cards for Historic Interest Sites

Items and places of historical interest in the Red Hill EIS study area are those which do not provide a suitable level of cultural heritage significance in their own right to justify further assessment. They are however, included here as they contribute (or potentially contribute) to the broader discussion of historical and archaeological sites, places and precincts within and around the EIS study area. Twelve places of historic interest were originally located during the site surveys, however, only six are located within the current EIS study area - these are briefly described below.

Site No	**RHHI-01**	
Type/Name	Historic Property Boundary Fence 1	
Location (Datum WGS84 Zone 55K)	603060E	7588413N
	Located within current BRM footprint	
Description	Located approximately 200m from the eastern bank of the Isaac River are the remains of a 3 barb timber fence. The line of fence posts extends for 200-300m in a north-east direction. The fence is believed to have been constructed by a Riverside Homestead leaseholder's father in the late 1940s (pers comm. Riverside Homestead leaseholder). The timber posts are deteriorating, however are in good condition considering the prevalence of white ants in the area.	
Provenance	Unknown	
Potential Impact	None	
Archaeological Potential	N/A	
Significance	Low	

Site No	**RHHI-02**	
Type/Name	Historic Property Boundary Fence 2	
Location (Datum WGS84 Zone 55K)	606339E	7590012N
	Within southern area of proposed underground footprint	
Description	Remnants of two historic property boundary fences (2 barb and 3 barb) extend alongside a current fence line in an east-west direction between the power easement and the Isaac River towards the survey tree located at RHHAS-05. The fence post remnants are in poor condition with one line of posts having completely collapsed. Weathered barbed wire remnants are evident. This fence line is consistent with the original position of the southern boundary of Goonyella Station as noted in the 1922 survey plans of the area.	
Provenance	20th Century	
Potential Impact	Potentially impacted by subsidence from underground mining.	

Site No	RHHI-02
Archaeological Potential	N/A
Significance	Low

Site No	RHHI-03	
Type/Name	Telegraph Tree	
Location (Datum WGS84 Zone 55K)	608201E	7599796N
	Just north of the underground footprint.	
Description	Of interest, and probably more closely associable with the dwelling that occurred within the RHHAS-01 and RHHAS-02 precinct, is the remains of the telegraph wire and insulator, still hanging from a tree approximately 300 m to the northwest of the old tank.	
Provenance	Unknown	
Potential Impact	None	
Archaeological Potential	N/A	
Significance	Low	

Site No	RHHI-04	
Type/Name	Possible location of Police Camp	
Location (Datum WGS84 Zone 55K)	Not confirmed	Not confirmed
	Within underground footprint.	
Description	A Riverside leaseholder remembers his father showing him the location of an old Police camp when he was a boy. This location has been recorded and identified as RHHI-06. The location of the camp, as identified by this leaseholder, is on the west bank of the Isaac River, approximately 6 kilometres downstream from the current Riverside Homestead Complex (RHHAS-09). The leaseholder has not been back to the camp site in 20 years, however, he remembers timber post remnants believed to be holding yard posts. The Queensland Native Mounted Police established in 1861 in the Nebo district with the main Police camp in the region located at Tongwarry, 10 kilometres north of Nebo. This detachment was responsible for patrolling all the country inland as far as the Isaac River and south along the coast from Mackay to Collaroy (Moore 1993:97). There are reports of a camp at North Creek (Mayes 1991), and Mayes (1991:136) notes that reference is made in *Pughs Almanac* of a police camp 26 miles (40 kilometres) west of Oxford Downs on the mail run from Nebo to Clermont. This camp was just to the north of today's Annandale Homestead. Although the available historical records and site survey provide no direct evidence at this stage of the location of a police camp in the EIS study area,	

Site No	RHHI-04
	the Riverside leaseholders have a long, established history and connection to the area. The possibility of this site being the location of a Native Police camp must therefore still be considered within the context of the proposed project and any remnants may require careful management. Significant attempts were made as part of the field survey to locate any remains of the camp from these discussions and the physical and environmental context. However, the area described exhibited no such visible remnants and extremely low ground surface visibility as a result of dense grass cover. Improvement of ground surface visibility along with a planned systematic survey of the area is required to determine the true nature of this site. ***A recommendation for further research and survey for this potential site is provided in Section 6- Recommendations.***
Provenance	C1800s
Potential Impact	Potential impacts from subsidence from underground mining
Archaeological Potential	Low
Significance	Moderate to High

Site No	RHHI-05	
Type/Name	Former Holding Yards and Associated Bore	
Location (Datum WGS84 Zone 55K)	597180E	7585251N
	In the southeast corner of the EIS study area.	
Description	The disused holding yard and bore are located towards the south eastern boundary of the EIS study area, outside of the proposed area of disturbance. The bore (spring) is located in a concreted water feeder that has been partially covered by wooden planks. Several remnant holding yard elements including the spear gate remain. The 1923 survey map of the area indicates a spring and holding yards within this vicinity, which suggests that there is possibility that this former holding yard represents the same item on the documented 1923 site (see **Figure 2.1**).	
Provenance	Early 20th Century	
Potential Impact	None	
Archaeological Potential	Low	
Significance	Low	

Site No	RHHI-06	
Type/Name	Dead Tree	
Location (Datum	604067E	7601976N

Site No	RHHI-06
WGS84 Zone 55K)	Located on the western bank of Goonyella Creek, approximately 4.5 kilometres NW of the Riverside Homestead.
Description	The dead tree (still standing) has extensive scarring as a result of the attentions of a steel axe. Scarring was probably the result of the tree being used at some early time as a fence post. This purpose did not result in the tree's death, which is apparent by the amount of growth around the scar that has occurred afterward. The axe cuts may be the source of death being used as a means of introducing herbicide into the tree; however, it is more likely the axe cuts occurred after the tree had already died.
Provenance	Unknown
Potential Impact	None
Archaeological Potential	Low
Significance	Low