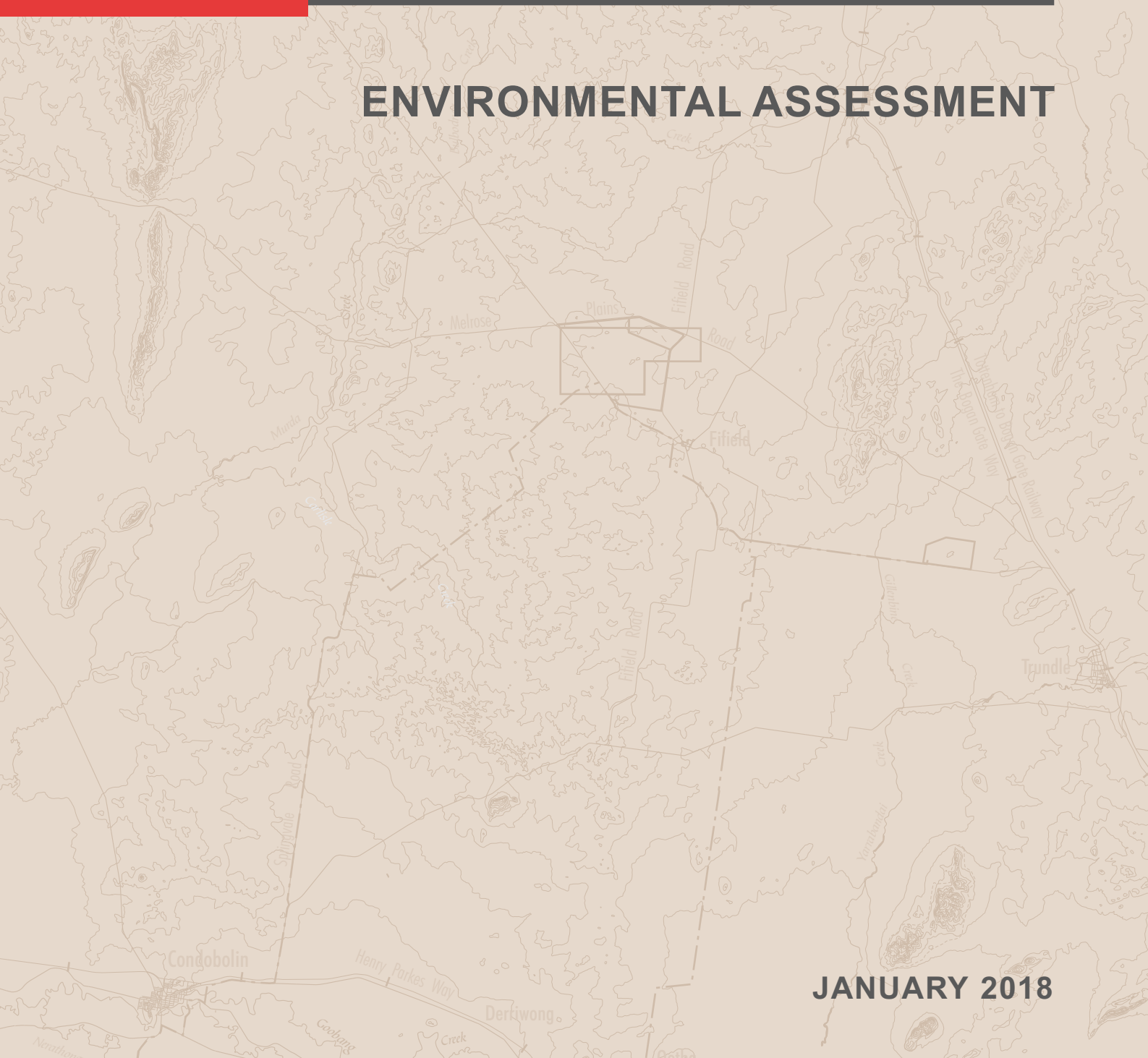


# CLEAN TEQ SUNRISE PROJECT

## ACCOMMODATION CAMP MODIFICATION

### ENVIRONMENTAL ASSESSMENT



**JANUARY 2018**

# **Clean TeQ Sunrise Project**

## **Accommodation Camp Modification (MOD 6)**

### **Environmental Assessment**

**00897181**

Date Published  
11-Jan-18

Revision  
1

## Executive Summary

### ES.1 Background

The Clean TeQ Sunrise Project (the Project) is an approved nickel cobalt scandium mining project situated approximately 350 kilometres west-northwest of Sydney, near the village of Fifield, New South Wales.

Scandium21 Pty Ltd owns the rights to develop the Project. Scandium21 Pty Ltd is a wholly owned subsidiary of Clean TeQ Holdings Limited (Clean TeQ).

Development Consent DA 374-11-00 for the Project was issued under Part 4 of the New South Wales *Environmental Planning and Assessment Act, 1979* in 2001. The Project includes the establishment and operation of the following:

- mine (including the processing facility);
- limestone quarry;
- rail siding;
- gas pipeline;
- borefields and water pipeline; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

An accommodation camp is approved to be located on the western side of the mine site in the vicinity of Wilmatha Road (Figures ES-1a and ES-1b). The approved accommodation camp will be used during the construction phase of the Project and will have accommodation facilities for approximately 1,000 personnel.

Construction of the Project commenced in 2006 with the construction of components of the borefields, however Project operations are yet to commence.

### ES.2 Modification Overview

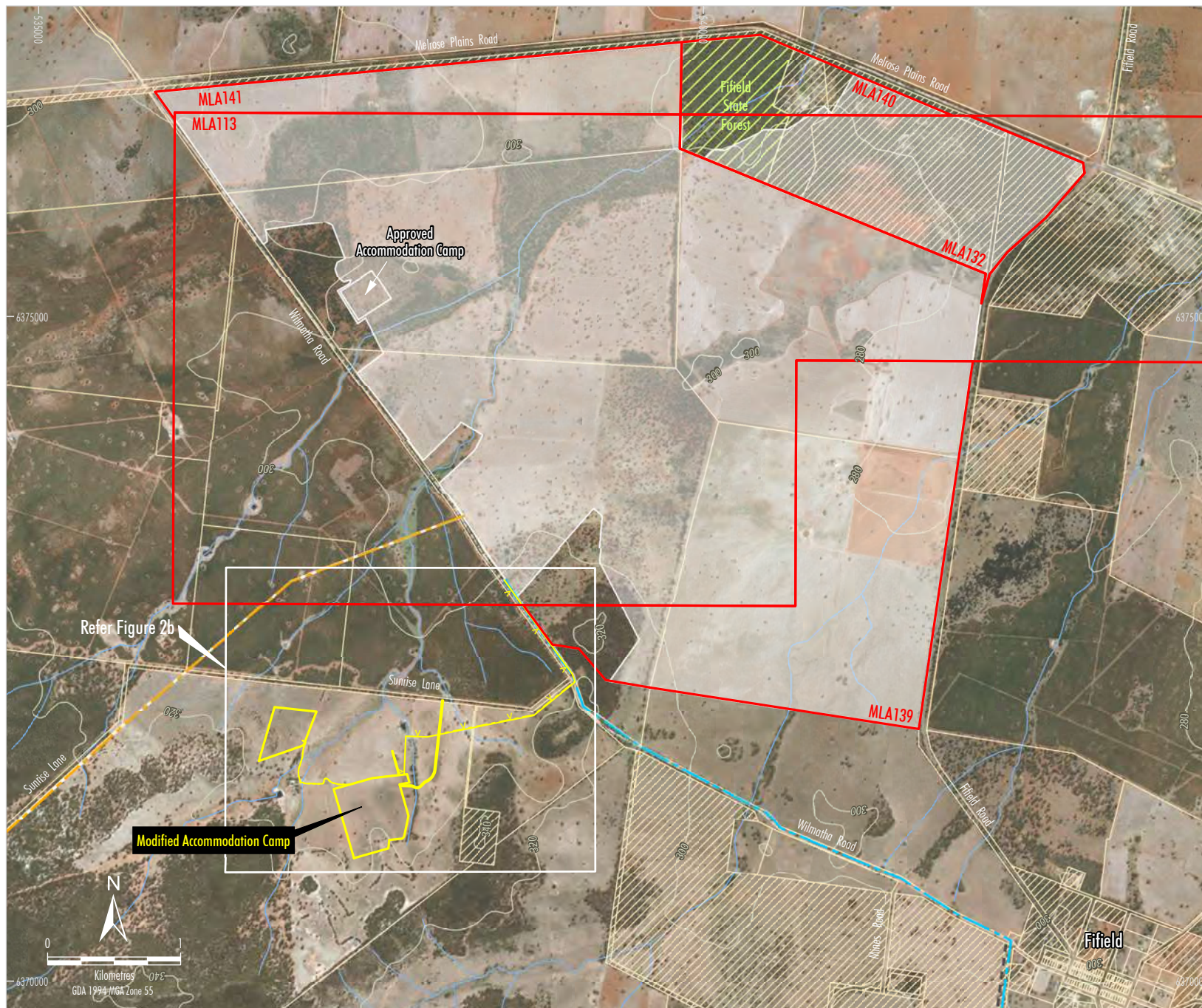
As part of detailed planning for the construction phase of the Project, Clean TeQ has identified an alternative location for the approved accommodation camp that would provide improved amenity for the workforce in the accommodation camp and minimise potential operational constraints at the mine site. Clean TeQ also identified the preference to maintain the accommodation camp (at reduced capacity) during operations for the short-term use of temporary contractors and visitors.

These proposed changes to the approved accommodation camp is referred to as the Accommodation Camp Modification (the Modification). The Modification is sought under section 75W of the New South Wales *Environmental Planning and Assessment Act, 1979* and would include:

- development of the accommodation camp (including supporting infrastructure) at an alternative location approximately 4 kilometres to the south of the mine site;
- construction of an electricity transmission line and water pipeline from the mine site to the modified accommodation camp site;
- minor road upgrades;
- increased accommodation camp capacity (from approximately 1,000 to 1,300 personnel); and
- the accommodation camp (at reduced capacity) would continue to be operated post-construction.

A conceptual general arrangement of the modified accommodation camp is provided on Figures ES-1a and ES-1b.





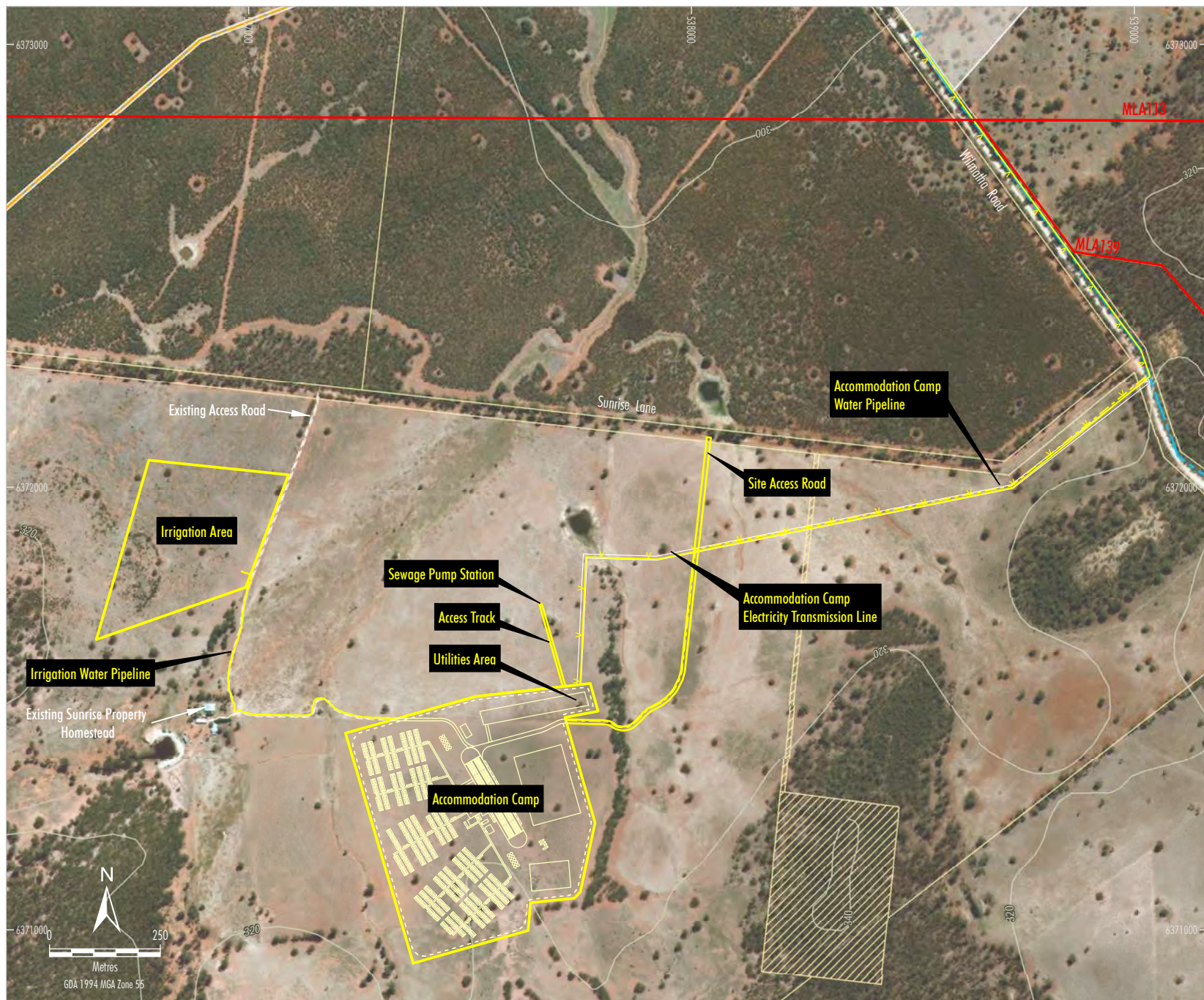
- LEGEND**
- Mining Lease Application Boundary
  - Approved Surface Development Area
  - Approved Fifield Bypass
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - State Forest
  - Property Boundary
  - Crown Land
  - Modified Layout
- Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
NSW Imagery: Esri Basemap

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**Conceptual Modified General Arrangement**

**Figure ES-1a**





- LEGEND**
- Mining Lease Application Boundary
  - Approved Surface Development Area
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - Property Boundary
  - Crown Land
  - Modified Layout

Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
NSW Imagery: Esri Basemap

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Conceptual Modified General Arrangement  
Inset

**Figure ES-1b**

The Modification would not involve changes to any aspects of the approved mine and processing operations, limestone quarry, rail siding, borefields, water pipeline or gas pipeline.

### ES.3 Environmental Review

Clean TeQ has undertaken a review of the potential environmental impacts of the Modification to identify key potential environmental issues requiring assessment. The following key potential environmental issues were identified:

- potential impacts due to additional surface development areas required for the modified accommodation camp and supporting infrastructure;
- potential surface water impacts associated with the development of the modified accommodation camp;
- potential air quality and noise impacts associated with the construction of the modified accommodation camp;
- changes to road transport requirements and road network due to relocation of the accommodation camp; and
- potential visual impacts associated with the development of the modified accommodation camp.

In order to assess the potential environmental impacts of the Modification, environmental reviews were completed for key issues.

Table ES-1 summarises the key environmental review conclusions regarding the Modification.

Clean TeQ would implement environmental management and monitoring measures to minimise the potential impacts of the modified Project on existing environmental values. Additional mitigation measures, management and monitoring proposed for the Modification are summarised in Table ES-1.

### ES.4 Modification Justification

The Modification would provide improved amenity for the workforce in the accommodation camp and minimise potential operational constraints at the mine site.

Alternatives locations for the modified accommodation camp have been considered by Clean TeQ as part of detailed planning for the construction phase of the Project. The proposed location and layout of the modified accommodation camp was the preferred location on the following basis:

- it would improve amenity for the workforce in the accommodation camp and minimise potential operational constraints at the mine site;
- it would remain proximal to the mine site to minimise workforce travel requirements;
- it would be located within previously cleared/cultivated land with minimal biodiversity values to minimise native vegetation clearance;
- it would be located approximately 2.5 kilometres from the closest privately-owned receiver to minimise potential amenity impacts; and
- it would be located on Clean TeQ owned land.

This Environmental Assessment has demonstrated that with the implementation of the mitigation measures, the Modification can be implemented with limited additional biophysical and environmental impacts in comparison with the approved Project.

It is therefore considered that the Modification is justified on environmental, economic and social grounds and that an application to modify Project Development Consent DA 374-11-00 under section 75W of the *Environmental Planning and Assessment Act, 1979* is appropriate.



Table ES-1 Key Outcomes of Environmental Review

Environmental Aspect	Summary of Key Environmental Review Conclusions	Additional Mitigation Measures, Management and Monitoring Proposed for the Modification <sup>1</sup>
Land and Agricultural Resources	<ul style="list-style-type: none"> <li>The Modification would result in the disturbance or alteration of approximately 38 hectares of existing low to moderate capability agricultural lands for the life of the Project.</li> </ul>	<ul style="list-style-type: none"> <li>Agricultural activities would continue to occur on outside the accommodation camp area during the Project.</li> <li>The modified accommodation camp area would be rehabilitated for an agricultural final land use.</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>The modified accommodation camp was designed to avoid and minimise potential biodiversity impacts and is proposed to be constructed solely within the previously cleared/cultivated land with minimal biodiversity values.</li> <li>The Modification would result in the clearance of approximately 27.5 hectares of previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs.</li> <li>Scattered trees would need to be cleared for the Modification, however trees which could provide habitat for threatened 'species credit species' were identified and would be avoided.</li> <li>The proposed irrigation over approximately 10.5 hectares of previously cleared land is unlikely to adversely impact native vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>Scattered trees which could provide habitat for threatened 'species credit species' would specifically be identified with flagging tape during nearby construction works and would be avoided.</li> <li>The modified accommodation camp would be kept as a clean, rubbish-free environment in order to discourage scavenging and reduce the potential for colonisation of these areas by non-endemic fauna (e.g. rodents).</li> <li>The workforce in the modified accommodation camp would not be permitted to keep native fauna or to encourage fauna through feeding.</li> <li>Domestic pets would not be allowed at the modified accommodation camp.</li> </ul>
Aboriginal Cultural Heritage	<ul style="list-style-type: none"> <li>The field surveys identified four previously unrecorded Aboriginal cultural heritage sites not of high scientific significance in the modified accommodation camp area and surrounds.</li> <li>One Aboriginal cultural heritage site (stone artefact site – AHIMS site number 35-4-0034) would be impacted by the Modification.</li> </ul>	<ul style="list-style-type: none"> <li>Three Aboriginal cultural heritage sites (AHIMS site numbers 35-4-0035, 35-4-0036 and 35-4-0037) would be avoided.</li> <li>Clean TeQ would submit an application for a new Aboriginal Heritage Impact Permit under section 90 of the New South Wales <i>National Parks and Wildlife Act, 1974</i> (and/or a variation application to the existing approved Aboriginal Heritage Impact Permit #C0003049).</li> </ul>
Historic Heritage	<ul style="list-style-type: none"> <li>As no historic heritage items were identified within the modified accommodation camp area, there would be no impacts to historic heritage items associated with the Modification.</li> </ul>	<ul style="list-style-type: none"> <li>Clean TeQ considers that no specific or additional mitigation measures, management or monitoring of historic heritage are required for the Modification.</li> </ul>
Water Resources	<ul style="list-style-type: none"> <li>The Modification is expected to result in negligible change to the approved flow impacts in Bullock Creek and the Bogan River.</li> <li>The Modification is predicted to have no change to the approved potential water quality impacts in the receiving drainage lines.</li> <li>As the Modification would not change mining operations or materially alter water demand, no change to approved groundwater impacts are expected.</li> </ul>	<ul style="list-style-type: none"> <li>The irrigation area would be managed in accordance with the <i>Environmental Guidelines Use of Effluent by Irrigation</i> and the irrigation rate would be controlled so as not to: <ul style="list-style-type: none"> <li>cause irrigation water runoff from the irrigation area; or</li> <li>exceed the capacity of the soil in the irrigation area to effectively absorb the applied nutrient, salt, organic material and hydraulic loads.</li> </ul> </li> </ul>



Table ES-1 Key Outcomes of Environmental Review (Continued)

Environmental Aspect	Summary of Key Environmental Review Conclusions	Additional Mitigation Measures, Management and Monitoring Proposed for the Modification <sup>1</sup>
Air Quality and Noise	<ul style="list-style-type: none"> <li>Potential air quality and noise impacts associated with the construction of the modified accommodation camp would not result in significant or prolonged impacts at any privately-owned receivers.</li> <li>Potential air quality and noise emissions from the modified accommodation camp operations would be negligible.</li> </ul>	<ul style="list-style-type: none"> <li>Clean TeQ considers that no specific or additional mitigation measures, management or monitoring of air quality or noise are required for the Modification.</li> </ul>
Road Transport	<ul style="list-style-type: none"> <li>The relocation of the accommodation camp would change Project road traffic movements on sections of Wilmatha Road and Sunrise Lane.</li> <li>The Modification would have negligible effect on the operation of the key access routes on the wider road network in the region.</li> <li>The Modification would not result in significant impacts on the safety of the road network with implementation of the road upgrades.</li> </ul>	<ul style="list-style-type: none"> <li>Clean TeQ would undertake the following road upgrades: <ul style="list-style-type: none"> <li>Sunrise Lane between Wilmatha Road and the modified accommodation camp access road – upgraded consistent with a Class 4A unsealed road; and</li> <li>Wilmatha Road/Sunrise Lane intersection – remove the transition between the gravel and dirt surfaces while Wilmatha Road remains unsealed, and then seal a minimum of 30 metres of Sunrise Lane on the approach to the intersection once Wilmatha Road is sealed.</li> </ul> </li> <li>Clean TeQ would contribute to the maintenance of Sunrise Lane during the life of the Project.</li> </ul>
Visual	<ul style="list-style-type: none"> <li>No views of the modified accommodation camp would be available from privately-owned dwellings due to the presence of intervening topography and vegetation.</li> <li>Overall, the potential visual impacts associated with the modified accommodation camp would be low.</li> </ul>	<ul style="list-style-type: none"> <li>The visual appearance of the modified accommodation camp (including paint colours, specifications and screening) would be designed to blend in as far as possible with the surrounding landscape.</li> <li>The modified accommodation camp would be landscaped in order to reduce the contrast between the modified accommodation camp and the surrounding environment.</li> </ul>
Community Infrastructure	<ul style="list-style-type: none"> <li>As the Modification would not result in any additional demand for employees, no material alteration to the approved population and community infrastructure demand is expected as a result of the Modification.</li> </ul>	<ul style="list-style-type: none"> <li>Clean TeQ considers that no specific or additional mitigation or management measures are required for the Modification with regard to community infrastructure.</li> </ul>
Hazard and Risk	<ul style="list-style-type: none"> <li>As the Modification would not result in changes to the existing potential risk areas identified in Preliminary Hazard Analysis previously prepared for the Project, no material alteration to the approved hazards and risks is expected as a result of the Modification.</li> </ul>	<ul style="list-style-type: none"> <li>Clean TeQ considers that no specific or additional mitigation or management measures are required for the Modification with regard to hazard and risks.</li> </ul>

<sup>1</sup> In addition to measures currently required under the Development Consent DA 374-11-00.

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# 1 Introduction

This document is an Environmental Assessment (EA) for a proposed modification to the Clean TeQ Sunrise Project (the Project), an approved nickel cobalt scandium mining project. Scandium21 Pty Ltd owns the rights to develop the Project. Scandium21 Pty Ltd is a wholly owned subsidiary of Clean TeQ Holdings Limited (Clean TeQ).

This Modification is sought under section 75W of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979* (EP&A Act).

## 1.1 Overview of the Approved Project

The Project is situated approximately 350 kilometres (km) west-northwest of Sydney, near the village of Fifield, NSW (Figure 1).

Development Consent DA 374-11-00 (Attachment 1) for the Project was issued under Part 4 of the EP&A Act in 2001.

The Project includes the establishment and operation of the following (Figure 1):

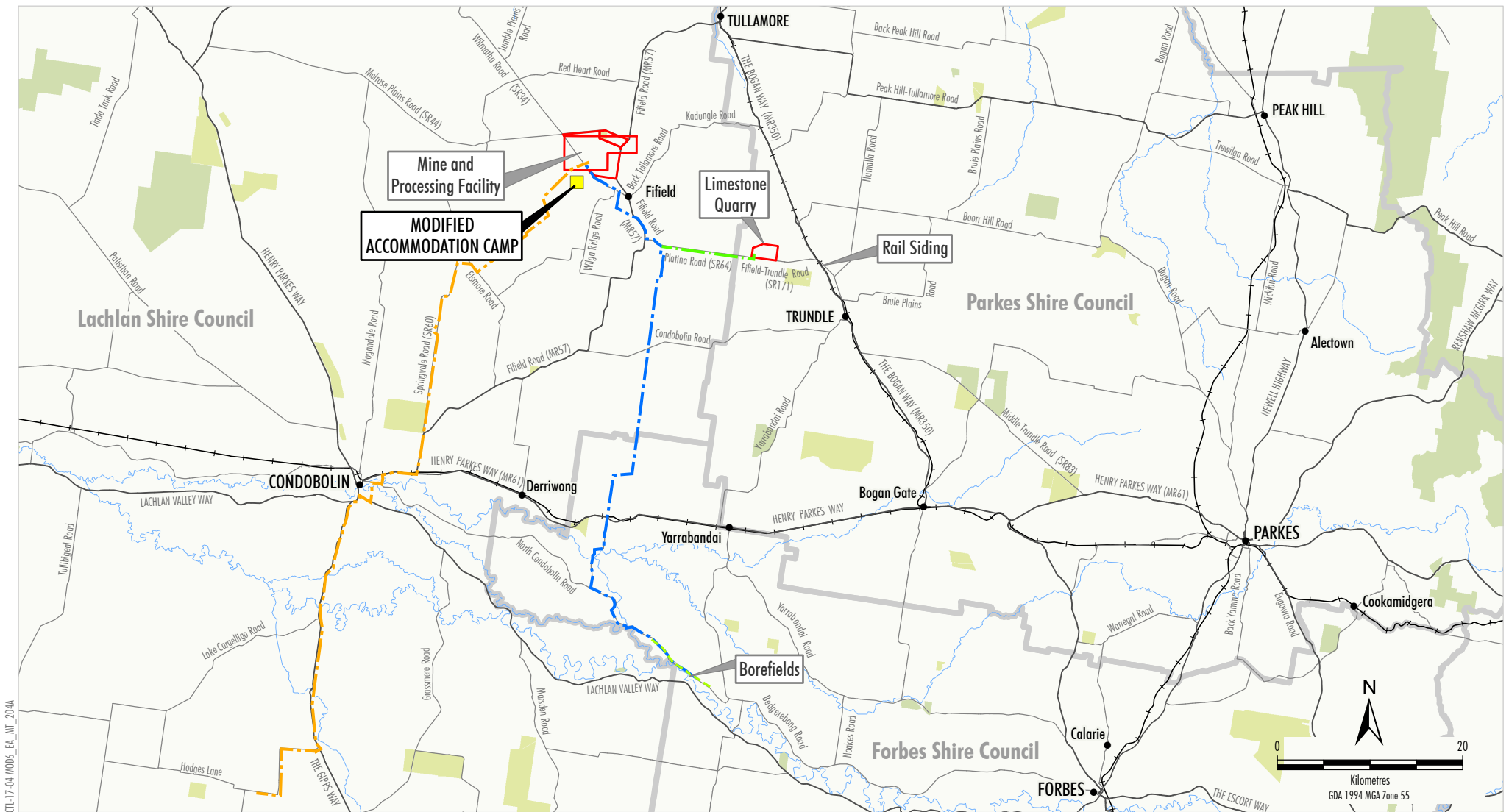
- mine (including the processing facility);
- limestone quarry;
- rail siding;
- gas pipeline;
- borefields and water pipeline; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

The Project includes an initial scandium oxide focussed production phase (the Initial Production Phase) prior to shifting to scandium oxide and nickel and cobalt precipitate production by developing the full Project (the Full Production Phase). The Initial Production Phase is a smaller-scale operation compared to the Full Project Phase and will include preferentially mining scandium-rich areas of the Syerston deposit at a run-of-mine ore production rate of 100,000 tonnes per annum (tpa) to produce up to 1,000 tpa of nickel and cobalt metal equivalents, as either sulphide or sulphate precipitate products, and up to approximately 80 tpa of scandium oxide.

The Project would transition to the Full Production Phase once scandium-rich areas of the Syerston deposit are depleted or sooner if favourable market conditions prevail for larger scale nickel cobalt scandium production. The mining and processing will then increase to allow for an autoclave feed rate of 2.5 million tonnes per annum (Mtpa) to produce up to 40,000 tpa of nickel and cobalt metal equivalents, as either sulphide or sulphate precipitate products, and up to approximately 180 tpa of scandium oxide.

An accommodation camp is approved to be located on the western side of the mine site in the vicinity of Wilmatha Road (Figures 2a and 2b). The approved accommodation camp will be used during the construction phase of the Project and will have accommodation facilities for approximately 1,000 personnel.

Construction of the Project commenced in 2006 with the construction of components of the borefields, however Project operations are yet to commence.



CTL-17-04 MOD6 EA\_INT\_204A



- LEGEND**
- National Park/Conservation Area
  - State Forest
  - Local Government Boundary
  - Mining Lease Application Boundary
  - Approved Water Pipeline
  - Approved Limestone Quarry Water Pipeline
  - Approved Gas Pipeline
  - Approved Borefield Infrastructure Corridor

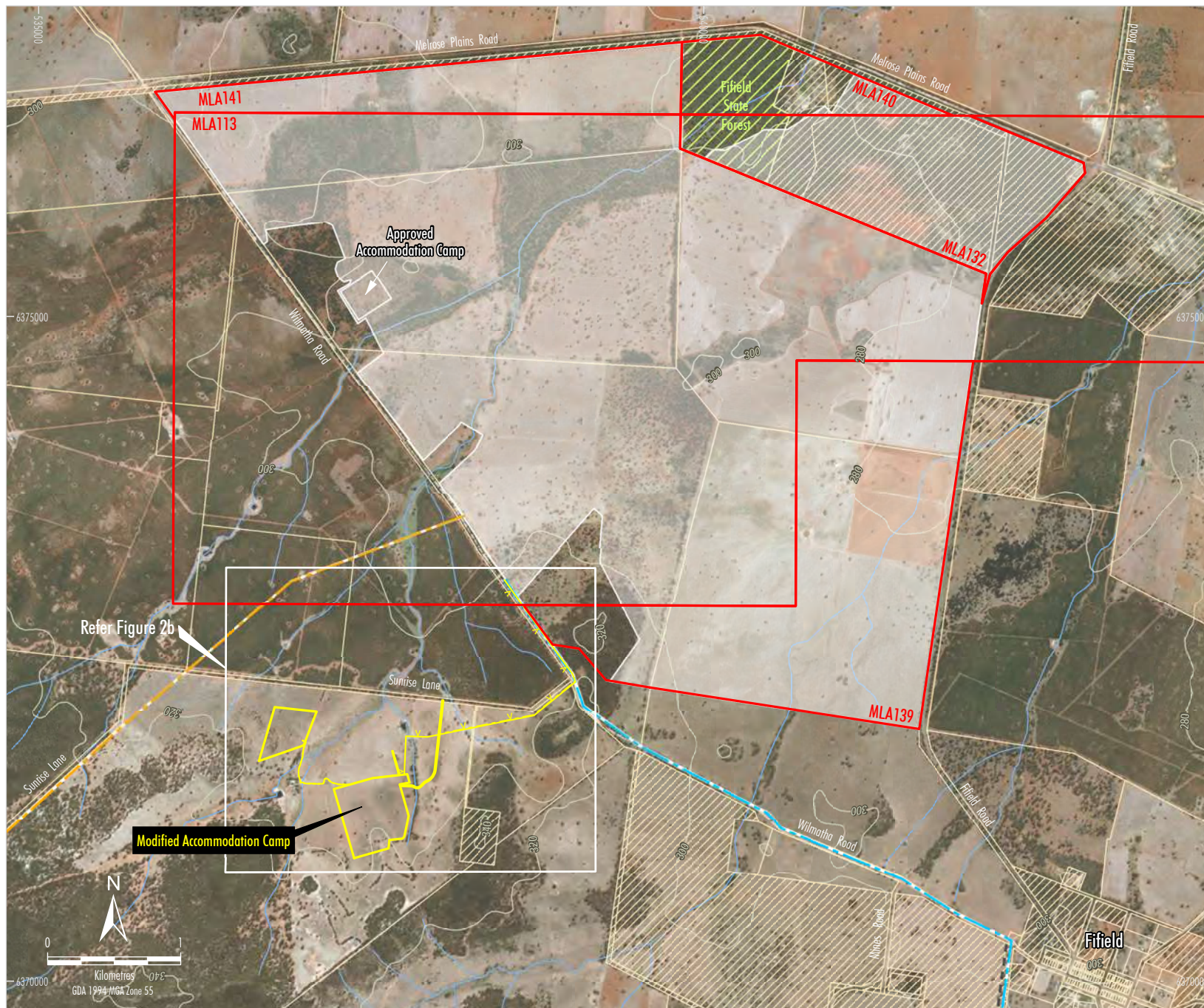
Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017); Office of Environment and Heritage NSW (2017)

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Project Location

**Figure 1**





**LEGEND**

- Mining Lease Application Boundary
- Approved Surface Development Area
- Approved Fifield Bypass
- Approved Gas Pipeline
- Approved Water Pipeline
- State Forest
- Property Boundary
- Crown Land
- Modified Layout

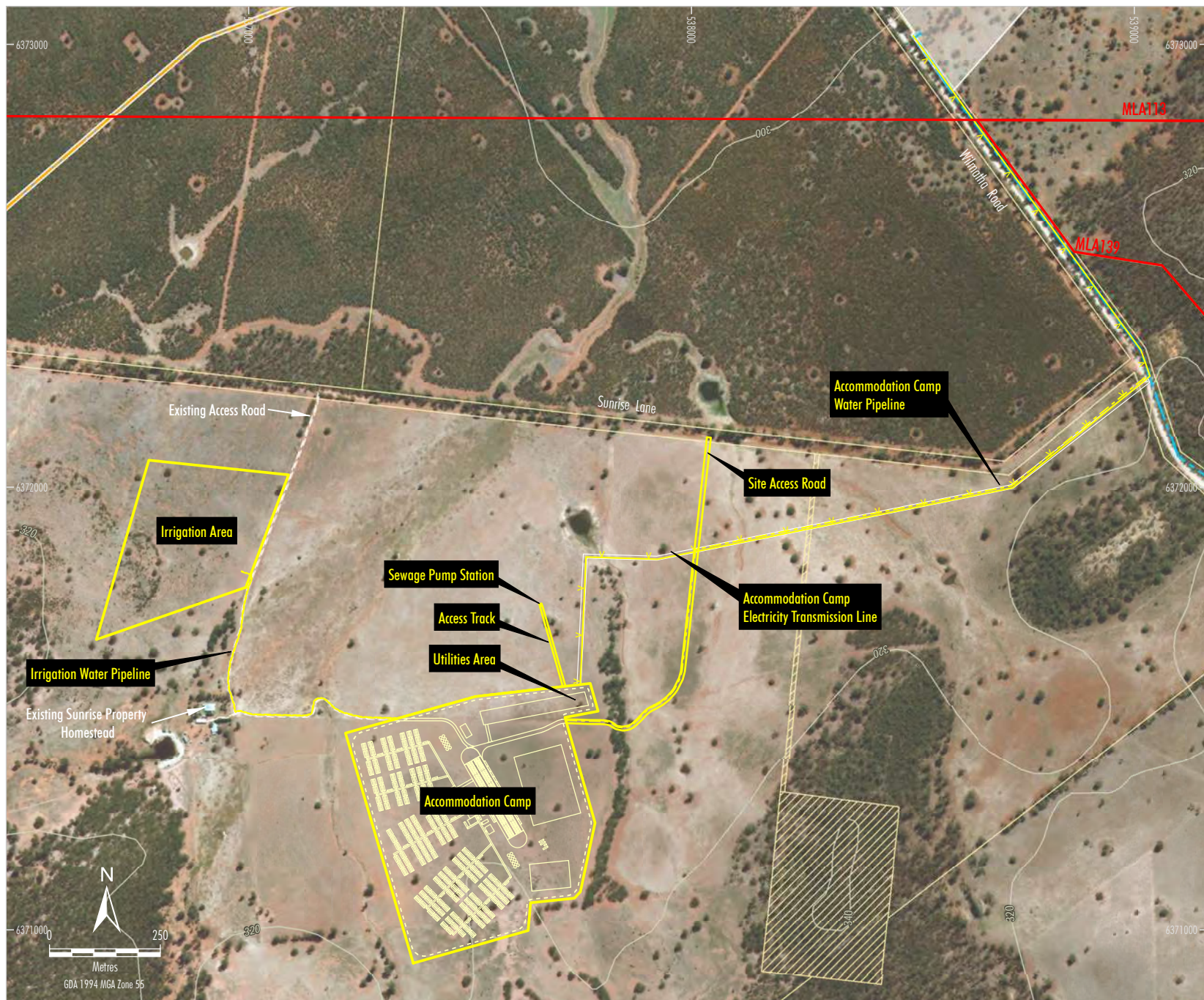
Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
NSW Imagery: Esri Basemap

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**CLEAN TEQ SUNRISE PROJECT**  
**Conceptual Modified General Arrangement**

**Figure 2a**





- LEGEND**
- Mining Lease Application Boundary
  - Approved Surface Development Area
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - Property Boundary
  - Crown Land
  - Modified Layout

Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
 NSW Imagery: Esri Basemap



**CLEAN TEQ SUNRISE PROJECT**  
 Conceptual Modified General Arrangement  
 Inset

**Figure 2b**

## 1.2 Approval History

Development Consent DA 374-11-00 for the Project was issued under Part 4 of the EP&A Act in 2001. Four modifications to Development Consent DA 374-11-00 have since been granted under the EP&A Act:

- 2005 – to allow for an increase of the autoclave feed rate, limestone quarry extraction rate and adjustments to ore processing operations (Modification 1);
- 2006 – to allow for the reconfiguration of the borefields (Modification 2);
- 2017 – to allow for the production of scandium oxide (Modification 3); and
- 2017 – to amend hazard study requirements (Modification 5).

The consolidated Development Consent DA 374-11-00, incorporating these modifications, is provided in Attachment 1.

In addition, Clean TeQ lodged a separate modification application to improve the overall efficiency of the Project (Modification 4) in November 2017. Modification 4 is subject to separate environmental assessment and approval to this Modification.

## 1.3 Modification Overview and Justification

As part of detailed planning for the construction phase of the Project, Clean TeQ has identified an alternative location for the approved accommodation camp that would provide improved amenity for the workforce in the accommodation camp and minimise potential operational constraints at the mine site. Clean TeQ also identified the preference to maintain the accommodation camp (at reduced capacity) during operations for the short-term use of temporary contractors and visitors. The Modification would include:

- development of the accommodation camp (including supporting infrastructure) at an alternative location approximately 4 km to the south of the mine site;
- construction of an electricity transmission line (ETL) and water pipeline from the mine site to the modified accommodation camp site;
- minor road upgrades;
- increased accommodation camp capacity (from approximately 1,000 to 1,300 personnel); and
- the accommodation camp (at reduced capacity) would continue to be operated post-construction.

The Modification would not involve changes to any aspects of the approved mine and processing operations, limestone quarry, rail siding, borefields, water pipeline or gas pipeline. Table 1 provides a comparative summary of the approved and proposed modified Project.

The Modification would provide improved amenity for the workforce in the accommodation camp due to the following:

- The modified accommodation camp would be located further away from the Project activities than the approved accommodation camp (Figure 2a) which would:
  - reduce the potential for sleep disturbance of the workforce in the accommodation camp and consequential hazards (e.g. fatigued personnel); and
  - reduce the potential air quality amenity impacts at the accommodation camp.
- The modified accommodation camp is larger than the approved accommodation camp which provides additional space for an improved layout and recreational spaces.



Table 1 Comparative Summary of the Approved and Modified Project

Component	Approved Clean TeQ Sunrise Project <sup>1,2</sup>	Modified Project
Mining Tenements	<ul style="list-style-type: none"> <li>Mining Lease Application (MLA) 113, 132, 139, 140, 141 and limestone quarry MLA 162.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Mine Life	<ul style="list-style-type: none"> <li>21 years from commencement of mining.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Hours of Operation	<ul style="list-style-type: none"> <li>24 hours per day, seven days per week.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Open Cut Mining	<ul style="list-style-type: none"> <li>Open cut mining method.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Blasting	<ul style="list-style-type: none"> <li>Blasting undertaken at the limestone quarry only.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Waste Rock Management	<ul style="list-style-type: none"> <li>Waste rock deposited in open cut voids and in waste rock emplacements.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Mineral Processing	<ul style="list-style-type: none"> <li>Autoclave feed rate of up to 2.5 Mtpa.</li> <li>Processing facility consists of counter current decantation or resin-in-pulp circuit/metals recovery.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Reagent Production	<ul style="list-style-type: none"> <li>Up to 700,000 tpa of sulphuric acid would be produced in the sulphuric acid plant.</li> <li>Hydrogen sulphide, hydrogen and nitrogen would be produced in the processing facility.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Limestone Supply	<ul style="list-style-type: none"> <li>Development of a limestone quarry to extract up to 790,000 tpa of limestone.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Product	<ul style="list-style-type: none"> <li>Up to 180 tpa of scandium oxide.</li> <li>Up to 40,000 tpa of nickel and cobalt metal equivalents, as either sulphide or sulphate precipitate products.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Tailings Management	<ul style="list-style-type: none"> <li>Waste deposited in the tailings storage facility and evaporation ponds.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Surface Water Management	<ul style="list-style-type: none"> <li>Overall objective is to control runoff from the construction and operational areas while diverting upstream water around these areas.</li> <li>The water management system will include both permanent features that will continue to operate post-closure and temporary structures during mining operations.</li> </ul>	<ul style="list-style-type: none"> <li>Overall objectives of the surface water management would be unchanged.</li> <li>Surface water objectives to be adopted at the modified accommodation camp.</li> </ul>
Accommodation Camp	<ul style="list-style-type: none"> <li>Accommodation camp located at the mine site during the construction phase with an approximate capacity of 1,000 personnel.</li> </ul>	<ul style="list-style-type: none"> <li>Development of the accommodation camp at an alternative location approximately 4 km to the south of the mine.</li> <li>Capacity of the construction camp would be increased from 1,000 to 1,300 personnel.</li> <li>A reduced capacity accommodation camp (300 personnel) would remain during the operations phase of the Project. No permanent employees or contractors would reside in the modified accommodation camp on a full-time basis.</li> </ul>
Water Supply	<ul style="list-style-type: none"> <li>Development of borefields and water pipeline from the borefields to the mine.</li> </ul>	<ul style="list-style-type: none"> <li>Water supply sources unchanged.</li> <li>An accommodation camp water supply pipeline would be constructed between the mine site and the modified accommodation camp.</li> </ul>



Table 1 Comparative Summary of the Approved and Modified Project (Continued)

Component	Approved Clean TeQ Sunrise Project <sup>1,2</sup>	Modified Project
Power Supply	<ul style="list-style-type: none"> <li>On-site gas power plant (34 megawatts).</li> </ul>	<ul style="list-style-type: none"> <li>Mine site power supply source unchanged.</li> <li>An accommodation camp ETL would be constructed between the mine site and the modified accommodation camp.</li> <li>Diesel generators would be used at the modified accommodation camp until the accommodation camp ETL is constructed.</li> </ul>
Gas Pipeline	<ul style="list-style-type: none"> <li>Development of a gas pipeline from an existing gas pipeline to the mine.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Material Transport	<ul style="list-style-type: none"> <li>Transport of inputs and products via a combination of road and rail (including development of a rail siding).</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>
Road Upgrades	<ul style="list-style-type: none"> <li>Road upgrades in accordance with the Development Consent DA 374-11-00 and Voluntary Planning Agreements (VPAs).</li> </ul>	<ul style="list-style-type: none"> <li>Minor changes to reflect modified accommodation camp road transport requirements.</li> </ul>
Employees	<ul style="list-style-type: none"> <li>Peak of approximately 1,000 personnel during construction phase.</li> <li>Approximately 300 personnel during operation phase.</li> </ul>	<ul style="list-style-type: none"> <li>Unchanged.</li> </ul>

<sup>1</sup> Development Consent DA 374-11-00 (as modified) – does not include Modification 4.

<sup>2</sup> Full Production Phase (maximum case) has been described.

The Modification would also minimise potential operational constraints at the mine site by avoiding the need to modify (constrain) mine site activities to minimise potential noise and air quality impacts at the approved accommodation camp.

The capacity of the modified accommodation camp during the construction phase of the modified Project would increase from approximately 1,000 to 1,300 personnel. The increased capacity of the modified accommodation camp is required to provide rooms for non-Project personnel associated with the accommodation camp management contractor, exploration activities and visitors. The additional capacity would minimise the requirement for personnel to share accommodation units (or 'hot bedding') at the accommodation camp.

The Modification would maintain the accommodation camp (at reduced capacity – approximately 300 personnel) during operations for the short-term use of temporary contractors and visitors. This reduced capacity accommodation camp would be maintained for the short-term use of temporary contractors and visitors (e.g. short-term contractors present during scheduled processing plant maintenance shutdowns). The availability of the accommodation would minimise potential impacts associated with temporary contractors and visitors use of the local road network (i.e. reduce movements to and from the mine site). No permanent employees or contractors would reside in the modified accommodation camp on a full-time basis.

Alternatives locations for the modified accommodation camp have been considered by Clean TeQ as part of detailed planning for the construction phase of the Project. The proposed location and layout of the modified accommodation camp was the preferred location on the following basis:

- it would improve amenity for the workforce in the accommodation camp and minimise potential operational constraints at the mine site;
- it would remain proximal to the mine site to minimise workforce travel requirements;
- it would be located within previously cleared/cultivated land with minimal biodiversity values to minimise native vegetation clearance;

- it would be located approximately 2.5 km from the closest privately-owned receiver to minimise potential amenity impacts; and
- it would be located on Clean TeQ owned land.

## 1.4 Consultation

Consultation has been conducted with key State government agencies and the Lachlan Shire Council (LSC), Parkes Shire Council (PSC), Forbes Shire Council (FSC) and the community during the preparation of this EA. A summary of this consultation is provided below.

It is anticipated that consultation with these stakeholders will continue during the assessment of the Modification by the NSW Government.

### **State Government Agencies**

#### *Department of Planning and Environment*

A meeting was held with representatives of the Department of Planning and Environment (DP&E) on 30 June 2017 to provide an overview of the Modification and discuss potential approval pathway options. Further consultation has been undertaken in regard to environmental assessment requirements and provisional timing for lodgement of the Modification.

Clean TeQ submitted a request to modify Development Consent DA 374-11-00 to the DP&E in the form of a letter with accompanying application form on 20 November 2017, which sought notification of environmental assessment requirements relevant to the Modification.

A response letter from the DP&E was received on 19 December 2017 confirming the Modification would be assessed and determined under section 75W of the EP&A Act.

#### *Other State Government Agencies*

A briefing package was provided to the following State government agencies in December 2017:

- Office of Environment and Heritage (OEH);
- Environment Protection Authority (EPA); and
- Department of Industry – Crown Lands and Water Division.

The briefing package included an overview of the Modification, an outline of the proposed scope of the environmental assessment and provisional timing for lodgement of the Modification.

These State government agencies had not provided any feedback at the time of writing the EA.

### **Local Government**

Consultation has been conducted with the relevant local councils regarding the approved Project, the Modification and revised VPAs during the preparation of this EA. A summary of this consultation is provided below.

#### *Lachlan Shire Council*

The modified accommodation camp would be located in the Lachlan Shire local government area (LGA).

Clean TeQ met with the LSC on 29 June 2017 to provide an initial overview of the Modification and discuss potential approval pathways. Since this initial meeting, Clean TeQ has consulted regularly with the LSC regarding the Modification, including ongoing VPA negotiations.

Clean TeQ has consulted with the LSC regarding the proposed changes to road upgrades and road maintenance requirements associated with the Modification as part of VPA negotiations (Section 2.3). The LSC indicated that it supports the proposed changes to road upgrades and road maintenance requirements.

A briefing package was also provided to the LSC in December 2017 to provide an update on the Modification.

#### *Parkes Shire Council and Forbes Shire Council*

The Modification would not change Project components located in the Parkes and Forbes LGAs.

A briefing package on the Modification was provided to the PSC and FSC in December 2017.

The briefing package included an overview of the Modification, an outline of the proposed scope of the environmental assessment and provisional timing for lodgement of the Modification.

#### **Community Consultative Committee**

In accordance with Condition 7, Schedule 5 of Development Consent DA 374-11-00, a Community Consultative Committee (CCC) has been established for the Project.

An outline of the Modification was provided during the CCC meeting held on 23 November 2017.

In addition, a briefing package was provided to the CCC in December 2017.

#### **Local Community and Landholders**

Clean TeQ has undertaken individual consultation with a number of private landholders that reside in the vicinity of the Project to discuss the upcoming development of the Project.

In addition, community liaison kiosks were established within Fifield, Trundle and Tullamore in August 2017 to provide opportunities for the local community to learn more about the Project.

#### **Aboriginal Community**

Aboriginal community consultation was undertaken in consideration of the requirements of the OEH's *Aboriginal cultural heritage consultation requirements for proponents 2010* (Department of Environment, Climate Change and Water [DECCW], 2010a) the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (Department of Environment and Conservation [DEC], 2005) and clause 80c of the *NSW National Parks and Wildlife Regulation, 2009*.

In accordance with these guidelines and regulation, Clean TeQ consulted with relevant government agencies and Registered Aboriginal Parties (RAPs), as described in Appendix B.

As a result of the registration process undertaken for the Modification in accordance with *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010a), a total of ten RAPs registered an interest in the Modification, including:

- Wiradjuri Condobolin Corporation;
- Murie Elders Group;
- Binjang Wellington Wiradjuri Aboriginal Heritage Survey;
- West Wyalong Local Aboriginal Land Council (LALC);
- Condobolin LALC;
- Louise Davis;
- Peter Peckham;
- Joshua Aboriginal Corporation;
- Isabel Goolagong; and
- Peter White.

Surveys of the modified accommodation camp area were undertaken with representatives of some of the RAPs (Appendix B). All RAPs were consulted regarding the Aboriginal cultural heritage management and mitigation measures documented in this EA.

## 1.5 Structure of this Document

This EA comprises a main text component and supporting studies. An overview of the main text sections is presented below:

- Section 1 Provides an overview of the approved Project and the Modification and the consultation undertaken in relation to the Modification.
- Section 2 Provides a description of the approved Project and the Modification.
- Section 3 Provides an environmental assessment of the Modification.
- Section 4 Describes the general statutory context of the Modification.
- Section 5 Provides a conclusion for the document.
- Section 6 References.

Attachment 1 and Appendices A to C provide supporting information as follows:

Attachment 1 Clean TeQ Sunrise Project Consolidated Development Consent.

Appendix A Biodiversity Development Assessment Report.

Appendix B Aboriginal Cultural Heritage Assessment.

Appendix C Land Contamination Assessment.



## 2 Description of the Modification

A description of the Modification is provided in this section, including a comparison of the modified Project with the approved Project.

As only minor changes are proposed to the approved Project as part of the Modification (Table 1), this section focuses on the Project components that would change as a result of the Modification. A complete description of the approved Project is provided in the environmental approval documentation listed in the Development Consent DA 374-11-00.

### 2.1 Accommodation Camp

#### 2.1.1 General Arrangement

##### **Approved Project**

The approved accommodation camp is located on the western side of the mine site in the vicinity of Wilmatha Road (Figure 2a).

The approved accommodation camp includes the following components (Black Range Minerals, 2000):

- accommodation facilities for approximately 1,000 personnel;
- recreational and mess areas;
- power supply infrastructure;
- water supply infrastructure (e.g. water treatment plant, storage tanks, distribution system);
- sewage treatment infrastructure (e.g. sewage treatment plant, storage tanks and irrigation area);
- access road; and
- other ancillary infrastructure.

The accommodation camp buildings and infrastructure would be constructed using conventional demountable components (Black Range Minerals, 2000).

The final layout and location of the accommodation camp is required to be prepared in consultation with the LSC by Condition 47, Schedule 3 of Development Consent DA 374-11-00.

##### **Modified Project**

The modified accommodation camp would be located on the Sunrise property (Lot 17 of Deposited Plan [DP] 752086) approximately 4 km to the south of the mine site (Figures 2a and 2b). The modified accommodation camp area would include:

- accommodation camp, including:
  - accommodation facilities;
  - administration offices and first aid facility;
  - recreational and mess areas;
  - fire-fighting infrastructure (e.g. fire water tank and reticulation system);
  - internal access roads and car parking areas; and
  - communications infrastructure;
- sewage pump station, irrigation water pipeline and irrigation area;

- utilities area, including:
  - water supply infrastructure (e.g. water treatment plant, storage tanks, distribution system);
  - sewage collection system, treatment plant and storage tanks; and
  - power supply infrastructure (e.g. diesel generators, substation);
- accommodation camp ETL (between the mine site and the accommodation camp);
- accommodation camp water pipeline (between the mine site and the accommodation camp);
- site access road from Sunrise Lane; and
- construction (laydown) areas.

The modified accommodation camp buildings and infrastructure would be constructed using conventional demountable components and would be located to avoid trees with hollows. Plate 1 provides an example of an accommodation camp constructed using conventional demountable components.

A conceptual general arrangement of the modified accommodation camp is provided on Figures 2a and 2b. In accordance with Condition 47, Schedule 3 of Development Consent DA 374-11-00, Clean TeQ would resolve the final layout and location of the modified accommodation camp in consultation with the LSC.

The footprint of the approved accommodation camp site at the mine would be used as a supplementary soil stockpile area during mine development.



Plate 1 Example Accommodation Camp Constructed using Conventional Demountable Components

### 2.1.2 Capacity and Development Staging

#### **Approved Project**

The accommodation camp is scheduled to be one of the first components developed as part of the construction phase of the approved Project (Black Range Minerals, 2000).

The accommodation camp is approved to have accommodation facilities for approximately 1,000 personnel during construction.

The accommodation camp is scheduled to be decommissioned at the completion of the construction phase of the approved Project.

#### **Modified Project**

The Modification would not change the approved construction timing or construction hours of the accommodation camp.

The capacity of the modified accommodation camp during the construction phase of the modified Project would be approximately 1,300 personnel. The increased capacity of the modified accommodation camp is required to provide rooms for non-Project personnel associated with the accommodation camp management contractor, exploration activities and visitors. The additional capacity would minimise the requirement for personnel to share accommodation units (or 'hot bedding').

At the completion of the construction phase of the modified Project, the capacity of the modified accommodation camp would be reduced to approximately 300 personnel rather than be decommissioned. This reduced capacity accommodation camp would be maintained for the short-term use of temporary contractors and visitors (e.g. short-term contractors present during scheduled processing plant maintenance shutdowns). The availability of the accommodation would minimise potential impacts associated with temporary contractors and visitors use of the local road network (i.e. reduce movements to and from the mine site).

No permanent employees or contractors would reside in the modified accommodation camp on a full-time basis.

### 2.1.3 Power Supply

#### **Approved Project**

Power for the accommodation camp is approved to be provided by the on-site gas fired co-generation plant.

#### **Modified Project**

Power for the modified accommodation camp would initially be supplied by diesel generators located in the modified accommodation camp utilities area until an 11 kilovolt ETL is constructed from the mine site substation to the modified accommodation camp utilities area (Figures 2a and 2b).

Diesel would be stored in self-bunded tanks adjacent the generators in utilities area.

The ETL alignment would follow the approved water pipeline corridor along Wilmatha Road until approximately 50 metres (m) after the intersection of Wilmatha Road and Sunrise Lane where it would cross Wilmatha Road to enter the Sunrise property. The ETL alignment would then cross the Sunrise property to the utilities area (Figures 2a and 2b).

Some diesel generator capacity would be maintained at the modified accommodation camp for emergency power in the event of power failure.



#### 2.1.4 Water Supply

##### **Approved Project**

Water for the accommodation camp is approved to be supplied by a package water treatment plant utilising raw water from the Project water supply. The treated water will be stored in tanks and then distributed around the approved accommodation camp.

##### **Modified Project**

Consistent with the approved Project, water for the modified accommodation camp would be supplied by a package water treatment plant utilising the raw water from the Project water supply.

Raw water would be pumped from the mine site to the packaged water treatment plant via the accommodation camp water pipeline (Figures 2a and 2b). The accommodation camp water pipeline alignment would follow the accommodation camp ETL alignment until it meets the site access road where it would then follow the site access road to the utilities area (Figures 2a and 2b).

The packaged water treatment plant would be located in the utilities area and would include:

- raw water receipt and potable water holding tanks;
- treatment and disinfection plants; and
- pumps for the distribution of potable water.

#### 2.1.5 Sewage Treatment and Waste Disposal

##### **Approved Project**

A sewage reticulation system is approved to collect and treat sewage and waste water at the accommodation camp. The sewage treatment plant will consist of anaerobic and aerobic treatment and final sterilisation. Effluent produced from the sewage treatment plant is approved to be irrigated on rehabilitated or landscaped areas.

Solid waste from the sewage treatment plant is approved to be periodically collected for disposal by a licensed contractor.

##### **Modified Project**

Consistent with the approved Project, a sewage reticulation system would be installed at the modified accommodation camp to collect and treat sewage and waste water.

Sewage would be transferred by a sewage pump station to a packaged sewage treatment plant in the utilities area. The sewage treatment plant would consist of anaerobic and aerobic treatment and final disinfection of treated effluent. The sewage treatment plant would be designed and constructed in accordance with LSC requirements.

Consistent with the approved Project, the treated waste water produced from the sewage treatment plant would be pumped to the irrigation area via the irrigation water pipeline (Figure 2b). The irrigation of the treated waste water would be undertaken in accordance with the *Environmental Guidelines Use of Effluent by Irrigation* (DEC, 2004).

Solid waste from the sewage treatment plant would be periodically collected for disposal by a licensed contractor.

## 2.2 Site Water Management

### **Approved Project**

The accommodation camp is approved to be located inside the mine site and therefore will form part of the mine site water management system.

### **Modified Project**

#### *Construction Phase*

The overall objective of the modified accommodation camp water management system during the construction phase would be to control runoff from construction areas, while diverting upstream water around these areas.

Sediment control structures such as sediment dams and sediment fences would be employed where necessary within and downstream of disturbance areas. Sediment control structures would be designed, installed and maintained in accordance with *Managing Urban Stormwater: Soils and Construction* in accordance with Condition 29, Schedule 3 of Development Consent DA 374-11-00.

#### *Operations Phase*

During the operations phase of the modified accommodation camp (i.e. once construction has been completed), site runoff would be free-draining to the natural environment with the exception of runoff from the utilities area.

Management of the irrigation area would be undertaken in accordance with the *Environmental Guidelines Use of Effluent by Irrigation* (DEC, 2004). The irrigation rate would be controlled so as not to:

- cause irrigation water runoff from the irrigation area; or
- exceed the capacity of the soil in the irrigation area to effectively absorb the applied nutrient, salt, organic material and hydraulic loads.

## 2.3 Road Upgrades and Maintenance

### **Approved Project**

Condition 17, Schedule 2 of Development Consent DA 374-11-00 requires Clean TeQ to enter into VPA with the LSC. The LSC VPA must include provision of funding for road upgrades outlined in Appendix 3 of Development Consent DA 374-11-00.

In addition, intersection upgrades outlined in Appendix 5 of Development Consent DA 374-11-00 are required prior to commissioning of the mine.

Condition 43, Schedule 3 of Development Consent DA 374-11-00 requires the preparation of a Road Upgrade and Maintenance Strategy. The Road Upgrade and Maintenance Strategy will detail all road upgrade requirements and a program for their implementation and maintenance.

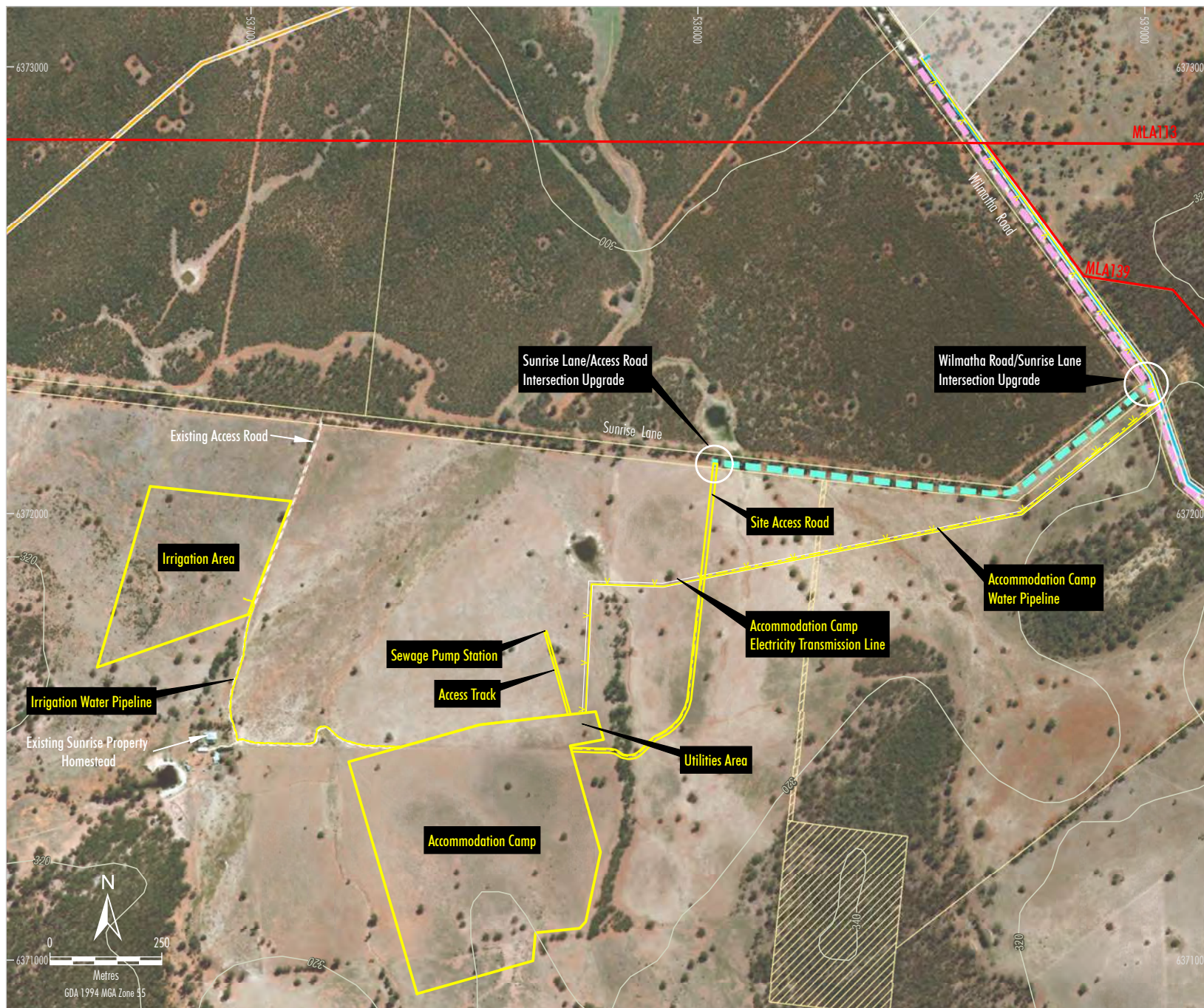
### **Modified Project**

As described in Section 2.1.1, access to the modified accommodation camp would be via Sunrise Lane.

GTA Consultants (2017) considered the potential road transport impacts associated with the modified accommodation camp and recommended the following road upgrades (Figure 3):

- Sunrise Lane between Wilmatha Road and the modified accommodation camp access road – upgraded consistent with a Class 4A unsealed road; and
- Wilmatha Road/Sunrise Lane intersection – remove the transition between the gravel and dirt surfaces while Wilmatha Road remains unsealed, and then seal a minimum of 30 m of Sunrise Lane on the approach to the intersection once Wilmatha Road is sealed.





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**Figure 3**



The road upgrades would be located within the extent of the existing road footprint.

The Modification would not change the other road upgrades currently required by Development Consent DA 374-11-00.

Clean TeQ would contribute to the maintenance of Sunrise Lane during the life of the Project. Clean TeQ has consulted with the LSC regarding the proposed changes to the road upgrades and road maintenance requirements as part of VPA negotiations.

## 2.4 Rehabilitation

### **Approved Project**

Condition 55, Schedule 3 of Development Consent DA 374-11-00 outlines the rehabilitation objectives for the Project and these are reproduced in Table 2.

The approved post-mining land use is a combination of agriculture (pasture for grazing) and nature conservation (endemic woodland areas) (Black Range Minerals, 2000).

**Table 2 Rehabilitation Objectives**

Features	Objective
Site (as a whole)	<ul style="list-style-type: none"> <li>• Safe, stable and non-polluting.</li> <li>• Materials (including topsoils, substrates and seeds of the disturbed areas) are recovered, appropriately managed and used effectively as resources in the rehabilitation of the site.</li> <li>• Final land forms to: <ul style="list-style-type: none"> <li>– restore native vegetation communities and ecosystem function (in the applicable domains);</li> <li>– sustain intended land use for the post- mining domains;</li> <li>– minimise visual impacts;</li> <li>– be generally in keeping with the natural terrain features of the area; and</li> <li>– incorporate micro-relief.</li> </ul> </li> <li>• Incorporate drainage lines consistent with topography and natural drainage where reasonable and feasible.</li> </ul>
Final voids	<ul style="list-style-type: none"> <li>• Minimise: <ul style="list-style-type: none"> <li>– the size and depth of the final void/s;</li> <li>– the drainage catchment of the final voids; and</li> <li>– risk of flood interaction for all flood events up to and including a 1 in 100 year or 1% annual exceedance probability storm event.</li> </ul> </li> </ul>
Surface Infrastructure	<ul style="list-style-type: none"> <li>• To be decommissioned and removed, unless agreed otherwise by the Secretary of the DP&amp;E.</li> </ul>
Agriculture	<ul style="list-style-type: none"> <li>• Land capability classification for the relevant nominated agricultural pursuit for each domain is established and self-sustaining within a reasonable timeframe.</li> </ul>
Community	<ul style="list-style-type: none"> <li>• Ensure public safety.</li> <li>• Minimise the adverse socio-economic effects associated with mine closure.</li> </ul>

### **Modified Project**

The Modification would not change the Project rehabilitation objectives.

The conceptual closure and rehabilitation objectives for the modified accommodation camp area would be:

- Infrastructure with no on-going beneficial use would be decommissioned and removed, unless otherwise agreed by the Secretary of the DP&E.
- Hydrocarbons (diesel), chemicals and liquid and non-liquid wastes unused at the completion of the Project would be returned to the supplier in accordance with relevant safety and handling procedures.

- If there are any contaminated soils associated with the modified accommodation camp, these would be identified and remediated in accordance with the requirements of the NSW *Contaminated Land Management Act, 1997*.
- The area would be profiled to a free-draining landform with runoff reporting to the natural environment and would be revegetated to pasture areas.

Following rehabilitation, it is anticipated that an agriculture land use would occur.

### 3 Environmental Review

#### 3.1 Identification of Key Issues

The Modification would not involve changes to any aspects of the approved mine and processing operations, limestone quarry, rail siding, borefields, water pipeline or gas pipeline (Table 1).

Clean TeQ has undertaken a review of the potential environmental impacts of the Modification to identify key potential environmental issues requiring assessment. The key environmental issues identified are summarised in Table 3 and addressed in Sections 3.2 to 3.10 and the relevant appendices.

**Table 3 Summary of Key Potential Environmental Issues**

Environmental Aspect	Key Potential Environmental Issue/Impact	EA Section/Appendix
Land and Agricultural Resources	Additional surface development areas required for the modified accommodation camp and supporting infrastructure.	Section 3.2 and Appendix C
Biodiversity		Section 3.3 and Appendix A
Aboriginal Cultural Heritage		Section 3.4 and Appendix B
Historic Heritage		Section 3.5
Water Resources	Potential surface water impacts associated with the development of the accommodation camp.  As the Modification would not change mining operations or materially alter water demand, no change to approved groundwater impacts are expected.	Section 3.6
Air Quality and Noise	Potential air quality and noise impacts associated with the construction of the modified accommodation camp.	Sections 3.7 and 3.8
Road Transport	Changes to road transport requirements and road network due to relocation of the accommodation camp.	Section 3.9
Visual	Potential visual impacts associated with the development of the modified accommodation camp.	Section 3.10
Community Infrastructure	As the Modification would not result in any additional demand for employees, no material alteration to the approved population and community infrastructure demand is expected as a result of the Modification.	-
Hazard and Risk	As the Modification would not result in changes to the existing potential risk areas identified in Preliminary Hazard Analysis previously prepared for the Project (SHE Pacific, 2000 and Pinnacle Risk Management, 2017), no material alteration to the approved hazards and risks is expected as a result of the Modification.	-

#### 3.2 Land and Agricultural Resources

##### 3.2.1 Existing Environment

##### ***Landforms and Topography***

The main topographic features in the modified accommodation camp area are three shallow drainage lines that drain towards Sunrise Lane in the north. Elevations in the modified accommodation camp area range from approximately 305 metres Australian Height Datum (m AHD) in the north to approximately 320 m AHD in the south (Figures 2a and 2b).



## **Land Use**

Land use at the modified accommodation camp area includes agriculture, vegetated areas and road reserve. Agricultural land uses include grazing and dryland cropping (fodder crop production) (Appendix C).

## **Soils**

OEH's (2017a) regional Australian Soil Classification mapping in the vicinity of the modified accommodation camp is presented on Figure 4. The soils types mapped include "Chromosols" and "Rudosols and Tenosols". The inherent soil fertility of these soils is "Moderate" and "Low" (OEH, 2017a).

## **Land Soil Capability**

The OEH's Land and Soil Capability system is used to give an indication of the land management practices that can be applied to a parcel of agricultural land. Agricultural land is classified by evaluating biophysical features of the land and soil including landform position, slope gradient, drainage, climate, soil type and soil characteristics to derive detailed rating tables for a range of land and soil hazards (OEH, 2012).

OEH's (2017a) regionally mapped Land and Soil Capability Classes in the vicinity of the modified accommodation camp is presented on Figure 5. The modified accommodation camp area is identified as having Land and Soil Capability Classes of 4 and 6. These Land and Soil Capability Classes are defined as (OEH, 2012):

*Class 4: Moderate capability land:*

*Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.*

*Class 6: Low capability land:*

*Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation.*

## **Contaminated Land**

A Land Contamination Assessment was undertaken in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites* (OEH, 2011a) by Ground Doctor (Appendix C). It was undertaken in the form of a Stage 1 (or Preliminary Investigation) Land Contamination Assessment.

As part of the Land Contamination Assessment, a site inspection and a soil sampling and analysis program was undertaken. Results from the soil sampling and analysis program indicated that there have been no significant impacts to soil within the modified accommodation camp area (Appendix C).

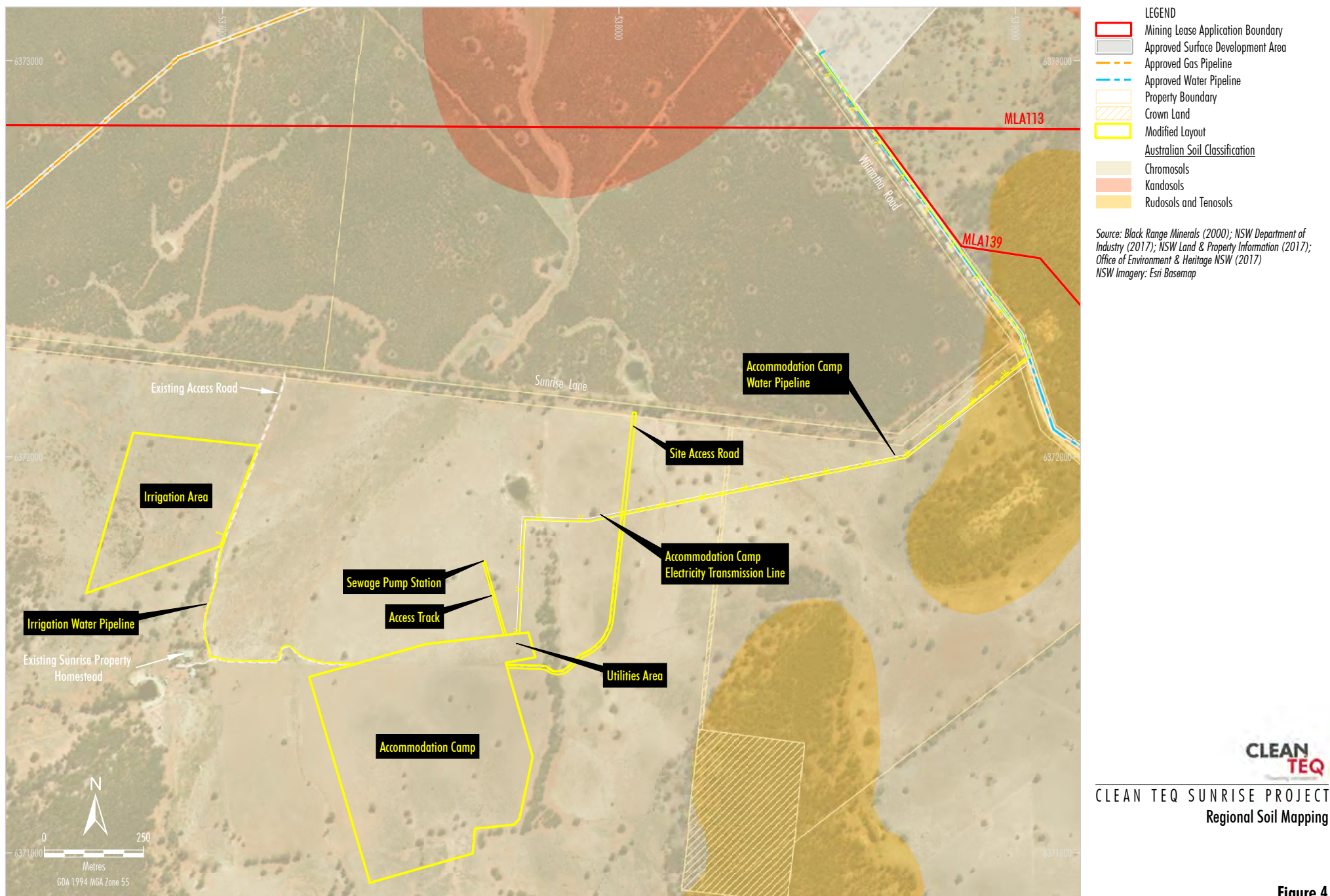
On the basis of the Stage 1 (or Preliminary Investigation) Land Contamination Assessment, the modified accommodation camp area is suitable for the land use proposed by the Modification (Appendix C).

## **Bushfire Regime**

The Project is located within the jurisdiction of the *Mid Lachlan Valley Fire Management Committee Bush Fire Management Plan* (Mid Lachlan Valley Bush Fire Management Committee, 2010) area.

The bushfire season is generally from October to March with the fire season coinciding with high temperatures, low humidity and strong north-west winds, which prevail over the summer months. Lightning strikes account for the majority of ignitions in the area (Mid Lachlan Valley Bush Fire Management Committee, 2010).

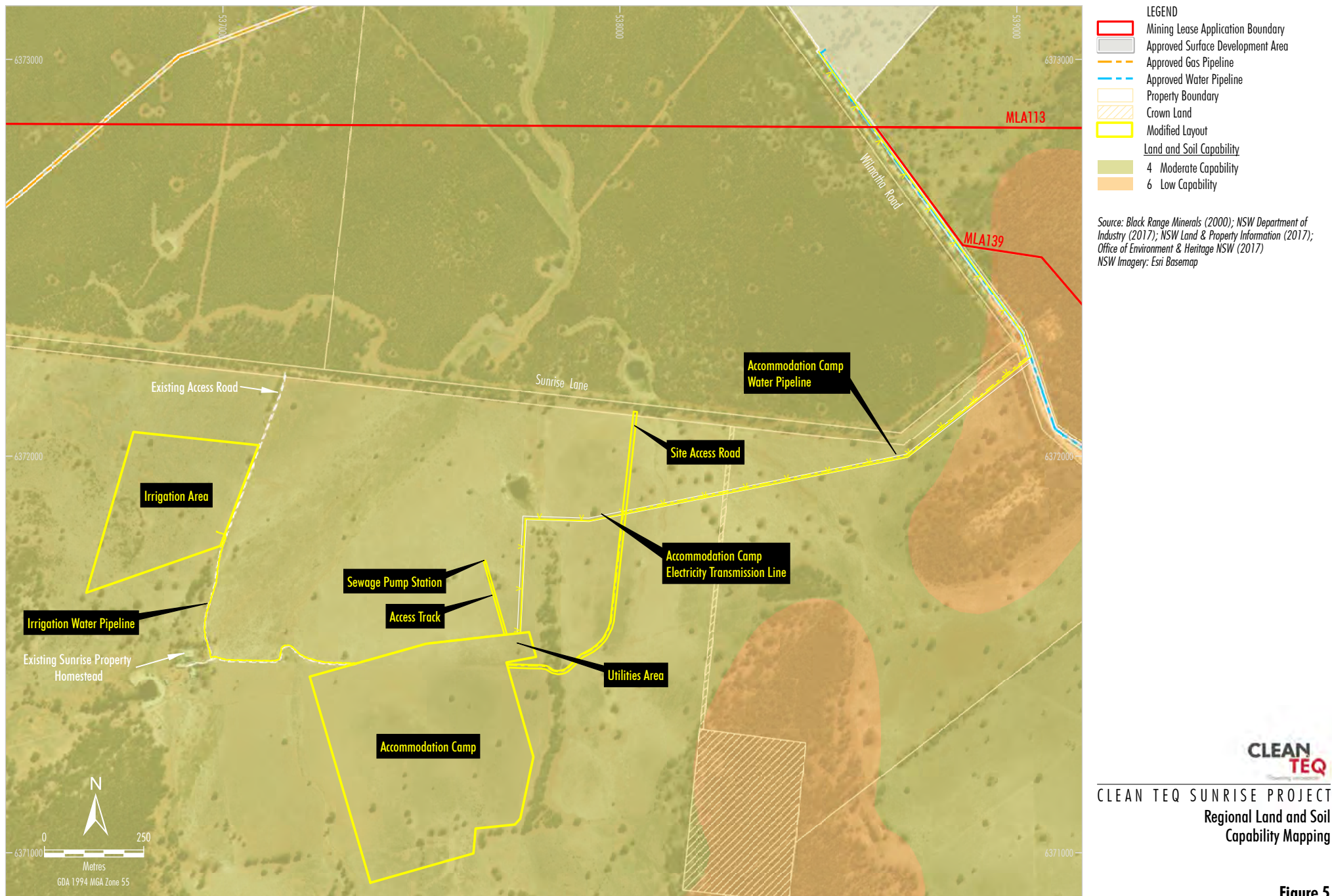
Bushfire management measures at the Project will be implemented in accordance with Condition 49, Schedule 3 of Development Consent DA 374-11-00 and will include the site being suitably equipped to fight fires; development of asset protection zones in accordance with the Rural Fire Service's (2006) *Planning for Bushfire Protection 2006*; and consultation with the Rural Fire Service.



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Figure 4





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Figure 5



### 3.2.2 Potential Impacts

#### **Soils**

Potential impacts of the Modification on soils would relate primarily to:

- disturbance of *in situ* soil resources within modified accommodation camp area;
- alteration of soil structure beneath infrastructure items, infrastructure areas and roads;
- possible soil contamination resulting from spillage of fuels and other chemicals;
- increased erosion and sediment movement due to exposure of soils during construction; and
- alteration of physical and chemical soil properties (e.g. structure, fertility, permeability and microbial activity) due to irrigation of the treated waste water.

#### **Land Use – Agricultural Activities and Productivity**

The modified accommodation camp area would result in the disturbance or alteration of approximately 38 hectares (ha) of existing agricultural lands for the life of the Project.

The potential agricultural productivity impacts associated with the accommodation camp ETL and water pipeline and site access road would be limited given their linear nature.

Agricultural activities would continue to occur on the Sunrise property outside the accommodation camp area during the Project.

#### **Land Contamination Potential**

Potential land contamination risks include leaks/spills and fires associated with the transport, storage and use of diesel and chemicals during construction and operational activities.

#### **Bushfire Hazard**

Any uncontrolled fires originating from Project activities may present potentially serious impacts to nearby rural properties. Similarly, fires originating outside the Project could pose a significant risk to Project infrastructure. The degree of potential impact of a bushfire would vary with climatic conditions (e.g. temperature and wind) and the quantity of available fuel.

The expansion of the approved Project operations to incorporate the modified accommodation camp area would increase the potential for fire generation. However, given the range of management measures in place, the overall risk of increased bushfire frequency due to the modified Project is likely to be low.

### 3.2.3 Mitigation Measures, Management and Monitoring

#### **Soils**

General soil management practices would include the stripping and stockpiling of soil resources for use in rehabilitation. The objectives of soil resource management would be to:

- identify and quantify potential soil resources for rehabilitation;
- optimise the recovery of usable soil reserves during soil stripping operations;
- manage soil reserves so as not to degrade the resource when stockpiled; and
- establish effective soil amelioration procedures to maximise the availability and suitability of soil reserves for future rehabilitation works.

Sediment control structures such as sediment dams and sediment fences would be employed where necessary within and downstream of disturbance areas. Sediment control structures would be designed, installed and maintained in accordance with *Managing Urban Stormwater: Soils and Construction* in accordance with Condition 29, Schedule 3 of Development Consent DA 374-11-00.

The irrigation of the treated waste water would be undertaken in accordance with the *Environmental Guidelines Use of Effluent by Irrigation* (DEC, 2004).

### **Land Use – Agricultural Activities and Productivity**

Agricultural land resource management at the modified Project would include the following key components:

- minimisation of disturbance to agricultural lands, where practicable;
- continued utilisation of areas on the Sunrise property outside the accommodation camp area for agricultural activities; and
- inclusion of agricultural lands in the modified accommodation camp rehabilitation strategy (Section 2.4).

### **Land Contamination**

General measures to reduce the potential for contamination of land would include the following:

- Contractors transporting dangerous goods loads would be appropriately licensed in accordance with the provisions of the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission, 2007).
- On-site consumable storage areas would be designed with appropriate bunding and would be operated, where applicable, in compliance with the requirements of Australian Standard (AS) 1940-2017: *The Storage and Handling of Flammable and Combustible Liquids*.
- Fuel storage areas would be regularly inspected and maintained. In addition, during construction and operations, diesel and chemicals would be managed to minimise the risk of spills which could cause soil contamination.

### **Bushfire Hazard**

Clean TeQ would implement bushfire management measures at the Project in accordance with Condition 49, Schedule 3 of Development Consent DA 374-11-00 in consultation with the Mid Lachlan Valley Fire Management Committee.

## **3.3 Biodiversity**

A Biodiversity Development Assessment Report (BDAR) has been prepared for the Modification by Resource Strategies (2017) and is provided in Appendix A. The BDAR has been completed in accordance with the *Biodiversity Assessment Method Order, 2017* (BAM) (OEH, 2017b) established under the NSW *Biodiversity Conservation Act, 2016* (BC Act).

### **3.3.1 Existing Environment**

#### **Landscape Features**

The modified accommodation camp area is located in the Nymagee Interim Biogeographic Regionalisation of Australia (IBRA) Sub-region of the Cobar Peneplain IBRA Region (Department of Environment and Energy, 2017). The modified accommodation camp is located within a predominantly cleared agricultural landscape. The remnant woodland surrounding the modified accommodation camp is mainly confined to low hills and along shallow first order drainage features.

#### **Plant Community Types**

AMBS Ecology & Heritage (2017) (Attachment B of Appendix A) identified and mapped Plant Community Types (PCTs) in the modified accommodation camp area and surrounds in accordance with the BAM (OEH, 2017b) and BioNet Vegetation Classification (OEH, 2017c) (Figure 6 and Table 4). The modified accommodation camp area is located on previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs, assigned to PCT 217 (Figure 6 and Table 4).



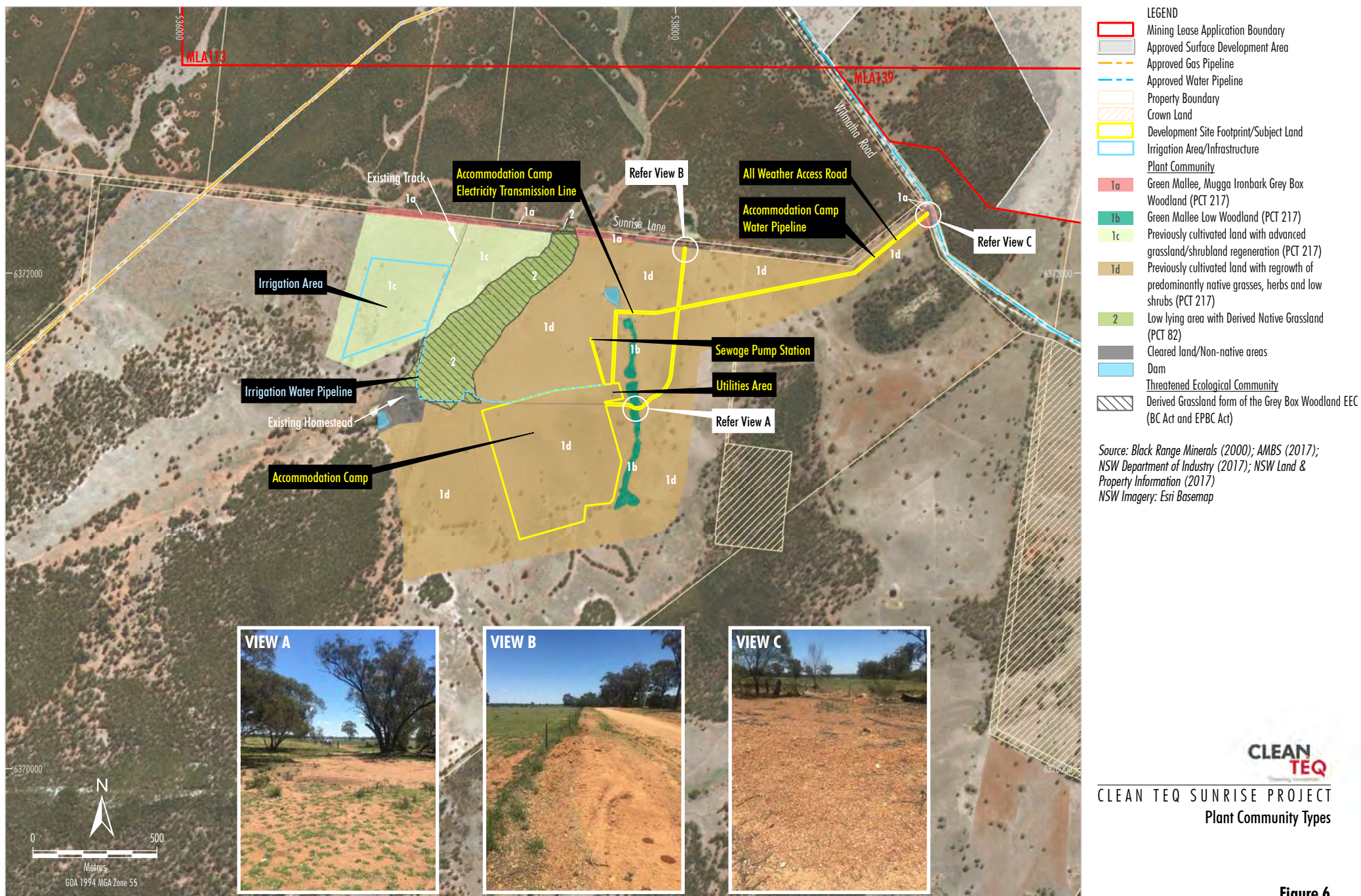


Figure 6



**Table 4 Plant Community Type**

#	Map Unit Name	Plant Community Type		Clearance Area (ha)
1d	Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs	217	Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion	27.5

Source: Appendix A.

There are small areas of bare ground without native vegetation (cleared land) associated with existing tracks/roads (Figure 6). The overall footprint is approximately 27.5 ha.

Other PCTs are located in the vicinity of the modified accommodation camp (Figure 6). Clean TeQ has modified the design of the modified accommodation camp to avoid these PCTs (Section 3.3.3).

### ***Vegetation Integrity Assessment***

According to the BAM Credit Calculator (OEH, 2017d), Vegetation Community 1d (Vegetation Zone 1) has a Vegetation Integrity Score of 16.6. This is a low Vegetation Integrity Score below the relevant BAM (OEH, 2017b) threshold for ecosystem credits (17) (Appendix A).

### ***Threatened Species – Ecosystem Credit Species***

An assessment of ecosystem credit species is not required due to the low Vegetation Integrity Score below the relevant BAM (OEH, 2017b) threshold for ecosystem credits (Appendix A). Only one threatened species, the Grey-crowned Babbler (eastern subspecies) listed as 'Vulnerable' under the BC Act has been recorded in the modified accommodation camp area.

### ***Threatened Species – Species Credit Species***

As a result of the surveys by AMBS Ecology & Heritage (2017) (Attachment B of Appendix A), no species credit species are present, or are likely to use habitat on the modified accommodation camp.

## **3.3.2 Potential Impacts**

### ***Clearance of Habitat and Vegetation***

The modified accommodation camp is proposed to be constructed solely within the previously cleared/cultivated land with minimal biodiversity values. The Modification would result in the clearance of approximately 27.5 ha of previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217).

Scattered trees would need to be cleared for the Modification, however trees which could provide habitat for threatened 'species credit species' (as defined by the BAM) were surveyed and such trees would be avoided (Appendix A).

### ***Irrigation***

The irrigation area is approximately 10.5 ha over previously cleared land with advanced grassland/shrubland regeneration (PCT217) (Vegetation Community 1d) (Figure 6). The proposed irrigation is unlikely to adversely impact the native vegetation because (Section 2.2):

- the irrigation rate would not cause irrigation water runoff from the irrigation area; and
- the irrigation rate would not exceed the capacity of the soil in the irrigation area to effectively absorb the applied nutrient, salt, organic material and hydraulic loads.

### ***Indirect Impacts on Native Vegetation and Habitat***

Indirect impacts (such as pest animals and weeds) are assessed in Appendix A. Measures to mitigate and manage potential impacts are provided in Section 3.3.3.

### 3.3.3 Mitigation Measures, Management and Monitoring

#### **Measures to Avoid and Minimise Impacts**

Measures to avoid and minimise potential biodiversity impacts are listed in Table 5.

**Table 5 Measures to Avoid and Minimise Potential Biodiversity Impacts**

Component	Refinement
Site Access Road	<ul style="list-style-type: none"> <li>The turnoff to the site access road from Sunrise Lane would be located in a previously cleared section of the road reserve in order to avoid clearance of the Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation Community 1a) (Figure 6).</li> <li>The site access road would traverse the first order drainage feature in the alignment of an existing track in order to avoid clearance of the Green Mallee Low Woodland (Vegetation Community 1b) (Figure 6).</li> <li>The modified accommodation camp area site access road corridor would be 8 m wide across the drainage feature (reduced from 9 m) in order to avoid clearance of the Green Mallee Low Woodland (Vegetation Community 1b) (Figure 6).</li> </ul>
Accommodation Camp ETL (between the mine site and the accommodation camp)	<ul style="list-style-type: none"> <li>The ETL was originally proposed to occur along Sunrise Lane but was re-aligned in order to avoid clearance of Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation Community 1a) (Figure 6).</li> <li>The ETL would be aligned to avoid paddock trees with habitat features for species credit species.</li> <li>The ETL would pass through an existing gap (approximately 17 m wide) in Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation Community 1a) along Wilmatha Road.</li> </ul>
Accommodation Camp Water Pipeline (between the mine site and the accommodation camp)	<ul style="list-style-type: none"> <li>The water pipeline was originally proposed to occur along Sunrise Lane but re-aligned in order to avoid clearance of Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation Community 1a).</li> <li>The water pipeline would be aligned to avoid paddock trees with habitat features for species credit species.</li> </ul>
Temporary Construction (Laydown) Areas	<ul style="list-style-type: none"> <li>Temporary construction (laydown) areas would be within the operational modified accommodation camp area.</li> </ul>
Irrigation Water Pipeline	<ul style="list-style-type: none"> <li>Irrigation water pipeline was originally proposed to occur across Low lying area with Derived Native Grassland (Vegetation Community 2) (equivalent to the Grey Box Endangered Ecological Community) (Figure 6) but would instead be placed beside an existing track.</li> </ul>

Source: Appendix A.

#### **Measures to Mitigate and Manage Impacts**

Measures to mitigate and manage potential biodiversity impacts are listed in Table 6.

**Table 6 Measures to Mitigate and Manage Potential Biodiversity Impacts**

Mitigation Measure	Techniques
Vegetation Clearance Protocol – Timing of Tree Clearance	<ul style="list-style-type: none"> <li>Trees used for nesting would not be felled until young have left the nest, where possible.</li> </ul>
Vegetation Clearance Protocol – Pre-clearance Surveys	<ul style="list-style-type: none"> <li>Pre-clearance vertebrate fauna surveys would be undertaken in two stages:               <ul style="list-style-type: none"> <li>Identify habitat features that could harbour vertebrate fauna and place them at risk during vegetation clearance activities (e.g. tree hollows), or features that could be salvaged and reused such as mature trees and stags.</li> <li>Identify vertebrate fauna most likely to be at risk during vegetation clearance activities and those that would be managed during clearing activities.</li> </ul> </li> </ul>
Vegetation Clearance Protocol – Delineating Clearing Limits	<ul style="list-style-type: none"> <li>Approved disturbance limits near areas to be cleared would be delineated on the ground prior to clearing activities (e.g. flagging tape and posts).</li> <li>Scattered trees which could provide habitat for threatened 'species credit species' would specifically be identified with flagging tape during nearby construction works.</li> </ul>

Table 6 Measures to Mitigate and Manage Potential Biodiversity Impacts (Continued)

Mitigation Measure	Techniques
Staff and Contractor Inductions	<ul style="list-style-type: none"> <li>Initial staff and contractor inductions would include the following:               <ul style="list-style-type: none"> <li>measures to reduce the occurrence of fauna-vehicle collisions; and</li> <li>bushfire prevention and management strategies.</li> </ul> </li> </ul>
Weed Control	<ul style="list-style-type: none"> <li>Agricultural activities would continue to occur on the Sunrise property outside the modified accommodation camp area (including the management of weeds). Additional weed monitoring and control would be undertaken around the accommodation camp, as necessary.</li> </ul>
Feral Animal Control	<ul style="list-style-type: none"> <li>Agricultural activities would continue to occur on the Sunrise property outside the modified accommodation camp area (including the management of feral animals). Additional feral animals monitoring and control would be undertaken around the accommodation camp, as necessary.</li> <li>The modified accommodation camp would be kept as a clean, rubbish-free environment in order to discourage scavenging and reduce the potential for colonisation of these areas by non-endemic fauna (e.g. rodents).</li> <li>The workforce in the modified accommodation camp would not be permitted to keep native fauna or to encourage fauna through feeding.</li> <li>Domestic pets would not be allowed at the modified accommodation camp.</li> </ul>
Bushfire Control	<ul style="list-style-type: none"> <li>Bushfire management measures at the Project would be implemented in accordance with Condition 49, Schedule 3 of Development Consent DA 374-11-00 and would include the site being suitably equipped to fight fires; develop asset protection zones in accordance with the Rural Fire Service's (2006) <i>Planning for Bushfire Protection 2006</i>; and consultation with the Rural Fire Service.</li> <li>The modified accommodation camp would include fire-fighting infrastructure (e.g. fire water tank and reticulation system).</li> </ul>

Source: Appendix A.

### 3.4 Aboriginal Cultural Heritage

An Aboriginal Cultural Heritage Assessment (ACHA) has been prepared for the Modification by Landscape Natural and Cultural Heritage Management (Landscape) and is presented in Appendix B. The ACHA focuses on the modified accommodation camp area and has been undertaken in consideration of (but not limited to) the following codes, guidelines and regulations (Appendix B):

- *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010a);
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b);
- *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010c);
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH, 2011b);
- *The Burra Charter: The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance* (Australia International Council on Monuments and Sites, 2013);
- *Aboriginal Cultural Heritage: Standards and Guidelines Kit* (NSW National Parks and Wildlife Service, 1997);
- *Ask First: A Guide to Respecting Indigenous Heritage Places and Values* (Australian Heritage Commission, 2002);
- *Engage Early* (Commonwealth Department of the Environment, 2016);
- *NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects* (NSW Minerals Council, 2010); and
- *NSW National Parks and Wildlife Regulation, 2009*.

### 3.4.1 Existing Environment

#### **Aboriginal Cultural Heritage Assessment**

The ACHA (Appendix B) incorporates relevant information from previous assessments (including for the approved Project), the results of the field surveys and associated consultation with the Aboriginal community, including:

- results from extensive fieldwork and archaeological and cultural investigations previously undertaken at the Project and surrounds;
- search results from the OEH Aboriginal Heritage Information Management System (AHIMS) database;
- results from extensive consultation with the Aboriginal community regarding archaeological and cultural heritage values; and
- a detailed description of the methods implemented and the results of archaeological and cultural surveys conducted by archaeologists and representatives of the Aboriginal community for the Modification during 2017.

The key steps involved in the preparation of the ACHA and associated consultation are described below.

#### **Aboriginal History**

Aboriginal people of the Wiradjuri language group were traditionally associated with the region encompassing the Macquarie, Lachlan and Murrumbidgee Rivers (Appendix B). The Wiradjuri appear to have had a semi-sedentary lifestyle, being hunter-fisher-gatherers they were often situated on a particular waterway or drainage catchment area where resources were plentiful (Appendix B).

Aboriginal settlement patterns of the southwest slopes are possibly reflected in the distribution of modified trees (Appendix B). Aboriginal people seem to have spent most of their time situated within close proximity to reliable water sources. Areas that people occupied were also influenced by available food sources, including waterbirds, kangaroos, wallabies, and various plant foods (Appendix B).

An Aboriginal Reserve (reserve number R32512) was gazetted for Aboriginal people on the south bank of the Lachlan River at Condobolin on 13 April 1901. Known as the Condobolin Mission, and later the Willow Bend Mission, the reserve was originally run by the Aborigines Protection Board (later Aborigines Welfare Board). Aboriginal people also resided at a self-managed “fringe camp” at the Murie Reserve, approximately 4 km south of Condobolin, between approximately 1900 and 1970 (Appendix B).

#### **Previous Archaeological Investigations**

A number of Aboriginal heritage surveys and assessments have previously been undertaken in the Project area and surrounds, including survey and assessment for the Project. Of relevant to the immediate area include the studies prepared by Appleton (2000, 2005) and Landskape (2017a) for the approved Project, and the more recent study prepared by Landskape (2017b) for Modification 4.

The ACHA prepared by Landskape (2017a) as part of an application for an Aboriginal Heritage Impact Permit (AHIP) for the approved Project, covered a portion of the modified accommodation camp area and included extensive surveys and community consultation.

A detailed description of the investigations and surveys undertaken in the modified accommodation camp area and surrounds is provided in Appendix B.

#### **Previously Recorded Aboriginal Heritage Sites**

Appleton (2000, 2005) identified 14 Aboriginal cultural heritage sites in or near the approved Project area. These comprised one stone artefact scatter, eight isolated finds of stone artefacts, four scarred trees and a site complex with stone artefacts, hearths, a scarred tree and hundreds of flaked lithics (Appendix B).



A more recent assessment undertaken by Landsape (2017a, 2017b) identified an additional 13 Aboriginal heritage sites in or near the approved Project area, including two stone artefact scatters, eight isolated finds of stone artefacts, two stone quarries and a scarred tree (Appendix B).

There are no previously recorded Aboriginal cultural heritage sites within or immediately adjacent to the modified accommodation camp area (Appendix B). The closest previously recorded Aboriginal cultural heritage sites are a scarred tree (AHIMS site number 35-4-0029) in the Wilmatha Road reserve approximately 1.5 km east of the modified accommodation camp area (Landsape, 2017b) and an isolated find of a volcanic flake (AHIMS site number 35-4-0016) east of Wilmatha Road approximately 1.5 km north of the modified accommodation camp area (Appleton, 2000).

### Community Consultation

Consultation for the Modification was undertaken in consideration of the OEH policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010a) and clause 80c of the NSW *National Parks and Wildlife Regulation, 2009*.

Table 7 summarises the main stages of the Aboriginal heritage consultation process undertaken for the Modification. A detailed account of the consultation process (including consultation records and a detailed consultation log) is provided in Appendix B.

**Table 7 Summary of Aboriginal Heritage Consultation Undertaken for the Modification**

Date	Consultation Conducted
<b>Notification of Project and Registrations</b>	
2 December 2016	Modification notifications were sent to the Central West Local Land Services, Condobolin LALC, LSC, National Native Title Tribunal, FSC, PSC, Native Title Services Corporation Limited, OEH, Office of the Registrar, <i>Aboriginal Land Rights Act, 1983</i> , and Peak Hill LALC to identify relevant organisations with a potential interest in the Modification.
6 December 2016 – 18 January 2017	Responses to the above request were received from the Office of the Registrar, NSW <i>Aboriginal Land Rights Act, 1983</i> , the OEH, National Native Title Tribunal and LSC.
6 January 2017 & 18 January 2017	Letters seeking registrations of interest were sent to the Aboriginal parties identified by the above step.
11 January 2017	A public notice was placed in the Koori Mail inviting interested Aboriginal parties or groups to register.
18 January 2017	A public notice was placed in the Condobolin Argus inviting interested Aboriginal parties or groups to register.
22 February 2017	The list of RAPs for the Modification, along with the written notifications and public notice, were provided to the OEH, the Condobolin LALC and the West Wyalong LALC.
<b>Proposed Methodology Review and Information Session</b>	
13 October 2017	The Proposed Methodology for undertaking the ACHA was distributed to the RAPs for review and comment.
October/November 2017	Comments and feedback on the relevant submissions of the Proposed Methodology were received from the relevant RAPs.
<b>Field Surveys</b>	
30 October 2017	Aboriginal heritage survey was conducted by an archaeologist from Landsape accompanied by representatives of the RAPs. The cultural significance of the modified accommodation camp area was discussed with attending representatives.
<b>Draft ACHA Review</b>	
22 December 2017	A copy of the draft ACHA was provided to all RAPs for their review and comment. The draft ACHA included survey results, archaeological and cultural significance assessment (based on feedback received during consultation and fieldwork), potential impacts and proposed mitigation and management measures.
January/February 2018	Comments received on the draft ACHA will be considered and included in the ACHA.

Source: Appendix B.

Consultation with the RAPs regarding the approved Project and the Modification has been extensive and involved various methods including public notices, onsite meetings, written and verbal correspondence, archaeological survey attendance and on-site inspections.

### **Survey Design and Methodology**

The field investigation of the modified accommodation camp area was undertaken on 30 October 2017.

The modified accommodation camp area was inspected on foot, and the field teams examined the ground surface for any archaeological traces such as stone artefacts, hearths, hearthstones, shells, bones and mounds. All mature trees in the areas of proposed disturbance were inspected for scarring or carving by Aboriginal people. Particular attention was paid to areas with high ground surface visibility such as along stock and vehicle tracks and in scalds, gullies and other eroded areas.

The survey sampled the geographic extent of the modified accommodation camp area.

### **Archaeological Findings**

Four Aboriginal cultural heritage sites were identified within the modified accommodation camp area and surrounds. These sites include three stone artefact sites (AHIMS site numbers 35-4-0034, 35-4-0035, and 35-4-0036) and a hearth site (AHIMS site number 35-4-0037). A summary of these sites is provided in Table 8 and the location of each site is presented on Figure 7.

**Table 8 Summary of Aboriginal Heritage Sites Proximal to the Modified Accommodation Camp Area**

Site	Landform	Site Type	Scientific Significance
35-4-0034	Sandplain	1 silcrete flake	Low
35-4-0035	Drainage line	2 sandstone millstones/mullers	Low
35-4-0036	Drainage line	2 silcrete flakes	Low
35-4-0037	Drainage line	1 hearth	Low

Source: Appendix B.

### **Archaeological and Cultural Heritage Values**

During the archaeological surveys the attending RAPs did not identify any specific locations within the modified accommodation camp area as being of exceptionally high or specific cultural significance. However, a number of sites were identified in the surrounding areas (e.g. Mulgutherie Mountain) as being of specific cultural value to the Aboriginal community. These sites are outside of the modified accommodation camp area and hence would not be subject to impacts by the modified Project.

RAPs identified the modified accommodation camp area as a place that Aboriginal people had occupied in the past. Generally, the Aboriginal representatives viewed all the Aboriginal cultural heritage sites as significant because they preserve a record of how and where people lived in the past.

### **3.4.2 Potential Impacts**

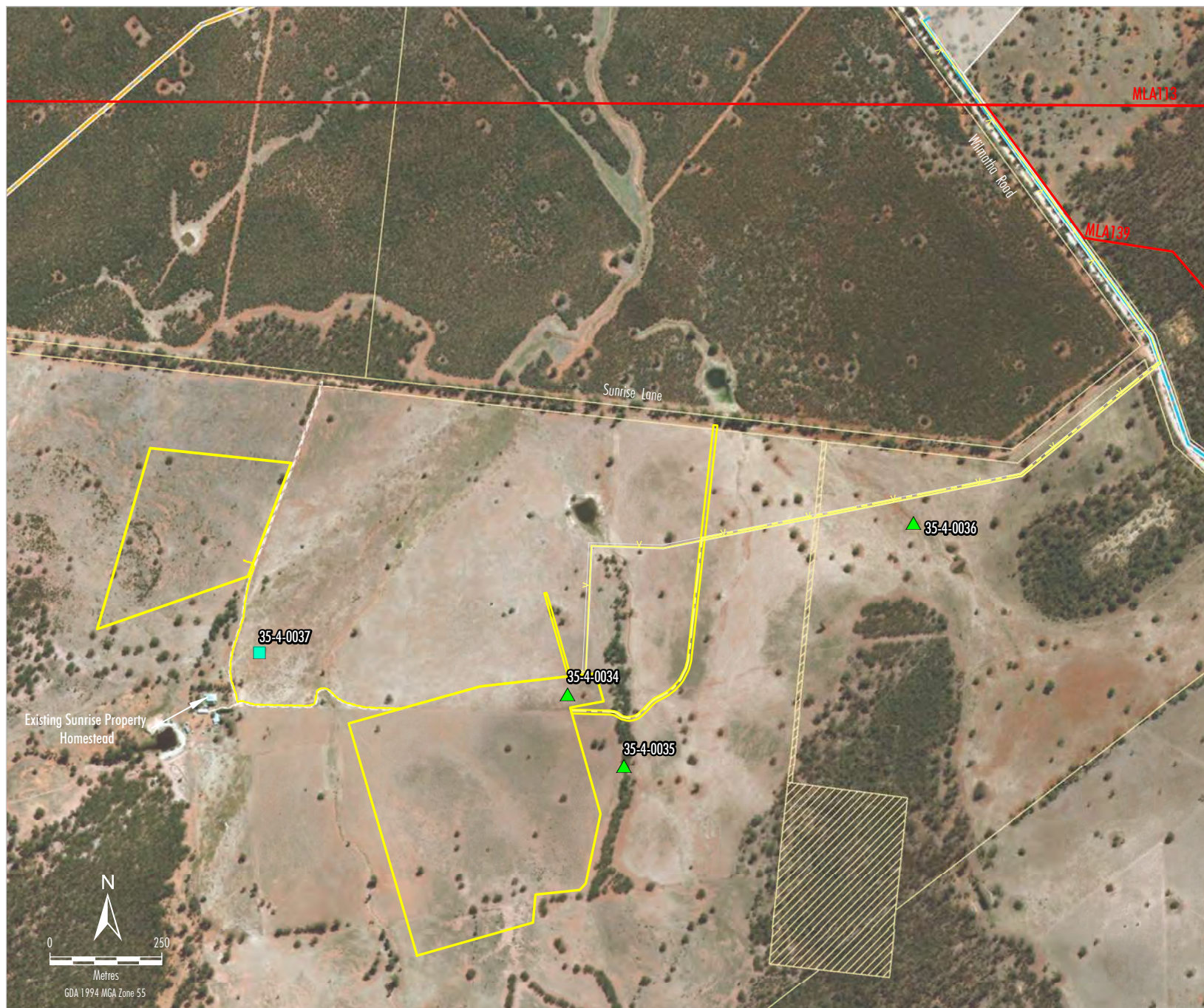
#### **Direct and Indirect Impacts**

The ACHA concluded that all four known Aboriginal cultural heritage sites within the modified accommodation camp area and surrounds are of low scientific significance (Table 8).

Of the four sites, only one site (AHIMS site number 35-4-0034) is located in the modified accommodation camp area. The remaining three sites are located outside the modified accommodation camp area (Figure 7). The Modification would therefore only result in direct harm to stone artefact site (AHIMS site number 35-4-0034) as it is the only site located in the modified accommodation camp area<sup>1</sup>.

<sup>1</sup> For assessment purposes, the ACHA conservatively assumed that the modified accommodation camp would cause direct or indirect harm to all four known Aboriginal objects.





- LEGEND**
- Mining Lease Application Boundary
  - Approved Surface Development Area
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - Property Boundary
  - Crown Land
  - Modified Layout
  - Known Aboriginal Cultural Heritage Sites
  - ▲ Artefact
  - Hearth
- Source: Black Range Minerals (2000); Landscape Natural and Cultural Heritage Management (2017); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
NSW Imagery: Esri Basemap

**CLEAN  
TEQ**  
Engineering Innovation

**CLEAN TEQ SUNRISE PROJECT**  
Location of Known  
Aboriginal Cultural Heritage Sites

**Figure 7**

Although the modified accommodation camp area was sufficiently surveyed, there remains the potential to uncover previously unidentified Aboriginal heritage within and in immediate proximity to the modified accommodation camp area (Appendix B). Such previously unidentified features, should they occur, would probably be isolated finds or low-density concentrations of stone artefacts (Appendix B). A strategy for managing any newly identified Aboriginal objects during the modified Project is considered further in Section 3.4.3.

### **Cumulative Impacts**

The modified accommodation camp is located within an area that has already been heavily modified by past clearing, pastoral and agricultural activities. The Modification is considered likely to cause few impacts additional to those that have already occurred. On this basis, it is considered that the Modification would not appreciably increase cumulative impacts to Aboriginal heritage in the region (Appendix B).

### **3.4.3 Mitigation Measures and Management**

The mitigation, management and monitoring measures detailed below have been developed in consultation with the RAPs, in consideration of the cultural and archaeological significance of the Aboriginal heritage sites predicted to be impacted, and the cultural significance of the broader area.

#### **Heritage Management Plan**

A Heritage Management Plan would be developed in consultation with the RAPs and the OEH for the Project in accordance with Condition 40, Schedule 3 of Development Consent DA 374-11-00. The Heritage Management Plan would reflect any changes to Development Consent DA 374-11-00 that arise from the Modification and would be developed prior to the commencement of any surface development works which would harm known Aboriginal heritage sites in the modified accommodation camp area.

The Heritage Management Plan would continue to remain active for the life of the Project and define the tasks, scope and conduct of all Aboriginal cultural heritage management activities.

#### **Aboriginal Heritage Impact Permit**

Clean TeQ would submit an application for a new AHIP under section 90 of the NSW *National Parks and Wildlife Act, 1974* (and/or a variation application to the existing approved AHIP #C0003049).

#### **General Management Measures**

The following general management measures would be undertaken to manage Aboriginal heritage during the life of the modified Project:

- Harm to the hearth site (AHIMS site number 35-4-0037) and two of the stone artefact sites (AHIMS site numbers 35-4-0035 and 35-4-0036) would be avoided. A temporary barrier would be erected around the hearth site (a minimum 10 m radius buffer), while the stone artefact sites would be demarcated with tape to avoid accidental disturbance.
- Clean TeQ would apply for an AHIP (or variation to the existing approved AHIP #C0003049) to collect Aboriginal objects at stone artefact site (AHIMS site number 35-4-0034) and any additional Aboriginal objects located within the disturbance areas for the Modification. These items would be properly curated and stored at the approved "Keeping Place".
- Clean TeQ would continue to provide training to all on-site personnel regarding the Heritage Management Plan strategies relevant to their employment tasks.



### 3.5 Historic Heritage

#### 3.5.1 Existing Environment

During the field investigation for the ACHA (Section 3.4), project archaeologist Dr Matt Cupper from Landscape examined the modified accommodation camp area for historic heritage items. No historic heritage items were observed in the modified accommodation camp area.

#### 3.5.2 Potential Impacts

As no historic heritage items were observed within the modified accommodation camp area, there would be no impacts to historic heritage items associated with the Modification.

#### 3.5.3 Mitigation Measures and Management

A Heritage Management Plan would be developed in consultation with the OEH for the Project in accordance with Condition 40, Schedule 3 of Development Consent DA 374-11-00. The Heritage Management Plan would reflect any changes to Development Consent DA 374-11-00 that arise from the Modification and would be developed prior to the commencement of any surface development works and would include protocols for the management of any previously unidentified historic heritage items.

### 3.6 Water Management

#### 3.6.1 Existing Environment

The modified accommodation camp area is located in the Macquarie-Bogan catchment which covers an area of approximately 74,800 square kilometres within the Murray-Darling Basin. Regional north-west-flowing rivers (Bogan, Macquarie, Castlereagh, Namoi and Barwon) drain an extensive floodplain north.

The modified accommodation camp area is located in the upper headwaters of Bullock Creek. Three shallow drainage lines drain northwards from the modified accommodation camp area towards the mine site (Figure 2a). The drainage lines discharge to Bullock Creek to the north-east of the mine site which flows north-easterly and then discharges to the Bogan River.

These drainage lines are shallow broad vegetated ephemeral channels (Golder Associates, 2017).

Given the ephemeral nature of the drainage lines in the vicinity of the mine site, there are no known surface water users immediately upstream or downstream with an access licence.

#### 3.6.2 Potential Impacts

##### **Surface Water Flow Regimes**

The Modification would result in very minor changes to flows in local drainage lines in the vicinity of the modified accommodation camp due to the capture of drainage from construction areas during the construction phase and from the utilities area during the operations phase.

Given the above, the Modification is expected to result in negligible change to the approved flow impacts in Bullock Creek and the Bogan River.

##### **Surface Water Quality Runoff and Contaminants**

Surface water runoff from the modified accommodation camp could potentially contain sediments, hydrocarbons (e.g. diesel, oil) and chemicals.

Sediment control structures such as sediment dams and sediment fences would be employed where necessary within and downstream of disturbance areas. Sediment control structures would be designed, installed and maintained in accordance with *Managing Urban Stormwater: Soils and Construction* in accordance with Condition 29, Schedule 3 of Development Consent DA 374-11-00.

The irrigation area would be managed in accordance with the *Environmental Guidelines Use of Effluent by Irrigation* (DEC, 2004) and the irrigation rate would be controlled so as not to:

- cause irrigation water runoff from the irrigation area; or
- exceed the capacity of the soil in the irrigation area to effectively absorb the applied nutrient, salt, organic material and hydraulic loads.

In addition, Clean TeQ would operate the Project in accordance with the requirements of an Environment Protection Licence (EPL) issued under Part 3 of the *Protection of the Environment Operations Act, 1997* (PoEO Act).

With these controls in place, the Modification is predicted to have no change to the approved potential water quality impacts in the receiving drainage lines.

### 3.6.3 Mitigation Measures, Management and Monitoring

The water management measures described in Section 2.2 would be implemented at the modified accommodation camp.

Clean TeQ has reviewed the water management performance measures included in Condition 29, Schedule 3 of Development Consent DA 374-11-00 in the context of the Modification and concluded that no changes are required for the modified Project.

A Water Management Plan would be prepared for the modified Project in accordance with Condition 30, Schedule 3 of Development Consent DA 374-11-00 and would include a Surface Water Management Plan. The Water Management Plan would reflect any changes to Development Consent DA 374-11-00 that arise from the Modification.

## 3.7 Air Quality

### 3.7.1 Existing Environment

#### **Previous Assessments**

An air quality assessment was prepared for the Project (Zib & Associates, 2000) which included dispersion modelling of a number of construction and operational scenarios. The air quality assessment found that the Project would comply with relevant air quality goals beyond the site boundary and/or at privately-owned dwellings.

Ramboll Environ (2017) prepared an air quality and greenhouse gas assessment for Modification 4 in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (Approved Methods) (EPA, 2016). Ramboll Environ (2017) predicted there would be no exceedances of the Development Consent DA 374-11-00 or Approved Methods criteria at any privately-owned receivers.

#### **Existing Air Quality**

Given there are no commercial or industrial facilities that report to the National Pollutant Inventory or hold an EPL in the vicinity of the Project, it is expected that air quality in the vicinity of the Project would be consistent with a typical rural environment. That is, material concentrations of gaseous pollutants would not be likely, however background levels of particulate matter would be present (e.g. from agricultural activities, wind-blown dust from exposed areas, wheel-generated dust from vehicle movements and other sources).

### 3.7.2 Potential Impacts

Potential air quality impacts associated with the Modification would be associated with the construction of the modified accommodation camp. Once the construction activities at the modified accommodation camp are complete, potential air quality emissions from the modified accommodation camp would be negligible.

Potential particulate matter emissions during construction activities would primarily be associated with material handling, windblown dust from exposed areas and vehicle movements (including vehicle exhaust).

The potential air quality impacts associated with construction activities are difficult to quantify given the tendency for such activities to be short term in duration and sporadic across an overall construction timeframe.

Notwithstanding, the total amount of dust generated during construction of the modified accommodation camp would not be significant in comparison to other initial construction activities for the Project (e.g. development of the tailings storage facility). The modified accommodation camp is also a significant distance from the closest privately-owned receivers to the south-east (i.e. greater than 2.5 km away), while development of the tailings storage facility is approximately 2.3 km away from the closest privately-owned receiver to the south (Figure 8).

It is also noted that prevailing winds in the Project area are generally from the north-east and south-west, with very little wind originating from the north-west (Ramboll Environ, 2017) (i.e. from the modified accommodation camp area toward the closest receivers). This limits the potential for any dust generated at the modified accommodation camp area to be experienced at the nearest receivers to the south-east.

Based on the above, it is expected there would be no material change to the Year 1 scenario modelled by Ramboll Environ (2017), which indicated no potential exceedances of relevant air quality criteria at any receivers. Therefore there would be no significant or prolonged impacts at any privately-owned receivers predicted due to construction of the modified accommodation camp, noting a range of dust management and control measures would be implemented as described in Section 3.7.3.

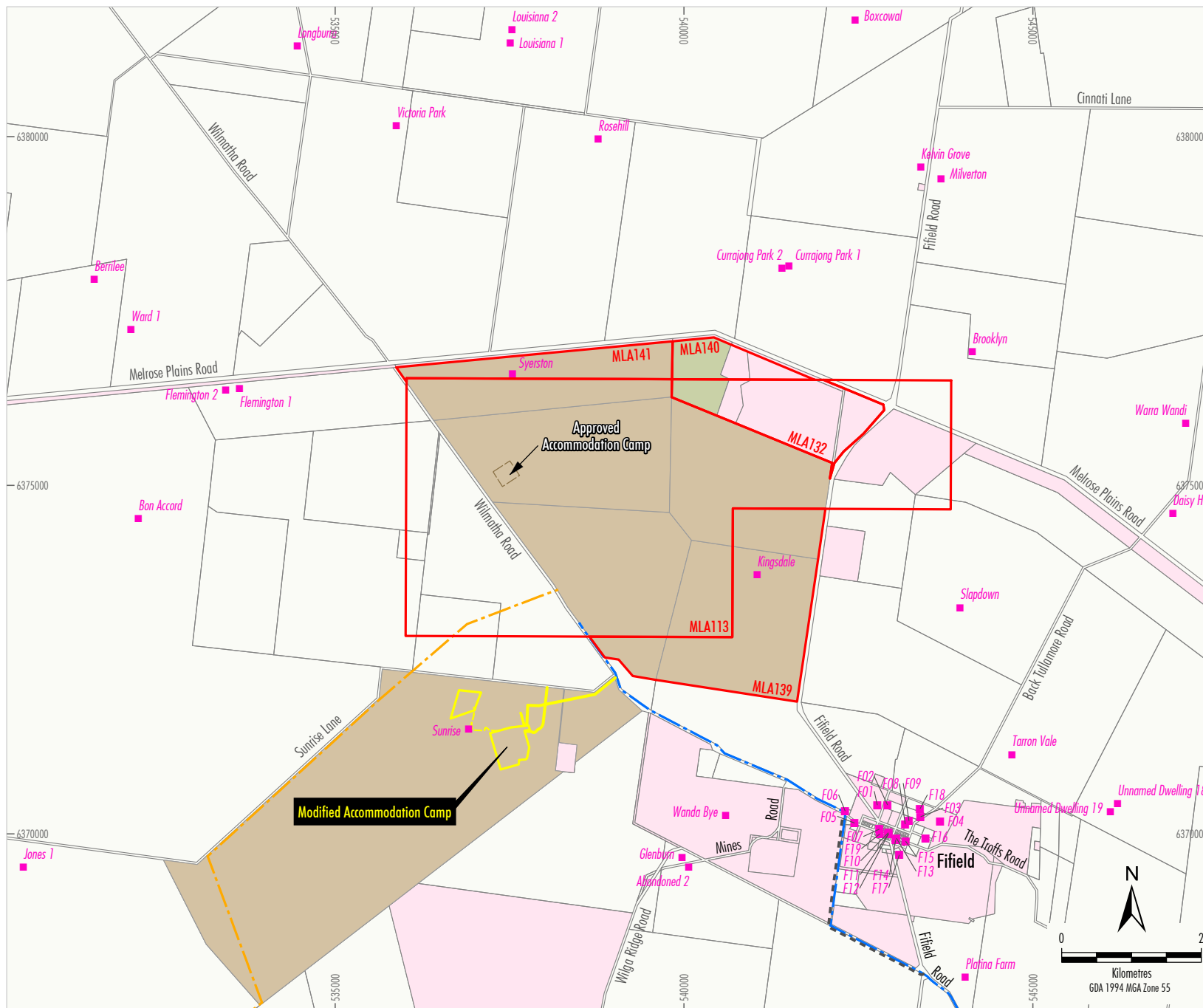
### 3.7.3 Mitigation Measures, Management and Monitoring

An Air Quality Management Plan would be prepared for the modified Project in accordance with Condition 23, Schedule 3 of Development Consent DA 374-11-00. The Air Quality Management Plan would reflect any changes to Development Consent DA 374-11-00 that arise from the Modification and would relevantly include:

- details of the air quality mitigation measures to be implemented for the Project;
- the air quality monitoring program, monitoring of ambient dust levels;
- details of protocols for measuring environmental performance and triggers for the investigation of additional mitigation measures; and
- complaint management protocols.

It is anticipated that the Air Quality Management Plan would include a range of construction dust management and control measures such as the following:

- site inductions would include air quality requirements to ensure employee and contractor awareness of potential dust impacts;
- minimisation of disturbance areas, and watering cleared areas as required;
- speed limits would be imposed on all roads; and
- water carts would be utilised as necessary to minimise excessive visible dust.





### 3.7.4 Greenhouse Gas Emissions

Construction of the modified accommodation camp, rather than the approved accommodation camp, would not materially change the potential greenhouse gas emissions associated with the construction activities.

Clean TeQ would calculate and report annual greenhouse gas emissions and energy consumption of the Project under the Commonwealth Government National Greenhouse and Energy Reporting System.

## 3.8 Noise

### 3.8.1 Existing Environment

A noise assessment was prepared for the Project (Richard Heggie Associates, 2000) which included noise modelling of a number of construction and operational scenarios. The noise assessment found that the Project would comply with relevant noise goals beyond the site boundary and/or at all privately-owned dwellings except for Currajong Park.

Renzo Tonin & Associates (2017) prepared a noise and blasting assessment for Modification 4 in accordance with the NSW *Industrial Noise Policy* (EPA, 2000) and *Interim Construction Noise Guideline* (Department of Environment and Climate Change [DECC], 2009). The assessment focused on the mine (including the processing facility) and the predicted construction noise levels at all receivers were found to comply with the relevant noise management levels described in the *Interim Construction Noise Guideline* (DECC, 2009) both within and outside of recommended standard construction hours.

### 3.8.2 Potential Impacts

Once the construction activities at the modified accommodation camp are complete, potential noise emissions from the modified accommodation camp would be negligible.

Potential construction noise emissions would primarily be associated with equipment such as cranes, trucks and other mobile equipment.

Construction activities would be short term in duration and sporadic across the overall construction timeframe. In other words, the magnitude and nature of construction noise would vary throughout the construction timeframe.

The total amount of noise generated during construction of the modified accommodation camp would not be significant in comparison to other initial construction activities for the Project (e.g. development of the tailings storage facility). The modified accommodation camp is also a significant distance from the closest privately-owned receivers to the south-east (i.e. greater than 2.5 km away), while development of the tailings storage facility is approximately 2.3 km away from the closest receiver to the south (Figure 8).

It is also noted that prevailing winds in the Project area are generally from the north-east and south-west, with very little wind originating from the north-west (Ramboll Environ, 2017) (i.e. from the modified accommodation camp area toward the closest receivers). This limits the potential for noise generated at the modified accommodation camp area to be experienced at the nearest receivers to the south-east.

Based on the above, it is expected there would be no material change to the Year 1 construction noise scenario modelled by Renzo Tonin & Associates (2017), which indicated no potential exceedances of relevant noise criteria at any receivers. Therefore there would be no significant noise impacts at any privately-owned receivers predicted due to construction of the modified accommodation camp, noting a range of noise management and control measures would be implemented as described in Section 3.8.3.

### 3.8.3 Mitigation Measures, Management and Monitoring

A Noise Management Plan would be prepared for the modified Project in accordance with Condition 9, Schedule 3 of Development Consent DA 374-11-00. The Noise Management Plan would reflect any changes to Development Consent DA 374-11-00 that arise from the Modification and would relevantly include:

- the noise monitoring program;
- details of protocols for measuring environmental performance and triggers for the investigation of additional mitigation measures; and
- complaint management protocols.

It is anticipated that the Noise Management Plan would a range of construction noise management and control measures such as the following:

- site inductions would include noise requirements to ensure employee and contractor awareness of potential noise impacts;
- all plant and machinery used for construction activities would be operated in a proper and efficient manner and regularly maintained to minimise noise generation;
- lesser noise generating construction activities (e.g. welding and electrical works) would be conducted during the evening and night-time periods; and
- temporary cessation of work (by a single item of particularly noisy equipment, or a number of items if required) would be considered when adverse conditions are present (e.g. strong temperature inversions).

## 3.9 Road Transport

GTA Consultants (2017) prepared a road transport assessment for Modification 4 in accordance with the *Guide to Traffic Generating Developments* (NSW Roads and Traffic Authority, 2002) that also considered the modified accommodation camp. The conclusions of the GTA Consultants (2017) are considered in this section where relevant.

### 3.9.1 Existing Environment

The following key roads are of relevance to the modified accommodation camp (Figure 3):

- Wilmatha Road – extends north-west from Fifield and past the mine site; and
- Sunrise Lane – extends west from Wilmatha Road.

Traffic survey data on Wilmatha Road (north of Sunrise Lane) indicates that existing daily volumes (19 movements per day [traffic in both directions]) are low (GTA Consultants, 2017). Although there is no traffic survey data available for Sunrise Lane, it is also expected to be low.

There are no intersection operation capacity concerns in the vicinity of the Project (GTA Consultants, 2017).

A review of NSW Roads and Maritime Services (RMS) accident data in the vicinity of the Project during the period 1 January 2011 to 14 November 2016 indicated that no accidents were reported on Wilmatha Road (GTA Consultants, 2017).

### 3.9.2 Potential Impacts

The relocation of the accommodation camp would change Project road traffic movements on Wilmatha Road (between the approved mine site access road and Sunrise Lane) and on Sunrise Lane (between Wilmatha Road and the modified accommodation camp access road) (Figure 3).

### ***Project Traffic Generation***

The modified Project is predicted to result in the following daily vehicle movements (traffic in both directions) (GTA Consultants, 2017):

- Wilmatha Road (between the approved mine site access road and Sunrise Lane) – up to an additional 289 movements per day during the peak construction period; and
- Sunrise Lane (between Wilmatha Road and the modified accommodation camp access road) – up to an additional 391 movements per day during the peak construction period.

With regard to the wider road network in the region, the modified accommodation camp would have negligible effect on the operation of the key access routes (GTA Consultants, 2017).

### ***Roadway Capacity***

Austroroads (2013) defines a Level of Service as a qualitative measure describing operational conditions within a traffic stream (in terms of speed, travel time, freedom to manoeuvre, safety and convenience) and their perception by motorists and/or passengers. Level of Service A provides the best traffic conditions, with no restriction on desired travel speed or overtaking. Level of Service B to D describes progressively worse traffic conditions. Level of Service E occurs when traffic conditions are at or close to capacity.

GTA Consultants (2017) forecast a Level of Service B on Wilmatha Road which represents good operating conditions. The Modification is not expected to significantly change the Level of Service on Wilmatha Road.

### ***Road Safety Review***

The Modification would not result in significant impacts on the safety of the road network with implementation of the road upgrades (Section 3.9.3).

## **3.9.3 Mitigation Measures, Management and Monitoring**

### ***Road Upgrades and Maintenance***

The proposed road upgrades and road maintenance contributions for the modified Project are outlined in Section 2.3.

The modified road upgrades and road maintenance contributions are based on recommendations of GTA Consultants (2017).

### ***Road Upgrades and Maintenance Strategy***

A Road Upgrades and Maintenance Strategy would be developed in consultation with the RMS, LSC, PSC and FSC for the modified Project in accordance with Condition 43, Schedule 3 of Development Consent DA 374-11-00.

The Road Upgrades and Maintenance Strategy would reflect any changes to Development Consent DA 374-11-00 that arise from the Modification and would include a program for the implementation of the road upgrades and a program for road maintenance.

### ***Traffic Management Plan***

A Traffic Management Plan would be developed in consultation with the RMS, LSC, PSC and FSC for the modified Project in accordance with Condition 45, Schedule 3 of Development Consent DA 374-11-00. The Traffic Management Plan would reflect any changes to Development Consent DA 374-11-00 that arise from the Modification and would relevantly include:

- details of transport routes to be used by the Project;
- measures to minimise traffic safety issues and disruption to the local community during the construction of the Project; and
- a Road Transport Protocol for all drivers transporting materials to and from the Project.



### 3.10 Visual Amenity

#### 3.10.1 Existing Environment

The regional visual character is generally characterised by cleared agricultural land, with areas of remnant bushland on elevated areas or along road sides. The small village of Fifield is located to the south-east (Figure 8), with Condobolin (the largest nearby town) located approximately 45 km to the south-west (Figure 1).

The topography of the area is relatively flat with the main topographic features being Boona Mountains approximately 20 km to the west and Gobondry Mountains approximately 10 km to the east (Resource Strategies, 2000). The main topographic features in the modified accommodation camp area are three shallow drainage lines that drain towards Sunrise Lane in the north. Elevations in the modified accommodation camp area range from approximately 305 m AHD in the north to approximately 320 m AHD in the south (Figures 2a and 2b).

Views of the modified accommodation camp area would be limited due to the lack of public vantage points, the relatively flat topography and shielding roadside vegetation. Views of the modified accommodation camp would however be available from Sunrise Lane. No views of the modified accommodation camp would be available from privately-owned dwellings due to the presence of intervening topography and vegetation.

#### 3.10.2 Potential Impacts

The modified accommodation camp and associated supporting infrastructure would be visible from Sunrise Lane. Due to roadside vegetation along Sunrise Lane, these views would generally be intermittent or partial views. The modified accommodation camp would therefore contribute to a low level of visual modification along Sunrise Lane. As Sunrise Lane is a local road and users would be exposed to the views of the modified accommodation camp for a relatively short period of time and the number of users is limited, the visual sensitivity of users of Sunrise Lane would be low.

For users of Sunrise Lane, the low level of visual modification coupled with the low level of visual sensitivity indicates a low level of potential visual impact would be expected.

Any potential impact associated with night-lighting required for the modified accommodation camp (i.e. for safety reasons) would be insignificant compared to the mine site. These potential impacts would be minimised as far as possible through the implementation of the mitigation measures described in Section 3.10.3.

Overall, the potential visual impacts associated with the modified accommodation camp would be low.

#### 3.10.3 Mitigation Measures and Management

Clean TeQ would implement a number of measures to minimise potential visual impacts at the modified Project:

- The visual appearance of the modified accommodation camp (including paint colours, specifications and screening) would be designed to blend in as far as possible with the surrounding landscape.
- The modified accommodation camp would be landscaped as soon as practicable following disturbance in order to reduce the contrast between the modified accommodation camp and the surrounding environment.
- Whilst ensuring that safety is not compromised, Clean TeQ would minimise light emissions from the modified accommodation camp by select placement, configuration and direction of lighting so as to reduce off-site nuisance effects where practicable.
- All external lighting at the modified accommodation camp would be operated in accordance with AS 4282 (INT):1997 – *Control of Obtrusive Effects of Outdoor Lighting*.

## 4 Statutory Context

This section outlines the statutory requirements relevant to the assessment of the Modification.

### 4.1 Environmental Planning and Assessment Act, 1979

The Project was approved under Part 4 of the EP&A Act in 2001 (Development Consent DA 374-11-00).

Clause 12 of Schedule 6A of the EP&A Act provides that section 75W of Part 3A of the EP&A Act continues to apply to modification of development consents referred to in clause 8J(8) of the *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation) following the repeal of Part 3A.

The Project was approved under Part 4 of the EP&A Act in 2001 by development consent under Division 4 of Part 4 of the EP&A Act (relating to State significant development). Therefore, Development Consent DA 374-11-00 is a development consent that falls within clause 8J(8)(c) of the EP&A Regulation. That is, section 75W of the EP&A Act continues to apply to modifications to Development Consent DA 374-11-00, notwithstanding its repeal<sup>2</sup>.

Approval for the Modification will be sought as a modification to Development Consent DA 374-11-00 under section 75W of the EP&A Act. Section 75W of the EP&A Act relevantly provides:

#### **75W Modification of Minister's approval**

(1) *In this section:*

**Minister's approval** means an approval to carry out a project under this Part, and includes an approval of a concept plan.

**Modification of approval** means changing the terms of a Minister's approval, including:

- (a) *Revoking or varying a condition of the approval or imposing an additional condition of the approval, and*
- (b) *Changing the terms of any determination made by the Minister under Division 3 in connection with the approval.*
- (2) *The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*
- (3) *The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*
- (4) *The Minister may modify the approval (with or without conditions) or disapprove of the modification...*

### 4.2 Environmental Planning Instruments

#### 4.2.1 Local Environmental Plans

The Project is located within the Lachlan, Parkes and Forbes LGAs, which are covered by the *Lachlan Local Environmental Plan, 2013* (Lachlan LEP), *Parkes Local Environmental Plan, 2012* (Parkes LEP) and *Forbes Local Environmental Plan, 2013* (Forbes LEP), respectively.

As the Modification would not change Project components located in the Parkes and Forbes LGAs, the Parkes LEP and Forbes LEP have not been considered further in this section.

<sup>2</sup> Part 3A of the EP&A Act (as in force immediately before its repeal) continues to apply for the Project. The description and quotations of relevant references to clauses of Part 3A in this document are as if Part 3A of the EP&A Act is still in force.

**Lachlan Local Environmental Plan, 2013**

The modified accommodation camp would be located in the Lachlan LGA.

*Permissibility*

The modified accommodation camp is located in land zoned “RU1” (Primary Production) under the Lachlan LEP. Temporary accommodation and/or multi-dwelling residential accommodation are not listed as permissible uses in land zoned “RU1” (Primary Production) under the Lachlan LEP. Open cut mining is listed as permissible activity with consent on lands zoned “RU1” (Primary Production) under the Lachlan LEP.

The Lachlan LEP defines “open cut mining” as:

*... mining carried out on, and by excavating, the earth’s surface, but does not include underground mining.*

The Lachlan LEP defines “mining” as:

*mining carried out under the Mining Act, 1992 or the recovery of minerals under the Offshore Minerals Act, 1999, and includes:*

- (a) the construction, operation and decommissioning of associated works, and*
- (b) the rehabilitation of land affected by mining.*

The modified accommodation camp would be associated with the Project’s mining operations carried out under the *Mining Act, 1992*.

The Minister would not be precluded from approving the Modification due to the land zoning under the Lachlan LEP.

*Objectives*

Clause 2.3(2) of the Lachlan LEP provides:

*The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone.*

The objectives of the “RU1” (Primary Production) zone include:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage the diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*

The Modification is consistent with the general objectives of the “RU1” (Primary Production) zone as mining is a primary industry and the Modification would minimise potential operational constraints at the mine site.

The Modification would not significantly alter the compatibility of Project with adjoining land uses.

**4.2.2 State Environmental Planning Policies*****State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007***

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries)* (Mining SEPP) regularises the various environmental planning instruments that previously controlled mining activities and aims to provide for the proper management of and development of mineral resources.

Clause 5(3) of the Mining SEPP gives it primacy where there is an inconsistency between the provisions of the Mining SEPP and the provisions of any other environmental planning instrument (except the *State Environmental Planning Policy (Major Development) 2005*, *State Environmental Planning Policy No. 14 [Coastal Wetlands]* and *State Environmental Planning Policy No. 26 [Littoral Rainforest]*).



## Clause 2 – Aims

Clause 2 sets out the aims of the Mining SEPP as follows:

- (c) *to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and*
- (d) *to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and*
- (b1) *to promote the development of significant mineral resources, and*
- (e) *to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources, and*
- (f) *to establish a gateway assessment process for certain mining and petroleum (oil and gas) development:*
  - (i) *to recognise the importance of agricultural resources, and*
  - (ii) *to ensure protection of strategic agricultural land and water resources, and*
  - (iii) *to ensure a balanced use of land by potentially competing industries, and*
  - (iv) *to provide for the sustainable growth of mining, petroleum and agricultural industries.*

## Clause 12 – Compatibility with Other Land Uses

Clause 12 of the Mining SEPP requires that, before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must:

- (a) *consider:*
  - (i) *the existing uses and approved uses of land in the vicinity of the development, and*
  - (ii) *whether or not the development is likely to have significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and*
  - (iii) *any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and*
- (b) *evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a) (i) and (ii), and*
- (c) *evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii).*

Existing and approved land use in the vicinity of the Project is generally characterised by agricultural land uses. Land use at the modified accommodation camp area includes agriculture, vegetated areas and road reserve.

Consideration of the potential impacts of the Project on agricultural and other land uses is summarised in Section 3.2.2.

The modified Project is not incompatible with existing, approved or likely adjoining land uses. As described in Section 3, the modified Project would be operated in a manner as to minimise potential impacts on the environment and alternative land uses on adjoining lands.

Clean TeQ would implement a progressive rehabilitation program (Section 2.4) which aims to rehabilitate the site to a state that would minimise the incompatibility of the Project with existing and future land uses in the area. The rehabilitated modified accommodation camp area would incorporate agriculture as the final land use.

**Clause 14 – Natural Resource Management and Environmental Management**

Clause 14(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:

- (a) *that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,*
- (b) *that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,*
- (c) *that greenhouse gas emissions are minimised to the greatest extent practicable.*

In addition, clause 14(2) requires that, without limiting clause 14(1), in determining a development application for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable state or national policies, programs or guidelines concerning greenhouse gas emissions.

The potential impacts of the Modification on water resources are discussed in Section 3.6.2, including measures to minimise potential impacts which are described in Section 3.6.3.

The potential impacts of the Modification on threatened species and biodiversity are described in Section 3.3.2, including measures to minimise potential impacts which are described in Section 3.3.3.

Consideration of the modified Project greenhouse gas emissions is provided in Section 3.7.4.

**Clause 17 – Rehabilitation**

Clause 17 of the Mining SEPP requires that before granting consent for development for the purposes of mining, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development.

In particular, the consent authority must consider whether conditions of the consent should:

- (a) *require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or*
- (b) *require waste generated by the development or the rehabilitation to be dealt with appropriately, or*
- (c) *require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under section 145C of the Act and the Contaminated Land Management Act 1997), or*
- (d) *require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.*

A comprehensive program would be implemented for the progressive rehabilitation of the modified accommodation camp area, including the remediation of any contaminated soil, if applicable (Section 2.4).

One of the key Project rehabilitation objectives (Section 2.4) is the creation of safe, stable, adequately drained post-mining landforms that are consistent with the local surrounding landscape.

**State Environmental Planning Policy No. 55 (Remediation of Land)**

The State Environmental Planning Policy No. 55 (Remediation of Land) (SEPP 55) aims to provide a State-wide planning approach to the remediation of contaminated land. Under SEPP 55, planning authorities are required to consider the potential for contamination to adversely affect the suitability of the site for its proposed use.

A consent authority must consider the following under clause 7(1) of SEPP 55:

- (a) *it has considered whether the land is contaminated, and*
- (b) *if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*
- (c) *if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

Clause 7(2) provides that before a consent authority determines an application for development consent, a 'preliminary investigation' is required where:

- the application for consent is to carry out development that would involve a 'change of use'; and
- that 'change of use' applies to certain land specified in clause 7(4).

The certain land specified in clause 7(4) on which the 'change of use' must relate is either:

- land that is an 'investigation area' – defined in SEPP 55 as land declared to be an investigation area by a declaration in force under Division 2 of Part 3 of the *Contaminated Land Management Act, 1997*; or
- land on which development for a purpose referred to in Table A5-1 to the contaminated land planning guidelines (being *Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land* [NSW Department of Urban Affairs and Planning and EPA, 1998]) is being, or is known to have been carried out.

Ground Doctor (Appendix C) completed a Land Contamination Assessment of the modified accommodation camp area, including a Stage 1 (or Preliminary Investigation) in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites* (OEH, 2011a).

On the basis of the Stage 1 (or Preliminary Investigation) Land Contamination, the modified accommodation camp area is suitable for the land use proposed by the Modification (Appendix C).

#### 4.2.3 NSW Government Policy

In September 2012, the NSW Government released the following policy documents potentially relevant to the Modification:

- *Strategic Regional Land Use Policy* (NSW Government, 2012a); and
- *Aquifer Interference Policy* (AIP) (NSW Government, 2012b).

##### **Strategic Regional Land Use Policy**

As part of the *Strategic Regional Land Use Policy* (NSW Government, 2012a), the NSW Government introduced a 'Gateway Process' for the upfront assessment of the impacts of State Significant mining and coal seam gas proposal on Strategic Agricultural Land.

The Mining SEPP includes mapping of lands identified as Strategic Agricultural Land and none is mapped in the mine site.

A Site Verification Certificate or Gateway Certificate is not required for the modified accommodation camp area as it located outside the mining tenements (clause 17A[2] of the Mining SEPP).

An assessment of potential impacts on agricultural resources is presented in Section 3.2.2.

##### **Aquifer Interference Policy**

The AIP has been developed to ensure equitable water sharing between various water users and proper licensing of water taken by aquifer interference activities such that the take is accounted for in the water budget and water sharing arrangements. The AIP also aims to enhance existing regulation, contributing to a comprehensive framework to protect the rights of all water users and the environment in NSW.



No change to approved water demand or groundwater impacts are expected as a result of the Modification and therefore the AIP is not considered further.

### 4.3 Development Application Area

The Modification necessitates an extension to the Development Application Area for Development Consent DA 374-11-00. Figure 9 shows the extent of the proposed Development Application Area extension to incorporate the Modification.

The proposed Development Application Area extension includes Lot 17 DP 752086, Road within Lot 17 DP 752086 and Road (Sunrise Lane) bounded by Lot 17 DP 752086 and Lots 3 to 5 DP 754021.

### 4.4 Environment Protection and Biodiversity Conservation Act, 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) defines proposals that are likely to have a significant impact on a matter of national environmental significance as a 'controlled action'. Proposals that are, or may be, a controlled action are required to be referred to the Commonwealth Minister for the Environment for a determination as to whether or not the action is a controlled action.

Matters of national environmental significance include:

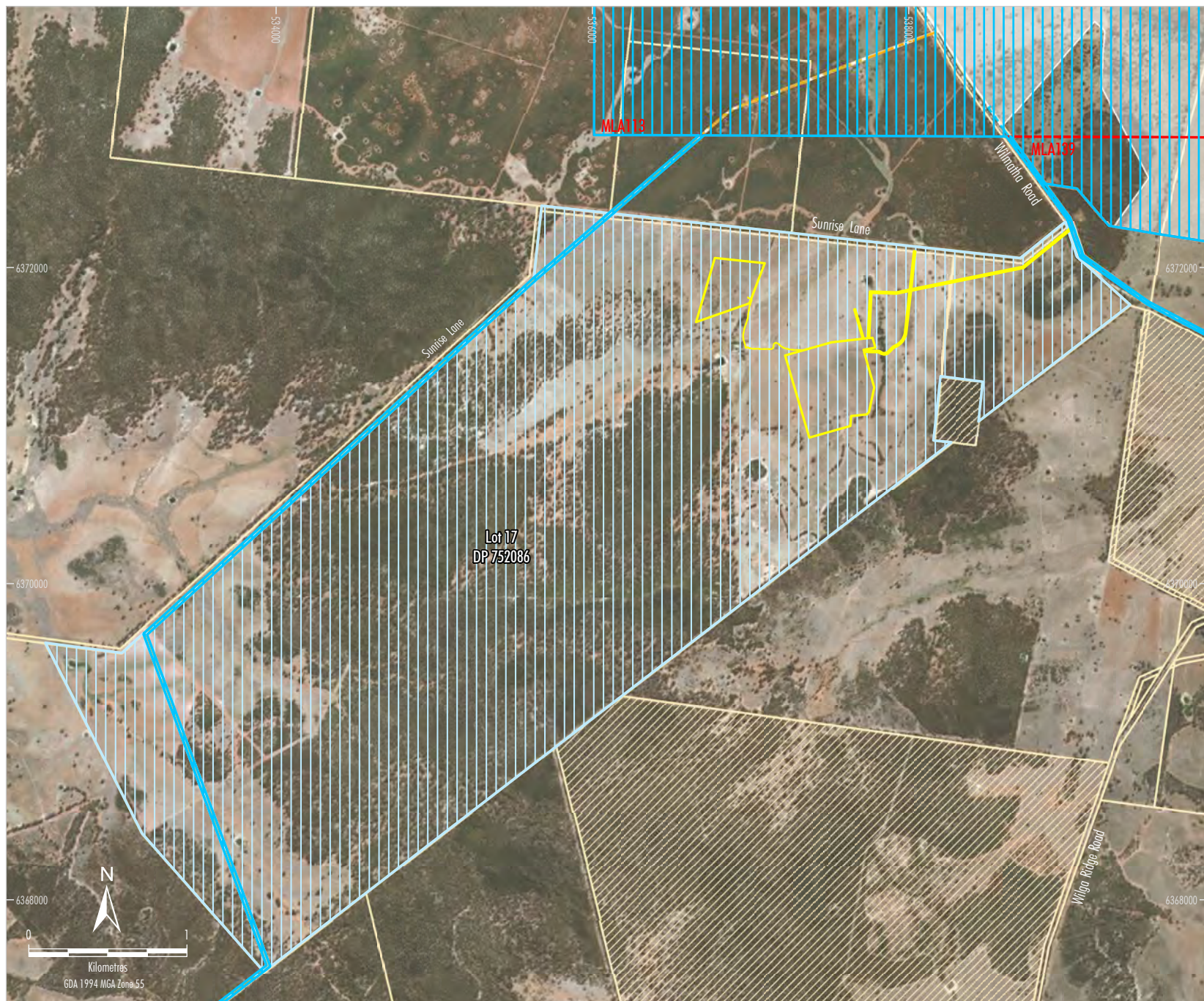
- world heritage properties;
- wetlands listed under the Ramsar Convention;
- listed threatened species and ecological communities;
- listed migratory species protected under international agreements;
- nuclear actions;
- the Commonwealth marine environment;
- national heritage places; and
- water resources, in relation to coal seam gas development and large coal mining developments.

The Project was referred in 2001, and was determined as 'not a controlled action' (EPBC 2001/133).

The Modification is unlikely to impact (or significantly impact) any threatened species or communities listed under the EPBC Act as none have been confirmed to occur and the modified accommodation camp is proposed to be constructed solely within the previously cleared/cultivated land with minimal biodiversity values (Appendix A). Hence, there would be no significant impact on threatened species and communities listed under the EPBC Act as a result of the Modification.

The other matters of national environmental significance are not considered relevant to the Modification.

It is therefore considered that there is no need to refer the Modification to the Commonwealth Minister for the Environment.



- LEGEND**
- Mining Lease Application Boundary
  - Approved Surface Development Area
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - Property Boundary
  - Crown Land
  - Development Consent Area DA 374-11-00
  - Proposed Extension to the Development Application Area
  - Modified Layout

Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
NSW Imagery: Esri Basemap

**CLEAN  
TEQ**  
CLEAN TEQ SUNRISE PROJECT  
Development Application Area Extension

**Figure 9**



## 5 Conclusion

As part of detailed planning for the construction phase of the Project, Clean TeQ has identified an alternative location for the approved accommodation camp that would provide improved amenity for the workforce in the accommodation camp and minimise potential operational constraints at the mine site. Clean TeQ also identified the preference to maintain the accommodation camp (at reduced capacity) during operations for the short-term use of temporary contractors and visitors. The Modification would include:

- development of the accommodation camp (including supporting infrastructure) at an alternative location approximately 4 km to the south of the mine site;
- construction of an ETL and water pipeline from the mine site to the modified accommodation camp site;
- minor road upgrades;
- increased accommodation camp capacity (from approximately 1,000 to 1,300 personnel); and
- the accommodation camp (at reduced capacity) would continue to be operated post-construction.

The Modification would not involve changes to any aspects of the approved mine and processing operations, limestone quarry, rail siding, borefields, water pipeline or gas pipeline (Table 1).

This EA has demonstrated that with the implementation of the mitigation measures described in Section 3, the Modification can be implemented with limited additional biophysical and environmental impacts in comparison with the approved Project.

It is therefore considered that the Modification is justified on environmental, economic and social grounds and that an application to modify Project Development Consent DA 374-11-00 under section 75W of the EP&A Act is appropriate.

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# CLEAN TEQ SUNRISE PROJECT

## ACCOMMODATION CAMP MODIFICATION

### ENVIRONMENTAL ASSESSMENT

### APPENDIX A

### Biodiversity Development Assessment Report



CLEAN TEQ SUNRISE PROJECT ACCOMMODATION CAMP MODIFICATION  
BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT



PREPARED BY  
RESOURCE STRATEGIES

DECEMBER 2017  
Project No. CTL-17-04  
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Attachment C	Vegetation Integrity (Site Condition) Data (AMBS, 2017a)
Attachment D	Review of Matters of National Environmental Significance
Attachment E	Biodiversity Assessment Method Credit Calculator Biodiversity Credit Report

## EXECUTIVE SUMMARY

The Clean TeQ Sunrise Project (herein referred to as the Project) is an approved nickel cobalt scandium mining project, approximately 350 kilometres west-northwest of Sydney, near the village of Fifiel, New South Wales (NSW). Scandium21 Pty Ltd owns the rights to develop the Project. Scandium 21 Pty Ltd is a wholly owned subsidiary of Clean TeQ Holdings Limited (Clean TeQ).

A modification to the Project is sought under section 75W of the NSW *Environmental Planning and Assessment Act, 1979* for an alternative location for the approved accommodation camp. The accommodation camp is approved to be located on the western side of the mine site in the vicinity of Wilmatha Road. Clean TeQ has identified an alternative location for the accommodation camp approximately 4 km to the south of the mine site on the Sunrise Property.

The Sunrise Property is owned by Clean TeQ and leased for agricultural activities, such as livestock grazing and dryland cropping. Most of the property has been previously cleared and/or cultivated over many years and the remnant woodland is confined to low hills and along ephemeral drainage features. Scattered trees are present, but often used for livestock shelter. Despite clearing and cultivation, the ground cover that has regrown comprises predominately native grasses, herbs and low shrubs. Without the modified accommodation camp, most of the previously cleared land would most likely be cultivated in the next growing season.

This Biodiversity Development Assessment Report has been prepared in accordance with the *Biodiversity Assessment Method Order, 2017* (BAM) established under the NSW *Biodiversity Conservation Act, 2016* (BC Act). The BC Act commenced in August 2017.

The biodiversity value of the land proposed to be developed was assessed by field surveys and desktop assessment. The field surveys were undertaken by AMBS Ecology and Heritage in October and November 2017 with a site inspection by Resource Strategies in December 2017. Various database and literature sources were reviewed to characterise the landscape features, native vegetation and potentially occurring threatened species under the BC Act and Commonwealth *Environmental Protection and Biodiversity Conservation Act, 1999* (EPBC Act).

The impact avoidance, minimisation and offset hierarchy has been applied to the Modification. The modified accommodation camp has been specifically located and designed to avoid and minimise impacts on biodiversity values, including native vegetation and potentially occurring threatened species. The modified accommodation camp is proposed to be constructed solely within the previously cleared/cultivated land with minimal biodiversity values. The Modification would result in the clearance of approximately 27.5 hectares of previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (Plant Community Type 217). Scattered trees would need to be cleared for the Modification, however trees which could provide habitat for threatened 'species credit species' (as defined by the BAM) were surveyed and such trees would be avoided.

No threatened ecological communities listed under the BC Act or EPBC Act would be cleared for the Modification. Only one threatened species, the Grey-crowned Babbler (eastern subspecies) listed as 'Vulnerable' under the BC Act has been recorded in the Development Site Footprint. This species is an ecosystem credit species (as defined by the BAM).

The BAM requires the use of an online program (the BAM Credit Calculator) to assess biodiversity impacts and determine the biodiversity offset requirements for those impacts. According to the BAM Credit Calculator, no ecosystem credits are required for the Modification because the Vegetation Integrity Score (a score generating by the BAM Credit Calculator as a measure of the site condition) is less than 17 (16.6). In accordance with the BAM, no species credits are required for the Modification because no species credit species are present, or are likely to use the land associated with the Development Site Footprint.

The likely direct, indirect and cumulative impacts on biodiversity have been assessed within this report and impact avoidance and mitigation measures have been identified and described. Clean TeQ will prepare a *Biodiversity Management Plan* (BMP) for the Project in accordance with Development Consent DA 374-11-00 and it would include the Modification. The BMP would provide vegetation clearance protocol for the Modification as well as measures to prevent and control weeds and pest animals. Agricultural activities would continue to occur on the Sunrise Property outside the modified accommodation camp area.

# 1 INTRODUCTION

## 1.1 PROJECT OVERVIEW

The Clean TeQ Sunrise Project (herein referred to as the Project) is an approved nickel cobalt scandium mining project. The Project is situated approximately 350 kilometres (km) west-northwest of Sydney, near the village of Fifield, New South Wales (NSW) (Figure 1). Scandium21 Pty Ltd owns the rights to develop the Project. Scandium 21 Pty Ltd is a wholly owned subsidiary of Clean TeQ Holdings Limited (Clean TeQ). The Project includes the establishment and operation of the following (Figure 1):

- mine (including the processing facility);
- limestone quarry;
- rail siding;
- gas pipeline;
- borefields and water pipeline; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

Development Consent DA 374-11-00 for the Project was issued under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) in 2001. A modification to the Project (the Modification) is sought under section 75W of the EP&A Act for an alternative location for the approved accommodation camp. For the purposes of this Biodiversity Development Assessment Report (BDAR), the Modification is assessed as a State Significant Development.

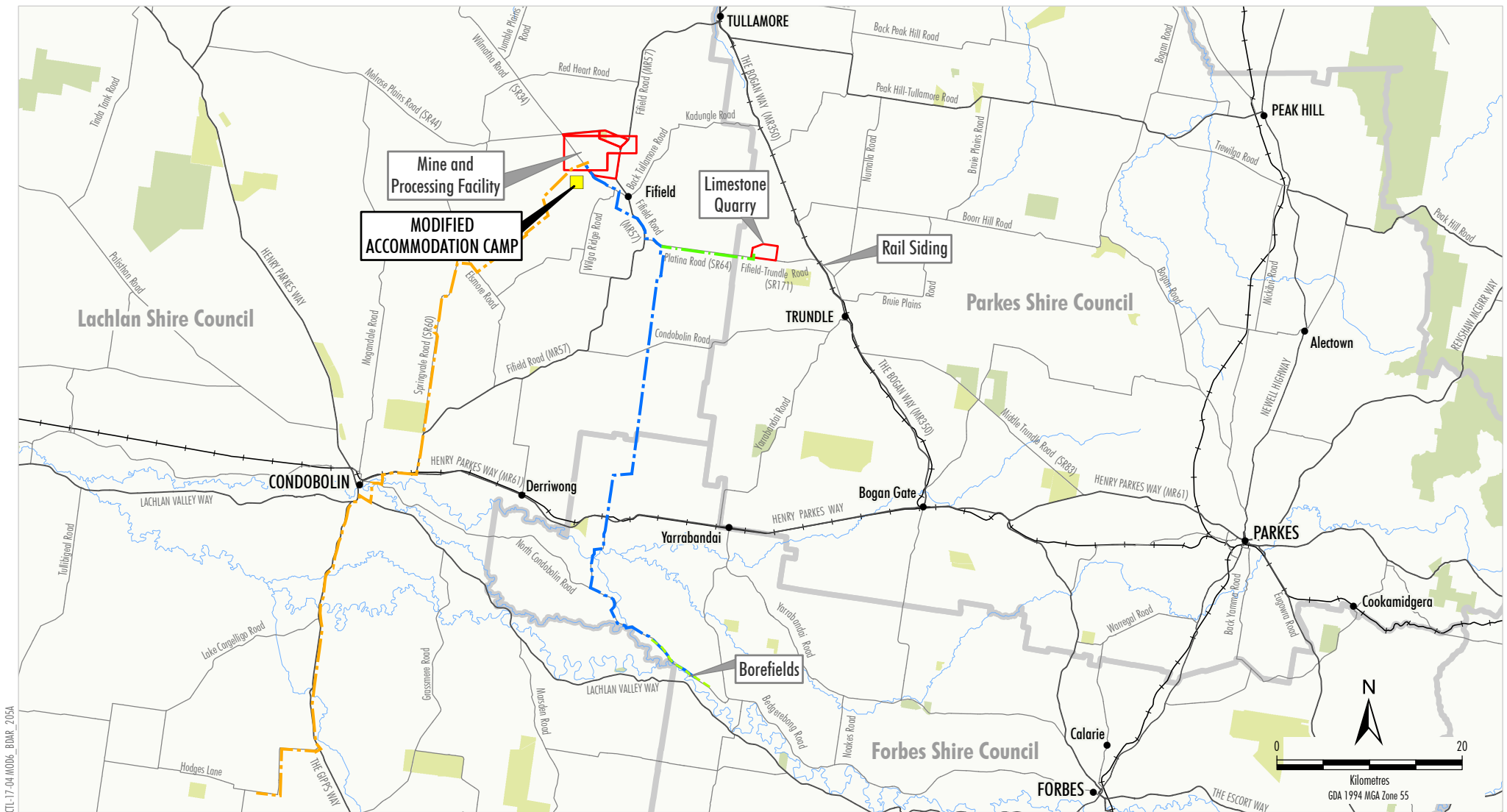
Construction of the Project commenced in 2006 with the construction of components of the borefields, however Project operations are yet to commence.

The accommodation camp is approved to be located on the western side of the mine site in the vicinity of Wilmatha Road. Clean TeQ has identified an alternative location for the approved accommodation camp that would provide improved amenity for the workforce in the accommodation camp and minimise potential operational constraints at the mine site. Clean TeQ also identified the preference to maintain the accommodation camp (at reduced capacity) during operations for the short-term use of contractors and visitors. The Modification would include:

- development of the accommodation camp (including supporting infrastructure) (Figure 2);
- construction of an electricity transmission line (ETL) and water pipeline from the mine site to the modified accommodation camp site (Figure 2);
- minor road upgrades (Figure 2);
- increased accommodation camp capacity (from approximately 1,000 to 1,300 personnel); and
- the accommodation camp (at reduced capacity) would continue to be operated post-construction.

The Modification would not involve changes to any aspects of the approved mine and processing operations, limestone quarry, rail siding or gas pipeline. The approved mine life is 21 years from commencement of mining operations.





CTL-17-04 MOD6\_BDMR\_205A



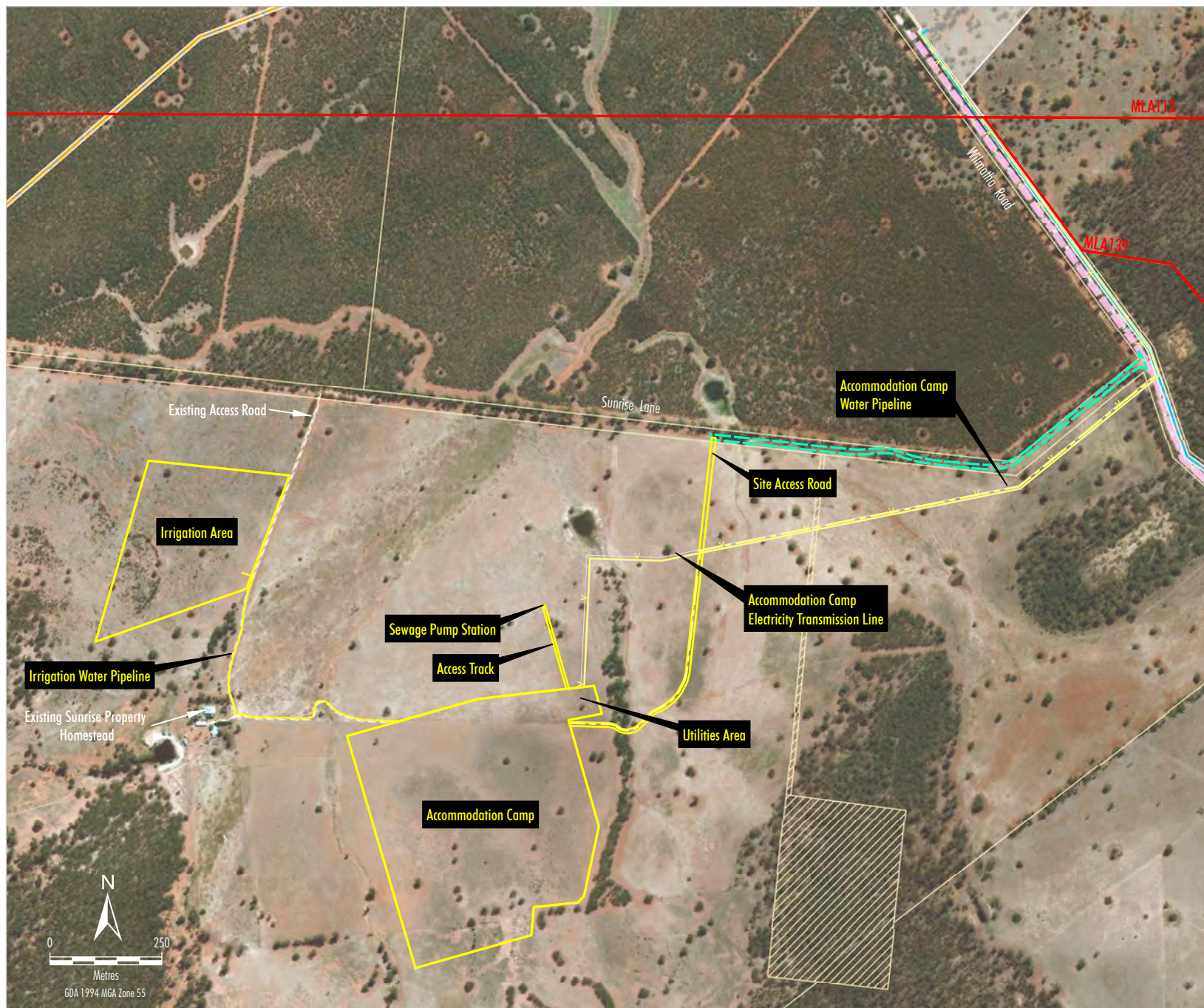
- LEGEND**
- National Park/Conservation Area
  - State Forest
  - Local Government Boundary
  - Mining Lease Application Boundary
  - Approved Water Pipeline
  - Approved Limestone Quarry Water Pipeline
  - Approved Gas Pipeline
  - Approved Borefield Infrastructure Corridor

Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017); Office of Environment and Heritage NSW (2017)

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Project Location

Figure 1



**LEGEND**

- Mining Lease Application Boundary
- Approved Surface Development Area
- Approved Gas Pipeline
- Approved Water Pipeline
- Extent of Approved Road Upgrade
- Property Boundary
- Crown Land
- Modified Layout
- Extent of Modified Road Upgrade

Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
NSW Imagery: Esri Basemap

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**CLEAN TEQ SUNRISE PROJECT**  
**Conceptual Modified General Arrangement**

**Figure 2**



## 1.2 GENERAL DESCRIPTION OF THE DEVELOPMENT SITE FOOTPRINT

The Sunrise Property is owned by Clean TeQ and leased for agricultural activities, such as grazing and dryland cropping. Agricultural activities would continue to occur on the Sunrise Property outside the modified accommodation camp area.

The construction and operational Development Site Footprint is shown on Figure 3. The Development Site Footprint encompasses (Figure 3):

- modified accommodation camp, including:
  - accommodation facilities;
  - administration offices and first aid facility;
  - recreational and mess areas;
  - fire-fighting infrastructure (e.g. fire water tank and reticulation system);
  - internal access roads and car parking areas;
  - communications infrastructure; and
- sewage pump station and related infrastructure;
- utilities area, including:
  - water supply infrastructure (e.g. water treatment plant, storage tanks, distribution system);
  - sewage collection system, treatment plant and storage tanks;
  - power supply infrastructure (e.g. diesel generators, substation);
- accommodation camp ETL (11 kilovolts) (between the mine site and the modified accommodation camp);
- accommodation camp water pipeline (between the mine site and the modified accommodation camp);
- site access road from Sunrise Lane; and
- construction (laydown) areas.

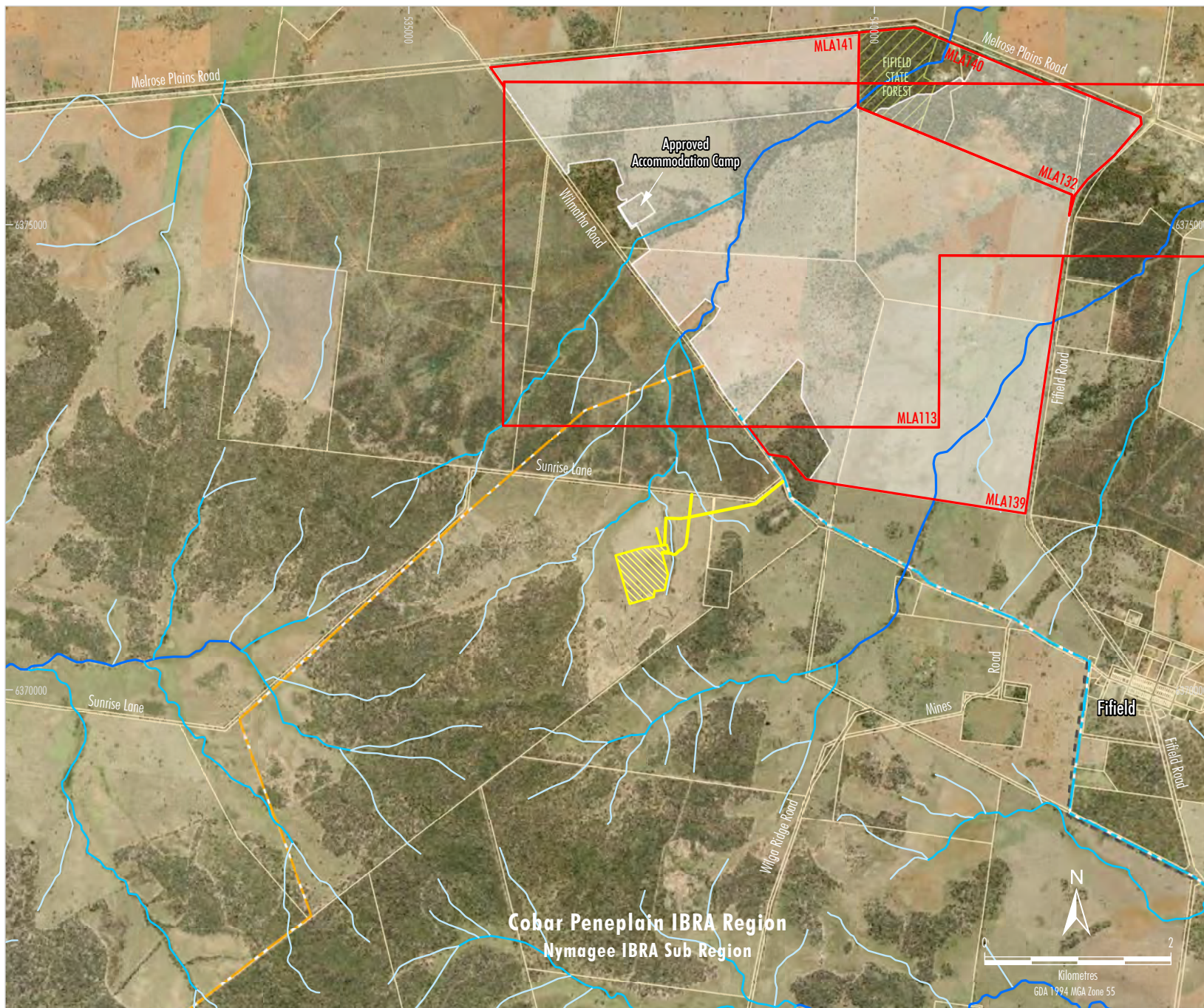
The Modification also includes an irrigation area (approximately 10.5 hectares [ha]) and irrigation water pipeline (Figure 2). Clean TeQ propose no native vegetation clearance for these components as the pipeline would be laid on the ground beside an existing track.

The ETL and water pipeline for the modified accommodation camp enters an approved clearing footprint (9 metres [m] wide) on the northern side of Wilmatha Road. Hence, the clearing footprint for the purpose of this assessment, ends on the southern side of Wilmatha Road. For the purpose of this assessment, the Development Site Footprint corridor associated with ETL and water pipeline is conservatively approximately 9 m wide.

The Development Site Footprint corridor associated with site access road from Sunrise Lane is approximately 9 m wide, and approximately 8 m wide across an ephemeral drainage feature (in an existing cleared track/gap between the Green Mallee Low Woodland).

The minor road upgrades (Figure 2) would be within the extent of the existing road footprint. Clean TeQ propose no native vegetation clearance for the minor road upgrades.

It should also be noted that the Development Site Footprint may vary slightly following further detailed planning. While some changes to the Development Site Footprint could occur, any such changes are expected to be minor and therefore would have no material impact on biodiversity values.



- LEGEND**
- State Forest
  - Mining Lease Application Boundary
  - Approved Surface Development Area
  - Approved Ffield Bypass
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - Development Site Footprint/Subject Land
  - Strahler Stream Order
  - 1st Order
  - 2nd Order
  - 3rd Order

Source: NSW Department of Industry (2017); NSW Land and Property Information (2017); © Spatial Services - NSW Department of Finance, Services and Innovation (2017); © Crown Lands and Water - a Division of the NSW Department of Industry (2013)  
NSW Imagery: © Department of Finance, Services & Innovation (2017)

**CLEAN  
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CLEAN TEQ SUNRISE PROJECT  
Site Map

**Figure 3**



### 1.3 ASSESSMENT REQUIREMENTS/APPROACH

The NSW *Biodiversity Conservation Act, 2016* (BC Act) commenced in August 2017 and establishes a new biodiversity offset scheme for NSW. The Modification has been assessed in accordance with the *Biodiversity Assessment Method Order, 2017* (BAM) (NSW Office of Environment and Heritage [OEH], 2017a) established under Section 6.7 of the BC Act. For the purposes of this BDAR, the Modification is assessed as a State Significant Development.

This BDAR has been prepared by Jamie Gleeson (Resource Strategies), who is an accredited assessor (assessor accreditation number BAAS17080) and peer-reviewed by Dr Colin Driscoll (Hunter Eco), who is also an accredited assessor (assessor accreditation number BAAS17004). The peer review letter is provided in Attachment A.

A third accredited assessor under the BC Act, Mark Semeniuk (AMBS Ecology and Heritage [AMBS]) (BAAS17072), co-authored the *Clean TeQ Sunrise Project Accommodation Camp - Ecological Surveys Report* (Attachment B).

### 1.4 STRUCTURE OF THIS ASSESSMENT

The structure of the BDAR follows the requirements in Appendix 10 of the BAM (OEH, 2017a).

### 1.5 INFORMATION SOURCES USED IN THIS ASSESSMENT

This BDAR has been prepared using various data sources as described below.

#### 1.5.1 Field Surveys

In October and November 2017, AMBS (2017a) (Attachment B) collected the ecological survey data in accordance with the BAM (OEH, 2017a). Resource Strategies undertook a site inspection on the 12 December 2017.

#### 1.5.2 Published Databases

Published databases used in this assessment include:

- *BioNet Vegetation Classification* (OEH, 2017b);
- *Threatened Biodiversity Data Collection* (OEH, 2017c)<sup>1</sup>;
- *BioNet Atlas* (OEH, 2017d)<sup>2</sup>; and
- *Directory of Important Wetlands of Australia* (Department of the Environment and Energy [DEE], 2017a).

#### 1.5.3 Local Data

It was not necessary use local data or deviate from the OEH databases (OEH, 2017b and c).

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<sup>1</sup> This website is titled 'Profiles'.

<sup>2</sup> This website is titled 'Species Sightings Search'

#### **1.5.4 BAM Credit Calculator**

BAM Credit Calculator Version 1.2.1.00 (BAM Credit Calculator) (OEH, 2017e) (Last updated: 16/11/2017 16:00) was used in this assessment. On the 6 December 2017, OEH confirmed that there is an error with the BAM Credit Calculator (OEH, 2017e) and that it should not require credits if the Vegetation Integrity Score is below the relevant threshold in the BAM (OEH, 2017a).

## 2 LANDSCAPE FEATURES

This section provides information on the landscape features in accordance with the BAM (OEH, 2017a). The BAM (OEH, 2017a) refer to 'Subject land' as the land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land (i.e. the landscape features [Section 2], native vegetation [Section 3] and threatened species [Section 4]). For the purpose of this assessment, the 'Subject land' is the same as the 'Development Site Footprint', the area directly impacted on by a proposed development.

### 2.1 REGIONAL SETTING

The Subject land is located in the Nymagee Interim Biogeographic Regionalisation of Australia (IBRA) Sub-region of the Cobar Peneplain IBRA Region (DEE, 2017b) (Figures 3 and 4). The regional boundaries do not occur near the Subject land and hence are not shown on Figures 3 and 4.

The Subject land is located in Lachlan Shire Council (Figure 4).

### 2.2 NATIVE VEGETATION COVER

The BAM (OEH, 2017a) defines 'Native Vegetation Cover' as:

*the percentage of native vegetation cover on the Subject land and the surrounding buffer area. Cover estimates are based on the cover of native woody and non-woody vegetation relative to the approximate benchmarks for the PCT, taking into account vegetation condition and extent. Native over-storey vegetation is used to determine the percent cover in woody vegetation types, and native ground cover is used to assess cover in non-woody vegetation types.*

The extent of native vegetation cover as mapped by site surveys (AMBS, 2017a and b) and regional mapping (OEH, 2016a) is shown on Figure 4.

A buffer area of 1500 m surrounding the outside edge of the boundary of the Subject land (referred to as the 'assessment area surrounding the Subject land' in the BAM [OEH, 2017a]) is shown on Figure 4<sup>3</sup>. There is 44% native vegetation cover within the buffer area.

### 2.3 HABITAT CONNECTIVITY FEATURES

The native vegetation extent/habitat connectivity as mapped by site surveys (AMBS, 2017a and b) and regional mapping (OEH, 2016a) is shown on Figure 4. Any native vegetation on Figure 4 may facilitate the movement of one or more threatened species across their range.

### 2.4 RIVERS AND STREAMS

Drainage features (and riparian buffer distances based on Strahler stream ordering and the BAM [OEH, 2017a]) is shown on Figures 3 and 4 from the Department of Primary Industries – Water (2017). The site access road follows an existing track which crosses a shallow first order ephemeral drainage feature through an existing track (Figures 3 and 4). The accommodation camp water pipeline and ETL also traverse shallow first order ephemeral drainage features that occur through the cultivated paddock (Figures 3 and 4).

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<sup>3</sup> The figure scale has been selected which is appropriate for the size of the 1500 m assessment area.

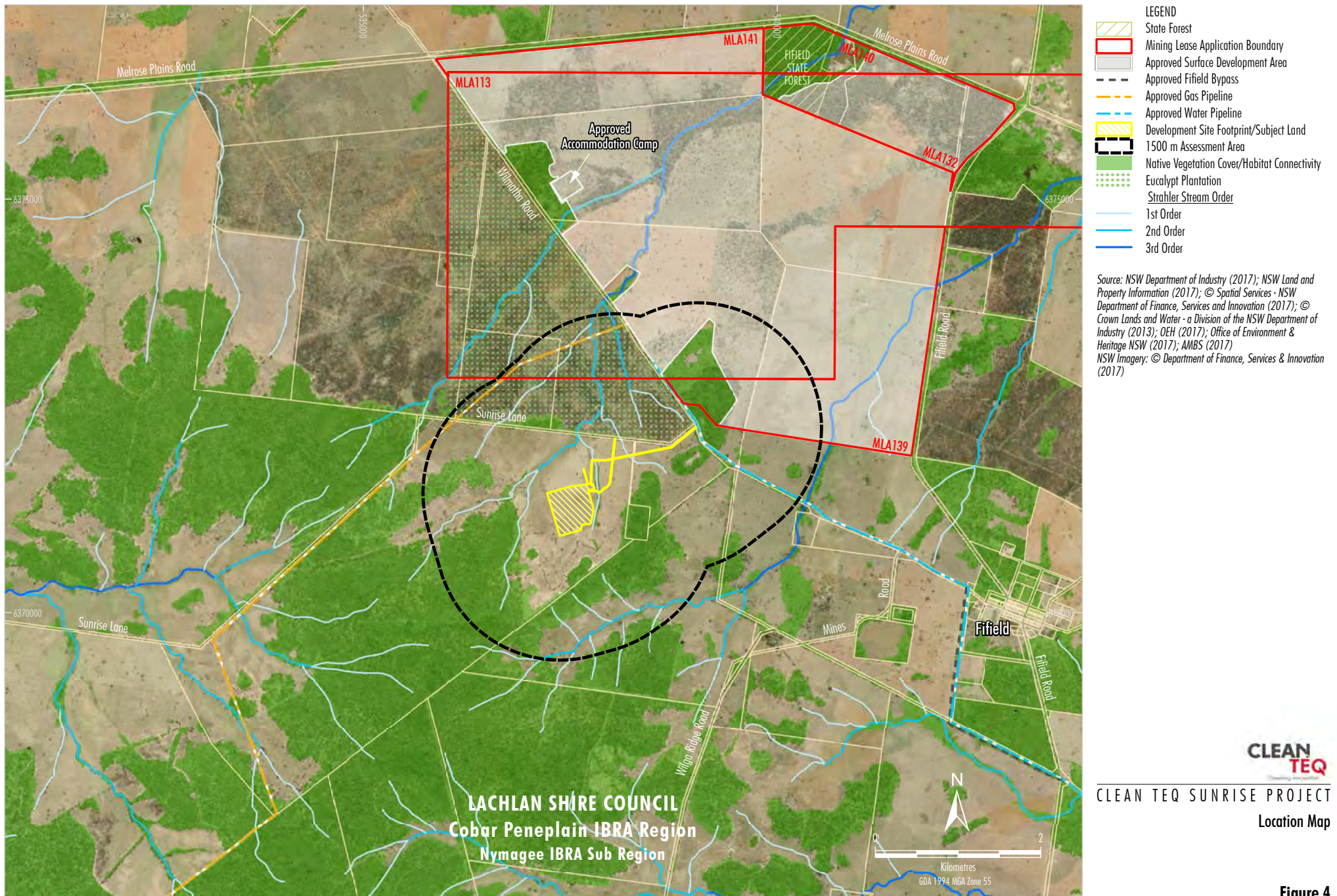


Figure 4



## **2.5 WETLANDS**

There are no important and local wetlands on or, adjacent to the of the Subject land (Figure 4) (after DEE, 2017a; OEH, 2017f). The closest wetland is too far away to be shown on Figure 4.

## **2.6 GEOLOGY**

There are no karst, caves, crevices, cliffs or other areas of geological significance on the Subject land or within the assessment area surrounding the Subject land.

## **2.7 AREAS OF OUTSTANDING BIODIVERSITY VALUE**

There are no Areas of Outstanding Biodiversity Value listed under the NSW *Biodiversity Conservation Regulation, 2017* associated with the Subject land.

## **2.8 MIGRATORY SPECIES POTENTIAL FLYWAYS**

There are no defined potential flyways for migratory species listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) that pass over the Subject land, however, migratory birds could fly over the Subject land similar to most areas in NSW, e.g. Rainbow Bee-eater (*Merops ornatus*).

## **2.9 SITE CONTEXT COMPONENTS**

A site-based method described in the BAM (OEH, 2017a) was applied to the Modification due to the compact size and shape of the Development Site Footprint. The Modification is not eligible for the streamline assessment modules described in the BAM (OEH, 2017a). The supporting infrastructure (pipeline, access road and ETL) are less the 3.5 km in length and therefore do not meet the definition of linear shaped development (OEH, 2017a).

The extent of native vegetation cover is described in Section 2.2. The patch size relative to the vegetation zone is described in Section 3.3.2. There are no additional features required to be assessed by Secretary's Environmental Assessment Requirements (SEARs). No SEARs were issued for the Modification.

### 3 NATIVE VEGETATION

#### 3.1 PLANT COMMUNITY TYPES

AMBS (2017a) (Attachment B) identified and mapped Plant Community Types (PCTs) on the Subject land and surrounding area in accordance with the BAM (OEH, 2017a) and *BioNet Vegetation Classification* (OEH, 2017b) (Figure 5) (Table 1). AMBS (2017a) justify the PCT and vegetation zone mapping in Attachment B.

The Subject land is located on previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (Figure 5, Table 1 and Plate 1). Without the modified accommodation camp, most of the previously cleared land would most likely be cultivated in the next growing season. There are small areas of bare ground without native vegetation (cleared land) associated with existing tracks/roads (Figure 5).

The vegetation integrity (site condition) plot data was independently collected by AMBS (2017a) (Attachment B). The vegetation integrity (site condition) plots used in the BAM Credit Calculator (OEH, 2017e) are shown on Figure 6. The vegetation integrity (site condition) data is provided in Attachment C.

**Table 1**  
**Plant Community Types**

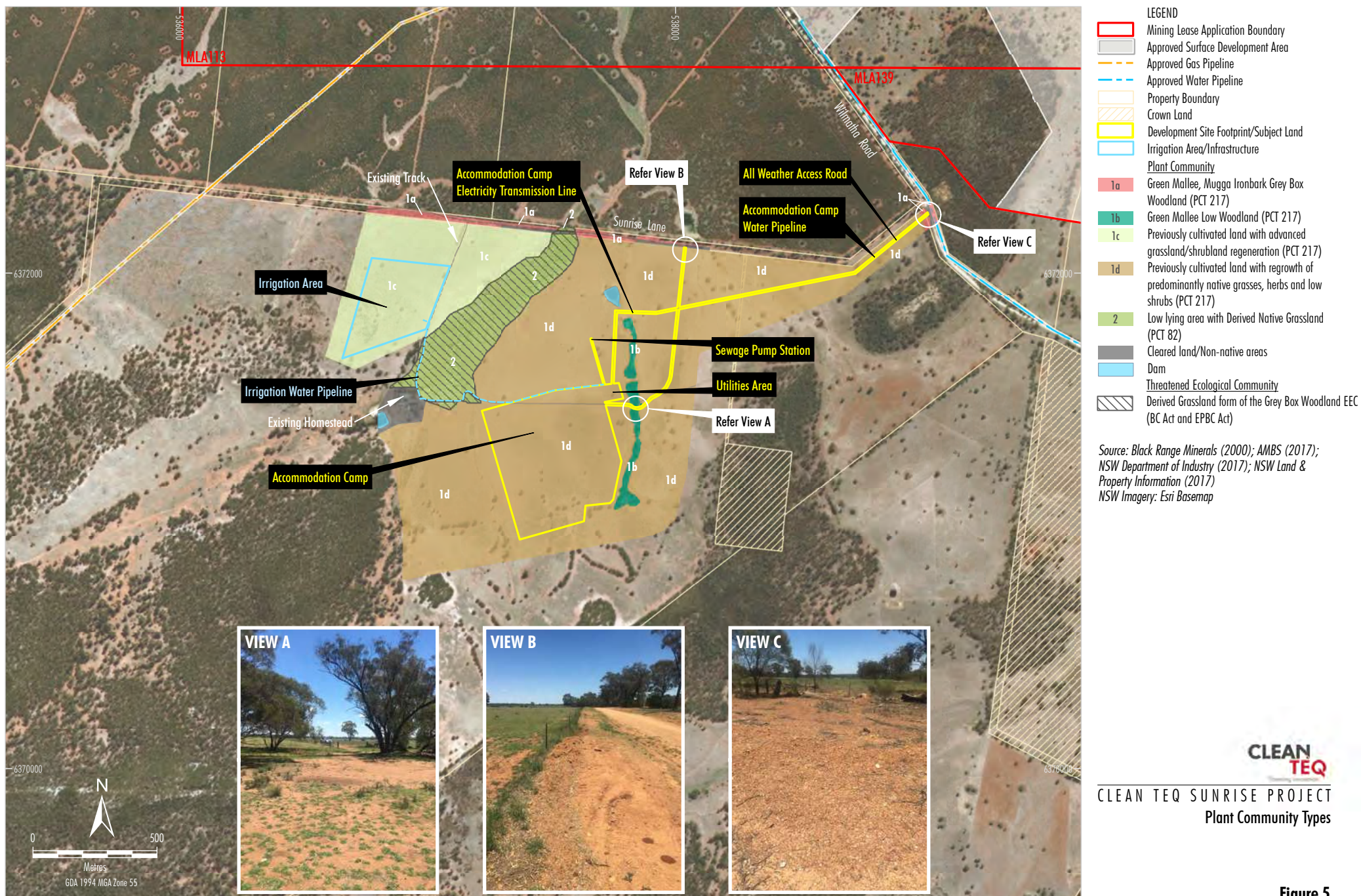
#*	Map Unit Name	Area of Clearance (ha)	PCT	
1d	Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs	27.5	217	Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion

\* Number based on vegetation communities listed on Figure 5.

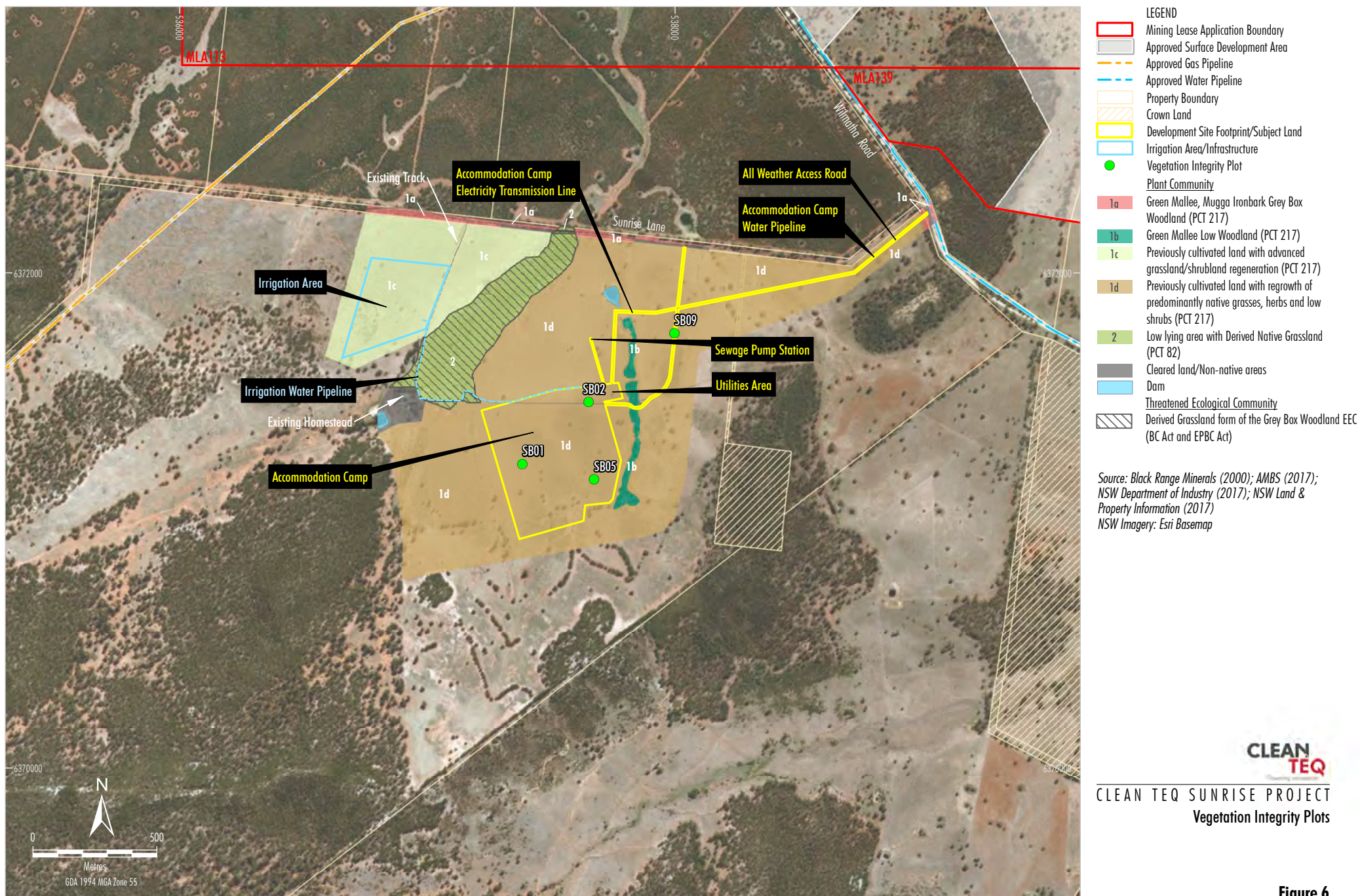


**Plate 1 – Development Site Footprint - Previously Cleared Land with Regrowth of Predominantly Native Grasses, Herbs and Low Shrubs**









**Figure 6**



### 3.1.1 Threatened Ecological Communities

AMBS (2017a) (Attachment B) undertook targeted surveys for potentially occurring threatened ecological communities listed under the BC Act or the EPBC Act. No threatened ecological communities listed under the BC Act or EPBC Act occur within the Subject land/Development Site Footprint.

### 3.2 PLANT COMMUNITY TYPES PERCENT CLEARED VALUE

The BAM (2017a) defines 'Percent Cleared Value' as the percentage of a PCT that has been cleared as a proportion of its pre-1750 extent, as identified in the *BioNet Vegetation Classification* (OEH, 2017b). PCT 217 has a Percent Cleared Value of 69% (+/- 80%) (Table 2). As described above, PCT 217 is not a threatened ecological community.

**Table 2**  
**Vegetation Zone Data**

#	Map Unit Name	PCT	Clearance Area (ha)	Vegetation Zone	Percent Cleared Value <sup>1</sup>	Patch Size	Vegetation Integrity Score
1d	Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs	217 Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion	27.5	1	69% (+/- 80%)	0	16.6

<sup>1</sup> *BioNet Vegetation Classification* (OEH, 2017b)

### 3.3 VEGETATION INTEGRITY ASSESSMENT

#### 3.3.1 Vegetation Zones

There is a single vegetation zone in the Development Site Footprint/Subject land, namely Vegetation Community 1d (Vegetation Zone 1) (Table 2). Vegetation Community 1d is the occurrence of PCT 217 in the lowest condition in the Subject land.

#### 3.3.2 Patch Size

The BAM (OEH, 2017a) defines 'Patch Size' as:

*An area of **intact native vegetation** that:*

- a) occurs on the development site or biodiversity stewardship site, and*
- b) includes native vegetation that has a gap of less than 100m from the next area of moderate to good condition native vegetation (or ≤30m for non-woody ecosystems).*

*Patch size may extend onto adjoining land that is not part of the development site or biodiversity stewardship site.*

The BAM (OEH, 2017a) defines '**intact native vegetation**' as:

*Intact vegetation: vegetation where all tree, shrub, grass and/or forb structural growth form groups expected for a plant community type are present.*

Vegetation Community 1d (Vegetation Zone 1) is previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs. Vegetation Community 1d (Vegetation Zone 1) does not meet the definition of intact native vegetation because not all the structural growth form groups expected for a PCT are present (i.e. trees and shrubs are missing due to past and recent clearing for agricultural activities).

The patch size for Vegetation Community 1d (Vegetation Zone 1) is therefore zero (Table 2).

### **3.3.3 Vegetation Integrity Score**

According to the BAM Credit Calculator (OEH, 2017e), the Vegetation Community 1d (Vegetation Zone 1) has a Vegetation Integrity Score of 16.6 (Table 2).

### **3.3.4 Local Data**

It was not necessary use local data to deviate from the OEH databases (OEH, 2017b and 2017c).

## 4 THREATENED SPECIES

Threatened species that are 'ecosystem credit species' and/or 'species credit species' are pre-determined by OEH in the BAM Credit Calculator (OEH, 2017e) and *Threatened Biodiversity Data Collection* (OEH, 2017c).

The BAM (OEH, 2017a) states:

*Threatened species where the likelihood of occurrence of a species or elements of the species' habitat can be predicted by vegetation surrogates and landscape features, or for which targeted survey has a low probability of detection, are identified in the Threatened Biodiversity Data Collection as ecosystem credit species. Targeted survey is not required for these species.*

...

*'Species credit species' are threatened species or components of species habitat that are identified in the Threatened Species Data Collection as requiring assessment for species credits.*

### 4.1 ECOSYSTEM CREDIT SPECIES - HABITAT SUITABILITY ASSESSMENT

In accordance with the BAM (OEH, 2017a), assessing the habitat suitability for an ecosystem credit species involves the following steps:

Step 1: Identify threatened species for assessment; and

Step 2: Assessment of the habitat constraints and vagrant species on the Subject land.

These steps are applied below.

#### 4.1.1 Step 1: Identify Ecosystem Species for Assessment

A total of 20 ecosystem credit species for assessment are listed in Table 3 from the BAM Credit Calculator (OEH, 2017e). Relevant databases and literature was reviewed for additional ecosystem credit species for assessment and additional ecosystem credit species are listed in Section 4.2.1.

Of the species in Table 3, 12 have been recorded in the wider locality. Only one threatened species, the Grey-crowned Babbler (eastern subspecies) has been recorded in the Development Site Footprint.

**Table 3**  
**Ecosystem Species from the BAM Credit Calculator**

Scientific Name	Common Name	Conservation Status		Class of Credit	Sensitivity to Gain Class
		BC Act	EPBC Act		
Birds					
<i>Leipoa ocellata</i>	Malleefowl	E	V	Ecosystem	High
<i>Lophoictinia isura</i>	Square-tailed Kite (foraging)	V	-	Species/Ecosystem	Moderate
<i>Hieraaetus morphnoides</i>	Little Eagle (foraging)	V	-	Species/Ecosystem	Moderate
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo (foraging)	V	-	Species/Ecosystem	High
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo (foraging)	V	-	Species/Ecosystem	Moderate
<i>Neophema pulchella</i>	Turquoise Parrot	V	-	Ecosystem	High
<i>Lathamus discolor</i>	Swift Parrot (foraging)	E	CE	Species/Ecosystem	Moderate
<i>Polytelis swainsonii</i>	Superb Parrot (foraging)	V	V	Species/Ecosystem	Moderate
<i>Tyto novaehollandiae</i>	Masked Owl (foraging)	V	-	Species/Ecosystem	High
<i>Chthonicola sagittata</i>	Speckled Warbler	V	-	Ecosystem	High
<i>Grantiella picta</i>	Painted Honeyeater	V	V	Ecosystem	Moderate
<i>Artamus cyanopterus</i>	Dusky Woodswallow	V	-	Ecosystem	Moderate
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V	-	Ecosystem	Moderate
<i>*Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	-	Ecosystem	Moderate
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	Ecosystem	Moderate
<i>Stagonopleura guttata</i>	Diamond Firetail	V	-	Ecosystem	Moderate
<i>Petroica phoenicea</i>	Flame Robin	V	-	Ecosystem	Moderate
Mammals					
<i>Dasyurus maculatus maculatus</i> (south-eastern mainland population)	Spotted-tailed Quoll	V	E	Ecosystem	High
<i>Phascolarctos cinereus</i>	Koala (foraging)	V	V	Species/Ecosystem	High
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	V	-	Ecosystem	High

<sup>1</sup> Threatened fauna species status under the BC Act and/or EPBC Act (current as at December 2017).

V = Vulnerable; E = Endangered, CE = Critically Endangered

\* Species recorded in the Development Site Footprint.

Highlighted species = those recorded in the wider locality

#### 4.1.2 Step 2: Assessment of the Habitat Constraints and Vagrant Species on the Subject Land

The BAM (OEH, 2017a) states:

*the assessor may opt to undertake an additional assessment of the habitat constraints on the Subject land for the threatened species predicted for assessment.*

The ecosystem credit species identified in the BAM Credit Calculator (OEH, 2017e) were not reviewed because the Vegetation Integrity Score is less than 17 (16.6) (Section 3.3.3) and therefore a calculation of ecosystem credits is not required. No further assessment of ecosystem credit species is required.



## 4.2 SPECIES CREDIT SPECIES - HABITAT SUITABILITY ASSESSMENT

Assessing the habitat suitability for a species credit species involves the following steps:

- Step 1: Identify species credit species for assessment.
- Step 2: Assessment of the habitat constraints for species credit species on the Subject land.
- Step 3: Identify candidate species credit species for further assessment.
- Step 4: Determine presence or absence of a candidate species credit species.
- Step 5: Determine the area or count, and location of suitable habitat for a species credit species.
- Step 6: Determine the habitat condition within the species polygon for species assessed by area.

### 4.2.1 Step 1: Identify Species Credit Species for Assessment

A total of 14 species credit species are listed in Table 4 for assessment, including 12 species credit species from the BAM Credit Calculator (OEH, 2017e) and two species based on nearby records by AMBS (2017b), namely the *Tylophora linearis* and *Lepidium monoplacoides*.

**Table 4**  
**Species Credit Species for Assessment**

Scientific Name	Common Name	Conservation Status		Class of Credit
		BC Act	EPBC Act	
Flora				
Austrostipa wakoolica	A spear-grass	E	E	Species
Commersonia procumbens	-	V	V	Species
*Tylophora linearis	-	V	E	Species
*Lepidium monoplacoides	Winged Peppergrass	E	E	Species
Birds				
Lophoictinia isura	Square-tailed Kite (Breeding)	V	-	Species/Ecosystem
Hieraaetus morphnoides	Little Eagle (Breeding)	V	-	Species/Ecosystem
Calyptorhynchus lathami	Glossy Black-Cockatoo (Breeding)	V	-	Species/Ecosystem
Lophochroa leadbeateri	Major Mitchell's Cockatoo (Breeding)	V	-	Species/Ecosystem
Burhinus grallarius	Bush Stone-curlew	E	-	Species
Lathamus discolor	Swift Parrot (Breeding)	E	CE	Species/Ecosystem
Polytelis swainsonii	Superb Parrot (Breeding)	V	V	Species/Ecosystem
Tyto novaehollandiae	Masked Owl (Breeding)	V	-	Species/Ecosystem
Mammals				
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	Species
Phascolarctos cinereus	Koala (Breeding)	V	V	Species/Ecosystem

<sup>1</sup> Threatened fauna species status under the BC Act and/or EPBC Act (current as at December 2017).

V = Vulnerable; E = Endangered, CE = Critically Endangered

\* These species are not predicted in the BAM Credit Calculator (OEH, 2017e), however are species for assessment based on nearby records by AMBS (2017b).

The following databases and reports were reviewed for any nearby potentially occurring threatened species records (including species credit species):

- *BioNet Atlas* (OEH, 2017g);
- Birdlife Australia database search (Birdlife Australia, 2017);
- Atlas of Living Australia (2017);
- Future Ecology (2017); and
- AMBS (2017b).

Table 5 provides a summary of the threatened species records in the locality from survey records or database records. Threatened species records are shown on Figures 7, 8a and 8b.

**Table 5**  
**Threatened Species Recorded in the Wider Locality**

Scientific Name	Common Name	Conservation Status		Class of Credit	Source	Figure
		BC Act	EPBC Act			
Flora						
Austrostipa wakoolica	A spear-grass	E	E	Species	A	Figure 7
Tylophora linearis	-	V	E	Species	A	Figure 7
Lepidium monoplacoides	Winged Peppergrass	E	E	Species	A	Figure 7
Birds						
Leipoa ocellata	Malleefowl	E	V	Ecosystem	B	Figure 8a
Falco subniger	Black Falcon	V	-	Ecosystem	B	Figure 8a
Circus assimilis	Spotted Harrier	V	-	Ecosystem	C	Figure 8a
Hieraaetus morphnoides	Little Eagle	V	-	Species/ Ecosystem	B	Figure 8a
Lophochroa leadbeateri	Major Mitchell's Cockatoo	V	-	Species /Ecosystem	B, C, D, E	Figure 8a
Neophema pulchella	Turquoise Parrot	V	-	Ecosystem	B	Figure 8a
Polytelis swainsonii	Superb Parrot	V	V	Species/ Ecosystem	B, C, D, E	Figure 8a
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	Ecosystem	B, C, D	Figure 8a
Grantiella picta	Painted Honeyeater	V	V	Ecosystem	B	Figure 8a
Artamus cyanopterus	Dusky Woodswallow	V	-	Ecosystem	D	Figure 8a
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	-	Ecosystem	B	Figure 8a
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	Ecosystem	B, C, D, E	Figure 8a
Daphoenositta chrysoptera	Varied Sittella	V	-	Ecosystem	B, C	Figure 8a
Pachycephala inornata	Gilbert's Whistler	V	-	Ecosystem	D	Figure 8a
Stagonopleura guttata	Diamond Firetail	V	-	Ecosystem	B, C, D, E	Figure 8a

**Table 5 (Continued)**  
**Threatened Species Recorded in the Wider Locality**

Scientific Name	Common Name	Conservation Status		Class of Credit	Source	Figure
		BC Act	EPBC Act			
Bats						
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V	-	Ecosystem	D	Figure 8b
<i>Miniopterus schreibersii oceanensis</i>	^Eastern Bentwing-bat (breeding)	V	-	Species /Ecosystem	D	Figure 8b
<i>Nyctophilus corbeni</i>	^Corben's Long-eared Bat	V	V	Ecosystem	D	Figure 8b
<i>Chalinolobus dwyeri</i>	^Large-eared Pied Bat	V	V	Species	D	Figure 8b
<i>Chalinolobus picatus</i>	Little Pied Bat	V	-	Ecosystem	D	Figure 8b
<i>Myotis macropus</i>	^Southern Myotis	V	-	Species	D	Figure 8b
<i>Vespadelus troughtoni</i>	^Eastern Cave Bat	V	-	Species	D	Figure 8b

<sup>1</sup> Threatened fauna species status under the BC Act and/or EPBC Act (current as at December 2017).

V = Vulnerable; E = Endangered.

^ unconfirmed calls possibly recorded via bat recording devices.

Blue highlighted species = species credit species not from the BAM Credit Calculator (OEH, 2017e).

A AMBS (2017b).

B Atlas of Living Australia (2017).

C Birdlife Australia (2017).

D Future Ecology (2017).

E OEH (2017g).

Unconfirmed calls possibly from four cave-dwelling species credit species bats were recorded via bat recording devices by Future Ecology (2017) in the surrounding locality, namely, Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), Large-eared Pied Bat (*Chalinolobus dwyeri*), Southern Myotis<sup>4</sup> (*Myotis macropus*) and Eastern Cave Bat (*Vespadelus troughtoni*) (Table 5; Figure 8b). Consistent with the BAM Credit Calculator (OEH, 2017e) (Table 4), these species are not considered to be species credit species for assessment due to the absence of breeding habitat for these species in the Development Site Footprint.

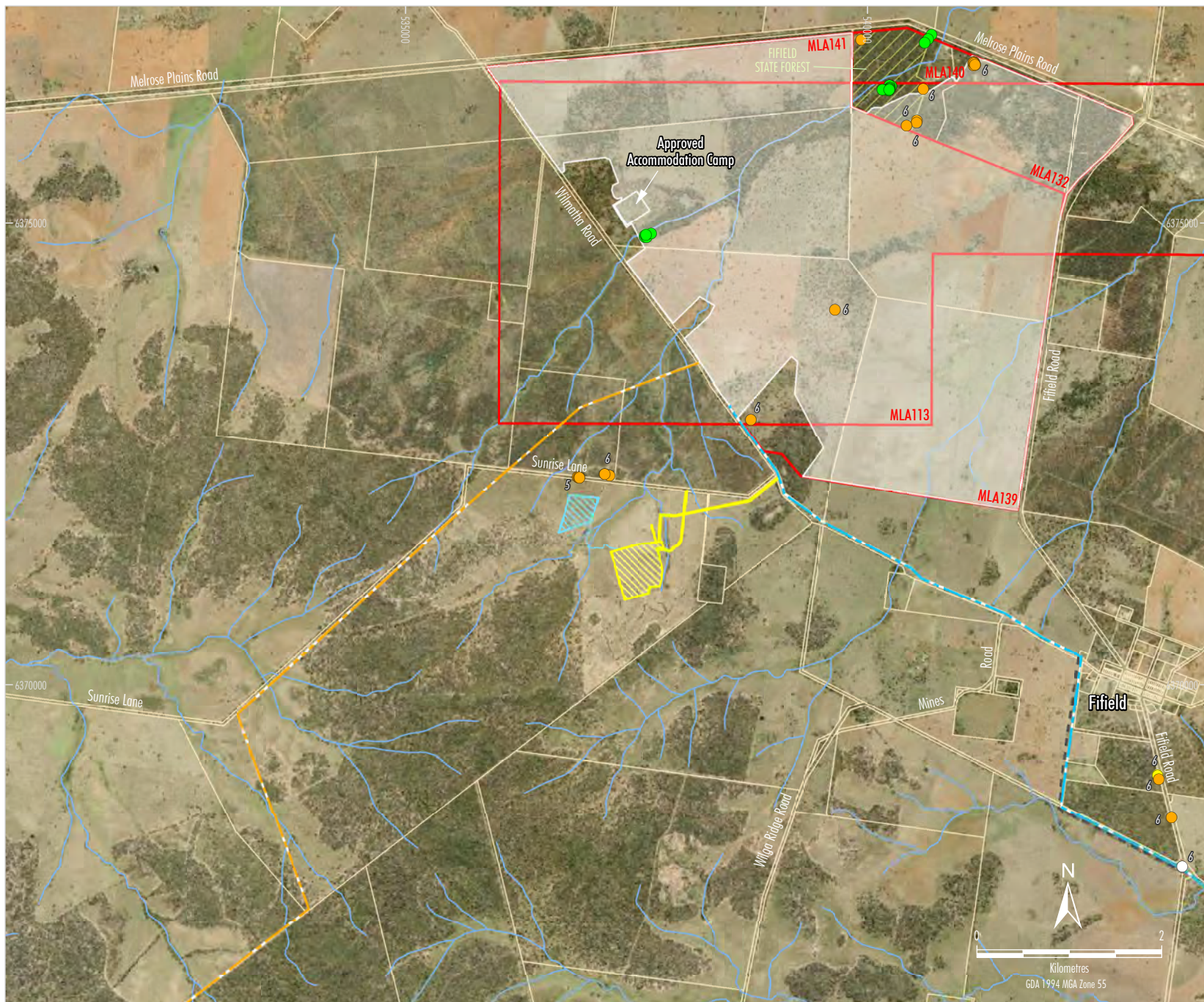
#### 4.2.2 Step 2: Assessment of the Habitat Constraints for Species Credit Species on the Subject Land

Habitat constraints are identified in the *Threatened Biodiversity Data Collection* (OEH, 2017c) for some fauna species credit species and the absence of the habitat constraints precludes the species from further assessment (Table 6). Step 2 is not applicable to a species where no habitat constraints are listed for that species in the *Threatened Biodiversity Data Collection* (OEH, 2017c), e.g. threatened flora.

AMBS (2017a) (Attachment B) undertook a field assessment of habitat constraints for the species in Table 6. A description of the methods is provided below.

<sup>4</sup> The Southern Myotis can use tree hollows however the Modification is not located within the known or likely habitat distributions for this species and the nearest database record is located approximately 150 km north-west of the Development Site Footprint (OEH, 2017d). This species is also dependant on waterways for foraging which are absent from the Subject land.





- LEGEND**
- State Forest
  - Mining Lease Application Boundary
  - Approved Surface Development Area
  - Approved Fife Bypass
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - Development Site Footprint/Subject Land
  - Irrigation Area/Infrastructure
  - Threatened Species
  - Austrostipa wakoolica*
  - Lepidium monoplacoides*
  - Swainsona sp.*
  - Tylophora linearis*

Reference: 5. AMBS (2017)  
6. AMBS (2016)

Note: There are no references 1 - 4 on this figure.

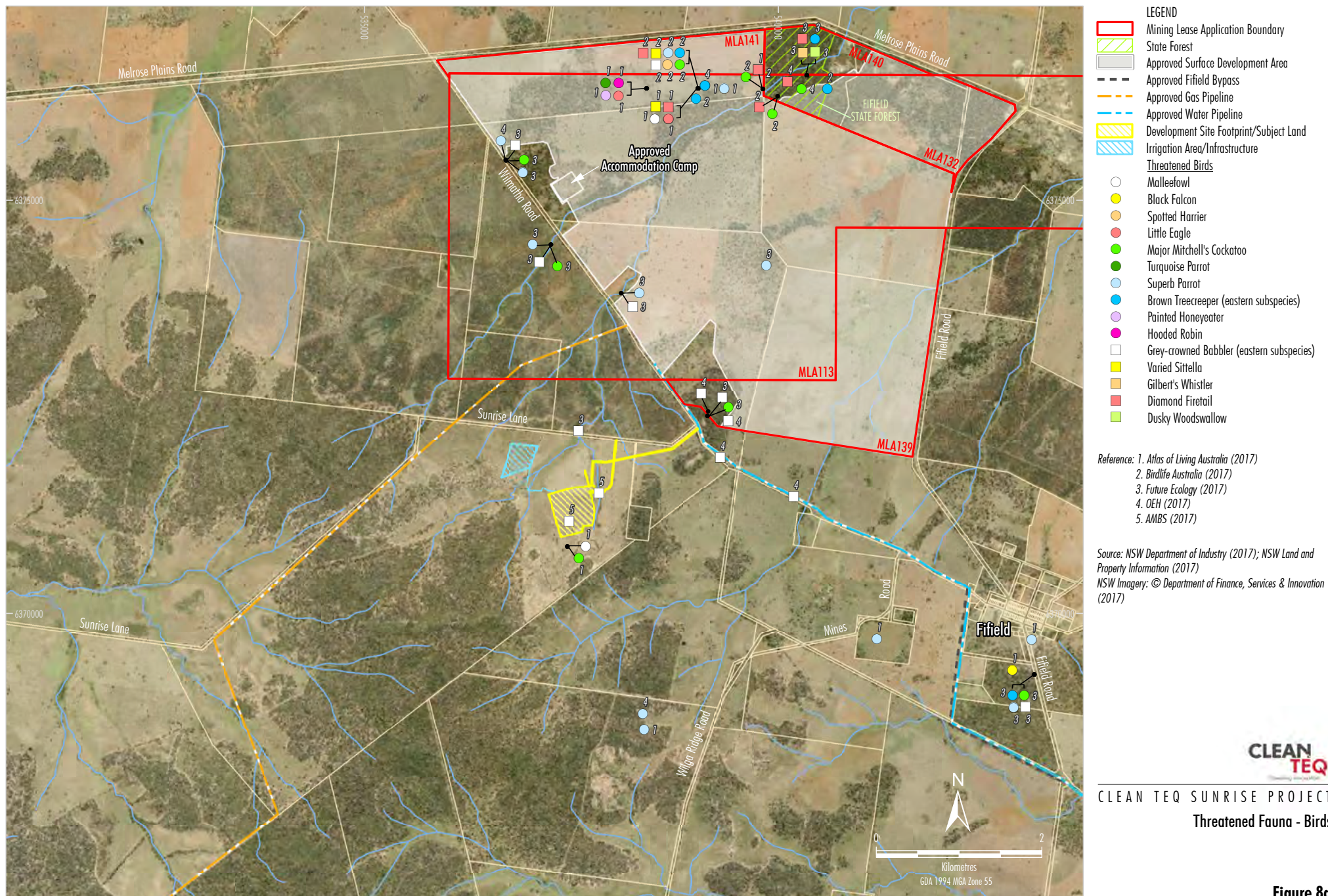
Source: NSW Department of Industry (2017); NSW Land and Property Information (2017)  
NSW Imagery: © Department of Finance, Services & Innovation (2017)

**CLEAN  
TEQ**

CLEAN TEQ SUNRISE PROJECT  
Threatened Flora

Figure 7

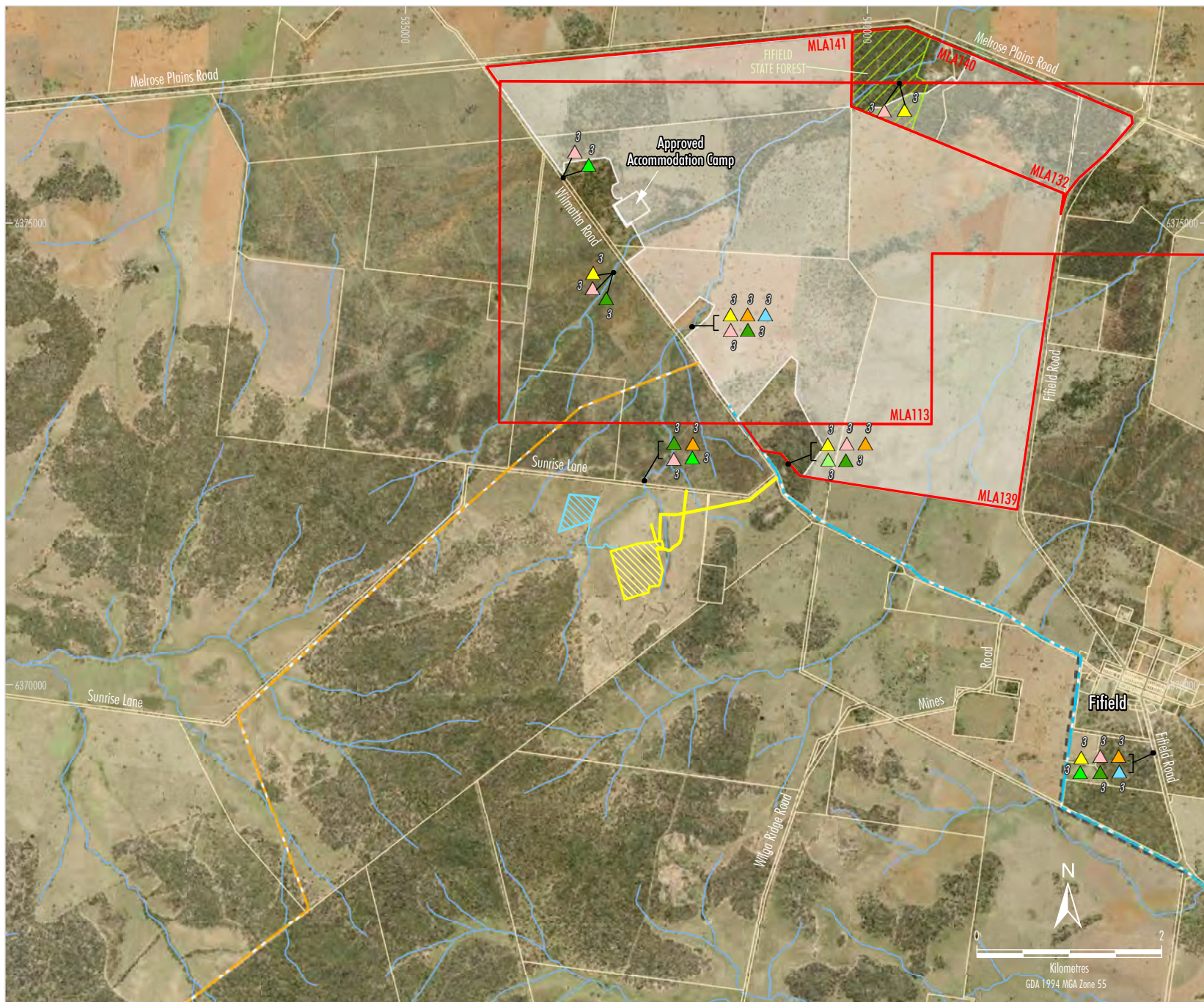




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**Figure 8a**





- LEGEND**
- State Forest
  - Mining Lease Application Boundary
  - Approved Surface Development Area
  - Approved Fife Bypass
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - Development Site Footprint/Subject Land
  - Irrigation Area/Infrastructure

- Threatened Mammals**
- ▲ Yellow-bellied Shearwater-bat
  - ▲ Eastern Bentwing-bat
  - ▲ Corben's Long-eared Bat
  - ▲ Large-eared Pied Bat
  - ▲ Little Pied Bat
  - ▲ Southern Myotis
  - ▲ Eastern Cave Bat

Reference: 3. Future Ecology (2017)

Note: There are no references 1 and 2 on this figure.  
 ^ Unconfirmed calls possibly recorded via bat recording devices.

Source: NSW Department of Industry (2017); NSW Land and Property Information (2017)  
 NSW Imagery: © Department of Finance, Services & Innovation (2017)

**CLEAN  
TEQ**  
Powering innovation  
**CLEAN TEQ SUNRISE PROJECT**  
**Threatened Fauna - Mammals**

**Figure 8b**

### **Tree Census**

The location of trees with potential habitat for species credit species within a study area surrounding the Development Site Footprint was identified using aerial imagery and site inspections by AMBS (2017a) (Attachment B).

### **Tree Hollow Assessment**

Hollow-bearing trees within a study area surrounding the Development Site Footprint were assessed by AMBS (2017a) (Attachment B) and data were collected on tree hollow sizes, numbers, heights; tree species, height, Diameter at Breast Height (DBH) and whether it was living or a stag. The tree hollow assessment considered the occurrence of:

- living or dead tree with hollows greater than 15 centimetres (cm) diameter and greater than 5 m above ground for the Glossy Black-Cockatoo (*Calyptorhynchus lathamii*);
- living or dead tree with hollows greater than 10 cm diameter for the Major Mitchell's Cockatoo (*Lophochroa leadbeateri*);
- living or dead *E. blakelyi*, *E. melliodora*, *E. albens*, *E. camaldulensis*, *E. microcarpa* and *E. polyanthemos* with hollows greater than 5 cm diameter; greater than 4 m above ground or trees with a DBH of greater than 30 cm for the Superb Parrot (*Polytelis swainsonii*);
- living or dead trees with hollows greater than 20 cm diameter for the Masked Owl (*Tyto novaehollandiae*); and
- hollow bearing trees for the Brush-tailed Phascogale (*Phascogale tapoatafa*) (tree hollows with entrances 2.5 - 4 cm wide [OEH, 2017c]).

### **Search for Suitable Fallen/Standing Dead Timber**

Potential habitat with suitable fallen/standing dead timber for the Bush Stone-curlew was searched for in the study area by AMBS (2017a) (Attachment B).

### **Searches for Stick Nests**

A search for stick-nests, as evidence of potential breeding of Square-tailed Kite (*Lophoictinia isura*) and Little Eagle (*Hieraaetus morphnoides*) was undertaken within the Development Site Footprint (and elsewhere on an opportunistic basis).

### **Habitat Assessment Results**

After carrying out a field assessment of habitat constraints, AMBS (2017a) (Attachment B) concluded that the habitat constraints for the following species credit species are not present in the Development Site Footprint (Table 6):

- Square-tailed Kite (breeding habitat);
- Little Eagle (breeding habitat);
- Glossy Black-Cockatoo (breeding habitat);
- Major Mitchell's Cockatoo (breeding habitat);
- Bush Stone-curlew<sup>5</sup>;
- Swift Parrot (breeding habitat) (this species was also not predicted to occur in the Protected Matters Search (DEE, 2017c);

---

<sup>5</sup> There is a single record of the Bush Stone-curlew approximately 40 km south of the Subject land (OEH, 2017d).

**Table 6**  
**Species Credit Species – Habitat Feature/Components**

Scientific Name	Common Name	Class of Credit (OEH, 2017c)	Requirement for Species Credit (BAM Credit Calculator [OEH, 2017e])	Can Paddock Trees be Important to the Species (OEH, 2017c)	Habitat Constraints identified in the <i>Threatened Biodiversity Data Collection</i> (OEH, 2017c)	Field Assessment of Habitat Constraints/Survey Method (AMBS, 2017a)	Results Field Assessment of Habitat Constraints (AMBS, 2017a)	Are the Habitat Constraints Present in the Vegetation Zone/Habitat Not Substantially Degraded Such that the Species is Not Unlikely to Utilise the Subject Land?
<i>Lophoictinia isura</i>	Square-tailed Kite	Species (Breeding)/ Ecosystem	Breeding habitat	No	<i>Nest trees</i>	Tree census and searches for stick nests	No potential nest trees were found within the Development Site Footprint	No, habitat constraints absent from the Development Site Footprint
<i>Hieraaetus morphnoides</i>	Little Eagle	Species (Breeding)/ Ecosystem	Breeding habitat	Yes	<i>Nest trees - live (occasionally dead) large old trees within vegetation.</i>	Tree census and searches for stick nests	No potential nest trees were found within the Development Site Footprint	No, habitat constraints absent from the Development Site Footprint
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	Species (Breeding)	Breeding habitat	Yes	<i>Living or dead tree with hollows greater than 15 cm diameter and greater than 5 m above ground.</i>	Tree hollow assessment	No living or dead tree with hollows greater than 15 cm diameter and greater than 5 m above ground occur within the Development Site Footprint	No, habitat constraints absent from the Development Site Footprint



**Table 6 (Continued)**  
**Species Credit Species – Habitat Feature/Components**

Scientific Name	Common Name	Class of Credit (OEH, 2017c)	Requirement for Species Credit (BAM Credit Calculator [OEH, 2017e])	Can Paddock Trees be Important to the Species (OEH, 2017c)	Habitat Constraints identified in the <i>Threatened Biodiversity Data Collection</i> (OEH, 2017c)	Field Assessment of Habitat Constraints/Survey Method (AMBS, 2017a)	Results Field Assessment of Habitat Constraints (AMBS, 2017a)	Are the Habitat Constraints Present in the Vegetation Zone/Habitat Not Substantially Degraded Such that the Species is Not Unlikely to Utilise the Subject Land?
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	Species (Breeding)/ Ecosystem	Breeding habitat	<i>Paddock trees with hollows greater than 10 cm diameter</i>	<i>Living or dead tree with hollows greater than 10 cm diameter</i>	Tree hollow assessment	No living or dead tree with hollows greater than 10 cm diameter occur within the Development Site Footprint	No, habitat constraints absent from the Development Site Footprint
<i>Burhinus grallarius</i>	Bush Stone-curlew	Species	-	Yes	Fallen/standing dead timber including logs	Search for fallen/standing dead timber which could provide habitat for the Bush Stone-curlew	No fallen/standing dead timber which could provide habitat for the Bush Stone-curlew occurs within the Development Site Footprint	No, habitat constraints absent from the Development Site Footprint
<i>Lathamus discolor</i>	Swift Parrot	Species (Breeding)/ Ecosystem	Breeding habitat	Yes	<i>As per mapped area</i>	OEH has not yet released mapping. OEH confirmed (14-12-17) that the Development Footprint does not fall within the OEH draft mapped area.	N/A	No, habitat constraints absent from the Development Site Footprint

**Table 6 (Continued)**  
**Species Credit Species – Habitat Feature/Components**

Scientific Name	Common Name	Class of Credit (OE, 2017c)	Requirement for Species Credit (BAM Credit Calculator [OE, 2017e])	Can Paddock Trees be Important to the Species (OE, 2017c)	Habitat Constraints identified in the <i>Threatened Biodiversity Data Collection</i> (OE, 2017c)	Field Assessment of Habitat Constraints/Survey Method (AMBS, 2017a)	Results Field Assessment of Habitat Constraints (AMBS, 2017a)	Are the Habitat Constraints Present in the Vegetation Zone/Habitat Not Substantially Degraded Such that the Species is Not Unlikely to Utilise the Subject Land?
<i>Polytelis swainsonii</i>	Superb Parrot	Species (Breeding)/ Ecosystem	Breeding habitat	Only <i>E. blakelyi</i> , <i>E. melliodora</i> , <i>E. albens</i> , <i>E. camaldulensis</i> , <i>E. microcarpa</i> & <i>E. polyanthemos</i>	Living or dead <i>E. blakelyi</i> , <i>E. melliodora</i> , <i>E. albens</i> , <i>E. camaldulensis</i> , <i>E. microcarpa</i> & <i>E. polyanthemos</i> with hollows greater than 5 cm diameter; greater than 4 m above ground or trees with a DBH of greater than 30 cm.	Tree hollow assessment	A single <i>E. microcarpa</i> occurs in the Development Site Footprint and it does not contain tree hollows	No, habitat constraints absent from the Development Site Footprint <sup>a</sup>
<i>Tyto novaehollandiae</i>	Masked Owl	Species (Breeding)/ Ecosystem	Breeding habitat	Yes	Living or dead trees with hollows greater than 20 cm diameter.	Tree hollow assessment	No living or dead trees with hollows greater than 20 cm diameter occur in the Development Site Footprint	No, habitat constraints absent from the Development Site Footprint
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	Species	-	Yes	Hollow bearing trees	Tree hollow assessment	No trees with hollows potentially suitable for the Brush-tailed Phascogale occur in the Development Site Footprint	No, habitat constraints absent from the Development Site Footprint

**Table 6 (Continued)**  
**Species Credit Species – Habitat Feature/Components**

Scientific Name	Common Name	Class of Credit (OEH, 2017c)	Requirement for Species Credit (BAM Credit Calculator [OEH, 2017e])	Can Paddock Trees be Important to the Species (OEH, 2017c)	Habitat Constraints identified in the <i>Threatened Biodiversity Data Collection</i> (OEH, 2017c)	Field Assessment of Habitat Constraints/Survey Method (AMBS, 2017a)	Results Field Assessment of Habitat Constraints (AMBS, 2017a)	Are the Habitat Constraints Present in the Vegetation Zone/Habitat Not Substantially Degraded Such that the Species is Not Unlikely to Utilise the Subject Land?
<i>Phascolarctos cinereus</i>	Koala	Species (Breeding)/ Ecosystem	Breeding habitat	Yes	<i>Areas identified via survey as important habitat (see comments) Important' habitat is defined by the density of koalas and quality of habitat determined by on-site survey - contact OEH for more information.</i>	OEH confirmed (14-12-17) that Koala was to be considered a species credit species for the Modification. Assumed possibly present	N/A	Assumed candidate species (Table 9)

\* Although noted to be breeding habitat in the BAM Credit Calculator (OEH, 2017e), this species does not breed in NSW.

^ The habitat constraint is absent, however OEH (2017e) states the following for the Superb Parrot: '*breeding habitat can be identified by the presence of habitat features and observed nest OR two or more birds seen on site*'. AMBS (2017a) (Attachment B) undertook an avifauna census targeting this species. This species was not found and it is therefore not a candidate species credit species for further assessment.

- Superb Parrot (breeding habitat);
- Masked Owl (breeding habitat); and
- Brush-tailed Phascogale<sup>6</sup>.

Any trees with potential habitat for species credit species were avoided (Figure 9) as described in Section 5.1.

In accordance with the BAM (OEH, 2017a), no further assessment is required for the above listed species. The Koala is assumed to be a candidate species for further assessment (Table 6) as the species does not have a specific habitat constraint in the *Threatened Biodiversity Data Collection* (OEH, 2017c) and OEH confirmed (14 December 2017) that Koala was to be considered a species credit species for the Modification. The closest records of Koala are approximately 55 km east of the Modification and approximately 50 km west (OEH, 2017d).

### Additional Survey Work

Despite the above bird species not requiring surveys, AMBS (2017a) (Attachment B) undertook avifauna surveys in accordance with Department of Environment and Conservation (DEC) (2004a). Two, 20-minute area searches for diurnal birds were undertaken on two consecutive mornings, targeting Square-tailed Kite, Little Eagle, Glossy Black-Cockatoo, Superb Parrot and Major Mitchell's Cockatoo. None of these birds were recorded.

In addition, AMBS (2017a) (Attachment B) undertook targeted surveys for evidence of Glossy Black-Cockatoo foraging within the Development Site Footprint was undertaken in areas where food species of the genera *Allocasuarina* and *Casuarina* occur. If cones were found under the sample species, they were investigated for evidence of chewing. No evidence of Glossy Black-Cockatoo was found.

### 4.2.3 Step 3: Identify Candidate Species Credit Species for Further Assessment

After considering the habitat constraints (Step 2), candidate species credit species for further assessment are listed in Table 7.

**Table 7**  
**Candidate Species Credit Species for Further Assessment**

Scientific Name	Common Name	Class of Credit <sup>^</sup>	Biodiversity Risk Rating <sup>^</sup>
<i>Austrostipa wakoolica</i>	A spear-grass	Species	High
<i>Commersonia procumbens</i>	-	Species	High
* <i>Tylophora linearis</i>	-	Species	High
* <i>Lepidium monoplacoides</i>	Winged Peppergrass	Species	High
<i>Phascolarctos cinereus</i>	Koala (Breeding)	Species/Ecosystem	High

\* Species not predicted in the BAM Credit Calculator (OEH, 2017e), however added to the Species Credit Species for assessment based on nearby records by AMBS (2017b).

<sup>^</sup> BAM Credit Calculator (OEH, 2017e)

No species listed in Table 7 are Serious and Irreversible Impact (SAIL) Entities as none have a Biodiversity Risk Rating of 'very high'.

<sup>6</sup> In NSW, the Brush-tailed Phascogale is mainly found east of the Great Dividing Range although there are occasional records west of the Great Dividing Range (OEH, 2017c). There is a single record of the Brush-tailed Phascogale approximately 40 km south of the Subject land (OEH, 2017d). This record is a historical record from 1919 made by the South Australian Museum from population that is no longer extant (OEH, 2017d). There are no other records in the IBRA region (OEH, 2017d).



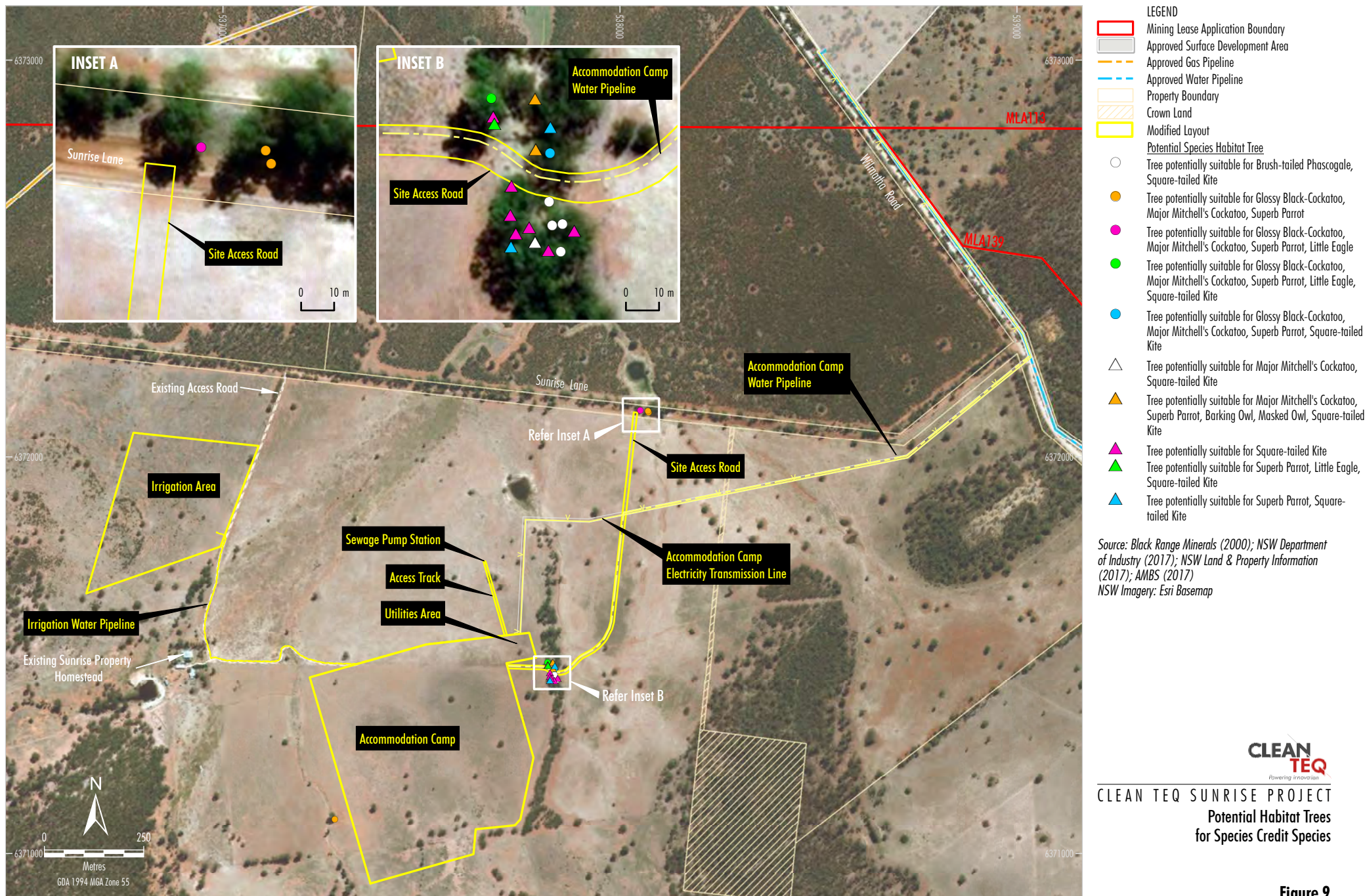


Figure 9

#### **4.2.4 Step 4: Determine Presence or Absence of a Candidate Species Credit Species**

AMBS (2017a) (Attachment B) undertook targeted surveys for candidate species credit species (Table 7) to determine presence or absence of the species within the survey period required by the BAM Credit Calculator (OEH, 2017e) (Table 8). The timing, methods and effort area outlined below and detailed in Attachment B.

##### ***Threatened Flora***

Targeted searches for threatened flora species were undertaken by AMBS (2017a) (Attachment B) in accordance with the NSW *Guide to Surveying Threatened Plants* (OEH, 2016b) in areas of potential habitat. Surveys for threatened flora species were undertaken in October over a period of two days and in November over a period of three days (AMBS, 2017a) (Attachment B).

No threatened flora species were recorded by AMBS (2017a) (Attachment B) in the Development Site Footprint. *Tylophora linearis* was found at four locations within the Sunrise Lane road easement, to the north of the Development Site Footprint (Figure 7). The population was found in Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation 1a) under Grey Box (*Eucalyptus microcarpa*) trees.

##### ***Koala (Breeding Habitat)***

AMBS (2017a) (Attachment B) undertook surveys for the Koala involving both direct observation and indirect observation methods consistent with the *EPBC Act Referral Guidelines for the Vulnerable Koala* (Department of the Environment, 2014). Direct observation involved diurnal searches for individuals of the species in trees within and nearby the Development Site Footprint. Every tree within the Development Site Footprint was checked. Indirect survey techniques involved searches for scratches on tree trunks and also searches for scats.

**Table 8**  
**Candidate Species Credit Species - Survey Timing**

Scientific Name	Common Name	Class of Credit	January	February	March	April	May	June	July	August	September	October	November	December
<b>Flora</b>														
<i>Austrostipa wakoolica</i>	A spear-grass	Species									Yes	Yes	Yes	Yes
<i>Commersonia procumbens</i>	-	Species	Yes	Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes
* <i>Tylophora linearis</i>	-	Species	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes	Yes
* <i>Lepidium monoplacoides</i>	Winged Peppergrass	Species	Yes	Yes									Yes	Yes
<b>Mammals</b>														
<i>Phascolarctos cinereus</i>	Koala (Breeding)	Species/Ecosystem	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\* Species not predicted in the BAM Credit Calculator (OEH, 2017e), however added to the Species Credit Species for Assessment based on nearby records by AMBS (2017b).

Highlighted cells – months surveyed by AMBS (2017a) (Attachment B)

#### 4.2.5 Step 5: Determine the Area or Count, and Location of Suitable Habitat for a Species Credit Species

As a result of the surveys by AMBS (2017a) (Attachment B), no species credit species are present, or are likely to use habitat on the Subject land (Table 9).

**Table 9**  
**Candidate Species Credit Species – Presence Status**

Scientific Name	Common Name	Class of Credit	Result (AMBS (2017a) (Attachment B))
<i>Austrostipa wakoolica</i>	A spear-grass	Species	Not recorded, despite targeted surveys.
<i>Commersonia procumbens</i>	-	Species	Not recorded, despite targeted surveys.
* <i>Tylophora linearis</i>	-	Species	Not recorded, despite targeted surveys.
* <i>Lepidium monoplacoides</i>	Winged Peppergrass	Species	Not recorded, despite targeted surveys.
<i>Phascolarctos cinereus</i>	Koala (Breeding)	Species/Ecosystem	Not recorded, despite targeted surveys. No primary feed trees for the Koala are located in the Development Site Footprint. One secondary feed tree, Grey Box ( <i>E. microcarpa</i> ), is present in the Development Site Footprint represented by one isolated tree. No evidence of Koala use (scats or scratches) was found. It is unlikely that the Koala uses the habitat in the Development Site Footprint.

The small areas of bare ground without native vegetation (cleared land) associated with existing tracks/roads (Figure 5) is not considered to be habitat for any of the species credit species.

#### 4.2.6 Step 6: Determine the Habitat Condition within the Species Polygon for Species Assessed by Area

Step 6 was not relevant as no species credit species are present, or are likely to use the Subject land (Table 9).

### 4.3 LOCAL DATA

It was not necessary use local data to deviate from the OEH databases (OEH, 2017b).

### 4.4 EXPERT REPORTS

No expert reports are required because there are no candidate species credits species (Table 7) that were not surveyed for by AMBS (2017a) (Attachment B) (Tables 8 and 9).



## 5 AVOID AND MINIMISE IMPACTS

### 5.1 MEASURES TO AVOID AND MINIMISE IMPACTS

The impact avoidance, minimisation and offset hierarchy has been applied to the Modification. Following the initial survey work by AMBS (2017a) (Attachment B), the modified accommodation camp has been located solely within previously cleared/cultivated land with low biodiversity values. The vegetation is the poorest occurrence of PCT 217, which is not a threatened ecological community.

Clean TeQ has designed the modified accommodation camp (and its development footprint) to be a suitable size to accommodate approximately 1,300 personnel. The supporting infrastructure has been specifically designed by Clean TeQ to avoid intact native vegetation and habitat features for species credit species (Figure 9). Alternative routes and locations were considered for the site access road, accommodation camp ETL and accommodation camp water pipeline in order to avoid and/or minimise impacts on biodiversity values. The refinements in Table 10 were made to the design of the Modification.

**Table 10**  
**Measures to Avoid and Minimise Impacts**

Component	Refinement	Justification for the Development Footprint
Site Access Road	<ul style="list-style-type: none"> <li>The turnoff to the site access road from Sunrise Lane was located in a previously cleared section of the road reserve in order to avoid clearance of the Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation Community 1a) (Figure 5).</li> <li>The site access road traverses the first order drainage feature in the alignment of an existing track in order to avoid clearance of the Green Mallee Low Woodland (Vegetation Community 1b) (Figure 5).</li> <li>The Development Site Footprint corridor associated with site access road is 8 m wide across the drainage feature (reduced from 9 m) in order to avoid clearance of the Green Mallee Low Woodland (Vegetation Community 1b) (Figure 5).</li> </ul>	<ul style="list-style-type: none"> <li>The site access road is located solely within previously cleared/cultivated land with low biodiversity values.</li> <li>The site access road avoids habitat trees.</li> </ul>
Accommodation Camp ETL (between the mine site and the accommodation camp)	<ul style="list-style-type: none"> <li>The ETL was originally proposed to occur along Sunrise Lane but re-aligned in order to avoid clearance of Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation Community 1a) (Figure 5).</li> <li>The ETL was aligned to avoid paddock trees with habitat features for species credit species.</li> <li>The ETL passes through an existing gap (approximately 17 m wide) in Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation Community 1a) (Figure 5) along Wilmatha Road.</li> </ul>	<ul style="list-style-type: none"> <li>The ETL is located solely within previously cleared/cultivated land with low biodiversity values.</li> <li>The ETL is located in the same corridor as the water pipeline.</li> <li>The ETL avoids trees, except two 4 m high acacia trees.</li> </ul>
Accommodation Camp Water Pipeline (between the mine site and the accommodation camp)	<ul style="list-style-type: none"> <li>The water pipeline was originally proposed to occur along Sunrise Lane but was re-aligned in order to avoid clearance of Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation Community 1a) (Figure 5).</li> <li>The water pipeline was aligned to avoid paddock trees with habitat features for species credit species.</li> </ul>	<ul style="list-style-type: none"> <li>The water pipeline is located solely within previously cleared/cultivated land with low biodiversity values.</li> <li>The water pipeline is located in the same corridor as the ETL.</li> <li>The water pipeline avoids trees, except two 4 m high acacia trees.</li> </ul>

**Table 10 (Continued)**  
**Measures to Avoid and Minimise Impacts**

Component	Refinement	Justification for the Development Footprint
Temporary Construction (Laydown) Areas	<ul style="list-style-type: none"> <li>Temporary construction (laydown) areas would be within the operational Development Site Footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Temporary construction (laydown) areas are located within proposed footprint (no additional footprint for construction).</li> </ul>
Irrigation Water Pipeline	<ul style="list-style-type: none"> <li>Irrigation water pipeline was originally proposed to occur across Low lying area with Derived Native Grassland (Vegetation Community 2) (equivalent to the Grey Box EEC) (Figure 5) but would instead be placed beside an existing track.</li> </ul>	<ul style="list-style-type: none"> <li>Irrigation water pipeline would be placed beside an existing track such that no native vegetation clearance would be required.</li> </ul>

There were no alternative sites on the Sunrise Property which could further avoid and/or minimise impacts on biodiversity values. There are no proposed alternative modes or technologies that would further avoid and/or minimise impacts on biodiversity values associated with the Modification.

Measures to manage and mitigate impacts are described in Section 5.6.

## **5.2 DIRECT IMPACTS ON NATIVE VEGETATION AND HABITAT**

### **5.2.1 Clearance of Habitat and Vegetation**

After applying the measures to avoid and/or minimise impacts on biodiversity values (Section 5.1), the Modification would result in the clearance of approximately 27.5 ha of previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs. Most of the Development Site Footprint has been previously cultivated, with scattered trees comprising Green Mallee (*Eucalyptus viridis*), Kurrajong (*Brachychiton populneus* subsp. *populneus*), *Acacia doratoxylon*, *Casuarina cristata* and Grey Box tree (*Eucalyptus microcarpa*). Scattered trees which could provide habitat for threatened species credit species were surveyed and any trees with potential habitat for species credit species (which were located near the access road, ETL and water pipeline) were avoided (Figure 9).

No threatened ecological communities listed under the BC Act or EPBC Act would be cleared for the Modification.

### **5.2.2 Irrigation**

The treated waste water produced from the sewage treatment plant would be pumped to the irrigation area via the irrigation water pipeline during operation of the accommodation camp (Figure 2). The irrigation water pipeline would be laid on the ground beside an existing track, as such, no native vegetation would be cleared.

The irrigation of the treated waste water would be undertaken in accordance with the *Environmental Guidelines Use of Effluent by Irrigation* (DEC, 2004b). The irrigation area is approximately 10.5 ha over previously cleared land with advanced grassland/shrubland regeneration (PCT217) (Vegetation Community 1d) (Plates 2a and 2b). The proposed irrigation is unlikely to adversely impact the native vegetation because:

- the irrigation rate would not cause irrigation water runoff from the irrigation area; and
- the irrigation rate would not exceed the capacity of the soil in the irrigation area to effectively absorb the applied nutrient, salt, organic material and hydraulic loads.

For the same reasons above, the proposed irrigation is unlikely to adversely impact the low-lying area with Derived Native Grassland (PCT 82) (Vegetation Community 2)<sup>7</sup> which occurs south of the proposed irrigation area (separated by the access track to the existing homestead) (Plates 3 and 4).

### **5.3 INDIRECT IMPACTS ON NATIVE VEGETATION AND HABITAT**

Habitat and vegetation adjacent to the Development Site Footprint is shown on Figure 5. Much of the area adjacent to the Development Site Footprint has been previously cleared of the remnant vegetation. There are two areas of remnant vegetation adjacent to the Development Site Footprint, the Green Mallee Low Woodland (Vegetation Community 1b) along the site access road and Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation Community 1b) along the ETL.

Threatened fauna records adjacent to the Development Site Footprint are shown on Figures 8a and 8b. Only one threatened species, the Grey-crowned Babbler (eastern subspecies) has been recorded in the Development Site Footprint (Figures 8a).

Indirect impacts on habitat and vegetation adjacent to the Development Site Footprint listed in the BAM (OEH, 2017a) are assessed below.

#### **5.3.1 Inadvertent Impacts on Adjacent Habitat or Vegetation**

Inadvertent impacts on adjacent habitat or native vegetation could occur in the short-term during construction or operation of any development such as the Modification, e.g. clearance of vegetation outside of approved disturbance limits.

To minimise the risk of inadvertent impacts during the Project, a vegetation clearance protocol has been prepared (Section 5.6). Particular attention would be given to avoiding impacts on trees with potential habitat for species credit species (Figure 9).

#### **5.3.2 Impacts on Adjacent Habitat or Vegetation from a Change in Land-Use Pattern (Increased Human Activity)**

Habitat and vegetation adjacent to the Development Site Footprint is described in Section 5.3.1. The accommodation camp would increase the human activity on the Sunrise Property during operation of the accommodation camp in the short to medium term. No adverse impacts are likely to result on habitat and vegetation adjacent to the Development Site Footprint due to the increase human activity on the Sunrise Property. Vehicle strike is assessed in Section 5.4.

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<sup>7</sup> Derived Native Grassland (PCT 82) (Vegetation Community 2) is a degraded example of the BC Act listed community *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penplain, Nandewar and Brigalow Belt South Bioregions* and the EPBC Act listed community *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia* (AMBS, 2017a) (Attachment B).



**Plate 2a Irrigation Area – Previously Cleared Land with Advanced Grassland/Shrubland Regeneration**



**Plate 2b Irrigation Area – Previously Cleared Land with Advanced Grassland/Shrubland Regeneration from Driveway**



**Plate 3 Driveway to Existing Homestead**



**Plate 4 Derived Native Grassland (PCT 82) (Vegetation Community 2) South of the Access Road to Existing Homestead and Proposed Irrigation Area**



### **5.3.3 Reduced Viability of Adjacent Habitat Due to Edge Effects**

Edge effects can occur from a change in physical and/or biological conditions at edges of habitat. No notable edge effects from noise, dust or light spill are likely to result on habitat and vegetation adjacent to the Development Site Footprint during construction or operation.

Sediment control structures such as sediment dams and sediment fences would be employed where necessary within and downstream of disturbance areas. Sediment control structures would be designed, installed and maintained in accordance with *Managing Urban Stormwater: Soils and Construction* in accordance with Condition 29, Schedule 3 of Development Consent DA 374-11-00.

### **5.3.4 Reduced Viability of Adjacent Habitat Due to Noise, Dust or Light Spill**

The accommodation camp is unlikely to reduce the viability of any adjacent habitat due to noise, dust or light spill during construction or operation. Noise from the Modification would likely be localised and minor in impact to fauna.

Whilst ensuring that operational safety is not compromised, Clean TeQ would minimise light emissions from the Project by select placement, configuration and direction of lighting to reduce off-site nuisance effects where practicable. All external lighting at the Project would be operated in accordance with Australian Standard 4282 (INT):1997 – *Control of Obtrusive Effects of Outdoor Lighting*.

### **5.3.5 Transport of Weeds and Pathogens from the Site to Adjacent Vegetation**

Agricultural activities would continue to occur on the Sunrise Property outside the accommodation camp area, including weed control. No high threat, exotic weeds were recorded by AMBS (2017a) (Attachment B). Weed control would be undertaken during construction and operation of the modified accommodation camp in the short to medium term (Section 5.6).

No vegetation pathogens are likely to be relevant to the construction and operation of the modified accommodation camp.

### **5.3.6 Increased Risk of Fauna Starvation, Exposure and Loss of Shade or Shelter**

Clearing the isolated trees may result in displacement of resident fauna. The accommodation camp is proposed to be constructed solely within the previously cleared/cultivated land with low biodiversity values. Scattered trees which could provide habitat for threatened species credit species were surveyed and any trees with potential habitat for species credit species would be avoided.

A vegetation clearance protocol has been prepared, which would include a pre-clearance survey to minimise impacts on displaced fauna during vegetation clearance activities.

### **5.3.7 Loss of Breeding Habitats**

Scattered trees in the Development Site Footprint are likely to be used as breeding habitat for a number of non-threatened bird and bat species. The loss of these breeding habitat resources during construction is unlikely to adversely impact these species. Particular attention would be given to avoiding impacts on trees with potential habitat for species credit species (Figure 9).

### **5.3.8 Trampling of Threatened Flora Species**

No threatened flora species have been located in areas at risk of trampling during construction or operation of the Modification. The *Tylophora linearis* found on Sunrise Lane (Figure 7) is not near the Development Site Footprint.

### **5.3.9 Inhibition of Nitrogen Fixation and Increased Soil Salinity**

The Modification would not inhibit nitrogen fixation or increase soil salinity. Irrigation would be undertaken as described in Section 5.2.2.

### **5.3.10 Fertiliser Drift**

The Modification would not involve the use of fertiliser, except in small quantities to assist with revegetation works.

### **5.3.11 Rubbish Dumping**

The Modification would not involve rubbish dumping. Rubbish generated by the accommodation camp would be disposed of appropriately in designated areas.

### **5.3.12 Wood Collection**

Collection of wood from surrounding native vegetation (for fires or other activities) would not be permitted at the accommodation camp.

### **5.3.13 Bush Rock Removal and Disturbance**

No notable bushrock areas which may provide habitat for fauna occur in the Development Site Footprint.

### **5.3.14 Increase in Predatory Species Populations**

The Modification is unlikely to increase predatory species populations (such as Cat [*Felis catus*] and Red Fox [*Vulpes vulpes*]) (Section 5.3.15).

### **5.3.15 Increase in Pest Animal Populations**

Agricultural activities would continue to occur on the Sunrise Property outside the accommodation camp area, including control of pest animal populations. AMBS (2017a) (Attachment B) recorded the Cat, Red Fox, European Brown Hare (*Lepus capensis*) and European Rabbit (*Oryctolagus cuniculus*) during surveys. The Modification is unlikely to increase pest animal populations.

### **5.3.16 Increased Risk of Fire**

The modified accommodation camp would include fire-fighting infrastructure (e.g. fire water tank and reticulation system) to enable a timely response to fire outbreaks (were they to occur).

### **5.3.17 Disturbance to Specialist Breeding and Foraging Habitat**

Scattered trees which could provide habitat for threatened species credit species were surveyed and any trees with potential habitat for species credit species were avoided.

## **5.4 PRESCRIBED BIODIVERSITY IMPACTS**

The NSW *Biodiversity Conservation Regulation, 2017* identifies actions that are prescribed as impacts to be assessed under the biodiversity offsets scheme. Prescribed Biodiversity Impacts are as follows:

- (a) the impacts of development on the following habitat of threatened species or ecological communities:*
  - (i) karst, caves, crevices, cliffs and other geological features of significance,*
  - (ii) rocks,*
  - (iii) human made structures,*
  - (iv) non-native vegetation,*
- (b) the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range,*
- (c) the impacts of development on movement of threatened species that maintains their lifecycle,*
- (d) the impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development),*
- (e) the impacts of wind turbine strikes on protected animals,*
- (f) the impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.*

These impacts are assessed below in relation to the Modification.

- (a) the impacts of development on the following habitat of threatened species or ecological communities:***
  - (i) karst, caves, crevices, cliffs and other geological features of significance,***
  - (ii) rocks,***
  - (iii) human made structures,***
  - (iv) non-native vegetation,***

The Modification is unlikely to result in this Prescribed Biodiversity Impact because:

- there are no karst, caves, crevices, cliffs or other areas of geological significance on the Subject land or within the assessment area surrounding the Subject land (Section 2.6);
- there are no threatened species which are likely to be associated with any rocks that occur on the Subject land or within the assessment area surrounding the Subject land;
- there are no human made structures that provide habitat for threatened species would be adversely impacted by the Modification; and
- AMBS (2017a) (Attachment B) did not map any non-native vegetation on the Subject land or within the assessment area surrounding the Subject land.

***(b) the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range***

As described in Section 2.3, any native vegetation on Figure 4 may facilitate the movement of one or more threatened species across their range. The Modification would not impact on the connectivity of different areas of habitat of threatened species that facilitates the movement of threatened species across their range. Scattered trees in the Development Site footprint would be removed, however there is sufficient connectivity in absence of those scattered trees in which threatened species can move.

For the purpose of this assessment, the Development Site Footprint corridor associated with ETL and water pipeline is conservatively approximately 9 m wide. The ETL would pass through an existing gap in Green Mallee, Mugga Ironbark, Grey Box Woodland (Vegetation Community 1a) near Wilmatha Road, approximately 17 m wide.

The Development Site Footprint corridor associated with site access road from Sunrise Lane is approximately 9 m wide, and approximately 8 m wide across the drainage feature (in an existing cleared track/gap between the Green Mallee Low Woodland).

***(c) the impacts of development on movement of threatened species that maintains their lifecycle***

The Modification would not impact on the movement of threatened species that maintains their lifecycle for the reasons described in (b) above.

***(d) the impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development)***

The Modification would not result in this Prescribed Biodiversity Impact because the Modification would not impact water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities.

***(e) the impacts of wind turbine strikes on protected animals***

The Modification would not result in this Prescribed Biodiversity Impact because the Modification does not include the use of wind turbines.

***(f) the impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community***

The Modification would result in an increase in vehicle traffic. The modified accommodation camp would provide increased accommodation camp capacity (from approximately 1,000 to 1,300 personnel) compared to the approved accommodation camp. The modified accommodation camp (at reduced capacity) would be maintained post-construction rather than be decommissioned as was proposed for the approved accommodation camp.



The modified accommodation camp would require the construction workforce to travel on public roads (Sunrise Land and Wilmatha Road) between the accommodation camp and the mine site (approximately 2 km). Traffic generated to and from the modified accommodation camp is expected to include (GTA Consultants, 2017):

- travel by resident employees to and from the mine site;
- recreational travel by resident employees;
- bus trips to and from Parkes Airport; and
- delivery trips of consumables and supplies.

GTA Consultants (2017) have assumed an average of 162 and peak of 289 vehicle trips each day by resident employees to and from the mine site, however the number would be much less with a shuttle bus system.

The BAM (OEH, 2017a) states:

*The assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community must:*

- (a) identify the range of threatened animal species or animals that are part of a threatened ecological community at risk of vehicle (or other transport mode) strike*
- (b) predict the likelihood of vehicle strike to each relevant species, taking into consideration mobility, abundance, range and other relevant life history factors*
- (c) estimate vehicle strike rates where supporting data or literature is available*
- (d) predict the consequences of the impacts for the local and bioregional persistence of the suite of relevant species, with reference to relevant literature and other published sources of information.*

These components are discussed below.

- (a) identify the range of threatened animal species or animals that are part of a threatened ecological community at risk of vehicle (or other transport mode) strike*

Any threatened birds or bats on Figures 8a and 8b are potentially at risk of vehicle strike. Species recorded between the accommodation camp and the mine site are Major Mitchell's Cockatoo, Superb Parrot, Grey-crowned Babbler, Yellow-bellied Sheath-tail Bat and Little Pied Bat. These species are considered relevant species for the purpose of this assessment.

- (b) predict the likelihood of vehicle strike to each relevant species, taking into consideration mobility, abundance, range and other relevant life history factors*

The likelihood of vehicle strike on the Major Mitchell's Cockatoo, Superb Parrot, Grey-crowned Babbler, Yellow-bellied Sheath-tail Bat and Little Pied Bat is considered low because:

- existing public roads would be travelled (there may be a greater risk if new roads were proposed through intact habitat); and
- there would be a relative short distance of travel between the modified accommodation camp and the mine site (approximately 2 km).

- (c) estimate vehicle strike rates where supporting data or literature is available*

Vehicle strike rates are estimated to be low for the reasons outlined above.

- (d) *predict the consequences of the impacts for the local and bioregional persistence of the suite of relevant species, with reference to relevant literature and other published sources of information.*

The consequence of the impacts from vehicle strike are predicted to be negligible as the Major Mitchell's Cockatoo, Superb Parrot, Grey-crowned Babbler, Yellow-bellied Sheath-tail Bat and Little Pied Bat are known to occur more widely than between the accommodation camp and the mine site.

## **5.5 IMPACTS ON COMMONWEALTH THREATENED SPECIES AND COMMUNITIES**

The Modification is unlikely to impact (or significantly impact) any threatened species or communities listed under the EPBC Act as none have been confirmed to occur near the Development Site Footprint (Figures 8a and 8b) and the modified accommodation camp is proposed to be constructed solely within the previously cleared/cultivated land with minimal biodiversity values. A review of threatened species or communities listed under the EPBC Act is provided in Attachment D considering Department of the Environment, Water, Heritage and the Arts (2013).

## **5.6 IMPACTS ON THREATENED SPECIES AND COMMUNITIES UNDER THE NSW FISHERIES MANAGEMENT ACT, 1994**

The Modification is unlikely to impact (or significantly impact) any threatened species or communities listed under the NSW *Fisheries Management Act, 1994*.

The site access road follows an existing track which crosses a shallow first order ephemeral drainage feature through an existing track (Figures 3 and 4). The accommodation camp water pipeline and ETL also traverse shallow first order ephemeral drainage features that occur through the cultivated paddock (Figures 3 and 4).

## **5.7 MEASURES TO MITIGATE AND MANAGE IMPACTS**

As described in Section 5.1, the modified accommodation camp has been specifically located and designed to avoid and minimise impacts on biodiversity values, including native vegetation and potentially occurring threatened species. The modified accommodation camp is proposed to be constructed solely within the previously cleared/cultivated land with minimal biodiversity values. The Modification would result in the clearance of approximately 27.5 ha of previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (Plant Community Type 217). Scattered trees would need to be cleared for the Modification, however those which could provide habitat for threatened 'species credit species' were surveyed and such trees would be avoided.

Clean TeQ will prepare a *Biodiversity Management Plan* (BMP) for the Project in accordance with Development Consent DA 374-11-00. The BMP would provide vegetation clearance protocol as well as measures to prevent and control weeds and pest animals. Table 11 provides measures to mitigate and manage impacts from the Modification. Clean TeQ would be responsible for implementing the measures.

After the measures to mitigate and manage impacts, there would be a negligible risk to biodiversity with a low consequence (e.g. individual fauna lost during controlled vegetation clearing works). Fire prevention is required to avoid a risk of bushfire outbreak.

**Table 11**  
**Measures to Mitigate and Manage Impacts**

<b>Mitigation Measure</b>	<b>Techniques</b>	<b>Timing/Frequency</b>	<b>Potential Risk</b>	<b>Contingency Measure</b>
Vegetation Clearance Protocol - Timing of tree clearance	Trees used for nesting would not be felled until young have left the nest, where possible.	Prior to clearing	Trees used for nesting are accidentally felled.	A suitably qualified person(s) will be present during clearing of habitat trees to manage vertebrate animals.
Vegetation Clearance Protocol - Pre-clearance Surveys	<p>Pre-clearance vertebrate fauna surveys would be undertaken in two stages:</p> <ul style="list-style-type: none"> <li>identify habitat features that could harbour vertebrate fauna and place them at risk during vegetation clearance activities (e.g. tree hollows), or features that could be salvaged and reused such as mature trees and stags; and</li> <li>identify vertebrate fauna most likely to be at risk during vegetation clearance activities and those that would be managed during clearing activities.</li> </ul>	Within two weeks prior to clearing.	Trees with habitat features with vertebrate fauna inside are accidentally felled.	A suitably qualified person(s) will be present during clearing of habitat trees to manage vertebrate animals.
Vegetation Clearance Protocol - Delineating clearing limits	<p>Approved disturbance limits near areas to be cleared would be delineated on the ground prior to clearing activities (e.g. flagging tape and posts).</p> <p>Scattered trees which could provide habitat for threatened 'species credit species' (Figure 9) would specifically be identified with flagging tape during nearby construction works.</p>	Prior to clearing	Incidental clearing	Review and adapt current Vegetation Clearance Protocol procedures.
Staff and Contractor Inductions	<p>Initial staff and contractor inductions would include the following:</p> <ul style="list-style-type: none"> <li>measures to reduce the occurrence of fauna-vehicle collisions; and</li> <li>bushfire prevention and management strategies.</li> </ul>	During staff and contractor inductions.	Increase in incidents.	Review induction content and update.
Weed Control	Agricultural activities would continue to occur on the Sunrise Property outside the modified accommodation camp area (including the management of weeds). Additional weed monitoring and control would be undertaken around the accommodation camp, as necessary.	Commence within six months of construction activities and be implemented twice a year, every six months (or at other times when rainfall conditions are favourable to weed outbreaks).	Weed invasion – perennial and annual grasses, perennial herbs, annual and biennial herbs and woody weeds.	<p>Review additional strategies to control target weed species.</p> <p>Increase the frequency of weed control and monitoring.</p>

**Table 11 (Continued)**  
**Measures to Mitigate and Manage Impacts**

<b>Mitigation Measure</b>	<b>Techniques</b>	<b>Timing/Frequency</b>	<b>Potential Risk</b>	<b>Contingency Measure</b>
Feral Animal Control	<p>Agricultural activities would continue to occur on the Sunrise Property outside the modified accommodation camp area (including the management of feral animals). Additional feral animals monitoring and control would be undertaken around the accommodation camp, as necessary.</p> <p>Domestic pets will not be allowed at the accommodation camp.</p> <p>The accommodation camp will be kept as a clean, rubbish-free environment in order to discourage scavenging and reduce the potential for colonisation of these areas by non-endemic fauna (e.g. rodents)</p> <p>The accommodation camp inhabitants would not be permitted to keep native fauna or to encourage fauna through feeding.</p>	Control measures would be implemented by mine staff or by an appropriate Pest Control Contractor(s) as required.	Sustained increase in feral animal numbers despite control measures.	<p>Review additional strategies to control target feral animals.</p> <p>Increase the frequency of feral animal control and monitoring.</p>
Bushfire Control	<p>Bushfire management measures at the Project will be implemented in accordance with Condition 49, Schedule 3 of Development Consent DA 374-11-00 and would include the site being suitably equipped to fight fires; develop asset protection in accordance with the Rural Fire Service's Planning for Bushfire Protection 2006; and consultation with the Rural Fire Service.</p> <p>The modified accommodation camp would include fire-fighting infrastructure (e.g. fire water tank and reticulation system).</p>	Upon commencement of the Modification.	Unplanned bushfire over the Subject land.	<p>Inspect and remedy issues with fences, gates or access.</p> <p>Re-evaluate the required management.</p>



## **6 IMPACT SUMMARY**

### **6.1 SERIOUS AND IRREVERSIBLE IMPACTS**

No SAI Entities listed in the *Threatened Biodiversity Data Collection* (OEH, 2017c) occur in the Development Site Footprint (Section 4.2.3).

### **6.2 IMPACTS ON NATIVE VEGETATION (ECOSYSTEM CREDITS)**

The BAM (OEH, 2017a) states:

*The assessor is required to determine an offset for all impacts of development or impacts from the conferral of biodiversity certification on PCTs that are associated with:*

- (b) a vegetation zone that has a vegetation integrity score of  $\geq 17$  where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community*

As stated in Section 3.3.3, according to the BAM Credit Calculator (OEH, 2017e), the Vegetation Community 1d (Vegetation Zone 1) has a Vegetation Integrity Score of 16.6 (<17). Therefore, no ecosystem credits are required for the Modification<sup>8</sup>.

### **6.3 IMPACTS ON THREATENED SPECIES (SPECIES CREDITS)**

As a result of the surveys by AMBS (2017a) (Attachment B) and measures to avoid and minimise impacts (Section 5.1), no species credit species are present, or are likely to use the Subject land/Development Site Footprint (Table 9). No species credits are required for the Modification (Attachment E).

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<sup>8</sup> The BAM Credit Calculator (OEH, 2017e) indicates that credits are required for the Modification (Attachment E). OEH (6 December 2017) confirmed that there is an error with the BAM Credit Calculator (OEH, 2017e) and that it should not require credits if the Vegetation Integrity Score is below the relevant threshold in the BAM (2017a).

## 7 CONCLUSION

The modified accommodation camp has been specifically located and designed to avoid and minimise impacts on biodiversity values, including native vegetation and potentially occurring threatened species. The modified accommodation camp is proposed to be constructed solely within the previously cleared/cultivated land with minimal biodiversity values. The Modification would result in the clearance of approximately 27.5 ha of previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (Plant Community Type 217). Scattered trees would need to be cleared for the Modification, however those which could provide habitat for threatened 'species credit species' were surveyed and such trees would be avoided.

No threatened ecological communities listed under the BC Act or EPBC Act would be cleared for the Modification. Only one threatened species, the Grey-crowned Babbler (eastern subspecies) listed as 'Vulnerable' under the BC Act has been recorded in the Development Site Footprint. This species is an ecosystem credit species.

According to the BAM Credit Calculator, no ecosystem credits required for the Modification because the Vegetation Integrity Score (a score generating by the BAM Credit Calculator as a measure of the site condition) is less than 17 (16.6). In accordance with the BAM, no species credits are required for the Modification because no species credit species are present, or are likely to use the land associated with the Development Site Footprint.

Clean TeQ will prepare a *Biodiversity Management Plan* (BMP) for the Project in accordance with Development Consent DA 374-11-00 and it would include the Modification. The BMP would provide vegetation clearance protocol for the Modification as well as measures to prevent and control weeds and pest animals. Agricultural activities would continue to occur on the Sunrise Property outside the modified accommodation camp area.

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ATTACHMENT A  
PEER REVIEW LETTER (DR COLIN DRISCOLL)



Clean TeQ Holdings Limited  
12/21 Howleys Rd,  
Notting Hill, Vic 3168

21 December 2017

Attn: John Hanrahan

Dear John

Clean TeQ Sunrise Project Accommodation Camp Modification – BDAR Review

Clean TeQ has asked me to review the Biodiversity Development Assessment Report (BDAR) developed for the Sunrise Project Accommodation Camp Modification by Resource Strategies Pty Ltd. This letter briefly outlines the outcomes of my review.

I am an Accredited Biodiversity Assessor (BAAS17004) and have a detailed understanding of the requirements of the NSW *Biodiversity Conservation Act, 2016* (BC Act) and the *Biodiversity Assessment Method Order, 2017* (BAM). I have also conducted floristic surveys in the Fifield area.

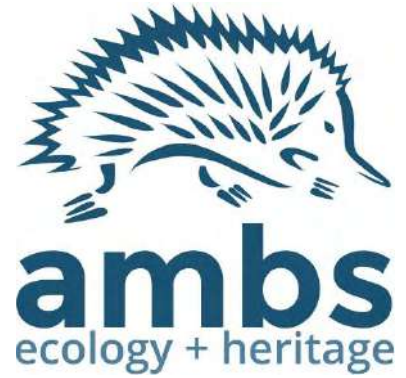
In reviewing the Sunrise Project Accommodation Camp Modification Project BDAR, I aimed to ensure that it met the BAM and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) guidelines requirements.

Overall I found the Sunrise Project Accommodation Camp Modification Project BDAR to be consistent with the field data collection and reporting requirements of the BAM. Specifically some corrections and clarification suggestions were made and these have been incorporated to my satisfaction. I consider that the BDAR meets the requirements of the BAM and EPBC Act guidelines.

Yours Sincerely  
HUNTER ECO

Dr Colin Driscoll  
Environmental Biologist

ATTACHMENT B  
CLEAN TEQ SUNRISE PROJECT ACCOMMODATION CAMP - ECOLOGICAL  
SURVEYS REPORT (AMBS, 2017a)



# **Clean TeQ Sunrise Project Accommodation Camp Modification - Ecological Surveys**

Prepared by AMBS Ecology & Heritage Pty Ltd  
for Clean TeQ

Final Report

December 2017

AMBS Reference: 17459



## Document Information

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<b>Recipient:</b>	John Hanrahan
<b>Authors:</b>	Belinda Pellow, Ulrike Kloecker, Mark Semeniuk
<b>Approved by:</b>	Glenn Muir

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## Executive Summary

AMBS Ecology & Heritage Pty Ltd (AMBS) was commissioned by Clean TeQ Holdings Limited to undertake a baseline flora and fauna survey in an area encompassing a proposed accommodation camp associated with the Clean TeQ Sunrise Project, an approved nickel cobalt scandium mining project. The area of investigation is approximately 4 kilometres (km) to the south of the mine site on the Sunrise property, located northwest of the town of Fifield, adjacent to Sunrise Lane and west of Wilmatha Road.

Flora and fauna surveys were undertaken in Spring 2017. The vegetation of the study area and its condition were surveyed using vegetation integrity (site condition) plots, additional full floristic plots, rapid assessment plots and paddock tree identification. The surveys included targeted surveys for specific threatened flora and fauna species listed under the NSW *Biodiversity Conservation Act, 2016* (BC Act) and Commonwealth *Environmental Protection and Biodiversity Conservation Act, 1999* (EPBC Act) and habitat assessments.

Although large portions of the study area have recently been cropped, AMBS surveys and analysis of data established that the species present in the ground layer were predominately native herbs, grasses and shrubs (89 of 120 plant species recorded were native). Exotic species were present, but the majority of the vegetation cover in the ground layer was provided by native species.

Two plant community types (PCT), in varying condition, were recorded in the study area:

- PCT - 217 *Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion*; and
- PCT - 82 *Western Grey Box-Poplar Box-White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penneplain Bioregion*.

PCT 217 covered most of the study area and was generally found in a derived native grassland form with scattered remnant trees and shrubs. In all locations the vegetation had been grazed and in parts of the area cropped as well.

PCT 82 was located in a low-lying area west of the Development Site Footprint and conforms to a derived grassland form of an endangered ecological community listed under the BC Act and EPBC Act. This area was likely to have formerly been dominated or co-dominated by Grey Box (*Eucalyptus microcarpa*).

One threatened plant species listed under the BC Act and EPBC Act, *Tylophora linearis*, was found at four locations in vegetation along Sunrise Lane, outside of the Development Site Footprint.

The fauna surveys recorded one species listed as 'Vulnerable' under the BC Act; the Grey-crowned Babbler (*Pomatostomus temporalis temporalis*). No evidence of Glossy Black-Cockatoo (*Calyptorhynchus lathami*), Koala (*Phascolarctus cinereus*), Little Eagle (*Hieraaetus morphnoides*) or Square-tailed Kite (*Lophoictinia isura*) was recorded. A number of trees with hollows suitable for threatened fauna were found along a creekline in the center of the study area.

# 1 Introduction

## 1.1 Background

AMBS Ecology & Heritage Pty Ltd (AMBS) undertook a baseline flora and fauna survey in an area encompassing a proposed accommodation camp associated with the Clean TeQ Sunrise Project, an approved nickel cobalt scandium mining project. The area of investigation (the “study area”) is shown in Figure 1. It is approximately 191 hectares (ha) in size and located northwest of the town of Fifield, New South Wales (NSW), adjacent to Sunrise Lane, south of the Mining Lease Application Boundary and west of Wilmatha Road.

Clean TeQ Holdings Limited (Clean TeQ) are seeking a modification to the Clean TeQ Sunrise Project under section 75W of the NSW *Environmental Planning and Assessment Act, 1979* for the proposed accommodation camp (herein referred to as the Modification). The Modification would include:

- development of the accommodation camp (including supporting infrastructure);
- construction of an electricity transmission line (ETL) and water pipeline from the mine site to the modified accommodation camp site;
- minor road upgrades;
- increased accommodation camp capacity (approximately 1,300 personnel); and
- the accommodation camp (at reduced capacity) would be maintained post-construction rather than be decommissioned.

The Development Site Footprint encompasses (Figure 1):

- accommodation camp, including:
  - accommodation facilities;
  - administration offices and first aid facility;
  - recreational and mess areas;
  - fire-fighting infrastructure (e.g. fire water tank and reticulation system);
  - water supply infrastructure (e.g. water treatment plant, storage tanks, distribution system);
  - internal access roads;
  - car parking areas;
  - communications infrastructure; and
  - other ancillary infrastructure.
- accommodation camp electricity transmission line (between the mine site and the accommodation camp);
- accommodation camp water pipeline (between the mine site and the accommodation camp);
- sewage pump station and related infrastructure;
- site access road from Sunrise Lane; and
- construction (laydown) areas.





Figure 1: Study area.

The Modification also includes an irrigation area and irrigation water pipeline (Figure 1). Clean TeQ have indicated that use of the irrigation area will not require native vegetation clearance and that the pipeline would be laid on the ground beside an existing track.

The minor road upgrades would be within the extent of the existing road footprint of Sunrise Lane. Clean TeQ propose no native vegetation clearance for the minor road upgrades.

The Sunrise Property is owned by Clean TeQ and leased for agricultural activities, such as grazing and dryland cropping. Agricultural activities would continue to occur on the Sunrise Property outside the accommodation camp area.

## **1.2 Scope**

The scope of work involved collection of ecological survey data in accordance with the *Biodiversity Assessment Method Order, 2017* (BAM) (NSW Office of Environment and Heritage [OEH] 2017a), specifically:

1. provision of a vegetation map identifying Plant Community Types (PCTs) and condition;
2. collection of vegetation integrity (site condition) data according to the BAM (2017a); and
3. targeted surveys for relevant species credit species, including those listed under the NSW *Biodiversity Conservation Act, 2016* (BC Act) and *Commonwealth Environmental Protection and Biodiversity Conservation Act, 1999* (EPBC Act).

Mark Semeniuk (AMBS co-author) is an accredited assessor under the BC Act (assessor accreditation number BAAS17072).

## 2 Methods

### 2.1 Survey Details

An initial vegetation survey was undertaken between 31 October 2017 and 1 November 2017 (inclusive) by James Schlunke, Daniel Clark and Ruby Stephens which included preliminary vegetation mapping, vegetation integrity (site condition) plots, additional full floristic plots, rapid assessment plots, paddock tree identification and threatened plant species searches.

A second field survey was undertaken between 27 November 2017 and 29 November 2017 (inclusive) by ecologists James Schlunke and Tom O'Sullivan. The second field survey included additional vegetation integrity (site condition) plots, threatened plant species searches and targeted fauna and fauna habitat surveys.

### 2.2 Plant community type and condition identification and mapping

The PCTs in the study area were identified and their distribution mapped. PCT naming was consistent with the NSW PCT classifications as described in the *BioNet Vegetation Classification* (OEH 2017b).

#### 2.2.1 Review of existing information on native vegetation

The following information sources were reviewed:

- species records held in the *BioNet Atlas* (OEH 2017c);
- existing vegetation maps (OEH 2016a);
- previous native vegetation surveys for the Clean TeQ Sunrise Project (AMBS 2017); and
- aerial imagery (Department of Finance, Services & Innovation 2017).

#### 2.2.2 Systematic field-based floristic vegetation survey

The vegetation of the study area and its condition were surveyed using vegetation integrity (site condition) plots, additional full floristic plots, rapid assessment plots and paddock tree identification. These methods are described below.

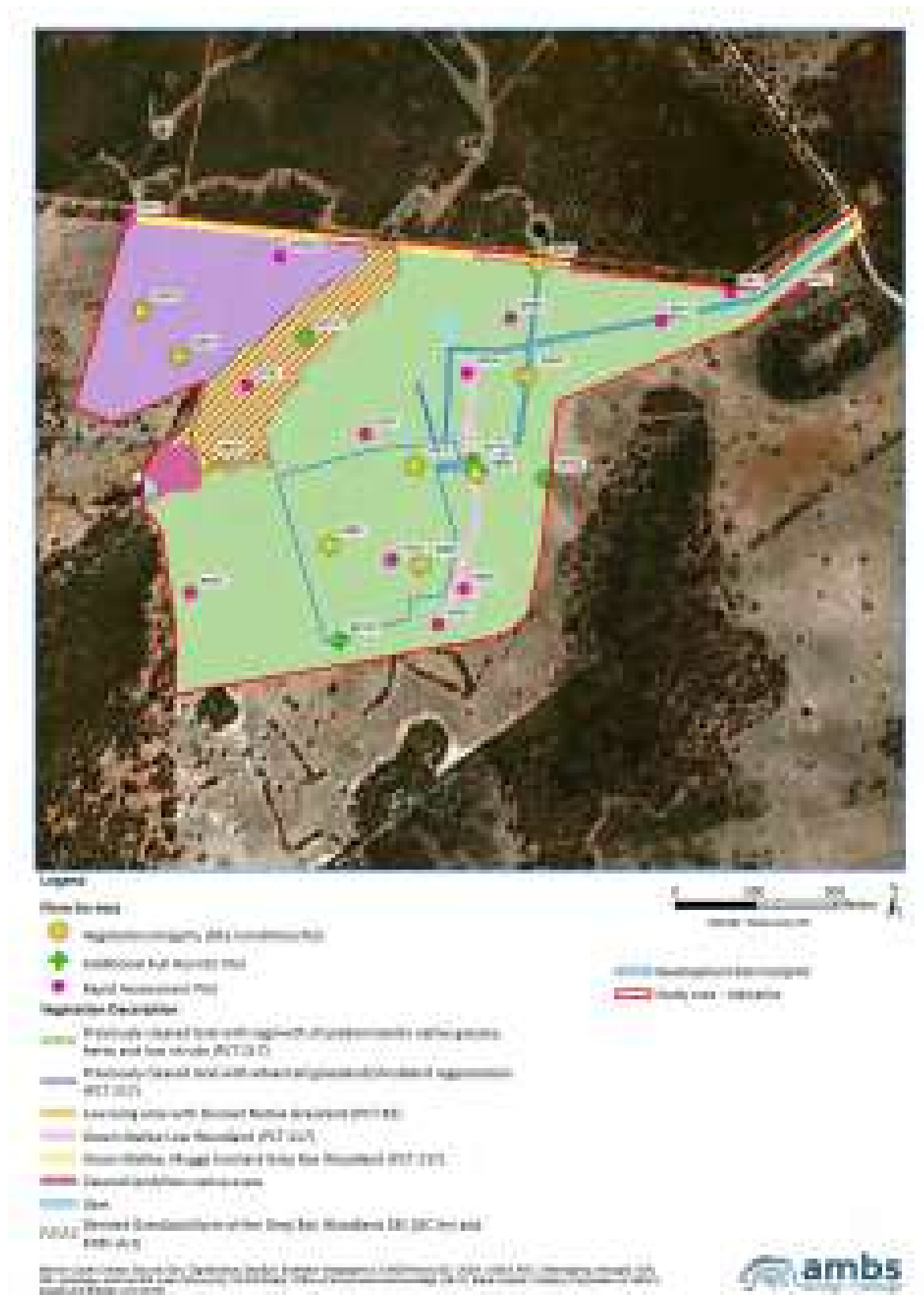
#### ***Vegetation integrity (site condition) plots***

Data were collected from nine vegetation integrity (site condition) plots (SB 01 to SB 09) in a manner consistent with the field survey requirements specified by the BAM (2017a) (Figure 2). A proforma was used to record data at each vegetation integrity (site condition) plot.

Vegetation zones were based on PCT and condition. Data were collected on ground layer characteristics, weed species richness and disturbance, to gauge the condition of the vegetation within the study area.

Plots were randomly located in each vegetation zone. The zones and number of plots in each are shown in Table 1.

The Development Site Footprint covers approximately 27 ha of previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217) (Figure 2). Accordingly, four vegetation integrity (site condition) plots (SB 01, 02, 05 and 09) were undertaken in this vegetation zone to meet the minimum number of plots required in the BAM (2017a) (Table 1).



**Figure 2: Flora plot locations.**



An additional five vegetation integrity (site condition) plots were undertaken in other vegetation zones (Table 1; Figure 2).

**Table 1: Number of vegetation integrity (site condition) plots required for each vegetation zone within the Development Site Footprint.**

Vegetation Zone	Development Site Footprint Area (ha)	Plots required	Number of Plots
Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217)	27	4	4
Previously cleared land with advanced grassland/shrubland regeneration (PCT 217)	0	0	2
Green Mallee, Mugga Ironbark, Grey Box Woodland (PCT 217)	0	0	1
Low lying area with Derived Native Grassland (PCT 82)	0	0	1
Green Mallee Low Woodland (PCT 217)	0	0	1
<b>Total</b>	<b>27</b>	<b>4</b>	<b>9</b>

### ***Additional floristic plots***

The survey included collection of data from four 20 metres (m) x 20 m “full floristic” plots to inform vegetation mapping (SFF 01 to SFF 02) (Figure 2). Data were collected on ground layer characteristics, weed species richness and disturbance, to gauge the condition of the vegetation within the study area.

### ***Rapid assessment plots***

The survey included collection of data from thirteen “rapid assessment” plots (SR 01, SR 02, SR 02B and SR 03 to SR 12) (Figure 2).

### ***Scattered tree identification***

The location of scattered trees within the study area was identified using aerial imagery. Each location was visited, the species of tree recorded, and observations made on the composition of the ground layer beneath each tree. The survey included collection of data from a total of 165 scattered trees to inform vegetation mapping.

#### ***2.2.3 Survey effort***

The survey effort described above is considered sufficient to sample the area commensurate with the expected environmental variation. The study area was stratified into preliminary environmental map units after reviewing existing information including vegetation maps, topographic maps and aerial imagery. The preliminary environmental units were refined after a preliminary survey of the study area. Plot-based sampling was undertaken in all relevant map units. The survey effort revised and updated existing mapping and site information as necessary.

## 2.3 Threatened ecological community identification and mapping

Interpretation of EPBC Act listing criteria and BC Act final determination criteria were used to determine if vegetation within the study area conformed to a Threatened Ecological Community (TEC). Determination of patches of vegetation that conformed to these criteria was based on interpretation of information from desktop assessment and field surveys, including soils, topography, patch size (ha), characteristic species, proximity to identified stands of the relevant TEC, degree of past disturbance, indications of past canopy using isolated canopy trees, and dead identifiable canopy trees or regenerating canopy species.

## 2.4 Threatened Plant Species Searches

A list of potential threatened plant species was determined (Appendix C) which included *Austrostipa wakoolica* and *Commersonia procumbens* as required by the BAM Credit Calculator (OEH, 2017g) assessment (Resource Strategies, 2017).

Targeted searches for threatened plant species were undertaken in accordance with the NSW *Guide to Surveying Threatened Plants* (OEH 2016b) in areas of potential habitat. Potential habitat was defined using data collected from plots, aerial imagery, any existing plant community mapping (OEH 2016a) and topographic features. Opportunistic searches for threatened plants were also undertaken during all plot-based surveys and while traversing the site. If a threatened plant species was found, the location and number (or estimate of number) was recorded.

The surveys included searches of suitable habitat for *Tylophora linearis*, *Lepidium monoplacoides* (Winged Peppergrass) and *Austrostipa wakoolica*, listed species known to be located in the wider area (AMBS 2017). Surveys for threatened plants were undertaken in October over a period of two days and in November over a period of three days.

## 2.5 Threatened Fauna Surveys

Targeted surveys for identified threatened fauna and habitat assessments were undertaken on 28 and 29 November 2017 by James Schlunke and Tom O'Sullivan. Details of survey techniques are provided below; survey locations of threatened fauna survey techniques are presented in Figure 3.

The survey methods were tailored to the threatened species required to be targeted according to the BAM Credit Calculator (OEH, 2017g) assessment (Resource Strategies, 2017).

Outside of the dedicated fauna surveys, observations of threatened fauna were recorded incidentally whenever on site. Appendix D provides a list of potential threatened fauna species.

### 2.5.1 Weather during survey period

An overnight storm on the first day of surveys caused run-off throughout the survey area. The conditions during the surveys days were dry with clear conditions on 28 November and overcast skies on 29 November. Minimum daily temperatures lay around 20 °C and temperatures during the day reached around 32 °C. Weather conditions during the survey period as reported from Condobolin Research Station (Bureau of Meteorology [BOM] 2017) are displayed in Table 2.

**Table 2: Weather conditions during survey period (Condobolin Research Station) (BOM 2017).**

Date	Temp Min [°C]	Temp Max [°C]	Rain [mm]
28/11/2017	16.0	32.4	47.8
29/11/2017	20.4	31.8	-

mm = millimetres.

## 2.5.2 Survey of Threatened Fauna Habitat Constraints

Habitat constraints are identified in the *Threatened Biodiversity Data Collection* (OEH 2017b) for some potentially occurring threatened fauna (Table 3). A survey of the habitat constraints was undertaken as outlined in Table 3 and described further below.

**Table 3: Survey of Threatened Fauna Habitat Constraints and Survey Method.**

Scientific Name	Common Name	Habitat Constraints identified in the Threatened Biodiversity Data Collection (OEH 2017a)	Field Assessment of Habitat Constraints/Survey Method
<i>Lophoictinia isura</i>	Square-tailed Kite	<i>Nest trees</i>	Tree census and searches for stick nests
<i>Hieraaetus morphnoides</i>	Little Eagle	<i>Nest trees - live (occasionally dead) large old trees within vegetation.</i>	Tree census and searches for stick nests
<i>Calyptrorhynchus lathamii</i>	Glossy Black-Cockatoo	<i>Living or dead tree with hollows greater than 15cm diameter and greater than 5m above ground.</i>	Tree hollow assessment
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	<i>Living or dead tree with hollows greater than 10cm diameter</i>	Tree hollow assessment
<i>Burhinus grallarius</i>	Bush Stone-curlew	<i>Fallen/standing dead timber including logs</i>	Search for suitable fallen/standing dead timber
<i>Polytelis swainsonii</i>	Superb Parrot	<i>Living or dead E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa and E. polyanthemus with hollows greater than 5cm diameter; greater than 4m above ground or trees with a DBH of greater than 30cm.</i>	Tree hollow assessment
<i>Ninox connivens</i>	Barking Owl	<i>Living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground.</i>	Tree hollow assessment
<i>Tyto novaehollandiae</i>	Masked Owl	<i>Living or dead trees with hollows greater than 20cm diameter.</i>	Tree hollow assessment
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	<i>Hollow bearing trees</i>	Tree hollow assessment

### Tree census

Scattered trees within the study area were assessed for features such as presence of hollows. A total of 165 trees were checked (Section 2.2.1).

### Tree hollow assessment

Hollow-bearing trees located within the Development Site Footprint were assessed in more detail and data were collected on tree hollow sizes, numbers, heights; tree species, height, Diameter at breast Height (DBH) and whether it was living or a stag. These tree hollow assessments were also undertaken in some areas adjacent to the Development Site Footprint, including where the track crosses the creekline and where the track meets Sunrise Lane. The tree hollow assessment considered the occurrence of:

- living or dead tree with hollows greater than 15 centimetre (cm) diameter and greater than 5 m above ground for the Glossy Black-Cockatoo;
- living or dead tree with hollows greater than 10 cm diameter for the Major Mitchell's Cockatoo;

- living or dead *E. blakelyi*, *E. melliodora*, *E. albens*, *E. camaldulensis*, *E. microcarpa* and *E. polyanthemos* with hollows greater than 5 cm diameter; greater than 4 m above ground or trees with a DBH of greater than 30 cm for the Superb Parrot;
- living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground for the Barking Owl;
- living or dead trees with hollows greater than 20 cm diameter for the Masked Owl; and
- hollow bearing trees for the Brush-tailed Phascogale (tree hollows with entrances 2.5 – 4 cm wide).

#### ***Search for suitable fallen/standing dead timber***

Potential habitat with suitable fallen/standing dead timber for the Bush Stone-curlew was searched for in the study area. No potential habitat with suitable fallen/standing dead timber for the Bush Stone-curlew occurs in the Development Site Footprint so no further surveys for the Bush Stone-curlew were required.

#### ***2.5.3 Survey of Threatened Fauna/Evidence of Threatened Fauna***

##### ***Avifauna Census***

The avifauna census was undertaken in accordance with DEC (2004). Two, 20-minute area searches for diurnal birds were undertaken on two consecutive mornings (Figure 3), targeting Square-tailed Kite, Little Eagle, Glossy Black-Cockatoo, Superb Parrot and Major Mitchell's Cockatoo. All birds observed were recorded.

##### ***Searches for Stick Nests***

A search for stick-nests, as evidence of potential breeding of Square-tailed Kite and Little Eagle was undertaken within the Development Site Footprint (and elsewhere on an opportunistic basis). The approximate size of the stick nest was recorded.

##### ***Evidence of Glossy Black-Cockatoo Foraging***

Targeted surveys for evidence of Glossy Black-Cockatoo foraging within the Development Site Footprint was undertaken in areas where food species of the genera *Allocasuarina* and *Casuarina* occur (Figure 3). If cones were found under the sample species, they were investigated for evidence of chewing.

##### ***Evidence of Koala***

Surveys for the Koala included both direct observation and indirect observation methods consistent with the *EPBC Act referral guidelines for the vulnerable koala* (Department of the Environment 2014). Direct observation involved diurnal searches for individuals of the species in trees within and nearby the Development Site Footprint. Every tree within the Development Site Footprint was checked. Indirect survey techniques involved searches for scratches on tree trunks and also searches for scats. A determination of the tree species present within the study area was undertaken to assess whether suitable habitat for the Koala was present.



Figure 3: Fauna survey locations.



## 3 Results

### 3.1 Plant community types and condition

Although large portions of the study area have previously been cropped the species present in the ground layer were predominately native herbs, grasses and shrubs. Exotic species were present but the majority of the vegetation cover in the ground layer was provided by native species. Two PCTs, in varying condition, were recorded in the study area. An outline of the plant communities is provided below.

#### **PCT - 217 Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion**

**Keith Formation: KF\_CH5 Dry Sclerophyll Forest (Shrubby sub-formation)**

**Keith Class: Western Slopes Dry Sclerophyll Forests**

**Map Units/Vegetation Zones:**

- **Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217)** - representing areas that have been cleared, grazed and in some locations cultivated. Occasional remnant trees and large shrubs occur.
- **Previously cleared land with advanced grassland/shrubland regeneration (PCT 217)** - representing areas that have been cleared, grazed and in some locations cultivated. Remnant trees, regenerating shrubs and a more diverse ground layer occur.
- **Green Mallee, Mugga Ironbark, Grey Box Woodland (PCT 217)** - representing areas in the road corridor with a mix of mature remnant trees including *Eucalyptus viridis*, *Eucalyptus sideroxylon* and *Eucalyptus microcarpa*.
- **Green Mallee Low Woodland (PCT 217)** - representing an area of mature remnant trees dominated by *Eucalyptus viridis* and, a grazed understorey.

PCT 217 covered most of the study area. Generally, it was found in a derived native grassland form with scattered remnant trees and shrubs (Figure 2). In all locations the vegetation had been grazed and in many cropped as well. Plates 1- 4 depict the variability across this PCT in locations where it has been cleared. Plates 5 and 6 show this PCT in its semi-cleared form. The location of each image can be matched to its site number shown on Figure 2.

Remnant tree and shrub species distributed across the area included *Eucalyptus viridis*, *Brachychiton populneus* subsp. *populneus*, *Eucalyptus sideroxylon*, *Eucalyptus microcarpa*, *Acacia doratoxylon*, *Alectryon oleifolius* and *Geijera parviflora*. Typical species in the ground layer were *Maireana microphylla*, *Rytidosperma setaceum*, *Calotis cuneifolius*, *Cheilanthes sieberi* subsp. *sieberi*, *Einadia nutans* subsp. *nutans*, *Tragus australis*, *Chloris truncata*, *Goodenia pinnatifida*, *Vittadinia gracilis*, *Digitaria diffusa*, *Atriplex spinibractea* and *Juncus filicaulis*.

Although cleared, vegetation in the study area was considered to most closely match PCT 217 based on: the presence of remnant tree and shrub species, listed above; composition of the ground layer; location in the landscape; and soil characteristics. The results of other recent surveys by AMBS (2017) and small remnants of less disturbed vegetation in the surrounding locality were also used to indicate that the PCT was present in the study area.



**Plate 1:** Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217), site SB01.



**Plate 2:** Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217), site SB02.



**Plate 3:** Previously cleared land with advanced grassland/shrubland regeneration (PCT 217), site SB03.



**Plate 4:** Previously cleared land with advanced grassland/shrubland regeneration (PCT 217), site SB04.



**Plate 5:** Green Mallee, Mugga Ironbark, Grey Box Woodland (PCT 217), site SR01.



**Plate 6:** Green Mallee Low Woodland (PCT 217), sites SFF03 and SR06.

**PCT - 82 Western Grey Box-Poplar Box-White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion**

**Keith Formation: KF\_CH3 Grassy Woodland**  
**Keith Class: Floodplain Transition Woodlands**

**Map Unit:**

**Low lying area with Derived Native Grassland (PCT 82)** – representing an area likely to have supported vegetation consistent with this PCT.

A derived native grassland form of PCT 82 has been mapped as occurring in a low-lying area within the study area (Figure 2). Soils in this location retain moisture for longer and are likely to have supported a different assemblage of species than that associated with PCT217. Clearing has removed most of the trees however species remaining suggest that PCT 82 or similar occurred in this location. The derived grassland form of this PCT is dominated by native species and meets the requirements for a community in moderate condition (OEH 2016). Plate 7 depicts the form of this PCT in the study area.

Scattered trees present include *Brachychiton populneus* subsp. *populneus*, *Eucalyptus microcarpa*, *Casuarina cristata*, *Callitris glaucophylla*, *Myoporum platycarpum* and *Alectryon oleifolius*. Species present in the ground layer *Cheilanthes sieberi* subsp. *sieberi* *Enteropogon acicularis*, *Sida corrugata*, *Oxalis perennans*, *Wahlenbergia communis*, *Walwhalleya subxerophila*.

Species composition, soil type and position in the landscape suggest that the area designated as PCT82 was different to that designated as PCT217. Remnant trees were sparse, but the ground layer was relatively high in native species, many of which are consistent with the description of PCT 82. Examples of less disturbed vegetation in the surrounding locality that occur in similar topographic locations (and surveyed by AMBS 2017) are a good match for this PCT and although cleared, it is most likely that the area was likely to have formerly been dominated or co-dominated by Grey Box (*Eucalyptus microcarpa*).

Based on the above, the low-lying area with Derived Native Grassland (PCT 82) is a degraded example of the BC Act listed community *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions* and the EPBC Act listed community *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia*.



**Plate 7: PCT 82 cleared and grazed with predominantly native grasses and herbs, site SFF 01.**

### 3.2 Paddock Trees

Examples of paddock trees and large shrubs are provided in Plates 8 - 11.



Plate 8: *Brachychiton populneus* subsp. *populneus* (Kurrajong).



Plate 9: *Eucalyptus viridis* (Green Mallee).

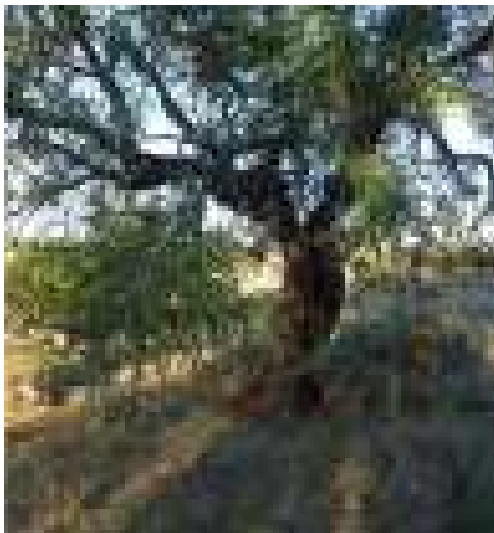


Plate 10: *Alectryon oleifolius* subsp. *elongatus* (Western Rosewood).



Plate 11: *Eucalyptus microcarpa* (Grey Box). Green cover of the ground layer is predominately native herbs and grasses.

### 3.3 Plant Species

In total 120 plant species were recorded during the surveys, of which 89 were native species (Appendix A).

One threatened plant species was located in the study area. *Tylophora linearis* was found at four locations within the Sunrise Lane easement (Table 4; Figure 4). The population was found under *Eucalyptus microcarpa* (Grey Box) trees as was also the case when a number of individuals were located in remnant woodland on the opposite side of the Lane in 2016 (AMBS 2017). *Tylophora linearis* is listed as vulnerable under the BC Act and Endangered under the EPBC Act.

Potential habitat for this species occurs in the easement of Sunrise Lane in the remnant PCT 217.

**Table 4: Coordinates and number of individuals in the *Tylophora linearis* populations.**

Population Number	Easting	Northing	Number of Plants
1	536863	6372250	14
2	536876	6372241	6
3	536877	6372251	7
4	536883	6372244	11

### 3.4 Vegetation Integrity (Site Condition) Data

Vegetation Integrity (Site Condition) data are provided in Appendix F.

### 3.5 Broad Habitat Types

Two broad habitat types based on vegetation formations as defined by Keith (2006) were identified in the study area during field surveys.

#### Grasslands

PCT: Derived grassland form of PCT 217 and PCT 82.

Grasslands occur across the majority of the study area. These grasslands are dominated by native herbs, grasses and in some locations shrubs. They occur in areas that previously may have been woodland but have been modified through historical and current management. Scattered trees occur throughout these habitats, particularly *Eucalyptus viridis* and *Eucalyptus microcarpa*.

#### Dry Sclerophyll Forest (shrubby sub-formation)

PCT: Uncleared and semi-cleared forms of PCT 217.

Dry Sclerophyll Forest (shrubby sub-formation) occurs in two areas. One area, along Sunrise Lane along the northern boundary, is dominated by *Eucalyptus sideroxylon*, *Eucalyptus viridis* and *Eucalyptus microcarpa*. The second area, in a drainage channel on the eastern side of the study area, consists of a narrow strip of mature *Eucalyptus viridis* trees.

The mid-storey and understorey in its current state is sparse and has limited habitat value aside from limited nectar and foraging resources.





Figure 4: Location of threatened plants found during the survey.

### 3.6 Fauna Surveys

#### 3.6.1 Survey of Threatened Fauna Habitat Constraints

The results of the habitat searches are summarised in Table 5.

**Table 5: Threatened Fauna Habitat Constraints.**

Scientific Name	Common Name	Habitat Constraints identified in the Threatened Biodiversity Data Collection (OEH 2017d)	Survey Effort/Result
<i>Lophoictinia isura</i>	Square-tailed Kite	<i>Nest trees</i>	No likely breeding trees observed in the Development Site Footprint. 2x 20 minute diurnal bird surveys undertaken. Searches for potential nests (e.g. large stick nests) undertaken, none observed in the Development Site Footprint.
<i>Hieraaetus morphnoides</i>	Little Eagle	<i>Nest trees - live (occasionally dead) large old trees within vegetation.</i>	No likely breeding trees observed in the Development Site Footprint. 2x 20min diurnal bird surveys undertaken. Searches for potential nests (e.g. large stick nests) undertaken, none observed in the Development Site Footprint.
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	<i>Living or dead tree with hollows greater than 15cm diameter and greater than 5m above ground.</i>	Potential breeding trees not observed in the Development Site Footprint. Surveys for foraging signs undertaken. No signs or animals observed. No potential breeding trees likely to be removed if hollow-bearing trees along creekline next to track are not removed.
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	<i>Living or dead tree with hollows greater than 10cm diameter</i>	2x 20 minute diurnal bird surveys and habitat surveys undertaken. No tree hollows likely to be impacted. No signs of the species recorded. No potential breeding trees likely to be removed if hollow-bearing trees along creekline next to track are not removed.
<i>Burhinus grallarius</i>	Bush Stone-curlew	<i>Fallen/standing dead timber including logs</i>	Habitat surveys undertaken, suitable habitat considered to be absent in the Development Site Footprint.
<i>Polytelis swainsonii</i>	Superb Parrot	<i>Living or dead E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa and E. polyanthemus with hollows greater than 5cm diameter; greater than 4m above ground or trees with a DBH of greater than 30cm.</i>	2x 20 minute diurnal bird surveys and habitat surveys undertaken. No tree hollows likely to be impacted. No signs of the species recorded. No potential breeding trees likely to be removed if hollow-bearing trees along creekline next to track are not removed.
<i>Ninox connivens</i>	Barking Owl	<i>Living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground.</i>	Habitat surveys undertaken. No tree hollows likely to be impacted. No signs of the species recorded. No potential breeding trees likely to be removed if hollow-bearing trees along creekline next to track are not removed.
<i>Tyto novaehollandiae</i>	Masked Owl	<i>Living or dead trees with hollows greater than 20cm diameter.</i>	Habitat surveys undertaken. No tree hollows likely to be impacted. No signs of the species recorded. No potential breeding trees likely to be removed if hollow-bearing trees along creekline next to track are not removed.
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	<i>Hollow bearing trees</i>	Habitat surveys undertaken, suitable habitat considered to be absent in the Development Site Footprint.

### **Tree census**

The main tree species found with the Development Site Footprint were *Eucalyptus viridis*, with some *Eucalyptus microcarpa* and one *Brachychiton populneus* subsp. *populneus*.

### **Tree hollow assessment**

The results of the search for hollow-bearing trees within and adjacent to the proposed Development Site Footprint are shown on Figure 6 and the data are included as Appendix E.

### **Search for suitable fallen/standing dead timber**

No potential habitat with suitable fallen/standing dead timber for the Bush Stone-curlew occurs in the Development Site Footprint.

### **3.6.2 Survey of Threatened Fauna/Evidence of Threatened Fauna**

#### **Avifauna Census**

One threatened species was recorded; the Grey-crowned Babbler, which was detected in two locations within the study area (Figure 5). The Grey-crowned Babbler is not a “species credit” species. A list of fauna recorded during the surveys is provided in Appendix B.

#### **Searches for Stick Nests**

The results of the search for nest-bearing trees within and adjacent to the proposed Development Site Footprint are shown on Figure 6 and the data are included as Appendix E.

#### **Evidence of Glossy Black-Cockatoo Foraging**

There was only one Casuarina tree found within the proposed Development Site Footprint. No evidence of chewed cones was found.

#### **Evidence of Koala**

No primary feed trees for the Koala (Department of Environment and Climate Change NSW 2008) are located in the Development Site Footprint. A secondary feed tree, Grey Box (*E. microcarpa*), is present in the Development Site Footprint, represented by one isolated tree. No evidence of Koala use (scats or scratches) was found. It is unlikely that the Koala uses the habitat in the Development Site Footprint.

Schedule 1 of *State Environmental Planning Policy No 44—Koala Habitat Protection* (SEPP 44) lists the Local Government Areas to which the policy applies. The study area occurs within the Lachlan Shire Council, which is not on Schedule 1. As such, SEPP 44 does not apply to the study area.

The wider study area contains some trees listed as secondary feed trees for the Koala. Further information regarding potential Koala habitat trees is provided in Appendix C.



Figure 5: Threatened fauna recorded during the surveys.



Figure 6: Location of trees assessed and hollow-bearing trees within the Development Site Footprint.



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## Appendix A: Plant Species Recorded During Surveys

### Native Species

Family	Scientific Name	Common Name
Fabaceae	<i>Acacia doratoxylon</i>	Currawang
Fabaceae	<i>Acacia lineata</i>	Streaked Wattle
Asteraceae	<i>Actinobole uliginosum</i>	Flannel Cudweed
Sapindaceae	<i>Alectryon oleifolius</i> subsp. <i>elongatus</i>	Western Rosewood
Amaranthaceae	<i>Alternanthera denticulata</i>	
Amaranthaceae	<i>Alternanthera</i> sp. A	
Poaceae	<i>Aristida behriana</i>	Bunch Wiregrass
Poaceae	<i>Aristida benthamii</i>	Three-awned spear grass
Poaceae	<i>Aristida ramosa</i>	Purple Wiregrass
Chenopodiaceae	<i>Atriplex spinibractea</i>	Spiny-fruit Saltbush
Poaceae	<i>Austrostipa scabra</i>	Speargrass
Poaceae	<i>Austrostipa setacea</i>	Corkscrew Grass
Nyctaginaceae	<i>Boerhavia dominii</i>	Tarvine
Poaceae	<i>Bothriochloa decipiens</i> var. <i>decipiens</i>	Pitted Bluegrass
Poaceae	<i>Bothriochloa macra</i>	Red Grass
Malvaceae	<i>Brachychiton populneus</i> subsp. <i>populneus</i>	Kurrajong
Asphodelaceae	<i>Bulbine semibarbata</i>	Wild Onion
Cupressaceae	<i>Callitris glaucophylla</i>	White Cypress Pine
Asteraceae	<i>Calotis cuneifolia</i>	Purple Burr-Daisy
Asteraceae	<i>Calotis hispidula</i>	Bogan Flea
Cyperaceae	<i>Carex inversa</i>	Knob Sedge
Casuarinaceae	<i>Casuarina cristata</i>	Belah
Asteraceae	<i>Centipeda cunninghamii</i>	
Euphorbiaceae	<i>Chamaesyce drummondii</i>	Caustic Weed
Adiantaceae	<i>Cheilanthes sieberi</i>	Rock Fern
Poaceae	<i>Chloris truncata</i>	Windmill Grass
Convolvulaceae	<i>Convolvulus erubescens</i>	Pink Bindweed
Asteraceae	<i>Cotula australis</i>	Common Cotula
Crassulaceae	<i>Crassula sieberiana</i>	Australian Stonecrop
Poaceae	<i>Cynodon dactylon</i>	Common Couch
Cyperaceae	<i>Cyperus</i> spp.	
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed
Poaceae	<i>Digitaria ammophila</i>	
Poaceae	<i>Digitaria diffusa</i>	Open Summer-grass
Chenopodiaceae	<i>Dysphania glomulifera</i>	
Chenopodiaceae	<i>Dysphania pumilio</i>	Small Crumbweed
Chenopodiaceae	<i>Einadia nutans</i>	Climbing Saltbush
Chenopodiaceae	<i>Einadia polygonoides</i>	
Poaceae	<i>Elymus scaber</i>	Common Wheatgrass
Poaceae	<i>Enteropogon acicularis</i>	Curly Windmill Grass
Poaceae	<i>Eragrostis brownii</i>	
Poaceae	<i>Eragrostis lacunaria</i>	Purple Lovegrass
Poaceae	<i>Eriochloa pseudoacrotricha</i>	

Family	Scientific Name	Common Name
Geraniaceae	<i>Erodium crinitum</i>	Blue Crowfoot
Myrtaceae	<i>Eucalyptus dwyeri</i>	Dwyer's Red Gum
Myrtaceae	<i>Eucalyptus microcarpa</i>	Grey Box
Myrtaceae	<i>Eucalyptus sideroxylon</i>	Mugga Ironbark
Myrtaceae	<i>Eucalyptus viridis</i>	Green Mallee
Asteraceae	<i>Euchiton sphaericus</i>	
Cyperaceae	<i>Fimbristylis dichotoma</i>	Common Fringe-sedge
Rutaceae	<i>Geijera parviflora</i>	Wilga
Goodeniaceae	<i>Goodenia pinnatifida</i>	Scrambles Eggs
Goodeniaceae	<i>Goodenia pusilliflora</i>	
Apiaceae	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort
Hypericaceae	<i>Hypericum gramineum</i>	Small St. John's Wort
Juncaceae	<i>Juncus aridicola</i>	Tussock Rush
Juncaceae	<i>Juncus filicaulis</i>	
Brassicaceae	<i>Lepidium fasciculatum</i>	Bundled Peppergrass
Lythraceae	<i>Lythrum hyssopifolium</i>	
Chenopodiaceae	<i>Maireana enchylaenoides</i>	Wingless Fissure-weed
Chenopodiaceae	<i>Maireana microphylla</i>	Small-leaf Bluebush
Scrophulariaceae	<i>Myoporum montanum</i>	Western Boobialla
Oxalidaceae	<i>Oxalis perennans</i>	
Poaceae	<i>Panicum effusum</i>	Hairy Panic
Poaceae	<i>Paspalidium gracile</i>	Slender Panic
Plantaginaceae	<i>Plantago debilis</i>	Shade Plantain
Plantaginaceae	<i>Plantago turrifera</i>	Small Sago-weed
Polygonaceae	<i>Polygonum plebeium</i>	Small Knotweed
Portulacaceae	<i>Portulaca oleracea</i>	Pigweed
Asteraceae	<i>Rhodanthe anthemoides</i>	
Polygonaceae	<i>Rumex brownii</i>	Swamp Dock
Poaceae	<i>Rytidosperma setaceum</i>	Small-flowered Wallaby-grass
Chenopodiaceae	<i>Sclerolaena muricata</i>	
Malvaceae	<i>Sida corrugata</i>	Corrugated Sida
Solanaceae	<i>Solanum esuriale</i>	
Solanaceae	<i>Solanum ferocissimum</i>	Spiny Potato Bush
Poaceae	<i>Sporobolus creber</i>	Slender Rat's Tail Grass
Asteraceae	<i>Stuartina muelleri</i>	Spoon Cudweed
Poaceae	<i>Tragus australianus</i>	Small Burrgrass
Asteraceae	<i>Triptilodiscus pygmaeus</i>	Common Sunray
Apocynaceae	<i>Tylophora linearis</i>	
Asteraceae	<i>Vittadinia cervicalis</i>	
Asteraceae	<i>Vittadinia cuneata</i>	A Fuzzweed
Asteraceae	<i>Vittadinia gracilis</i>	Woolly New Holland Daisy
Campanulaceae	<i>Wahlenbergia communis</i>	Tufted Bluebell
Campanulaceae	<i>Wahlenbergia gracilentia</i>	Annual Bluebell
Campanulaceae	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell
Poaceae	<i>Walwhalleya subxerophila</i>	Gilgai Grass
Asteraceae	<i>Xerochrysum bracteatum</i>	Golden Everlasting

*Exotic Species*

Family	Scientific Name	Common Name
Amaranthaceae	<i>Alternanthera pungens</i>	
Asteraceae	<i>Arctotheca calendula</i>	Cape Weed
Poaceae	<i>Avena sativa</i>	Oats
Poaceae	<i>Bromus molliformis</i>	Soft Brome
Asteraceae	<i>Carthamus lanatus</i>	Saffron Thistle
Gentianaceae	<i>Centaurium tenuiflorum</i>	Branched Centaury, Slender centaury
Asteraceae	<i>Chondrilla juncea</i>	Skeleton Weed
Asteraceae	<i>Cirsium vulgare</i>	Spear Thistle
Asteraceae	<i>Conyza bonariensis</i>	Flaxleaf Fleabane
Boraginaceae	<i>Echium plantagineum</i>	Patterson's Curse
Boraginaceae	<i>Heliotropium europaeum</i>	
Poaceae	<i>Hordeum leporinum</i>	Barley Grass
Asteraceae	<i>Hypochaeris glabra</i>	Smooth Catsear
Brassicaceae	<i>Lepidium africanum</i>	Common Peppergrass
Brassicaceae	<i>Lepidium bonariensis</i>	
Poaceae	<i>Lolium perenne</i>	Perennial Ryegrass
Poaceae	<i>Lolium rigidum</i>	Wimmera Ryegrass
Malvaceae	<i>Malva parvifolia</i>	
Lamiaceae	<i>Marrubium vulgare</i>	White Horehound
Fabaceae	<i>Medicago minima</i>	Woolly Burr Medic
Caryophyllaceae	<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed
Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle
Caryophyllaceae	<i>Spergularia diandra</i>	Lesser Sand-spurry
Fabaceae	<i>Trifolium arvense</i>	Haresfoot Clover
Fabaceae	<i>Trifolium campestre</i>	Hop Clover
Fabaceae	<i>Trifolium glomeratum</i>	Clustered Clover
Fabaceae	<i>Trifolium spp.</i>	A Clover
Fabaceae	<i>Trifolium subterraneum</i>	Subterranean Clover
Poaceae	<i>Vulpia muralis</i>	Wall Fescue
Poaceae	<i>Vulpia myuros</i>	Rat's Tail Fescue

## Appendix B: Fauna Recorded During Surveys

Class	Family	Common Name	Scientific Name
Amphibia	Hylidae	Peron's Tree Frog	<i>Litoria peronii</i>
	Myobatrachidae	Eastern sign-bearing Froglet	<i>Crinia parinsignifera</i>
		Common Eastern Froglet	<i>Crinia signifera</i>
		Long-thumbed Frog	<i>Limnodynastes fletcheri</i>
		Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>
Aves	Acanthizidae	Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>
	Alcedinidae	Laughing Kookaburra	<i>Dacelo novaeguineae</i>
	Ardeidae	White-necked Heron	<i>Ardea pacifica</i>
	Artamidae	Pied Butcherbird	<i>Cracticus nigrogularis</i>
		Australian Magpie	<i>Cracticus tibicen</i>
		Grey Butcherbird	<i>Cracticus torquatus</i>
	Cacatuidae	Galah	<i>Eolophus roseicapillus</i>
	Campephagidae	Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>
	Casuariidae	Emu	<i>Dromaius novaehollandiae</i>
	Charadriidae	Banded Lapwing	<i>Vanellus tricolor</i>
	Columbidae	Crested Pigeon	<i>Ocyphaps lophotes</i>
		Common Bronzewing	<i>Phaps chalcoptera</i>
	Corcoracidae	White-winged Chough	<i>Corcorax melanorhamphos</i>
		Apostlebird	<i>Struthidea cinerea</i>
	Corvidae	Australian Raven	<i>Corvus coronoides</i>
	Falconidae	Brown Falcon	<i>Falco berigora</i>
		Nankeen Kestrel	<i>Falco cenchroides</i>
	Maluridae	Variegated Fairy-wren	<i>Malurus lamberti</i>
	Meliphagidae	Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>
		Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>
		White-eared Honeyeater	<i>Lichenostomus leucotis</i>
		Noisy Miner	<i>Manorina melanocephala</i>
	Monarchidae	Magpie-lark	<i>Grallina cyanoleuca</i>
	Motacillidae	Australian Pipit	<i>Anthus novaeseelandiae</i>
	Phasianidae	Stubble Quail	<i>Coturnix pectoralis</i>
	Pomatostomidae	Grey-crowned Babbler (eastern subspecies)^	<i>Pomatostomus temporalis temporalis</i>
	Psittacidae	Blue Bonnet	<i>Northiella haematogaster</i>
		Eastern Rosella	<i>Platycercus eximius</i>
		Red-rumped Parrot	<i>Psephotus haematonotus</i>
	Rhipiduridae	Willie Wagtail	<i>Rhipidura leucophrys</i>
Mammalia	Bovidae	Sheep	<i>Ovis aries</i>
	Canidae	Red Fox*	<i>Vulpes vulpes</i>
	Dasyuridae	unidentified Antechinus	<i>Antechinus sp.</i>
	Felidae	Cat*	<i>Felis catus</i>
	Leporidae	European Brown Hare*	<i>Lepus capensis</i>
		European Rabbit*	<i>Oryctolagus cuniculus</i>
	Macropodidae	Eastern Grey Kangaroo	<i>Macropus giganteus</i>
		Common Wallaroo	<i>Macropus robustus</i>
	Phalangeridae	Common Brushtail Possum	<i>Trichosurus vulpecula</i>
Reptilia	Tachyglossidae	Short-beaked Echidna	<i>Tachyglossus aculeatus</i>
	Scincidae	unidentified Cryptoblepharus	<i>Cryptoblepharus sp.</i>
		Shingle-back	<i>Tiliqua rugosa</i>

^ Species listed as threatened under the BC Act or the EPBC Act

\* introduced species



## Appendix C: Likelihood of Occurrence – Threatened Plants

Scientific Name	Common Name	BC Act (BioNet Search)	EPBC Act (Protected Matters Search)	Credit type	PCT 82	PCT 217	Likelihood of Occurrence	Survey Effort	Recommended Survey time
<i>Austrostipa wakoolica</i>	A spear-grass	E	E	Species	Potential	Potential	Has been recorded in the vicinity in a previous survey (AMBS 2017).	Targeted surveys undertaken in suitable habitat. Not recorded.	Oct- Dec
<i>Commersonia procumbens</i>	-	V	V	Species		Potential	Unlikely; suitable PCT present but study area exposed to disturbance from clearing and grazing.	Targeted surveys undertaken in suitable habitat. Not recorded.	Aug - May
<i>Diuris tricolor</i>	Pine Donkey Orchid	V	-	Species	Potential		Unlikely; suitable PCT present but study area exposed to disturbance from clearing and grazing.	Random surveys in suitable habitat. Not recorded.	Sept - Oct
<i>Swainsona sericea</i>	Silky Swainson-pea	V	-	Species	Potential		Unlikely; suitable PCT present but study area exposed to disturbance from clearing and grazing.	Random surveys in suitable habitat. Not recorded.	Sept - Dec

Scientific Name	Common Name	BC Act (BioNet Search)	EPBC Act (Protected Matters Search)	Credit type	PCT 82	PCT217	Likelihood of Occurrence Prior to the Survey	Survey Effort	Recommended Survey time
<i>Austrostipa metatoris</i>	-	V	V	Species			Unlikely; suitable PCT not present. Study area exposed to disturbance from clearing and grazing.	Random surveys in suitable habitat. Not recorded.	Jan - Dec
<i>Lepidium monoplacoides</i>	Winged Pepper-cress	E	E	Species			Has been recorded in the vicinity in a previous survey	Targeted surveys undertaken in suitable habitat. Not recorded.	Nov - Feb
<i>Swainsona murrayana</i>	Slender Darling-pea	V	V	Species			Unlikely; suitable PCT not present. Study area exposed to disturbance from clearing and grazing.	Random surveys in suitable habitat. Not recorded.	Sept - Feb
<i>Tylophora linearis</i>	-	V	E	Species			Has been recorded in the vicinity in a previous survey.	Targeted surveys undertaken in suitable habitat. Recorded in road reserve outside of Development Site Footprint.	Sept - May

## Appendix D: Likelihood of Occurrence – Threatened Fauna

Species identified using the NSW BioNet Search tool or the EPBC Protected Matters Search Tool (Department of Environment and Energy, 2017)

Common Name	Scientific Name	BC Act (BioNet Search)	EPBC Act (Protected Matters Search)	Credit type	PCT 82	PCT 217	Likelihood of Occurrence	Survey Effort	Recommended Survey time
Australian Bustard	<i>Ardeotis australis</i>	E	-	Species	Yes		Unlikely. Suitable PCT present although requires some shrubland for cover. Study area exposed to disturbance from clearing and grazing.	Not recorded during any surveys. PCT 82 will not be impacted.	All year.
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	V	-	Species		Yes	Unlikely. Suitable PCT present but study area exposed to disturbance from clearing and grazing. Hollow-bearing trees and fallen timber uncommon.	Habitat surveys undertaken, suitable habitat considered to be absent in the Development Site Footprint. No habitat trees likely to be removed.	All year.
Bush Stone-curlew	<i>Burhinus grallarius</i>	E	-	Species	Yes	Yes	Unlikely. Suitable PCT present but study area exposed to disturbance from clearing and grazing. Hollow-bearing trees and fallen timber uncommon.	Habitat surveys undertaken, suitable habitat considered to be absent in the Development Site Footprint. No habitat trees likely to be removed.	All year.
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	V	-	Species	Yes		Unlikely. Suitable PCT present but study area exposed to disturbance from clearing and grazing. Only one potential feed tree within the Development Site Footprint but no foraging signs observed.	Surveys for foraging signs undertaken. No signs or animals observed. No potential breeding trees likely to be removed.	All year.
Sloane's Froglet	<i>Crinia sloanei</i>	V	-	Species	Yes		Unlikely. Suitable PCT present but study area exposed to disturbance from clearing and grazing.	Targeted surveys not undertaken. PCT 82 will not be impacted.	Jul - Aug
Barking Owl	<i>Ninox connivens</i>	V	-	Ecosystem & Species	Yes	Yes	Foraging possible. Suitable PCT present but study area exposed to disturbance from clearing and	Habitat surveys undertaken. No tree hollows likely to be impacted. No signs of the	May - Dec

Common Name	Scientific Name	BC Act (BioNet Search)	EPBC Act (Protected Matters Search)	Credit type	PCT 82	PCT 217	Likelihood of Occurrence	Survey Effort	Recommended Survey time
							grazing. No tree hollows suitable for breeding observed in the Development Site Footprint.	species recorded.	
Koala	<i>Phascolarctos cinereus</i>	V	V	Ecosystem & Species	Yes	Yes	Unlikely. Suitable PCT present but Primary feed trees absent. Secondary feed trees very uncommon in the Development Site Footprint (limited to sparsely distributed Western Grey Box, <i>Eucalyptus microcarpa</i> ).	Searches for signs of the species undertaken. No animals, scats or scratches were observed.	All year.
Little Eagle	<i>Hieraaetus morphnoides</i>	V	-	Ecosystem & Species	Yes	Yes	Foraging possible. Suitable PCT present but study area exposed to disturbance from clearing and grazing. Potential breeding trees not observed in the Development Site Footprint.	2x 20min diurnal bird surveys undertaken. Searches for potential nests (e.g. large stick nests) undertaken, none observed in the Development Site Footprint.	Aug - Oct
Major Mitchell's Cockatoo	<i>Lophochroa leadbeateri</i>	V	-	Ecosystem & Species	Yes	Yes	Foraging possible. Suitable PCT present but study area exposed to disturbance from clearing and grazing. No tree hollows suitable for breeding observed in the Development Site Footprint.	2x 20min diurnal bird surveys and habitat surveys undertaken. No tree hollows likely to be impacted. No signs of the species recorded.	Sep - Dec
Masked Owl	<i>Tyto novaehollandiae</i>	V	-	Ecosystem & Species	Yes	Yes	Foraging possible. Suitable PCT present but study area exposed to disturbance from clearing and grazing. No tree hollows suitable for breeding observed in the Development Site Footprint.	Habitat surveys undertaken. No tree hollows likely to be impacted. No signs of the species recorded.	May - Aug
Square-tailed Kite	<i>Lophoictinia isura</i>	V	-	Ecosystem & Species		Yes	Foraging possible. Suitable PCT present but study area exposed to disturbance from clearing and grazing. Potential breeding trees not observed in the Development Site Footprint.	2x 20min diurnal bird surveys undertaken. Searches for potential nests (e.g. large stick nests) undertaken, none observed in the Development Site Footprint.	Sep - Dec

Common Name	Scientific Name	BC Act (BioNet Search)	EPBC Act (Protected Matters Search)	Credit type	PCT 82	PCT 217	Likelihood of Occurrence	Survey Effort	Recommended Survey time
Superb Parrot	<i>Polytelis swainsonii</i>	V	V	Ecosystem & Species	Yes	Yes	Foraging possible. Suitable PCT present but study area exposed to disturbance from clearing and grazing. No tree hollows suitable for breeding observed in the Development Site Footprint.	2x 20min diurnal bird surveys and habitat surveys undertaken. No tree hollows likely to be impacted. No signs of the species recorded.	Sep - Nov
Swift Parrot	<i>Lathamus discolor</i>	E	CE	Ecosystem & Species	Yes	Yes	Unlikely. Suitable PCT present but study area exposed to disturbance from clearing and grazing. Suitable foraging resources sparsely distributed in the Development Site Footprint, landscape heavily fragmented.	Habitat surveys undertaken. Species unlikely to utilise habitats within the Development Site Footprint.	May - Aug



## Additional species identified using only the EPBC Protected Matters Search Tool (Department of Environment and Energy, 2017)

Common Name	Scientific Name	BC Act	EPBC Act	Likelihood of Occurrence	Survey Effort	Recommended Survey time
Regent Honeyeater	<i>Anthochaera phrygia</i>	CE	CE	Unlikely. Study area exposed to disturbance from clearing and grazing. Suitable foraging resources sparsely distributed in the Development Site Footprint, landscape heavily fragmented.	Habitat surveys undertaken. Species unlikely to utilise habitats within the Development Site Footprint.	Sep – Dec
Curlew Sandpiper	<i>Calidris ferruginea</i>	E	CE	Unlikely. Study area exposed to disturbance from clearing and grazing. Suitable habitats absent from footprint.	Habitat surveys undertaken. Species unlikely to utilise habitats within the Development Site Footprint.	Sep - Mar
Painted Honeyeater	<i>Grantiella picta</i>	V	V	Unlikely. Study area exposed to disturbance from clearing and grazing. Suitable foraging resources sparsely distributed in the Development Site Footprint.	2x 20min diurnal bird surveys and habitat surveys undertaken. Species unlikely to utilise habitats within the Development Site Footprint.	N/A
Malleefowl	<i>Leipoa ocellata</i>	E	V	Unlikely. Study area exposed to disturbance from clearing and grazing. Suitable mallee habitats absent from footprint.	Habitat surveys undertaken. Species unlikely to utilise habitats within the Development Site Footprint.	N/A
Eastern Curlew	<i>Numenius madagascariensis</i>	-	CE	Unlikely. Study area exposed to disturbance from clearing and grazing. Suitable habitats absent from footprint.	Habitat surveys undertaken. Species unlikely to utilise habitats within the Development Site Footprint.	All year
Plains-wanderer	<i>Pedionomus torquatus</i>	E	CE	Unlikely. Study area exposed to disturbance from clearing and grazing. Suitable habitats absent from footprint.	Habitat surveys undertaken. Species unlikely to utilise habitats within the Development Site Footprint.	Aug - Oct
Australian Painted Snipe	<i>Rostratula australis</i>	E	E	Unlikely. Study area exposed to disturbance from clearing and grazing. Suitable habitats absent from footprint.	Habitat surveys undertaken. Species unlikely to utilise habitats within the Development Site Footprint.	N/A
Corben's Long-eared Bat	<i>Nyctophilus corbeni</i>	V	V	Unlikely. Study area exposed to disturbance from clearing and grazing, limiting their potential to occur. Potential roosting trees uncommon.	Habitat surveys undertaken. No hollow-bearing trees likely to be impacted within the Development Site Footprint.	Oct - Apr
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V	Unlikely. Study area exposed to disturbance from clearing and grazing, limiting their potential to occur. No camps observed.	Habitat surveys undertaken. No camps observed in the Development Site Footprint and none likely to occur.	Oct - Dec

## Appendix E: Tree Feature Data

Easting	Northing	Tree Species	Tree Features			Habitat Features																	Comments	Habitat Assessment			Meets Habitats Constraint Criteria for occurring listed species?	Relevant Fauna Species				
						Small4 Mid-branch Hollow	Medium5 Mid-branch Hollow	Large6 Mid-branch Hollow	Small4 End-of-branch Opening	Medium5 End-of-branch Opening	Large6 End-of-branch Opening	Small4 Trunk Hollow	Medium5 Trunk Hollow	Large6 Trunk Hollow	Crevices	Loose Bark	Small4 >12 Hollows all Trees															
			Height (m)	DBH	Stag	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Present	Present	Present										
537636	6371194	<i>Eucalyptus viridis</i>	8	<30	No	0		0		0		0		0		0		0		0		0		N	Y	N	Mallee	N	N	N		
537531	6371162	<i>Brachychiton populneus subsp. populneus</i>	6.5	30-60	No	0		0		0		0		0		0		0		0		0		N	N	N		N	N	N		
537461	6371197	<i>Eucalyptus viridis</i>	6	<30	No	0		0		0		0		0		0		0		0		0		N	Y	N	Mallee	N	N	N		
537463	6371164	<i>Eucalyptus viridis</i>	9	<30	No	0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537379	6371114	<i>Eucalyptus microcarpa</i>	13	>60	No	0		0		0		0		0		0		0		0		0		N	N	N		N	N	N		
537288	6371428	<i>Casuarina cristata</i>	12	30-60	No	0		0		0		0		0		0		0		0		0		Y	N	N	No cones evident	N	N	Y		
537282	6371086	<i>Eucalyptus microcarpa</i>	16	>60	No	0		0		0		0		0		0		0	1	6	0		N	N	N	Bank around hollow has been chewed. Stick nest 50cm diameter at 12m.	Y	Y	Y			
537468	6371100	<i>Eucalyptus viridis</i>	6	<30	No	0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537468	6371096	<i>Eucalyptus viridis</i>	6	<30	No	0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537472	6371078	<i>Eucalyptus viridis</i>	7	<30	No	0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537502	6370972	<i>Callitris glaucophylla</i>	8.5	30-60	No	0		0		0		0		0		0		0		0		0		N	N	N	Chewed seed pods	N	N	N		
537503	6371009	<i>Callitris glaucophylla</i>	6.5	<30	No	0		0		0		0		0		0		0		0		0		N	N	N	Chewed cones.	N	N	N		
537497	6371025	<i>Eucalyptus viridis</i>	5	<30	No	0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537497	6371027	<i>Eucalyptus viridis</i>	8	<30	No	0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537529	6371049	<i>Eucalyptus viridis</i>	8	<30	No	0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		

Easting	Northing	Tree Species	Tree Features			Habitat Features																		Comments	Habitat Assessment			Meets Habitats Constraint Criteria for occurring listed species?	Relevant Fauna Species	
						Mid-branch Hollow		Mid-branch Hollow		Mid-branch Hollow		End-of-branch Opening		End-of-branch Opening		End-of-branch Opening		Trunk Hollow		Trunk Hollow		Trunk Hollow			Crevices	Loose Bark	Small4 Hollows all Trunks			
			Height (m)	DBH	Stag	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Present	Present		Present	Birds	Aboreal Mammal			Bats
537551	6371052	Eucalyptus viridis	7	<30	No	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537557	6371053	Eucalyptus viridis	7	<30	No	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537594	6371092	Eucalyptus viridis	7	<30	No	0		0		0		0		0		0		0		0		N	N	N	Flowering, mallee	N	N	N		
537608	6371073	Eucalyptus viridis	6	<30	No	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537589	6371066	Eucalyptus viridis	6	<30	No	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537656	6371043	Eucalyptus viridis	6.5	<30	No	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537658	6371036	Eucalyptus viridis	8	<30	No	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537657	6371030	Eucalyptus viridis	8	<30	No	0		0		0		0		0		0		0		0		N	N	N	stick nest 25cm	Y	N	N		
537659	6371026	Eucalyptus viridis	8	<30	No	0		0		0		0		0		0		0		0		N	N	N	Stick nest 20cm	Y	N	N		
537660	6371019	Eucalyptus viridis	9	<30	No	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537660	6371042	Eucalyptus viridis	7	<30	No	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537663	6371045	Eucalyptus viridis	6.5	<30	Yes	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537678	6371049	Eucalyptus viridis	8	<30	No	0		0		0		0		0		0		0		0		N	Y	N	Mallee	N	N	N		
537690	6371050	Eucalyptus viridis	6.5	<30	No	0		0		0		0		0		0		0		0		N	N	N	Flowering, mallee	N	N	N		
537699	6371051	Eucalyptus viridis	7	<30	No	0		0		0		0		0		0		0		0		N	N	N	Flowering, mallee	N	N	N		
537700	6371051	Eucalyptus viridis	7	<30	No	0		0		0		0		0		0		0		0		N	N	N	Flowering, mallee, mistletoe	N	N	N		
537697	6371274	Eucalyptus viridis	8	<30	No	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537621	6371364	Acacia dorataxylon	4.5	<30	No	0		0		0		0		0		0		0		0		N	Y	N		N	N	N		
537582	6371389	Eucalyptus viridis	5.5	<30	No	0		0		0		0		0		0		0		0		N	N	N	Flowering, mallee	N	N	N		
537751	6371505	Eucalyptus viridis	8	<30	No	0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
536795	6371778	Geijera parviflora	3.5	<30	No	0		0		0		0		0		0		0		0		N	N	N		N	N	N		

Easting	Northing	Tree Species	Tree Features			Habitat Features																		Comments	Habitat Assessment			Meets Habitats Constraint Criteria for occurring listed species?	Relevant Fauna Species					
						Small4 Mid-branch Hollow		Medium5 Mid-branch Hollow		Large6 Mid-branch Hollow		Small4 End-of-branch Opening		Medium5 End-of-branch Opening		Large6 End-of-branch Opening		Trunk Small4 Hollow		Trunk Medium5 Hollow		Trunk Large6 Hollow								Crevices	Loose Bark	Small4 >12 Hollows all Tunes		
			Height (m)	DBH	Stag	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height		Present	Present	Present			Birds	Aboreal Mammal	Bats		
536792	6371803	Eucalyptus viridis	8	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Flowering, mallee, mistletoe	N	N	N		
536801	6371828	Eucalyptus viridis	9	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Flowering, mallee, mistletoe	N	N	N		
536719	6371785	Eucalyptus viridis	3	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
536713	6371778	Eucalyptus viridis	2	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
536700	6371777	Eucalyptus viridis	9	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Stick nest 40cm, mallee, mistletoe	N	N	N		
536733	6371851	Eucalyptus viridis	8	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
536778	6371881	Eucalyptus viridis	6.5	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Flowering, mallee	N	N	N		
536775	6371893	Eucalyptus viridis	3.5	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
536821	6372013	Eucalyptus viridis	5.5	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
536822	6372031	Eucalyptus viridis	8.5	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
536901	6371854	Eucalyptus viridis	8	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Flowering, mallee	N	N	N		
536953	6371841	Eucalyptus viridis	4	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N		
537075	6371990	Eucalyptus microcarpa	16	>60	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Stick nest 35cm high 15m	N	N	N		
537818	6371482	Eucalyptus microcarpa	15	>60	No	0		0		0		1	6.5	0		0		1	10	1	9	1	7	Y	N	N		Y	Y	Y	Y		Glossy Black-Cockatoo, Major Mitchell's Cockatoo, Superb Parrot, Little Eagle, Square-tailed Kite	
537824	6371455	Eucalyptus viridis	8	<30	No	0		0		0		0		0		0		0		0		0		0		N	N	N	Flowering, mallee,	N	N	N	Y	

Easting	Northing	Tree Species	Tree Features			Habitat Features																		Comments		Habitat Assessment			Meets Habitats Constraint Criteria for occurring listed species?	Relevant Fauna Species		
						Small4 Mid-branch Hollow	Medium5 Mid-branch Hollow	Large6 Mid-branch Hollow	Small4 End-of-branch Opening	Medium5 End-of-branch Opening	Large6 End-of-branch Opening	Trunk Small4 Hollow		Trunk Medium5 Hollow		Trunk Large6 Hollow		Crevices	Loose Bark	>12 Small4 Hollows all Types												
			Height (m)	DBH	Stag	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Present	Present	Present								
																							stick nest 35cm diameter									
537824	6371446	<i>Eucalyptus viridis</i>	7.5	<30	No	0		0		0		0		0		0		0		0		0		Y	N	N	Mallee	N	N	Y	Y	Square-tailed Kite
537830	6371443	<i>Eucalyptus viridis</i>	9	<30	No	0		0		0		0		0		0		0		0		0		Y	N	N	Several dead stems, mallee	N	N	Y	Y	Square-tailed Kite
537836	6371443	<i>Eucalyptus viridis</i>	10	<30	No	0		0		0		1	8	0		0		0		0		0		Y	Y	N	Mallee	Y	Y	Y	Y	Brush-tailed Phascogale, Square-tailed Kite
537840	6371444	<i>Eucalyptus viridis</i>	7	<30	No	0		0		0		2	1.5	0		0		0		0		0		Y	N	N	Short dead stem, mallee	N	N	Y	Y	Brush-tailed Phascogale, Square-tailed Kite
537836	6371451	<i>Eucalyptus viridis</i>	7	<30	No	0		0		0		2	3	0		0		1	1	0		0		Y	N	N	Some dead stems, mallee	Y	Y	Y	Y	Brush-tailed Phascogale, Square-tailed Kite
537843	6371442	<i>Eucalyptus viridis</i>	5	<30	No	0		0		0		0		0		0		0		0		0		Y	N	N	Mallee	N	N	Y	Y	Square-tailed Kite
537839	6371435	<i>Eucalyptus viridis</i>	8	<30	No	0		0		0		1	3	0		0		1	0.5	0		0		Y	N	N	Mallee	N	N	Y	Y	Brush-tailed Phascogale, Square-tailed Kite
537835	6371436	<i>Eucalyptus viridis</i>	6.5	<30	No	0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N	Y	Square-tailed Kite
537831	6371438	<i>Eucalyptus viridis</i>	8	<30	No	0		0		0		0		2	4.5	0		0		0		0		Y	N	N	Broad multi-stemmed tree, some dead	Y	Y	Y	Y	Major Mitchell's Cockatoo, Square-tailed Kite
537824	6371437	<i>Eucalyptus microcarpa</i>	12	30-60	No	0		0		0		0		0		0		0		0		0		N	N	N		N	N	N	Y	Superb Parrot, Square-tailed Kite
537825	6371441	<i>Eucalyptus viridis</i>	8	<30	No	0		0		0		0		0		0		0		0		0		Y	N	N	Mallee	N	N	Y	Y	Square-tailed Kite
537819	6371474	<i>Eucalyptus</i>	15	>60	No	0		0		0		0		0		0		0		0		0		N	N	N		N	N	N	Y	Superb



Easting	Northing	Tree Species	Tree Features			Habitat Features																		Comments	Habitat Assessment			Meets Habitats Constraint Criteria for occurring listed species?	Relevant Fauna Species			
						Mid-Small4 branch Hollow		Mid-Medium5 branch Hollow		Mid-Large6 branch Hollow		End-of-Small4 branch Opening		End-of-Medium5 branch Opening		End-of-Large6 branch Opening		Trunk Small4 Hollow		Trunk Medium5 Hollow		Trunk Large6 Hollow								Crevices	Loose Bark	>12 Small4 Hollows all Trunks
			Height (m)	DBH	Stag	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height	Number	Height		Present	Present	Present					
		microcarpa																													Parrot, Little Eagle, Square-tailed Kite	
537819	6371476	Geijera parviflora	3.8	<30	No	0		0		0		0		0		0		0		0		0		N	N	N		N	N	N	Y	Square-tailed Kite
537831	6371482	Eucalyptus viridis	9	30-60	No	0		0		0		1	3	1	4	1	5	3		1		0		Y	N	N	Mallee	Y	Y	Y	Y	Major Mitchell's Cockatoo, Superb Parrot, Barking Owl, Masked Owl, Square-tailed Kite
537831	6371466	Eucalyptus viridis	9	30-60	No	0		0		0		2	2	0		1	5	1	2	0		0		Y	N	N	Several stems along ground, mallee	Y	Y	Y	Y	Major Mitchell's Cockatoo, Superb Parrot, Barking Owl, Masked Owl, Square-tailed Kite
537836	6371473	Eucalyptus viridis	8	30-60	No	0		0		0		0		0		0		0		0		0		N	N	N	Mallee	N	N	N	Y	Superb Parrot, Square-tailed Kite
537836	6371465	Eucalyptus viridis	9	30-60	No	0		0		0		4	3-7	2	5	0		0		2	6	1	7	Y	N	N	Mallee	Y	Y	Y	Y	Glossy Black-Cockatoo, Major Mitchell's Cockatoo, Superb Parrot, Square-tailed Kite
538073	6372112	Eucalyptus microcarpa	14	>60	No	0		0		0		1	9	2	9-10	0		0		0		0		N	N	N	Sunrise Lane	Y	Y	Y	Y	Glossy Black-

- <sup>1</sup> 2.5 to 4 cm wide
- <sup>2</sup> >4 to <20 cm wide
- <sup>3</sup> 20 cm or greater

## Appendix F: Vegetation Integrity (Site Condition) Data

Plot	PCT	Condition Class	Zone	Easting	Northing	Bearing	Composition Tree	Composition Shrub	Composition Grass	Composition Forbs	Composition Ferns	Composition Other	Structure Tree	Structure Shrub	Structure Grass	Structure Forbs	Structure Ferns	Structure Other	Function Large Trees	Function Hollow Trees	Function Litter Cover	Function Length Fallen Logs	Function Tree Stem 5 to 10	Function Tree Stem 10 to 20	Function Tree Stem 20 to 30	Function Tree Stem 30 to 50	Function Tree Stem 50 to 80	Function Tree Regen	Function High Threat Exotic
SB01	217	Derived native grass land (Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217))	55	537392	6371200		0	0	7	11	0	1	0.0	0.0	15.9	4.7	0.0	0.1	0	0	18.0	0.0	0	0	0	0	0	0	0.0
SB02	217	Derived native grass land (Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217))	55	537650	6371481		0	0	9	10	1	1	0.0	0.0	3.4	2.3	0.1	35.0	0	0	28.0	0.0	0	0	0	0	0	0	0.0
SB03	217	Derived native grass land (Previously cleared land with advanced grassland/shrubland regeneration (PCT 217))	55	536788	6371967		0	1	9	21	1	1	0.0	2.0	42.2	2.2	2.0	10.0	0	0	39.0	0.0	0	0	0	0	0	0	0.0
SB04	217	Derived native grass land (Previously cleared land with advanced grassland/shrubland regeneration (PCT 217))	55	536912	6371822		0	1	9	18	1	1	0.0	3.0	26.3	2.3	0.4	4.0	0	0	34.0	0.0	0	0	0	0	0	0	0.0
SB05	217	Derived native grass land (Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217))	55	537673	6371166		0	0	5	14	0	1	0.0	0.0	10.9	4.9	0.0	0.3	0	0	25.0	0.0	0	0	0	0	0	0	0.0
SB06	217	Semi cleared woodland (Green Mallee Low Woodland (PCT 217))	55	537844	6371454		1	1	9	8	0	4	20.0	0.1	7.7	0.9	0.0	4.1	0	16	30.0	86.0	1	0	2	4	0	0	0.0
SB07	217	Degraded woodland (Green Mallee, Mugga Ironbark Grey Box Woodland (PCT 217))	55	537977	6372118		0	0	8	12	1	2	0.0	0.0	17.4	1.9	0.1	0.3	0	0	20.0	0.0	0	0	0	0	0	0	0.0
SB08	82	Derived native grass land (Low lying area with Derived Native Grassland (PCT 82))	55	536956	6371574		0	0	12	26	0	7	0.0	0.0	9.4	5.8	0.0	5.5	0	0	40.0	0.0	0	0	0	0	0	0	0.0

SB09	217	Derived native grass land (Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217))	55	538000	6371757		0	0	11	5	1	0	0.0	0.0	26.1	1.3	0.1	0.0	0	0	35. 0	0.0	0	0	0	0	0	0	0	0.0
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## Appendix G: Vegetation Integrity (Site Condition) – Field Data Sheets

[illegible]



Site Name: _____		Survey Date: _____	Survey Time: _____	Recorder: _____
Grid	Section	Grid	Section	Grid
Grid	Section	Grid	Section	Grid
10	10	10	10	10
11	11	11	11	11
12	12	12	12	12
13	13	13	13	13
14	14	14	14	14
15	15	15	15	15
16	16	16	16	16
17	17	17	17	17
18	18	18	18	18
19	19	19	19	19
20	20	20	20	20
21	21	21	21	21
22	22	22	22	22
23	23	23	23	23
24	24	24	24	24
25	25	25	25	25
26	26	26	26	26
27	27	27	27	27
28	28	28	28	28
29	29	29	29	29
30	30	30	30	30
31	31	31	31	31
32	32	32	32	32
33	33	33	33	33
34	34	34	34	34
35	35	35	35	35
36	36	36	36	36
37	37	37	37	37
38	38	38	38	38
39	39	39	39	39
40	40	40	40	40
41	41	41	41	41
42	42	42	42	42
43	43	43	43	43
44	44	44	44	44
45	45	45	45	45
46	46	46	46	46
47	47	47	47	47
48	48	48	48	48
49	49	49	49	49
50	50	50	50	50
51	51	51	51	51
52	52	52	52	52
53	53	53	53	53
54	54	54	54	54
55	55	55	55	55
56	56	56	56	56
57	57	57	57	57
58	58	58	58	58
59	59	59	59	59
60	60	60	60	60
61	61	61	61	61
62	62	62	62	62
63	63	63	63	63
64	64	64	64	64
65	65	65	65	65
66	66	66	66	66
67	67	67	67	67
68	68	68	68	68
69	69	69	69	69
70	70	70	70	70
71	71	71	71	71
72	72	72	72	72
73	73	73	73	73
74	74	74	74	74
75	75	75	75	75
76	76	76	76	76
77	77	77	77	77
78	78	78	78	78
79	79	79	79	79
80	80	80	80	80
81	81	81	81	81
82	82	82	82	82
83	83	83	83	83
84	84	84	84	84
85	85	85	85	85
86	86	86	86	86
87	87	87	87	87
88	88	88	88	88
89	89	89	89	89
90	90	90	90	90
91	91	91	91	91
92	92	92	92	92
93	93	93	93	93
94	94	94	94	94
95	95	95	95	95
96	96	96	96	96
97	97	97	97	97
98	98	98	98	98
99	99	99	99	99
100	100	100	100	100

[illegible]

WEEK 10 - 11		WEEK 12 - 13		WEEK 14 - 15		WEEK 16 - 17		WEEK 18 - 19		WEEK 20 - 21		WEEK 22 - 23		WEEK 24 - 25		WEEK 26 - 27		WEEK 28 - 29		WEEK 30 - 31	
Week 10 - 11	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			
Week 12 - 13	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			
Week 14 - 15	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			
Week 16 - 17	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			
Week 18 - 19	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			
Week 20 - 21	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			
Week 22 - 23	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			
Week 24 - 25	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			
Week 26 - 27	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			
Week 28 - 29	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			
Week 30 - 31	Topic	0	4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Objectives	0																			
	Resources	0																			
	Notes	0																			
	Assessment	0																			

Number of students	72	21	30	4	25
Number of students	25	16	17	8	15

Field Number	1000	THE UNIVERSITY OF THE SOUTHERN CALIFORNIA
Date	10/10/50	
Locality	1000	
Collector	1000	
Plant	1000	
Height	1000	
Flower	1000	
Seed	1000	
Notes	1000	

Current plot = 20 in 22  
rest of litter and likely blowing in and trapped

Ref. no. (Inv. no.)	Survey Date	Ref. no. (Inv. no.)	Ref. no. (Inv. no.)
1000	10/10/10	1000	10/10/10

Ref. no. (Inv. no.)	Survey Date	Ref. no. (Inv. no.)	Ref. no. (Inv. no.)
1000	10/10/10	1000	10/10/10

[illegible]

[illegible]

Site # 21/0002		Survey Name	Plot Number	Recorder
21/0002		Ecological Survey	21/0002	21/0002
Plot	Species Name	Altitude (m)	Count	Area (m <sup>2</sup> )
1	<i>Pinus</i> sp. 1 (alt. 10) <i>Pinus</i> sp. 1	10	10	10
2	<i>Pinus</i> sp. 2 (alt. 10) <i>Pinus</i> sp. 2	10	10	10
3	<i>Pinus</i> sp. 3 (alt. 10) <i>Pinus</i> sp. 3	10	10	10
4	<i>Pinus</i> sp. 4 (alt. 10) <i>Pinus</i> sp. 4	10	10	10
5	<i>Pinus</i> sp. 5 (alt. 10) <i>Pinus</i> sp. 5	10	10	10
6	<i>Pinus</i> sp. 6 (alt. 10) <i>Pinus</i> sp. 6	10	10	10
7	<i>Pinus</i> sp. 7 (alt. 10) <i>Pinus</i> sp. 7	10	10	10
8	<i>Pinus</i> sp. 8 (alt. 10) <i>Pinus</i> sp. 8	10	10	10
9	<i>Pinus</i> sp. 9 (alt. 10) <i>Pinus</i> sp. 9	10	10	10
10	<i>Pinus</i> sp. 10 (alt. 10) <i>Pinus</i> sp. 10	10	10	10
11	<i>Pinus</i> sp. 11 (alt. 10) <i>Pinus</i> sp. 11	10	10	10
12	<i>Pinus</i> sp. 12 (alt. 10) <i>Pinus</i> sp. 12	10	10	10
13	<i>Pinus</i> sp. 13 (alt. 10) <i>Pinus</i> sp. 13	10	10	10
14	<i>Pinus</i> sp. 14 (alt. 10) <i>Pinus</i> sp. 14	10	10	10
15	<i>Pinus</i> sp. 15 (alt. 10) <i>Pinus</i> sp. 15	10	10	10
16	<i>Pinus</i> sp. 16 (alt. 10) <i>Pinus</i> sp. 16	10	10	10
17	<i>Pinus</i> sp. 17 (alt. 10) <i>Pinus</i> sp. 17	10	10	10
18	<i>Pinus</i> sp. 18 (alt. 10) <i>Pinus</i> sp. 18	10	10	10
19	<i>Pinus</i> sp. 19 (alt. 10) <i>Pinus</i> sp. 19	10	10	10
20	<i>Pinus</i> sp. 20 (alt. 10) <i>Pinus</i> sp. 20	10	10	10
21	<i>Pinus</i> sp. 21 (alt. 10) <i>Pinus</i> sp. 21	10	10	10
22	<i>Pinus</i> sp. 22 (alt. 10) <i>Pinus</i> sp. 22	10	10	10
23	<i>Pinus</i> sp. 23 (alt. 10) <i>Pinus</i> sp. 23	10	10	10
24	<i>Pinus</i> sp. 24 (alt. 10) <i>Pinus</i> sp. 24	10	10	10
25	<i>Pinus</i> sp. 25 (alt. 10) <i>Pinus</i> sp. 25	10	10	10
26	<i>Pinus</i> sp. 26 (alt. 10) <i>Pinus</i> sp. 26	10	10	10
27	<i>Pinus</i> sp. 27 (alt. 10) <i>Pinus</i> sp. 27	10	10	10
28	<i>Pinus</i> sp. 28 (alt. 10) <i>Pinus</i> sp. 28	10	10	10
29	<i>Pinus</i> sp. 29 (alt. 10) <i>Pinus</i> sp. 29	10	10	10
30	<i>Pinus</i> sp. 30 (alt. 10) <i>Pinus</i> sp. 30	10	10	10
31	<i>Pinus</i> sp. 31 (alt. 10) <i>Pinus</i> sp. 31	10	10	10
32	<i>Pinus</i> sp. 32 (alt. 10) <i>Pinus</i> sp. 32	10	10	10
33	<i>Pinus</i> sp. 33 (alt. 10) <i>Pinus</i> sp. 33	10	10	10
34	<i>Pinus</i> sp. 34 (alt. 10) <i>Pinus</i> sp. 34	10	10	10
35	<i>Pinus</i> sp. 35 (alt. 10) <i>Pinus</i> sp. 35	10	10	10
36	<i>Pinus</i> sp. 36 (alt. 10) <i>Pinus</i> sp. 36	10	10	10
37	<i>Pinus</i> sp. 37 (alt. 10) <i>Pinus</i> sp. 37	10	10	10
38	<i>Pinus</i> sp. 38 (alt. 10) <i>Pinus</i> sp. 38	10	10	10
39	<i>Pinus</i> sp. 39 (alt. 10) <i>Pinus</i> sp. 39	10	10	10
40	<i>Pinus</i> sp. 40 (alt. 10) <i>Pinus</i> sp. 40	10	10	10
41	<i>Pinus</i> sp. 41 (alt. 10) <i>Pinus</i> sp. 41	10	10	10
42	<i>Pinus</i> sp. 42 (alt. 10) <i>Pinus</i> sp. 42	10	10	10
43	<i>Pinus</i> sp. 43 (alt. 10) <i>Pinus</i> sp. 43	10	10	10
44	<i>Pinus</i> sp. 44 (alt. 10) <i>Pinus</i> sp. 44	10	10	10
45	<i>Pinus</i> sp. 45 (alt. 10) <i>Pinus</i> sp. 45	10	10	10
46	<i>Pinus</i> sp. 46 (alt. 10) <i>Pinus</i> sp. 46	10	10	10
47	<i>Pinus</i> sp. 47 (alt. 10) <i>Pinus</i> sp. 47	10	10	10
48	<i>Pinus</i> sp. 48 (alt. 10) <i>Pinus</i> sp. 48	10	10	10
49	<i>Pinus</i> sp. 49 (alt. 10) <i>Pinus</i> sp. 49	10	10	10
50	<i>Pinus</i> sp. 50 (alt. 10) <i>Pinus</i> sp. 50	10	10	10



Date		Survey Name	Field Number	Receiver	
1/10/01	1/10/01	Survey 1	63-04	Don Smith / John	
1/10/01	1/10/01		Point 1	37 + 3.3	Point 2
1/10/01	1/10/01	Survey 2	51-20	Don Smith / John	
Project Name				Project Number	
Project Community Type				Project Status	

S&B Activities 8/10/2012		Activity	S&B Activities 8/10/2012		Activity
Level of Water Increased	Time	0	Level of Water Increased	Time	0
	Speed	0		Speed	0
	Direction	0		Direction	0
	Depth	1		Depth	1
	Width	0		Width	0
Level of Water Decreased	Time	0	Level of Water Decreased	Time	0
	Speed	0		Speed	0
	Direction	0		Direction	0
	Depth	2.3		Depth	2.3
	Width	0		Width	0
Total		0	Total		0

[illegible][illegible]

- 10 miles with falling overhanging on left
- Bot det. under 20x50.
- 3rd photo 0000 (0000 of light from 12-1)
- Knowledge: ground/shadowed
- with light from ground shadowed
- Notes of how ground - approx 30%
- Above approx 100m - 100m - 100m - 100m

[illegible]

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[illegible]

Print more copies of this sheet to allow for higher species counts at a plot. All species at a plot need to be recorded

Received 10 October 2017

BAM Plot - Field Survey Form				Site Sheet No.	
Date	Survey Date	Plot Number	Section		
1/1/01	1/1/01	100-100	T1-E1		
1/1/01	1/1/01	100-100	Plot 1	100	Plot 100
1/1/01	1/1/01	100-100	100-100		
Map Sheet			100-100		
Map Contour Type			100-100		

[illegible]

Contract award date	15/11/2018	15/11/2018	15/11/2018	15/11/2018
Contract award date	15/11/2018	15/11/2018	15/11/2018	15/11/2018

1. Name of the person or organization 2. Address 3. City 4. State 5. Zip 6. Date 7. Signature 8. Title	9. Name of the person or organization 10. Address 11. City 12. State 13. Zip 14. Date 15. Signature 16. Title	17. Name of the person or organization 18. Address 19. City 20. State 21. Zip 22. Date 23. Signature 24. Title
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AMBS Field Sheet - of		Survey Date	Site Number	Observer			
Date	1/14/2014	Location	Point of View	JTS, P. JTS			
SP Type	The following animals are not present in this area. For species not recorded, all other vertebrates are present. For species not listed, please add.	SP Type	Count	Sex	Age	Notes	
1	Black Bear	1	1	Male	Adult	100%	
2	Grizzly Bear	1	1	Male	Adult	100%	
3	Wolverine	1	1	Male	Adult	100%	
4	Yellowthroat	1	1	Male	Adult	100%	
5	Goldeneye	1	1	Male	Adult	100%	
6	Redpoll	1	1	Male	Adult	100%	
7	Arctic Skua	1	1	Male	Adult	100%	
8	Black-throated Green	1	1	Male	Adult	100%	
9	Black-throated Blue	1	1	Male	Adult	100%	
10	Black-throated Green	1	1	Male	Adult	100%	
11	Black-throated Blue	1	1	Male	Adult	100%	
12	Black-throated Green	1	1	Male	Adult	100%	
13	Black-throated Blue	1	1	Male	Adult	100%	
14	Black-throated Green	1	1	Male	Adult	100%	
15	Black-throated Blue	1	1	Male	Adult	100%	
16	Black-throated Green	1	1	Male	Adult	100%	
17	Black-throated Blue	1	1	Male	Adult	100%	
18	Black-throated Green	1	1	Male	Adult	100%	
19	Black-throated Blue	1	1	Male	Adult	100%	
20	Black-throated Green	1	1	Male	Adult	100%	
21	Black-throated Blue	1	1	Male	Adult	100%	
22	Black-throated Green	1	1	Male	Adult	100%	
23	Black-throated Blue	1	1	Male	Adult	100%	
24	Black-throated Green	1	1	Male	Adult	100%	
25	Black-throated Blue	1	1	Male	Adult	100%	
26	Black-throated Green	1	1	Male	Adult	100%	
27	Black-throated Blue	1	1	Male	Adult	100%	
28	Black-throated Green	1	1	Male	Adult	100%	
29	Black-throated Blue	1	1	Male	Adult	100%	
30	Black-throated Green	1	1	Male	Adult	100%	
31	Black-throated Blue	1	1	Male	Adult	100%	
32	Black-throated Green	1	1	Male	Adult	100%	
33	Black-throated Blue	1	1	Male	Adult	100%	
34	Black-throated Green	1	1	Male	Adult	100%	
35	Black-throated Blue	1	1	Male	Adult	100%	
36	Black-throated Green	1	1	Male	Adult	100%	
37	Black-throated Blue	1	1	Male	Adult	100%	
38	Black-throated Green	1	1	Male	Adult	100%	
39	Black-throated Blue	1	1	Male	Adult	100%	
40	Black-throated Green	1	1	Male	Adult	100%	
41	Black-throated Blue	1	1	Male	Adult	100%	
42	Black-throated Green	1	1	Male	Adult	100%	
43	Black-throated Blue	1	1	Male	Adult	100%	
44	Black-throated Green	1	1	Male	Adult	100%	
45	Black-throated Blue	1	1	Male	Adult	100%	
46	Black-throated Green	1	1	Male	Adult	100%	
47	Black-throated Blue	1	1	Male	Adult	100%	
48	Black-throated Green	1	1	Male	Adult	100%	
49	Black-throated Blue	1	1	Male	Adult	100%	
50	Black-throated Green	1	1	Male	Adult	100%	
51	Black-throated Blue	1	1	Male	Adult	100%	
52	Black-throated Green	1	1	Male	Adult	100%	
53	Black-throated Blue	1	1	Male	Adult	100%	
54	Black-throated Green	1	1	Male	Adult	100%	
55	Black-throated Blue	1	1	Male	Adult	100%	
56	Black-throated Green	1	1	Male	Adult	100%	
57	Black-throated Blue	1	1	Male	Adult	100%	
58	Black-throated Green	1	1	Male	Adult	100%	
59	Black-throated Blue	1	1	Male	Adult	100%	
60	Black-throated Green	1	1	Male	Adult	100%	
61	Black-throated Blue	1	1	Male	Adult	100%	
62	Black-throated Green	1	1	Male	Adult	100%	
63	Black-throated Blue	1	1	Male	Adult	100%	
64	Black-throated Green	1	1	Male	Adult	100%	
65	Black-throated Blue	1	1	Male	Adult	100%	
66	Black-throated Green	1	1	Male	Adult	100%	
67	Black-throated Blue	1	1	Male	Adult	100%	
68	Black-throated Green	1	1	Male	Adult	100%	
69	Black-throated Blue	1	1	Male	Adult	100%	
70	Black-throated Green	1	1	Male	Adult	100%	
71	Black-throated Blue	1	1	Male	Adult	100%	
72	Black-throated Green	1	1	Male	Adult	100%	
73	Black-throated Blue	1	1	Male	Adult	100%	
74	Black-throated Green	1	1	Male	Adult	100%	
75	Black-throated Blue	1	1	Male	Adult	100%	
76	Black-throated Green	1	1	Male	Adult	100%	
77	Black-throated Blue	1	1	Male	Adult	100%	
78	Black-throated Green	1	1	Male	Adult	100%	
79	Black-throated Blue	1	1	Male	Adult	100%	
80	Black-throated Green	1	1	Male	Adult	100%	
81	Black-throated Blue	1	1	Male	Adult	100%	
82	Black-throated Green	1	1	Male	Adult	100%	
83	Black-throated Blue	1	1	Male	Adult	100%	
84	Black-throated Green	1	1	Male	Adult	100%	
85	Black-throated Blue	1	1	Male	Adult	100%	
86	Black-throated Green	1	1	Male	Adult	100%	
87	Black-throated Blue	1	1	Male	Adult	100%	
88	Black-throated Green	1	1	Male	Adult	100%	
89	Black-throated Blue	1	1	Male	Adult	100%	
90	Black-throated Green	1	1	Male	Adult	100%	
91	Black-throated Blue	1	1	Male	Adult	100%	
92	Black-throated Green	1	1	Male	Adult	100%	
93	Black-throated Blue	1	1	Male	Adult	100%	
94	Black-throated Green	1	1	Male	Adult	100%	
95	Black-throated Blue	1	1	Male	Adult	100%	
96	Black-throated Green	1	1	Male	Adult	100%	
97	Black-throated Blue	1	1	Male	Adult	100%	
98	Black-throated Green	1	1	Male	Adult	100%	
99	Black-throated Blue	1	1	Male	Adult	100%	
100	Black-throated Green	1	1	Male	Adult	100%	

[illegible]

S&B (continued) (2017-2018)		2017-2018
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
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89	89	89
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91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

1. <b>NAME (PRINT FULL NAME)</b> 2. <b>DATE</b> 3. <b>TIME</b>	4. <b>LOCATION</b> 5. <b>WEATHER</b> 6. <b>WIND</b> 7. <b>WAVE</b> 8. <b>SEA</b> 9. <b>SWELL</b> 10. <b>SWELL</b> 11. <b>SWELL</b> 12. <b>SWELL</b> 13. <b>SWELL</b> 14. <b>SWELL</b> 15. <b>SWELL</b> 16. <b>SWELL</b> 17. <b>SWELL</b> 18. <b>SWELL</b> 19. <b>SWELL</b> 20. <b>SWELL</b> 21. <b>SWELL</b> 22. <b>SWELL</b> 23. <b>SWELL</b> 24. <b>SWELL</b> 25. <b>SWELL</b> 26. <b>SWELL</b> 27. <b>SWELL</b> 28. <b>SWELL</b> 29. <b>SWELL</b> 30. <b>SWELL</b> 31. <b>SWELL</b> 32. <b>SWELL</b> 33. <b>SWELL</b> 34. <b>SWELL</b> 35. <b>SWELL</b> 36. <b>SWELL</b> 37. <b>SWELL</b> 38. <b>SWELL</b> 39. <b>SWELL</b> 40. <b>SWELL</b> 41. <b>SWELL</b> 42. <b>SWELL</b> 43. <b>SWELL</b> 44. <b>SWELL</b> 45. <b>SWELL</b> 46. <b>SWELL</b> 47. <b>SWELL</b> 48. <b>SWELL</b> 49. <b>SWELL</b> 50. <b>SWELL</b> 51. <b>SWELL</b> 52. <b>SWELL</b> 53. <b>SWELL</b> 54. <b>SWELL</b> 55. <b>SWELL</b> 56. <b>SWELL</b> 57. <b>SWELL</b> 58. <b>SWELL</b> 59. <b>SWELL</b> 60. <b>SWELL</b> 61. <b>SWELL</b> 62. <b>SWELL</b> 63. <b>SWELL</b> 64. <b>SWELL</b> 65. <b>SWELL</b> 66. <b>SWELL</b> 67. <b>SWELL</b> 68. <b>SWELL</b> 69. <b>SWELL</b> 70. <b>SWELL</b> 71. <b>SWELL</b> 72. <b>SWELL</b> 73. <b>SWELL</b> 74. <b>SWELL</b> 75. <b>SWELL</b> 76. <b>SWELL</b> 77. <b>SWELL</b> 78. <b>SWELL</b> 79. <b>SWELL</b> 80. <b>SWELL</b> 81. <b>SWELL</b> 82. <b>SWELL</b> 83. <b>SWELL</b> 84. <b>SWELL</b> 85. <b>SWELL</b> 86. <b>SWELL</b> 87. <b>SWELL</b> 88. <b>SWELL</b> 89. <b>SWELL</b> 90. <b>SWELL</b> 91. <b>SWELL</b> 92. <b>SWELL</b> 93. <b>SWELL</b> 94. <b>SWELL</b> 95. <b>SWELL</b> 96. <b>SWELL</b> 97. <b>SWELL</b> 98. <b>SWELL</b> 99. <b>SWELL</b> 100. <b>SWELL</b>
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Date: _____ Page: _____		Title: _____ Author: _____	
Chapter: _____ Section: _____		Topic: _____ Subtopic: _____	
Summary: _____ Key points: _____		Conclusion: _____ Reflection: _____	



Site of collection		Local Name	Altitude	Number	
Date	2/10/67	Region, Province	5,825	75	10

No.	Species	Sex	Age	Weight	Length	Wing	Tail
1	<i>Alouatta palliata</i>	M	20	7	100	100	100
2	<i>Alouatta palliata</i>	M	1	1	100	100	100
3	<i>Alouatta palliata</i>	M	10	10	100	100	100
4	<i>Alouatta palliata</i>	M	10	10	100	100	100
5	<i>Alouatta palliata</i>	M	10	10	100	100	100
6	<i>Alouatta palliata</i>	M	10	10	100	100	100
7	<i>Alouatta palliata</i>	M	10	10	100	100	100
8	<i>Alouatta palliata</i>	M	10	10	100	100	100
9	<i>Alouatta palliata</i>	M	10	10	100	100	100
10	<i>Alouatta palliata</i>	M	10	10	100	100	100
11	<i>Alouatta palliata</i>	M	10	10	100	100	100
12	<i>Alouatta palliata</i>	M	10	10	100	100	100
13	<i>Alouatta palliata</i>	M	10	10	100	100	100
14	<i>Alouatta palliata</i>	M	10	10	100	100	100
15	<i>Alouatta palliata</i>	M	10	10	100	100	100
16	<i>Alouatta palliata</i>	M	10	10	100	100	100
17	<i>Alouatta palliata</i>	M	10	10	100	100	100
18	<i>Alouatta palliata</i>	M	10	10	100	100	100
19	<i>Alouatta palliata</i>	M	10	10	100	100	100
20	<i>Alouatta palliata</i>	M	10	10	100	100	100
21	<i>Alouatta palliata</i>	M	10	10	100	100	100
22	<i>Alouatta palliata</i>	M	10	10	100	100	100
23	<i>Alouatta palliata</i>	M	10	10	100	100	100
24	<i>Alouatta palliata</i>	M	10	10	100	100	100
25	<i>Alouatta palliata</i>	M	10	10	100	100	100
26	<i>Alouatta palliata</i>	M	10	10	100	100	100
27	<i>Alouatta palliata</i>	M	10	10	100	100	100
28	<i>Alouatta palliata</i>	M	10	10	100	100	100
29	<i>Alouatta palliata</i>	M	10	10	100	100	100
30	<i>Alouatta palliata</i>	M	10	10	100	100	100
31	<i>Alouatta palliata</i>	M	10	10	100	100	100
32	<i>Alouatta palliata</i>	M	10	10	100	100	100
33	<i>Alouatta palliata</i>	M	10	10	100	100	100
34	<i>Alouatta palliata</i>	M	10	10	100	100	100
35	<i>Alouatta palliata</i>	M	10	10	100	100	100
36	<i>Alouatta palliata</i>	M	10	10	100	100	100
37	<i>Alouatta palliata</i>	M	10	10	100	100	100
38	<i>Alouatta palliata</i>	M	10	10	100	100	100
39	<i>Alouatta palliata</i>	M	10	10	100	100	100
40	<i>Alouatta palliata</i>	M	10	10	100	100	100

[illegible]

[illegible]

East London 2012-2013		East London	East London (2012-2013)		East London (2012-2013)		East London (2012-2013)	
Age	Gender	Age	Gender	Age	Gender	Age	Gender	
10-14	Male	10-14	Male	10-14	Male	10-14	Male	
10-14	Female	10-14	Female	10-14	Female	10-14	Female	
15-19	Male	15-19	Male	15-19	Male	15-19	Male	
15-19	Female	15-19	Female	15-19	Female	15-19	Female	
20-24	Male	20-24	Male	20-24	Male	20-24	Male	
20-24	Female	20-24	Female	20-24	Female	20-24	Female	
25-29	Male	25-29	Male	25-29	Male	25-29	Male	
25-29	Female	25-29	Female	25-29	Female	25-29	Female	
30-34	Male	30-34	Male	30-34	Male	30-34	Male	
30-34	Female	30-34	Female	30-34	Female	30-34	Female	
35-39	Male	35-39	Male	35-39	Male	35-39	Male	
35-39	Female	35-39	Female	35-39	Female	35-39	Female	
40-44	Male	40-44	Male	40-44	Male	40-44	Male	
40-44	Female	40-44	Female	40-44	Female	40-44	Female	
45-49	Male	45-49	Male	45-49	Male	45-49	Male	
45-49	Female	45-49	Female	45-49	Female	45-49	Female	
50-54	Male	50-54	Male	50-54	Male	50-54	Male	
50-54	Female	50-54	Female	50-54	Female	50-54	Female	
55-59	Male	55-59	Male	55-59	Male	55-59	Male	
55-59	Female	55-59	Female	55-59	Female	55-59	Female	
60-64	Male	60-64	Male	60-64	Male	60-64	Male	
60-64	Female	60-64	Female	60-64	Female	60-64	Female	
65-69	Male	65-69	Male	65-69	Male	65-69	Male	
65-69	Female	65-69	Female	65-69	Female	65-69	Female	
70-74	Male	70-74	Male	70-74	Male	70-74	Male	
70-74	Female	70-74	Female	70-74	Female	70-74	Female	
75-79	Male	75-79	Male	75-79	Male	75-79	Male	
75-79	Female	75-79	Female	75-79	Female	75-79	Female	
80-84	Male	80-84	Male	80-84	Male	80-84	Male	
80-84	Female	80-84	Female	80-84	Female	80-84	Female	
85-89	Male	85-89	Male	85-89	Male	85-89	Male	
85-89	Female	85-89	Female	85-89	Female	85-89	Female	
90-94	Male	90-94	Male	90-94	Male	90-94	Male	
90-94	Female	90-94	Female	90-94	Female	90-94	Female	
95-99	Male	95-99	Male	95-99	Male	95-99	Male	
95-99	Female	95-99	Female	95-99	Female	95-99	Female	
100-104	Male	100-104	Male	100-104	Male	100-104	Male	
100-104	Female	100-104	Female	100-104	Female	100-104	Female	
105-109	Male	105-109	Male	105-109	Male	105-109	Male	
105-109	Female	105-109	Female	105-109	Female	105-109	Female	
110-114	Male	110-114	Male	110-114	Male	110-114	Male	
110-114	Female	110-114	Female	110-114	Female	110-114	Female	
115-119	Male	115-119	Male	115-119	Male	115-119	Male	
115-119	Female	115-119	Female	115-119	Female	115-119	Female	
120-124	Male	120-124	Male	120-124	Male	120-124	Male	
120-124	Female	120-124	Female	120-124	Female	120-124	Female	
125-129	Male	125-129	Male	125-129	Male	125-129	Male	
125-129	Female	125-129	Female	125-129	Female	125-129	Female	
130-134	Male	130-						

144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597
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[illegible]

Observer and Date		Survey Name	Plot Identifier	Numbers				
Date: 28/1/2017		Area: 100m x 100m	Plot: 1	100				
Plot	For all species recorded in each quadrat (including those recorded in adjacent quadrats)	Abundance	Frequency	Percentage	Percentage	Percentage	Percentage	Percentage
1	Grass	100	100	100	100	100	100	100
2	Grass	100	100	100	100	100	100	100
3	Grass	100	100	100	100	100	100	100
4	Grass	100	100	100	100	100	100	100
5	Grass	100	100	100	100	100	100	100
6	Grass	100	100	100	100	100	100	100
7	Grass	100	100	100	100	100	100	100
8	Grass	100	100	100	100	100	100	100
9	Grass	100	100	100	100	100	100	100
10	Grass	100	100	100	100	100	100	100
11	Grass	100	100	100	100	100	100	100
12	Grass	100	100	100	100	100	100	100
13	Grass	100	100	100	100	100	100	100
14	Grass	100	100	100	100	100	100	100
15	Grass	100	100	100	100	100	100	100
16	Grass	100	100	100	100	100	100	100
17	Grass	100	100	100	100	100	100	100
18	Grass	100	100	100	100	100	100	100
19	Grass	100	100	100	100	100	100	100
20	Grass	100	100	100	100	100	100	100
21	Grass	100	100	100	100	100	100	100
22	Grass	100	100	100	100	100	100	100
23	Grass	100	100	100	100	100	100	100
24	Grass	100	100	100	100	100	100	100
25	Grass	100	100	100	100	100	100	100
26	Grass	100	100	100	100	100	100	100
27	Grass	100	100	100	100	100	100	100
28	Grass	100	100	100	100	100	100	100
29	Grass	100	100	100	100	100	100	100
30	Grass	100	100	100	100	100	100	100
31	Grass	100	100	100	100	100	100	100
32	Grass	100	100	100	100	100	100	100
33	Grass	100	100	100	100	100	100	100
34	Grass	100	100	100	100	100	100	100
35	Grass	100	100	100	100	100	100	100
36	Grass	100	100	100	100	100	100	100
37	Grass	100	100	100	100	100	100	100
38	Grass	100	100	100	100	100	100	100
39	Grass	100	100	100	100	100	100	100
40	Grass	100	100	100	100	100	100	100
41	Grass	100	100	100	100	100	100	100
42	Grass	100	100	100	100	100	100	100
43	Grass	100	100	100	100	100	100	100
44	Grass	100	100	100	100	100	100	100
45	Grass	100	100	100	100	100	100	100
46	Grass	100	100	100	100	100	100	100
47	Grass	100	100	100	100	100	100	100
48	Grass	100	100	100	100	100	100	100
49	Grass	100	100	100	100	100	100	100
50	Grass	100	100	100	100	100	100	100

SAR Plot - Field Survey Form				Date of Survey (yr)	
Date		Survey Route	Plot Identifier	Recorder	
Year	Month	Day	Plot #	Recorder	Date
Year	Month	Day	Plot #	Recorder	Date
Description			Comments or Notes		
Vegetation Class			Comments		
Plant Community Type			Comments		

SAR Results (100% pass)		Test status
Group 1 Normal Reference	Time	22
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 2 Large Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 3 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 4 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 5 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 6 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 7 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 8 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 9 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 10 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 11 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 12 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 13 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 14 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 15 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 16 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 17 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 18 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 19 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 20 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 21 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 22 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 23 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 24 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 25 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 26 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 27 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 28 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 29 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 30 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 31 Small Reference	Time	23
	Monday	23
	Wednesday	13
	Friday	24
	Saturday	13
Group 32 Small Reference	Time	23
	Monday	23

Best Available Estimate:	10/1/2016	10/1/2016	10/1/2016	10/1/2016
Company Name: (to be filled)	10/1/2016	10/1/2016	10/1/2016	10/1/2016
Company Name: (to be filled)	10/1/2016	10/1/2016	10/1/2016	10/1/2016

[illegible]

Site ID: 1001, Date: 10/10/19		Surveyor: [Name]	Observer: [Name]	Weather: [Conditions]				
Sp. Code	Sp. Name	HT	LT	HT	LT	HT	LT	HT
1	<i>Phlox subulata</i>	10	10	10	10	10	10	10
2	<i>Salix glauca</i>	10	10	10	10	10	10	10
3	<i>Chamaenerion angustifolium</i>	10	10	10	10	10	10	10
4	<i>Geranium macranthum</i>	10	10	10	10	10	10	10
5	<i>Alnus incana</i>	10	10	10	10	10	10	10
6	<i>Salix glauca</i>	10	10	10	10	10	10	10
7	<i>Salix glauca</i>	10	10	10	10	10	10	10
8	<i>Salix glauca</i>	10	10	10	10	10	10	10
9	<i>Salix glauca</i>	10	10	10	10	10	10	10
10	<i>Salix glauca</i>	10	10	10	10	10	10	10
11	<i>Salix glauca</i>	10	10	10	10	10	10	10
12	<i>Salix glauca</i>	10	10	10	10	10	10	10
13	<i>Salix glauca</i>	10	10	10	10	10	10	10
14	<i>Salix glauca</i>	10	10	10	10	10	10	10
15	<i>Salix glauca</i>	10	10	10	10	10	10	10
16	<i>Salix glauca</i>	10	10	10	10	10	10	10
17	<i>Salix glauca</i>	10	10	10	10	10	10	10
18	<i>Salix glauca</i>	10	10	10	10	10	10	10
19	<i>Salix glauca</i>	10	10	10	10	10	10	10
20	<i>Salix glauca</i>	10	10	10	10	10	10	10
21	<i>Salix glauca</i>	10	10	10	10	10	10	10
22	<i>Salix glauca</i>	10	10	10	10	10	10	10
23	<i>Salix glauca</i>	10	10	10	10	10	10	10
24	<i>Salix glauca</i>	10	10	10	10	10	10	10
25	<i>Salix glauca</i>	10	10	10	10	10	10	10
26	<i>Salix glauca</i>	10	10	10	10	10	10	10
27	<i>Salix glauca</i>	10	10	10	10	10	10	10
28	<i>Salix glauca</i>	10	10	10	10	10	10	10
29	<i>Salix glauca</i>	10	10	10	10	10	10	10
30	<i>Salix glauca</i>	10	10	10	10	10	10	10

Site of Survey		Survey Date	Site Location	Observer	
Date		2/2/2019	Golden, Colorado, USA	J. J. J.	
ID	This section is used to list all species that were observed during the survey. All other information (e.g., number of individuals, etc.) should be recorded in the adjacent columns.	Number of Individuals	Number of Groups	Number of Pairs	Number of Flocks
1	Spizella socialis	10	1	1	1
2	Spizella socialis	10	1	1	1
3	Spizella socialis	10	1	1	1
4	Spizella socialis	10	1	1	1
5	Spizella socialis	10	1	1	1
6	Spizella socialis	10	1	1	1
7	Spizella socialis	10	1	1	1
8	Spizella socialis	10	1	1	1
9	Spizella socialis	10	1	1	1
10	Spizella socialis	10	1	1	1
11	Spizella socialis	10	1	1	1
12	Spizella socialis	10	1	1	1
13	Spizella socialis	10	1	1	1
14	Spizella socialis	10	1	1	1
15	Spizella socialis	10	1	1	1
16	Spizella socialis	10	1	1	1
17	Spizella socialis	10	1	1	1
18	Spizella socialis	10	1	1	1
19	Spizella socialis	10	1	1	1
20	Spizella socialis	10	1	1	1
21	Spizella socialis	10	1	1	1
22	Spizella socialis	10	1	1	1
23	Spizella socialis	10	1	1	1
24	Spizella socialis	10	1	1	1
25	Spizella socialis	10	1	1	1
26	Spizella socialis	10	1	1	1
27	Spizella socialis	10	1	1	1
28	Spizella socialis	10	1	1	1
29	Spizella socialis	10	1	1	1
30	Spizella socialis	10	1	1	1
31	Spizella socialis	10	1	1	1
32	Spizella socialis	10	1	1	1
33	Spizella socialis	10	1	1	1
34	Spizella socialis	10	1	1	1
35	Spizella socialis	10	1	1	1
36	Spizella socialis	10	1	1	1
37	Spizella socialis	10	1	1	1
38	Spizella socialis	10	1	1	1
39	Spizella socialis	10	1	1	1
40	Spizella socialis	10	1	1	1
41	Spizella socialis	10	1	1	1
42	Spizella socialis	10	1	1	1
43	Spizella socialis	10	1	1	1
44	Spizella socialis	10	1	1	1
45	Spizella socialis	10	1	1	1
46	Spizella socialis	10	1	1	1
47	Spizella socialis	10	1	1	1
48	Spizella socialis	10	1	1	1
49	Spizella socialis	10	1	1	1
50	Spizella socialis	10	1	1	1



[illegible]

2008-2009		2009-2010		2010-2011		2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017		2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2028-2029		2029-2030		2030-2031		2031-2032		2032-2033		2033-2034		2034-2035		2035-2036		2036-2037		2037-2038		2038-2039		2039-2040		2040-2041		2041-2042		2042-2043		2043-2044		2044-2045		2045-2046		2046-2047		2047-2048		2048-2049		2049-2050		2050-2051		2051-2052		2052-2053		2053-2054		2054-2055		2055-2056		2056-2057		2057-2058		2058-2059		2059-2060		2060-2061		2061-2062		2062-2063		2063-2064		2064-2065		2065-2066		2066-2067		2067-2068		2068-2069		2069-2070		2070-2071		2071-2072		2072-2073		2073-2074		2074-2075		2075-2076		2076-2077		2077-2078		2078-2079		2079-2080		2080-2081		2081-2082		2082-2083		2083-2084		2084-2085		2085-2086		2086-2087		2087-2088		2088-2089		2089-2090		2090-2091		2091-2092		2092-2093		2093-2094		2094-2095		2095-2096		2096-2097		2097-2098		2098-2099		2099-2100		2100-2101		2101-2102		2102-2103		2103-2104		2104-2105		2105-2106		2106-2107		2107-2108		2108-2109		2109-2110		2110-2111		2111-2112		2112-2113		2113-2114		2114-2115		2115-2116		2116-2117		2117-2118		2118-2119		2119-2120		2120-2121		2121-2122		2122-2123		2123-2124		2124-2125		2125-2126		2126-2127		2127-2128		2128-2129		2129-2130		2130-2131		2131-2132		2132-2133		2133-2134		2134-2135		2135-2136		2136-2137		2137-2138		2138-2139		2139-2140		2140-2141		2141-2142		2142-2143		2143-2144		2144-2145		2145-2146		2146-2147		2147-2148		2148-2149		2149-2150		2150-2151		2151-2152		2152-2153		2153-2154		2154-2155		2155-2156		2156-2157		2157-2158		2158-2159		2159-2160		2160-2161		2161-2162		2162-2163		2163-2164		2164-2165		2165-2166		2166-2167		2167-2168		2168-2169		2169-2170		2170-2171		2171-2172		2172-2173		2173-2174		2174-2175		2175-2176		2176-2177		2177-2178		2178-2179		2179-2180		2180-2181		2181-2182		2182-2183		2183-2184		2184-2185		2185-2186		2186-2187		2187-2188		2188-2189		2189-2190		2190-2191		2191-2192		2192-2193		2193-2194		2194-2195		2195-2196		2196-2197		2197-2198		2198-2199		2199-2200		2200-2201		2201-2202		2202-2203		2203-2204		2204-2205		2205-2206		2206-2207		2207-2208		2208-2209		2209-2210		2210-2211		2211-2212		2212-2213		2213-2214		2214-2215		2215-2216		2216-2217		2217-2218		2218-2219		2219-2220		2220-2221		2221-2222		2222-2223		2223-2224		2224-2225		2225-2226		2226-2227		2227-2228		2228-2229		2229-2230		2230-2231		2231-2232		2232-2233		2233-2234		2234-2235	
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Date of visit, month, day		Survey Date	Site Number	Observer
1987	03	10	1000	J. Smith
Site	Time	Temp	Wind	Humidity
1	08:00	15.0	10	80
2	08:30	15.5	12	82
3	09:00	16.0	15	85
4	09:30	16.5	18	88
5	10:00	17.0	20	90
6	10:30	17.5	22	92
7	11:00	18.0	25	95
8	11:30	18.5	28	98
9	12:00	19.0	30	100
10	12:30	19.5	32	100
11	13:00	20.0	35	100
12	13:30	20.5	38	100
13	14:00	21.0	40	100
14	14:30	21.5	42	100
15	15:00	22.0	45	100
16	15:30	22.5	48	100
17	16:00	23.0	50	100
18	16:30	23.5	52	100
19	17:00	24.0	55	100
20	17:30	24.5	58	100
21	18:00	25.0	60	100
22	18:30	25.5	62	100
23	19:00	26.0	65	100
24	19:30	26.5	68	100
25	20:00	27.0	70	100
26	20:30	27.5	72	100
27	21:00	28.0	75	100
28	21:30	28.5	78	100
29	22:00	29.0	80	100
30	22:30	29.5	82	100
31	23:00	30.0	85	100
32	23:30	30.5	88	100
33	00:00	31.0	90	100
34	00:30	31.5	92	100
35	01:00	32.0	95	100
36	01:30	32.5	98	100
37	02:00	33.0	100	100
38	02:30	33.5	100	100
39	03:00	34.0	100	100
40	03:30	34.5	100	100
41	04:00	35.0	100	100
42	04:30	35.5	100	100
43	05:00	36.0	100	100
44	05:30	36.5	100	100
45	06:00	37.0	100	100
46	06:30	37.5	100	100
47	07:00	38.0	100	100
48	07:30	38.5	100	100
49	08:00	39.0	100	100
50	08:30	39.5	100	100
51	09:00	40.0	100	100
52	09:30	40.5	100	100
53	10:00	41.0	100	100
54	10:30	41.5	100	100
55	11:00	42.0	100	100
56	11:30	42.5	100	100
57	12:00	43.0	100	100
58	12:30	43.5	100	100
59	13:00	44.0	100	100
60	13:30	44.5	100	100
61	14:00	45.0	100	100
62	14:30	45.5	100	100
63	15:00	46.0	100	100
64	15:30	46.5	100	100
65	16:00	47.0	100	100
66	16:30	47.5	100	100
67	17:00	48.0	100	100
68	17:30	48.5	100	100
69	18:00	49.0	100	100
70	18:30	49.5	100	100
71	19:00	50.0	100	100
72	19:30	50.5	100	100
73	20:00	51.0	100	100
74	20:30	51.5	100	100
75	21:00	52.0	100	100
76	21:30	52.5	100	100
77	22:00	53.0	100	100
78	22:30	53.5	100	100
79	23:00	54.0	100	100
80	23:30	54.5	100	100
81	00:00	55.0	100	100
82	00:30	55.5	100	100
83	01:00	56.0	100	100
84	01:30	56.5	100	100
85	02:00	57.0	100	100
86	02:30	57.5	100	100
87	03:00	58.0	100	100
88	03:30	58.5	100	100
89	04:00	59.0	100	100
90	04:30	59.5	100	100
91	05:00	60.0	100	100
92	05:30	60.5	100	100
93	06:00	61.0	100	100
94	06:30	61.5	100	100
95	07:00	62.0	100	100
96	07:30	62.5	100	100
97	08:00	63.0	100	100
98	08:30	63.5	100	100
99	09:00	64.0	100	100
100	09:30	64.5	100	100

All models were fitted using maximum likelihood estimation. The model fit was evaluated using the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC). The model with the lowest AIC and BIC values was considered the best model. The model fit was also evaluated using the likelihood ratio test (LRT). The LRT compares the fit of two models, where the null hypothesis is that the simpler model is adequate. The LRT statistic is calculated as  $-2 \ln(L_1/L_2)$ , where  $L_1$  and  $L_2$  are the likelihoods of the two models. The LRT statistic is compared to a chi-squared distribution with degrees of freedom equal to the difference in the number of parameters between the two models. The p-value for the LRT is then calculated. The model with the lower p-value is considered the better model. The model fit was also evaluated using the deviance information criterion (DIC). The DIC is a measure of the model fit that takes into account the complexity of the model. The DIC is calculated as  $-2 \ln(L(\hat{\theta})) + \text{tr}(S)$ , where  $L(\hat{\theta})$  is the likelihood of the model with the estimated parameters  $\hat{\theta}$ , and  $S$  is the sum of the squared standardized residuals. The model with the lowest DIC is considered the best model. The model fit was also evaluated using the cross-validated log-likelihood (CVLL). The CVLL is a measure of the model fit that takes into account the model's ability to generalize to new data. The CVLL is calculated as  $-2 \ln(L(\hat{\theta})) + \text{tr}(S_{cv})$ , where  $L(\hat{\theta})$  is the likelihood of the model with the estimated parameters  $\hat{\theta}$ , and  $S_{cv}$  is the sum of the squared standardized residuals for the cross-validated data. The model with the lowest CVLL is considered the best model. The model fit was also evaluated using the integrated log-likelihood (ILL). The ILL is a measure of the model fit that takes into account the model's ability to generalize to new data. The ILL is calculated as  $-2 \ln(L(\hat{\theta})) + \text{tr}(S_{ill})$ , where  $L(\hat{\theta})$  is the likelihood of the model with the estimated parameters  $\hat{\theta}$ , and  $S_{ill}$  is the sum of the squared standardized residuals for the integrated data. The model with the lowest ILL is considered the best model. The model fit was also evaluated using the deviance information criterion (DIC). The DIC is a measure of the model fit that takes into account the complexity of the model. The DIC is calculated as  $-2 \ln(L(\hat{\theta})) + \text{tr}(S)$ , where  $L(\hat{\theta})$  is the likelihood of the model with the estimated parameters  $\hat{\theta}$ , and  $S$  is the sum of the squared standardized residuals. The model with the lowest DIC is considered the best model. The model fit was also evaluated using the cross-validated log-likelihood (CVLL). The CVLL is a measure of the model fit that takes into account the model's ability to generalize to new data. The CVLL is calculated as  $-2 \ln(L(\hat{\theta})) + \text{tr}(S_{cv})$ , where  $L(\hat{\theta})$  is the likelihood of the model with the estimated parameters  $\hat{\theta}$ , and  $S_{cv}$  is the sum of the squared standardized residuals for the cross-validated data. The model with the lowest CVLL is considered the best model. The model fit was also evaluated using the integrated log-likelihood (ILL). The ILL is a measure of the model fit that takes into account the model's ability to generalize to new data. The ILL is calculated as  $-2 \ln(L(\hat{\theta})) + \text{tr}(S_{ill})$ , where  $L(\hat{\theta})$  is the likelihood of the model with the estimated parameters  $\hat{\theta}$ , and  $S_{ill}$  is the sum of the squared standardized residuals for the integrated data. The model with the lowest ILL is considered the best model.

ATTACHMENT C  
VEGETATION INTEGRITY (SITE CONDITION) DATA (AMBS, 2017a)

**Table C1**  
**Vegetation Integrity (Site Condition) Data**

Plot	PCT	Condition Class	Zone	Easting	Northing	Bearing	Composition Tree	Composition Shrub	Composition Grass	Composition Forbs	Composition Ferns	Composition Other	Strucutre Tree	Strucutre Shrub	Strucutre Grass	Strucutre Forbs	Strucutre Ferns	Strucutre Other	Function Large Trees	Function Hollow Trees	Function Litter Cover	Function Length Fallen Logs	Function Tree Stem 5 to 10	Function Tree Stem 10 to 20	Function Tree Stem 20 to 30	Function Tree Stem 30 to 50	Function Tree Stem 50 to 80	Function Tree Regen	Function High Threat Exotic
SB01	217	Derived native grass land (Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217))	55	537392	6371200	0	0	0	7	11	0	1	0	0	15.9	4.7	0	0.1	0	0	18	0	0	0	0	0	0	0	0
SB02	217	Derived native grass land (Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217))	55	537650	6371481	0	0	0	9	10	1	1	0	0	3.4	2.3	0.1	35	0	0	28	0	0	0	0	0	0	0	0
SB05	217	Derived native grass land (Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217))	55	537673	6371166	0	0	0	5	14	0	1	0	0	10.9	4.9	0	0.3	0	0	25	0	0	0	0	0	0	0	0
SB09	217	Derived native grass land (Previously cleared land with regrowth of predominantly native grasses, herbs and low shrubs (PCT 217))	55	538000	6371757	0	0	0	11	5	1	0	0	0	26.1	1.3	0.1	0	0	0	35	0	0	0	0	0	0	0	0

Source: AMBS (2017a)

ATTACHMENT D  
REVIEW OF MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

**Table D1**  
**Review of Matters of National Environmental Significance**

Scientific Name	Common Name	Conservation Status <sup>1</sup>		Class of Credit	Table in the Main Text	Protected Matters Search	Potential impact
		BC Act	EPBC Act				
<b>Ecological Community</b>							
<i>Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia</i>		E	E	Ecosystem	-	•	Derived Native Grassland (PCT 82) (Vegetation Community 2) is a degraded example of this community (Attachment B). The Modification would not impact this community.
<b>Birds</b>							
<i>Leipoa ocellata</i>	Malleefowl	E	V	Ecosystem	Table 3	•	No significant impact expected to occur. Suitable habitat for this species is not present within the Development Site Footprint (AMBS, 2017)
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	Species / Ecosystem	-	•	No significant impact expected to occur due to the lack of potential habitat in the Development Site Footprint.
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	Species / Ecosystem	-	•	No significant impact expected to occur. Suitable habitat for this species is not present within the Development Site Footprint (AMBS, 2017)
<i>Numenius madagascariensis</i>	Eastern Curlew	-	CE	Species / Ecosystem	-	•	No significant impact expected to occur. Suitable habitat for this species is not present within the Development Site Footprint (AMBS, 2017)
<i>Lathamus discolor</i>	Swift Parrot	E	CE	Species / Ecosystem	Tables 3 and 4	-	No significant impact expected to occur due to the lack of potential habitat in the Development Site Footprint.



**Table D1 (Continued)**  
**Review of Matters of National Environmental Significance**

Scientific Name	Common Name	Conservation Status <sup>1</sup>		Class of Credit	Table in the Main Text	Protected Matters Search	Potential impact
		BC Act	EPBC Act				
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	Species / Ecosystem	Tables 3 and 4	•	No significant impact expected to occur due to the lack of potential habitat in the Development Site Footprint.
<i>Grantiella picta</i>	Painted Honeyeater	V	V	Ecosystem	Table 3	•	No significant impact expected to occur due to the lack of potential habitat in the Development Site Footprint.
<i>Pedionomus torquatus</i>	Plains-wanderer	E	CE	Species / Ecosystem	-	•	No significant impact expected to occur. Suitable habitat for this species is not present within the Development Site Footprint (AMBS, 2017)
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	Ecosystem	-	•	No significant impact expected to occur. Suitable habitat for this species is not present within the Development Site Footprint (AMBS, 2017)
<b>Mammals</b>							
<i>Dasyurus maculatus maculatus</i> (south-eastern mainland population)	Spotted-tailed Quoll	V	E	Ecosystem	Table 3	•	No significant impact expected to occur. Suitable habitat for this species is not present within the Development Site Footprint
<i>Phascolarctos cinereus</i>	Koala	V	V	Species / Ecosystem	Tables 3 and 4	•	No significant impact expected to occur due to the lack of potential habitat in the Development Site Footprint.
<i>Nyctophilus corbeni</i>	^Corben's Long-eared Bat	V	V	Ecosystem	Table 5	-	No significant impact expected to occur due to the lack of potential habitat in the Development Site Footprint.

**Table D1 (Continued)**  
**Review of Matters of National Environmental Significance**

Scientific Name	Common Name	Conservation Status <sup>1</sup>		Class of Credit	Table in the Main Text	Protected Matters Search	Potential impact
		BC Act	EPBC Act				
<i>Chalinolobus dwyeri</i>	^Large-eared Pied Bat	V	V	Species	Table 5	-	No significant impact expected to occur. Suitable habitat for this species is not present within the Development Site Footprint
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Species / Ecosystem	-	•	No significant impact expected to occur. Any trees with potential roosting habitat for this species were avoided and no camps have been identified within the Development Site Footprint (AMBS, 2017).

<sup>1</sup> Threatened fauna species status under the BC Act and/or EPBC Act (current as at December 2017).

V = Vulnerable; E = Endangered, CE = Critically Endangered

^ unconfirmed calls possibly recorded via bat recording devices.

**References:**

AMBS Ecology and Heritage (2017a) *Clean TeQ Sunrise Project Accommodation Camp - Ecological Surveys*.

DEE (2017c) *EPBC Protected Matters Report for Search Area: -32.7133 147.2862,-32.6858 147.5002,-32.8647 147.5285,-32.8897 147.3194,-32.7133 147.2862*. Date received: November 2017.

## ATTACHMENT E

### BIODIVERSITY ASSESSMENT METHOD CREDIT CALCULATOR BIODIVERSITY CREDIT REPORT



## BAM Biodiversity Credit Report (Like for like)

---

### Proposal Details

Assessment Id

00009503/BAAS17080/17/00009504

Proposal Name

Clean TeQ Sunrise Project  
Accommodation Camp

Report Created

22/12/2017

Assessor Name

Jamie Gleeson

Assessor Number

0

Proponent Names

### Candidate Serious and Irreversible Impacts

No Data

No Data

### Additional Information for Approval

PCTs With Customized Benchmarks

No Changes



## BAM Biodiversity Credit Report (Like for like)

Predicted Threatened Species Not On Site

No Changes

### Ecosystem Credit Summary

PCT	TEC	Area	Credits
217-Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South Western Slopes Bioregion	Not a TEC	27.5	200.00

Credit classes for 217	Like-for-like options			
	Any PCT in the below Class	And in any of below trading groups	Containing HBT	In the below IBRA subregions
	Western Slopes Dry Sclerophyll Forests (including PCT's 54, 110, 217, 255, 273, 287, 330, 333, 341, 343, 346, 348, 358, 403, 455, 456, 472, 577, 581, 592, 617, 673, 676, 713, 940, 956, 1277, 1279, 1313, 1316, 1381, 1610, 1661, 1668, 1709 )	Western Slopes Dry Sclerophyll Forests - $\geq 50\%$ - $< 70\%$ cleared group (including Tier 6 or higher).	No	Nymagee, Barnato Downs, Bogan-Macquarie, Canbelego Downs, Darling Depression, Lachlan Plains and Lower Slopes. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.



## BAM Biodiversity Credit Report (Like for like)

---

### | Species Credit Summary

No Species Credit Data



# CLEAN TEQ SUNRISE PROJECT

## ACCOMMODATION CAMP MODIFICATION

### ENVIRONMENTAL ASSESSMENT

### APPENDIX B

### Aboriginal Cultural Heritage Assessment

**Clean TeQ Sunrise Project – Accommodation  
Camp Modification**

# **Aboriginal Cultural Heritage Assessment**



**Report to Clean TeQ Holdings Limited  
December 2017**

*Landscape*

a division of ML Copper Pty Ltd  
ABN 48 107 932 918

PO Box 1068 Carlton 3053

e-mail: [landscape@telstra.com](mailto:landscape@telstra.com)

tel: 0408 006 690

Clean TeQ Holdings Limited

## **Clean TeQ Sunrise Project – Accommodation Camp Modification**

# **Aboriginal Cultural Heritage Assessment**

Local Government Area: Lachlan

Nearest Town: Fifield



PO Box 1068 Carlton 3053  
e-mail: [landscape@telstra.com](mailto:landscape@telstra.com)  
tel: 0408 006 690

**Author: Dr Matt Cupper**  
**Date: 14 December 2017**

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## EXECUTIVE SUMMARY

Scandium21 Pty Ltd is the proponent of the approved Clean TeQ Sunrise Project (the Project), near Fifield, approximately 60 kilometres north of Condobolin in central western New South Wales (NSW) (**Figures 1 and 2**). Scandium21 Pty Ltd is a wholly owned subsidiary of Clean TeQ Holdings Limited (Clean TeQ).

The approved Project includes the establishment and operation of the nickel cobalt scandium mine and processing facility, limestone quarry and processing facility, rail loading and unloading facility, gas pipeline, borefields and water pipeline, and associated road infrastructure upgrades. Open cut mining and processing of ore to produce up to 180 tonnes per annum (tpa) of scandium oxide and 40,000 tpa of nickel and cobalt metal equivalents (as either sulphide or sulphate precipitate products) are approved at the mine processing facility. Construction of the Project commenced in 2006 with the construction of components of the borefields, however Project operations are yet to commence.

An Environmental Impact Statement (EIS) was prepared in late 2000 by then-proponent Black Range Minerals, as a requirement to apply for Development Consent for the Project. The existing environment, potential environmental impacts, mitigation measures and environmental management, rehabilitation and monitoring strategies associated with the approved Project are documented in the EIS. An archaeological investigation (Appleton, 2000) was prepared as part of the EIS. The Project was granted Development Consent (DA 374-11-00) in May 2001, with several modifications since that time.

Clean TeQ is seeking to modify the existing Development Consent (DA 374-11-00) to (amongst other elements) construct and operate an accommodation camp on the “Sunrise” property adjacent to the approved mine area. This proposal is herein referred to as “the Modification”. To this end, Clean TeQ commissioned Landskape Natural and Cultural Heritage Management to undertake an Aboriginal Cultural Heritage Assessment of the Modification.

This report presents an assessment of the Aboriginal cultural heritage related issues for the Modification in accordance with the relevant requirements of the various advisory documents and guidelines.

No Aboriginal cultural heritage sites have previously been recorded in or immediately adjacent to the Modification area. The present survey encountered four Aboriginal cultural heritage sites in the Modification area. These sites are three stone artefact sites (with one or two artefacts at each) (Aboriginal Heritage Information Management System [AHIMS] site numbers 35-4-0034, 35-4-0035, and 35-4-0036) and a hearth site (AHIMS site number 35-4-0037).

Harm can be avoided to the hearth site (AHIMS site number 35-4-0037) near the proposed disturbance area for the Modification.

Three Aboriginal cultural heritage sites are located within proposed disturbance areas for the Modification. The Aboriginal cultural heritage sites are three stone artefact sites (with one or two artefacts at each) (AHIMS site numbers 35-4-0034, 35-4-0035, and 35-4-0036). This assessment has concluded that these sites are not of high scientific significance.

Based on the results of this cultural heritage investigation and consultation with representatives of the Registered Aboriginal Parties (RAPs) the following is recommended:

- Harm to the hearth site (AHIMS site number 35-4-0037) must be avoided. A temporary barrier should be erected around the site (a minimum 10 metre radius buffer).

- Clean TeQ apply for an Aboriginal Heritage Impact Permit (AHIP) (or variation to the existing approved AHIP #C0003049) to collect Aboriginal objects at the three known stone artefact sites (AHIMS site numbers 35-4-0034, 35-4-0035, 35-4-0036) and any additional Aboriginal objects located within the disturbance areas for the Modification. A suitably qualified archaeologist and representatives of the local Aboriginal community should be engaged to record and collect the Aboriginal objects. These items should be properly curated and stored at the approved “Keeping Place”. Following the relinquishment of the mining lease for the mine, artefacts should be replaced within rehabilitated areas in consultation with local Aboriginal groups and the NSW Office of Environment and Heritage (OEH).
- In the unlikely event that human skeletal remains are encountered during the course of activities associated with the Modification, all work in that area must cease. Remains must not be handled or otherwise disturbed except to prevent further disturbance. Clean TeQ should notify the Police or the State Coroner’s Office (tel: 02 9552 4066) immediately. If there is reason to suspect that the skeletal remains are more than 100 years old and of Aboriginal origin, Clean TeQ should contact the OEH’s Environmental Line (tel: 131 555) for advice. In the unlikely event that an Aboriginal burial is encountered, strategies for its management would need to be developed with the involvement of the local Aboriginal community.
- The Project *Heritage Management Plan* (HMP), which outlines the management and mitigation measures for Aboriginal cultural heritage, should be updated in consultation with the Aboriginal community and the OEH and should incorporate the Modification and the recommendations of this assessment. The HMP should continue to remain active for the life of the Modification and define the tasks, scope and conduct of all Aboriginal cultural heritage management activities.
- Clean TeQ should continue to provide training to all on-site personnel regarding the HMP strategies relevant to their employment tasks.
- Clean TeQ should continue to involve the RAPs and any other relevant Aboriginal community groups or members in matters pertaining to the Modification.

## 1 INTRODUCTION

Scandium21 Pty Ltd is the proponent of the approved Clean TeQ Sunrise Project (the Project), a wholly owned subsidiary of Clean TeQ Holdings Limited (Clean TeQ). The Project is situated approximately 350 kilometres (km) west-northwest of Sydney, near the village of Fifield, New South Wales (NSW) (**Figures 1 and 2**).

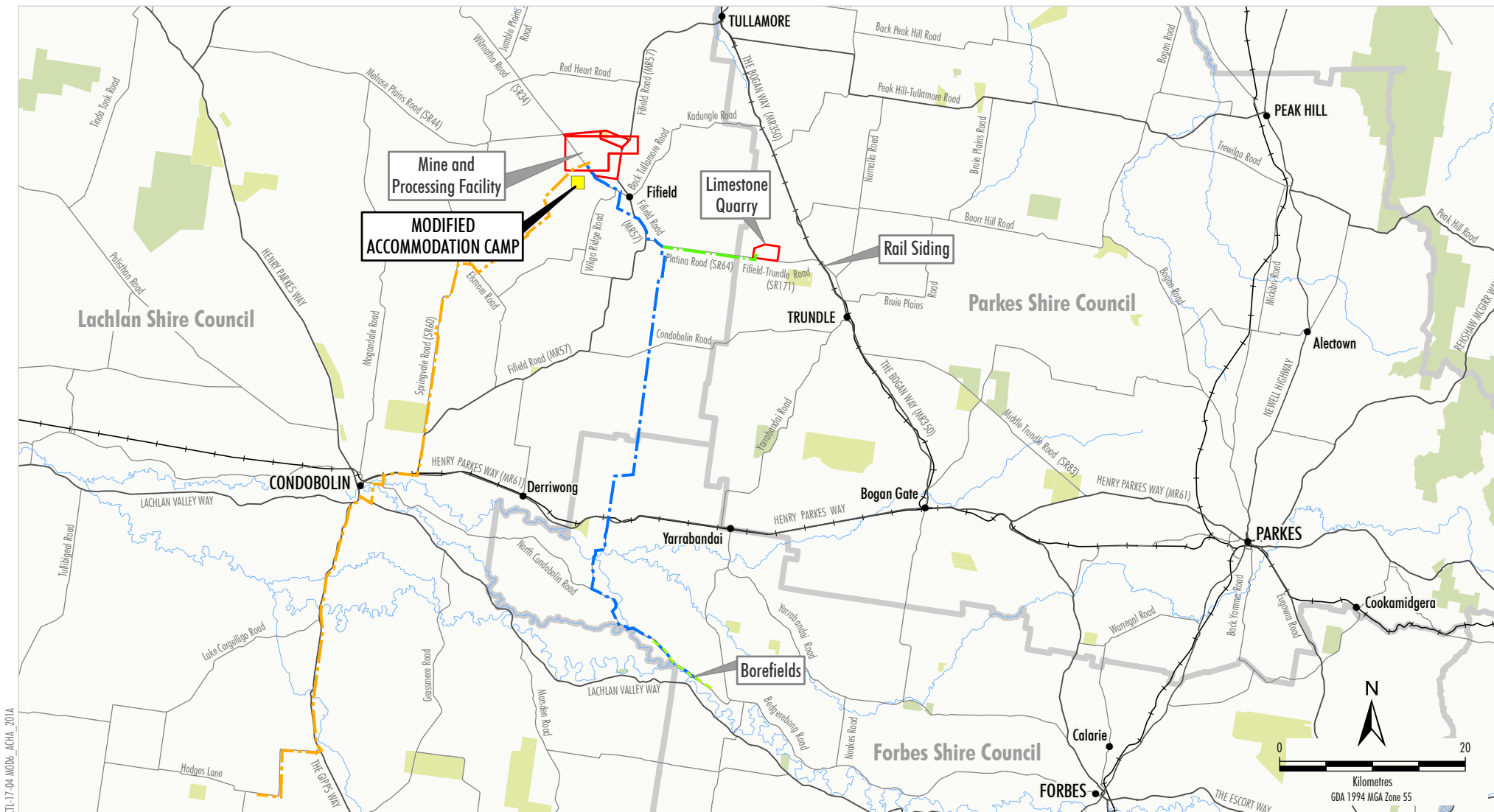
The approved Project includes the establishment and operation of the nickel cobalt scandium mine and processing facility, limestone quarry and processing facility, rail loading and unloading facility, natural gas pipeline, borefields and water pipeline, and associated road infrastructure upgrades. Open cut mining and processing of ore to produce up to 180 tonnes per annum (tpa) of scandium oxide and 40,000 tpa of nickel and cobalt metal equivalents (as either sulphide or sulphate precipitate products) are approved at the mine processing facility. Construction of the Project commenced in 2006 with the construction of components of the borefields, however Project operations are yet to commence.

An Environmental Impact Statement (EIS) was prepared in late 2000 by then-proponent Black Range Minerals, as a requirement to apply for Development Consent for the Project. The existing environment, potential environmental impacts, mitigation measures and environmental management, rehabilitation and monitoring strategies associated with the approved Project are documented in the EIS. An archaeological investigation (see Appleton, 2000) was prepared as part of the EIS. The Project was granted Development Consent (DA 374-11-00) in May 2001, with several modifications since that time.

Clean TeQ is seeking to modify the existing Development Consent (DA 374-11-00) under section 75W of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) to (amongst other elements) construct and operate an accommodation camp on the “Sunrise” property adjacent to the approved mine area. This proposal is herein referred to as “the Modification”. To this end, Clean TeQ commissioned Landskape Natural and Cultural Heritage Management (Landskape) to undertake an Aboriginal Cultural Heritage Assessment (ACHA) of the Modification.

This report presents an assessment of the potential Aboriginal cultural heritage related issues for the Modification in accordance with the relevant requirements of the various advisory documents and guidelines. These guidelines and documents include (but are not limited to):

- *Aboriginal cultural heritage consultation requirements for proponents 2010* (Part 6 *National Parks and Wildlife Act, 1974* [NP&W Act]) (Consultation Guidelines) (NSW Department of Environment, Climate Change and Water [DECCW], 2010a).
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b).
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (NSW Office of Environment and Heritage [OEH], 2011).
- *The Burra Charter: The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance* (Australia International Council on Monuments and Sites, 2013).
- *Aboriginal Cultural Heritage: Standards and Guidelines Kit* (NSW National Parks and Wildlife Service, 1997).
- *Ask First: A Guide to Respecting Indigenous Heritage Places and Values* (Australian Heritage Commission, 2002).
- *NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects* (NSW Minerals Council, 2010).
- *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010c).



CTL-17-04 MOD6\_ACHA\_201A



- LEGEND**
- National Park/Conservation Area
  - State Forest
  - Local Government Boundary
  - Mining Lease Application Boundary
  - Approved Water Pipeline
  - Approved Limestone Quarry Water Pipeline
  - Approved Gas Pipeline
  - Approved Borefield Infrastructure Corridor

Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017); Office of Environment and Heritage NSW (2017)

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**Project Location**

**Figure 1**



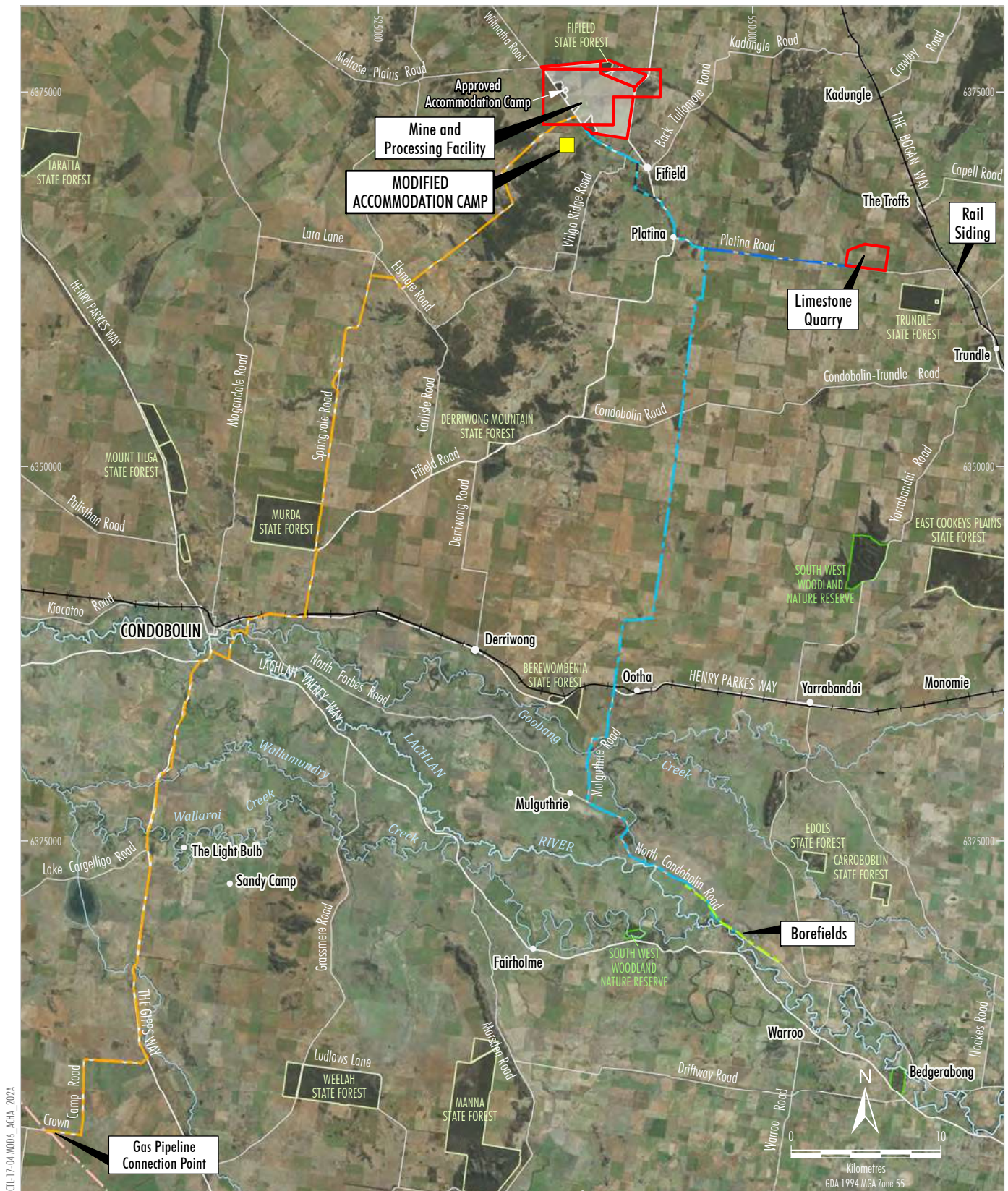


Figure 2

- *Engage Early – Guidance for proponents on best practice Indigenous engagement for environmental assessments under the Environment and Protection and Biodiversity Conservation Act 1999 (EPBC Act)* (Commonwealth Department of the Environment, 2016).

This ACHA would be used to support an application for an Aboriginal Heritage Impact Permit (AHIP) under section 90 of the NP&W Act (and/or a variation application to the existing approved AHIP #C0003049).

### 1.1 OBJECTIVES OF STUDY

The specific objectives of the ACHA were to:

- consult the local Aboriginal community to identify any concerns they may have (consultation with the Aboriginal community followed the requirements of the Consultation Guidelines [DECCW, 2010a]);
- conduct a desktop assessment (including heritage register searches) to delineate areas of known and predicted Aboriginal cultural heritage within the Modification area;
- undertake a stratified archaeological survey of known and predicted Aboriginal cultural heritage identified in the desktop assessment with representatives of the local Aboriginal community;
- record any Aboriginal cultural heritage sites within the Modification area and assess their significance;
- identify the nature and extent of approved impacts of the Modification on Aboriginal cultural heritage; and
- develop measures in consultation with the Aboriginal community to avoid or mitigate potential impacts of the approved Modification on Aboriginal cultural heritage places and objects.

Preparation of this report involved collation of relevant archival, archaeological, historical and environmental information and the use of aerial photographs and topographic and geomorphic maps to identify areas likely to contain Aboriginal cultural heritage sites.

### 1.2 STRUCTURE OF THIS REPORT

This ACHA has been prepared in consideration of the requirements of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b) and as such includes the following specific information:

- |            |   |
|------------|---|
| Section 1: | Outlines the Modification and the objectives and structure of this report.  |
| Section 2: | Lists the investigators and contributors involved with this report.   |
| Section 3: | Provides a summary description of the existing Project and the Modification and the Modification area being considered in this ACHA.  |
| Section 4: | Details the consultation and partnership with the Aboriginal community.   |
| Section 5: | Outlines the landscape context and includes descriptions of land use history, geology and vegetation within the Modification area.  |
| Section 6: | Provides background information and a description of previous archaeological works, including relevant ethno-history and the regional archaeological context for the Modification area. |



- Section 7: Describes the current predictive model for the Modification area including archaeological survey and data collection, information regarding the method of the survey and a description of the areas surveyed. The results of the survey area are presented in this section. Also provides a consideration of cultural values/significance.
- Section 8: Assesses the archaeological significance of the Modification Area and provides a discussion and analysis of these results. Also provides a consideration of cultural values/significance.
- Section 9: Assesses the impact of the Modification on Aboriginal cultural heritage.
- Section 10: Describes the management, mitigation measures and recommendations.
- Section 11: Provides a summary of the recommendations.
- Section 12: Lists the references cited in this report.
- Appendix 1: Provides a glossary of commonly used terms in this report.
- Appendix 2: Provides a log of consultation carried out for the Modification relevant to Aboriginal cultural heritage.
- Appendix 3: Provides a summary of correspondence to Aboriginal community stakeholders.
- Appendix 4: Provides a summary of correspondence from Aboriginal community stakeholders.
- Appendix 5: Provides the Aboriginal Heritage Information Management System (AHIMS) Register search results.
- Appendix 6: Provides relevant cadastre information.

## 2 INVESTIGATORS AND CONTRIBUTORS

Landscape was commissioned by Clean TeQ to complete the ACHA for the Modification and to prepare this report.

Dr Matt Cupper, a qualified archaeologist and geoscientist with 18 years' experience as a cultural heritage advisor, was Landscape's project archaeologist for the Modification.

The field investigation for the modification was completed on 30 October 2017 by project archaeologist Dr Matt Cupper, with the assistance of the following Aboriginal community representatives: Tiara Dunn (Murie Elders Group), Joseph Coe (Wiradjuri Condobolin Corporation), Jamie Gray (Binjang Wellington Wiradjuri Aboriginal Heritage Survey), Leeanne Hampton (West Wyalong Local Aboriginal Land Council [LALC]), Andrew (Condobolin LALC), Joe Peckham (Joshua Aboriginal Corporation Dandaloo District) and Louise Davis.

Community consultation pursuant to the Consultation Guidelines (DECCW, 2010a) was managed by Clean TeQ.

### 3 DESCRIPTION OF THE MODIFICATION

#### 3.1 THE APPROVED PROJECT

Development Consent (DA 374-11-00) for the Project was issued under Part 4 of the EP&A Act in 2001. The Development Consent (DA 374-11-00) has been modified on three occasions since it was issued:

- 2005 – to allow for the increase of run-of-mine ore processing rate, limestone quarry extraction rate and adjustments to ore procession operations.
- 2006 – to allow for the reconfiguration of the water supply borefield.
- 2017 – to allow for an initial scandium oxide focused production phase prior to refocusing on nickel and cobalt precipitate production by developing the full Project with additional scandium oxide production.

The approved Project is presented on **Figure 2** and includes the establishment and operation of the following:

- nickel cobalt scandium mine and processing facility;
- limestone quarry and processing facility;
- rail loading and unloading facility;
- natural gas pipeline;
- borefields and water pipeline; and
- associated transport and infrastructure (including the approved Fifield Bypass and materials transport route upgrades).

AHIP #C0003049 was issued to Clean TeQ on 10 October 2017 under the NP&W Act. AHIP #C0003049 outlines the management requirements for all Aboriginal heritage (known and unknown) within the AHIP area for the approved Project.

#### 3.2 THE MODIFICATION

A proposed modification to the Project is sought under section 75W of the EP&A Act for an alternative location for the approved accommodation camp.

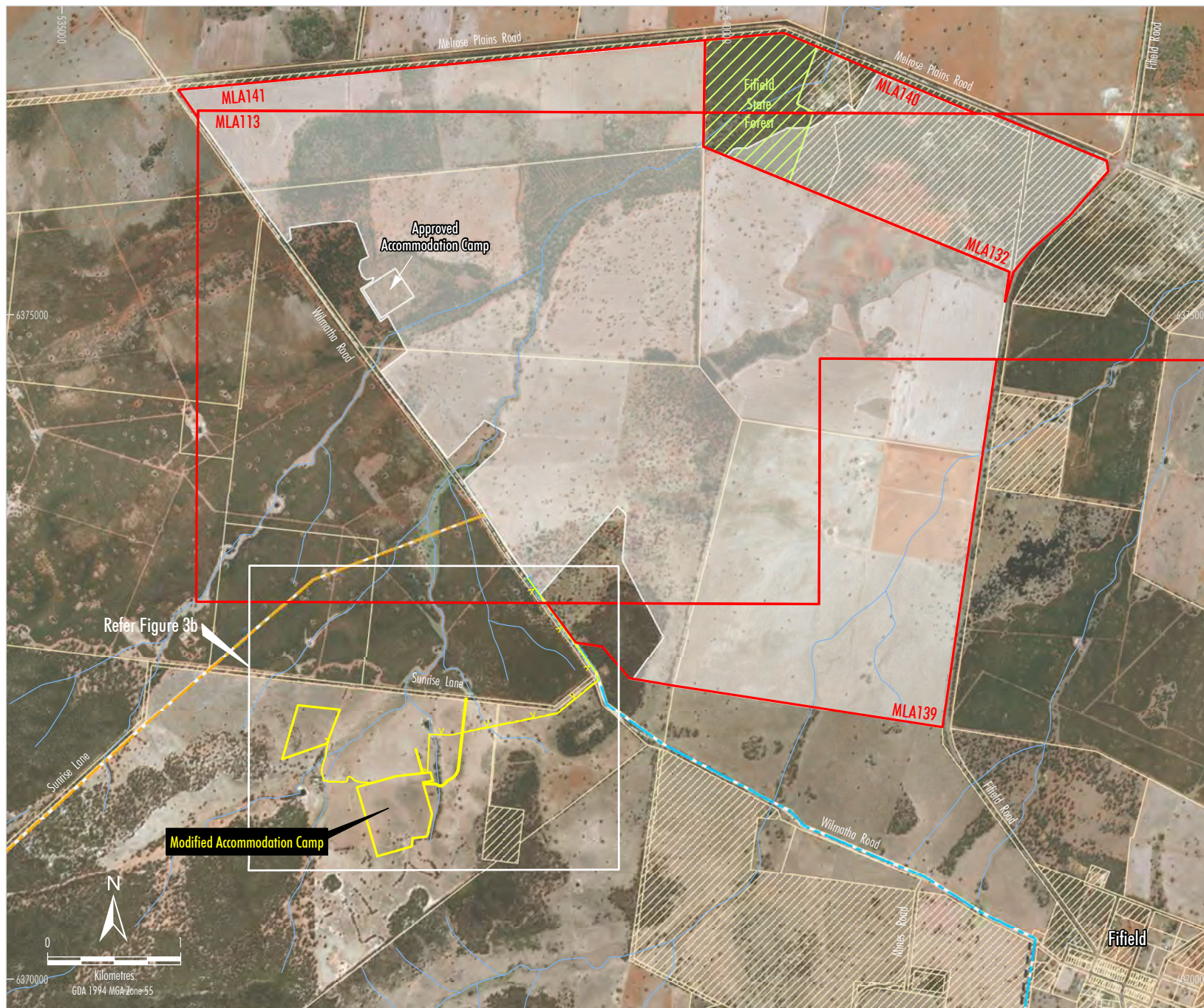
Construction of the Project commenced in 2006 with the construction of components of the borefields, however Project operations are yet to commence.

The accommodation camp is approved to be located on the western side of the mine site in the vicinity of Wilmatha Road. Clean TeQ has identified an alternative location for the accommodation camp (approximately 4 km to the south of the mine site on the Sunrise property) that would improve the amenity of the accommodation camp inhabitants and minimise operational constraints at the mine site.

The Modification would include:

- development of the accommodation camp (including supporting infrastructure) in an alternative location (**Figure 2**);
- construction of an electricity transmission line and water pipeline from the mine site to the modified accommodation camp site (**Figures 3a and 3b**);
- increased accommodation camp capacity (approximately 1,300 personnel);





**LEGEND**

- Mining Lease Application Boundary
- Approved Surface Development Area
- Approved Fifeild Bypass
- Approved Gas Pipeline
- Approved Water Pipeline
- State Forest
- Property Boundary
- Crown Land
- Modified Layout

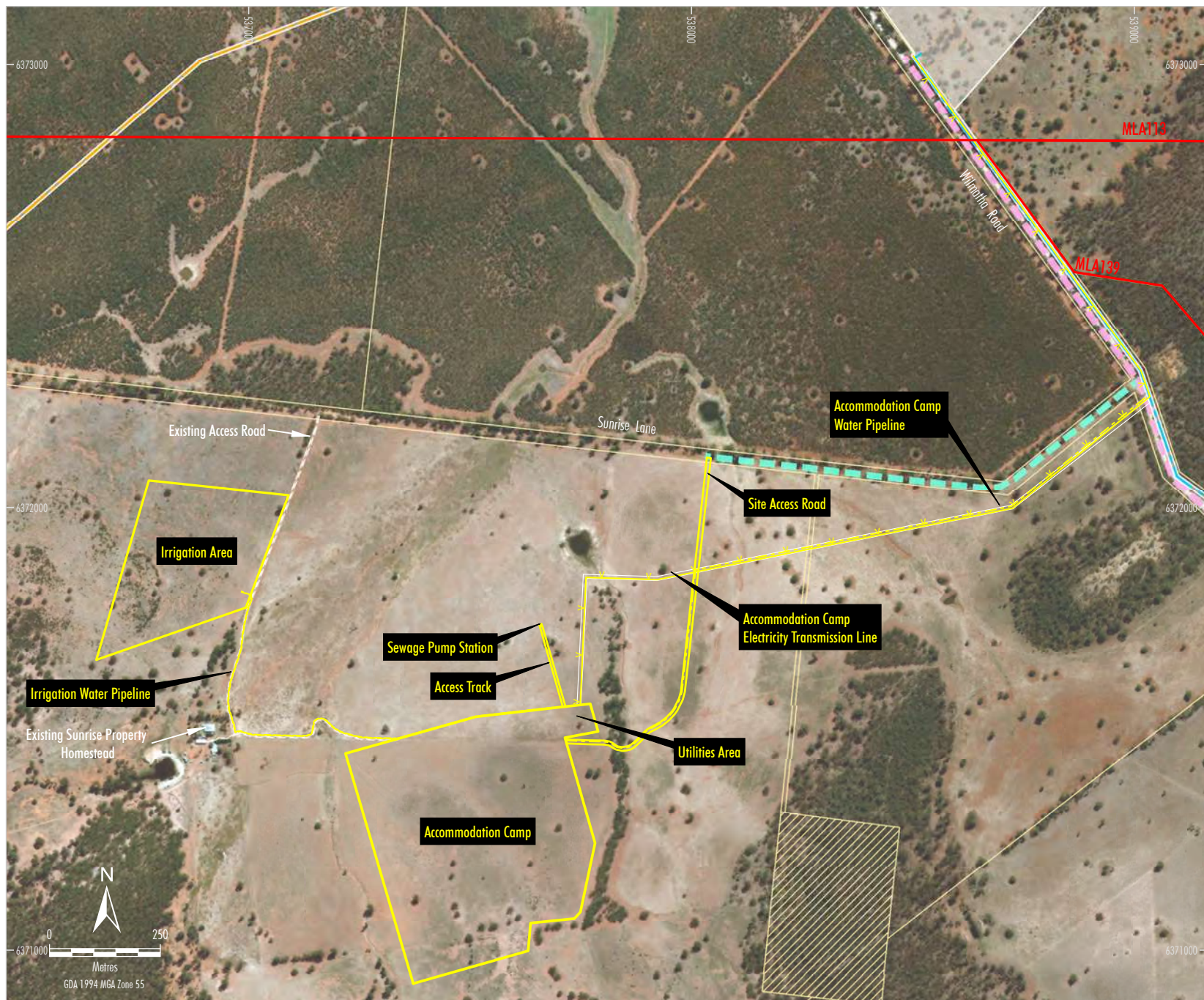
Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
 NSW Imagery: © Department of Finance, Services & Innovation (2017)

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**Conceptual Modified General Arrangement**

**Figure 3a**





CTL-17-04 MOD6\_ACHA\_207A

**Figure 3b**

- minor road upgrades; and
- the accommodation camp (at reduced capacity) would be maintained post-construction rather than it being decommissioned at the end of the construction phase.

The Modification would not involve changes to any aspects of the approved mine and processing operations, limestone quarry, rail siding or gas pipeline.

The Modification is proposed to commence as soon as practicable after all necessary approvals have been obtained and any pre-requisite conditions filled.

### 3.3 THE MODIFICATION AREA

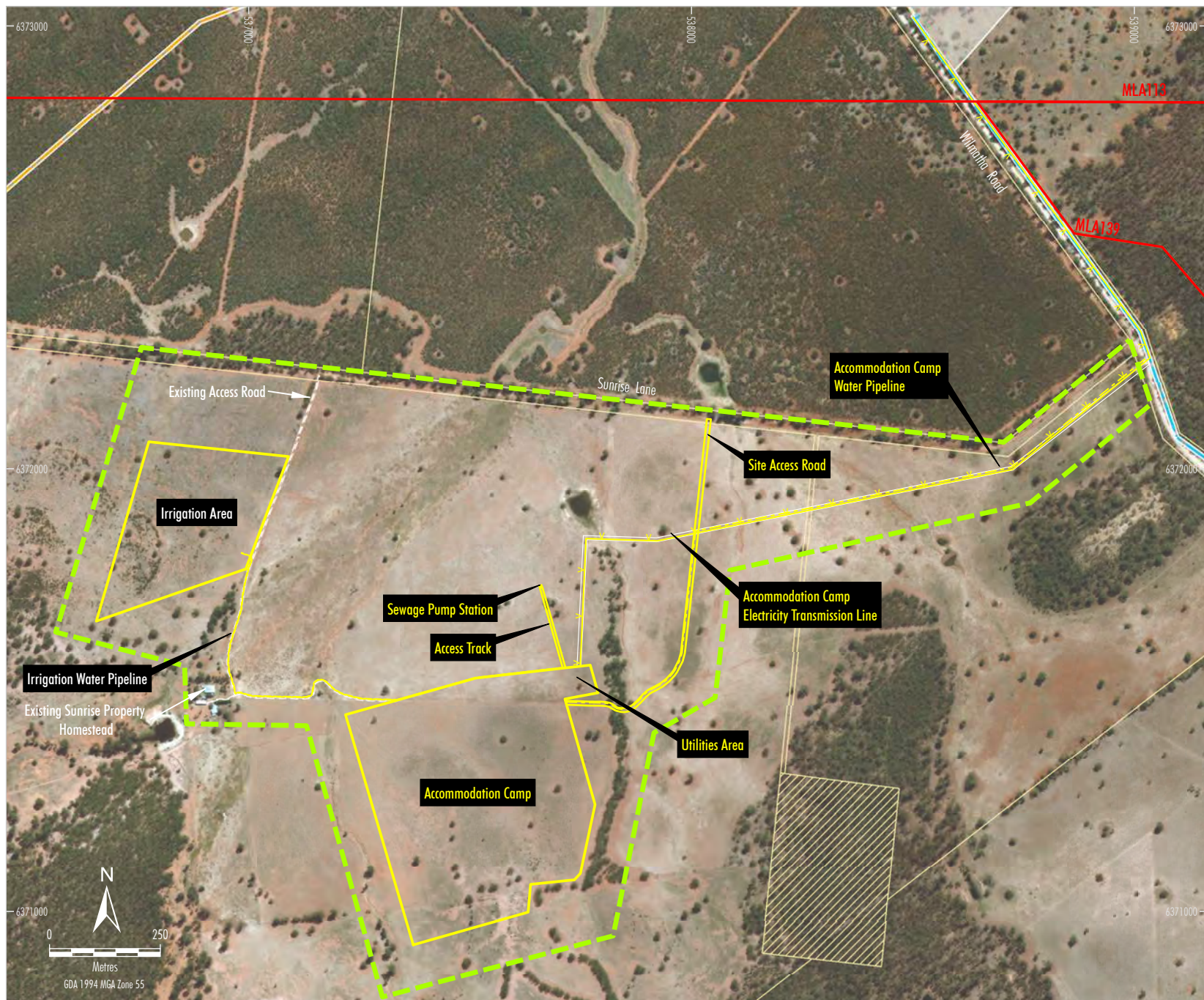
The conceptual general arrangement of the Modification is presented on **Figures 3a and 3b**. Although disturbance will be limited where possible, it has been conservatively assumed in this assessment that disturbance may occur anywhere within the extent of the area shown (presented on **Figures 3a and 3b**).

As part of the Modification, additional ancillary works may be required (e.g. access tracks, water drainage etc.). The locations of ancillary infrastructure would be flexible and sited where possible to avoid known Aboriginal heritage sites.

Clean TeQ will therefore seek an application for an AHIP for the Modification area and immediate surrounds (and/or a variation application to the existing approved AHIP #C0003049), including all portions of land described above and affected by the components of the Modification. The extent of the proposed AHIP application area is shown on **Figure 4**.

Cadastre information relevant to the Modification area is presented in **Appendix 6**.





- LEGEND**
- Mining Lease Application Boundary
  - Approved Surface Development Area
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - Property Boundary
  - Crown Land
  - Modified Layout
  - Proposed AHIP Application Area

Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
 NSW Imagery: Esri Basemap

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**Proposed AHIP Application Area**

**Figure 4**

## 4 ABORIGINAL COMMUNITY CONSULTATION

### 4.1 INTRODUCTION

Consultation with the Aboriginal community for the Modification was undertaken in accordance with the Consultation Guidelines (DECCW, 2010a), and the NSW *National Parks and Wildlife Regulation, 2009* (NP&W Regulation).

Accordingly, this assessment has involved the appropriate representatives of the local Aboriginal community and considered their cultural values and concerns. The following sections describe consultation undertaken with the Aboriginal community and demonstrate that the input of the involved Aboriginal community representatives has been considered.

The Consultation Guidelines (DECCW, 2010a) outline a four stage consultation process that includes detailed guidance as to the aim of each consultation stage and what actions are necessary for it to be successfully completed. These four stages include the following:

- Stage 1 – Notification of Modification proposal and registration of interest.
- Stage 2 – Presentation of information about the proposed Modification.
- Stage 3 – Gathering information about the cultural significance.
- Stage 4 – Review of draft ACHA report.

It is noted that community consultation was undertaken previously as part of the archaeological investigation prepared to support the original EIS for the approved Project (Appleton, 2000) and as part of the Modification to the borefield (Modification 2) (Appleton, 2005). Notwithstanding, this consultation was undertaken prior to the implementation of relevant guidelines and regulations, and hence, Clean TeQ has commissioned Landsape to prepare a contemporary assessment including consultation with the local Aboriginal community in accordance with the Consultation Guidelines (DECCW, 2010a) and the NP&W Regulation. An ACHA was therefore prepared by Landsape in 2016 for the approved Project. Subsequently, an additional ACHA was prepared by Landsape for the proposed Modification 4 (i.e. bore field reconfiguration and modified pipeline alignment).

### 4.2 REGISTRATION PROCESS

In accordance with Section 4.1.2 of the Consultation Guidelines (DECCW, 2010a), Modification notifications (**Appendix 3**) were sent on 2 December 2016 and 3 February 2017 to the following organisations:

- Central West Local Land Services;
- Condobolin LALC;
- Lachlan Shire Council;
- Forbes Shire Council;
- Parkes Shire Council;
- National Native Title Tribunal;
- Native Title Services Corporation Limited;
- OEH;
- Office of the Registrar, NSW *Aboriginal Land Rights Act, 1983*;
- Peak Hill LALC; and
- West Wyalong LALC.



Responses to the Modification notifications were received from the following organisations (**Appendix 4**):

- Office of the Registrar, NSW *Aboriginal Land Rights Act, 1983* (7 December 2016);
- OEH (9 December 2016);
- National Native Title Tribunal (14 December 2016); and
- Lachlan Shire Council (7 December 2016).

As a result of contacting the relevant organisations, a number of individuals and groups were identified as potentially having an interest in the Modification. An invitation was sent out to each individual/group inviting Aboriginal persons or groups who hold cultural knowledge relevant to, or who have right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or place(s) in the “Area of Interest”, to register an interest in the Modification on 6 January and 18 January 2017 (**Appendix 3**).

In addition, public notices inviting the registration of Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or place(s) in the “Area of Interest” were published in the Condobolin Argus on 18 January 2017 and the Koori Mail on 11 January 2017 (**Appendix 3**).

A copy of the list of the Registered Aboriginal Parties (RAPs) for the Modification, along with a copy of the written notifications and the public notice, were provided to the OEH, the Condobolin LALC and the West Wyalong LALC on 22 February 2017, in accordance with Section 4.1.6 of the Consultation Guidelines (DECCW, 2010a).

As a result of the registration process undertaken for the Modification, a total of 10 RAPs have registered an interest in the Modification<sup>1</sup>, including:

- Wiradjuri Condobolin Corporation.
- Murie Elders Group.
- Binjang Wellington Wiradjuri Aboriginal Heritage Survey.
- West Wyalong LALC.
- Condobolin LALC.
- Louise Davis.
- Peter Peckham.
- Joshua Aboriginal Corporation Dandaloo District (Sandra Peckham).
- Isabel Goolagong<sup>2</sup>.
- Peter White<sup>2</sup>.

A consultation log detailing all Aboriginal community consultation undertaken for the Modification is provided in **Appendix 2**. A copy of relevant written correspondence sent to and received from the RAPs is provided in **Appendices 3** and **4** respectively.

---

<sup>1</sup> The Forbes Aboriginal & Community Working Party were originally registered as stakeholders for the consultation process, however at a later date they advised Clean TeQ that they did not wish to be included in the Aboriginal consultation process going forward, and hence have not been described further in this report.

<sup>2</sup> Late registration following completion of the registration process, Proposed Methodology review and field surveys. Notwithstanding, Clean TeQ has committed to involving this individual in consultation going forward, from the point of their initial registration.

### 4.3 PROPOSED METHODOLOGY

Information regarding the Modification was provided in writing to all RAPs on 13 October 2017. A copy of the Proposed Methodology was provided for review and comment (**Appendix 3**).

A minimum of 28 days was allowed for the RAPs to provide input in regards to the following aspects:

- The nature of the Proposed Methodology.
- Any Aboriginal objects or places of cultural value within the Modification area, or issues of cultural significance.
- Any restrictions or protocols considered necessary in relation to any information of sensitivity that may be provided.
- Any other factors considered to be relevant to the ACHA.

### 4.4 COMMENTS ON PROPOSED METHODOLOGY

At the close of the Proposed Methodology review period, no comments and feedback on the Proposed Methodology were received by Clean TeQ.

A consultation log detailing all Aboriginal community consultation undertaken for the Modification is provided in **Appendix 2**. A copy of relevant written correspondence sent to and received from the RAPs is provided in **Appendices 3** and **4** respectively.

### 4.5 ABORIGINAL CULTURAL HERITAGE FIELD SURVEYS

The field investigation for the Modification was completed on 30 October 2017 by project archaeologist Dr Matt Cupper, with the assistance of the following Aboriginal community representatives: Tiara Dunn (Murie Elders Group), Joseph Coe (Wiradjuri Condobolin Corporation), Jamie Gray (Binjang Wellington Wiradjuri Aboriginal Heritage Survey), Leeanne Hampton (West Wyalong Local Aboriginal Land Council), Andrew (Condobolin Local Aboriginal Land Council), Joe Peckham (Joshua Aboriginal Corporation Dandaloo District) and Louise Davis.

During the field surveys, attending RAPs were invited to provide any cultural information or values associated with the Modification area. For example, the archaeologists encouraged participants to provide input on bush food resources, fauna and cultural associations/knowledge of the Modification area.

### 4.6 REVIEW OF DRAFT ACHA REPORT

In accordance with the Consultation Guidelines (DECCW, 2010a), a draft of this ACHA will be provided to all RAPs listed in Section 4.2 for review and comment.

## 5 LANDSCAPE CONTEXT

### 5.1 CONTEXT OF MODIFIED ACCOMMODATION CAMP AREA

The Modification is located on the western extent of the southwest slopes region of central western NSW. It occupies undulating plains abutting footslopes of the Lachlan Fold Belt to the north of the Lachlan riverine tract (**Figure 1**). The climate is semi-arid, receiving approximately 420 millimetres of rainfall per annum (Bureau of Meteorology, 2017).

Geologically, the Modification comprises heavily lateritized sedimentary and volcanic deposits of Ordovician to Devon age. These have weathered to lateritic clay loams and occasional gravels. All of the Modification area has been previously cleared for cereal cropping or pastoralism with remnant, isolated paddock trees including Wilga (*Geijera parviflora*) and Kurrajong (*Brachychiton populneus*) (see **Figures 5 to 8**).



**Figure 5.** Cleared paddock in the northern portion of the Modification area.



**Figure 6.** Cleared cereal paddock in the southern portion of the Modification area.



**Figure 7.** Cleared paddock in the northern portion of the Modification area.



**Figure 8.** Cleared paddock in the northern portion of the Modification area.

## 6 ABORIGINAL CULTURAL HERITAGE CONTEXT

### 6.1 ETHNO-HISTORICAL CONTEXT

Aboriginal people of the Wiradjuri language group occupied the southwest slopes of central western NSW at the time of first contact with Europeans (Sturt, 1833; Hovell and Hume, 1837; Mitchell, 1839; Tindale, 1974). The Wiradjuri were traditionally associated with the region encompassing the Macquarie, Lachlan and Murrumbidgee Rivers.

There may have been around 60 different dialects of Wiradjuri, whose speakers shared similar material culture and social organisation (Howitt, 1904; White, 1986). Perhaps the greatest regional variation was between speakers of the northern dialect (*Wirraaydhuurray*) and those of the south (speakers of the *Wirraayjuurray* dialect) (White, 1986). For example, the practice of carving zigzag motifs into tree trunks appears to have been particular to the Wiradjuri of the Macquarie and Lachlan River valleys, but is absent from the Murrumbidgee (Etheridge, 1918; Bell, 1982). Such carved trees are thought to have perhaps marked ceremonial areas and burial grounds. The *Burbung* ceremony was another of the Wiradjuri customs and traditions (Howitt, 1904). This ceremony was associated with male initiation and involved the preparation of special earth mounds and usually the application of red ochre.

The Wiradjuri were hunter-fisher-gatherers and appear to have had a semi-sedentary lifestyle. They caught fish including eels, freshwater crayfish, yabbies, tortoises and freshwater mussels in the Lachlan, Macquarie and Murrumbidgee Rivers and other streams and wetlands in the region (Howitt, 1904). Watercraft were manufactured from large slabs of bark cut from River Red Gum trees. Fish were caught using fishing lines and nets made from reed fibre.

Nets were used to catch waterbirds, whose eggs were also collected. Some of the other animals that the Wiradjuri hunted include kangaroos, wallabies, emus, possums, echidnas, lizards, snakes and frogs (Howitt, 1904). In summer, some Wiradjuri journeyed southeast to the high plains of the Great Dividing Range, where bogong moths were collected in large quantities (Flood, 1980). Plant foods included Native Millet, Panic Grass, Pigface fruits, Wild Cherries, Kangaroo Apple, tubers, yams, roots and other grass grains (Howitt, 1904; Gott, 1983).

Aspects of the initial interaction between Europeans and the Wiradjuri led to violent conflict. Aboriginal people were shot, poisoned and displaced from their land by pastoral settlers and, in retaliation, cattle, sheep, stockmen and shepherds were speared (Pearson, 1984).

Explorer and Surveyor-General of NSW Lieutenant John Joseph William Molesworth Oxley had led an expedition down the Lachlan River in 1817 (Johnson, 2001). At Goobothery upstream of Condobolin, he exhumed the burial mound of a Wiradjuri leader that had been marked by two carved trees. Oxley's party was eventually forced to divert north by the Great Cumbungi Swamp in the lower reaches of the Lachlan (Johnson, 2001). He struck the Macquarie River and encountered favourable land for pasture, further surveying the region the following year and opening up the southwest slopes to pastoral settlement (Pearson, 1984). Over the next few years pastoral runs were taken up along the Macquarie in the Wellington area approximately 140 km northeast of the Modification area.

Expanding European settlement led to conflict with the Wiradjuri. Intense fighting occurred between 1822 and 1824 in what were termed the Bathurst Wars (Pearson, 1984). In 1824, Governor Brisbane instituted a period of martial law over the region between Bathurst and Wellington. There was considerable resistance by local Aboriginal people led by Windradyne, a senior Wiradjuri guerrilla leader, but by the end of the year the violence had been quashed. Martial law was repealed on 11 December 1824, and on 28 December 1824 Windradyne travelled to Parramatta, where he was pardoned by Governor Brisbane (Pearson, 1984).



The first pastoral runs were taken up on the Lachlan in the 1830s and within a decade of the first contact with Europeans many of the Wiradjuri were living adjacent to pastoral homesteads, often working as shepherds or engaged in other labouring activities (Günther, 1837-1842). Those Aboriginal people who resided on pastoral holdings in central western NSW continued to live a semi-traditional existence into the second half of the nineteenth century (Pearson, 1984). This included collecting plant and animal foods to supplement station rations. Historical sources record a rapid decline in Wiradjuri numbers, caused by dispossession of land and the consequent destruction of habitat and social networks (Günther, 1837-1842; Pearson, 1984). Diseases including smallpox and malnutrition also took their toll (Günther, 1837-1842; Pearson, 1984). Traditional social networks collapsed. Other social structures, such as marriage laws, were also abandoned.

Grants of land were set aside for church and government Aboriginal reserves from the 1830s. One of the earliest was Wellington Mission operated by the Church Missionary Society for Africa and the Far East between 1832 and 1844 on the Macquarie River at Wellington (Günther, 1837-1842). One of the ministers, Reverend Watson, had a policy of removing Aboriginal children from their families, which led to bitter confrontations between Watson and other missionaries. The Church Missionary Society dismissed Watson in 1839 (Pearson, 1984). Watson and his wife left the mission along with a small group of Wiradjuri People and established a private mission, known as Apsley Mission, just outside the boundary of the Wellington Mission. Approximately eight years after establishing Apsley Mission, Watson, his wife Ann and their small Aboriginal community of about thirty people moved to a new site on the bank of the Macquarie River, known as the Blake's Fall Mission (Pearson, 1984).

An Aboriginal Reserve (reserve number R32512) was gazetted for Aboriginal people on the south bank of the Lachlan River at Condobolin on 13 April 1901 (Department of Lands, 1900). Known as the Condobolin Mission, and later the Willow Bend Mission, the reserve was originally run by the Aborigines Protection Board (later Aborigines Welfare Board). Aboriginal people also resided at a self-managed "fringe camp" at the Murie Reserve, approximately 4 km south of Condobolin, between approximately 1900 and 1970.

Many of the contemporary Aboriginal people of central western NSW live in regional centres such as Condobolin, and the region has a population of around 13,600 Aboriginal people, or some 6 % of the total population (Australian Bureau of Statistics, 2016).

## 6.2 PREHISTORIC CONTEXT

Accounts of Aboriginal land use of central western NSW during the nineteenth century provide an insight into possible settlement patterns in the prehistoric period. Pearson (1984) concluded that, prior to European settlement, large localised clans of Aboriginal people inhabited the southwest slopes encompassing the Modification area.

During normal conditions, clans divided into bands of up to 20 people, who may have used a territory with a radius of 20 km to 30 km. These bands coalesced relatively quickly into groups of 80 to 150 people to take advantage of a guaranteed or desirable resource, such as seasonal food resources (Pearson, 1984).

The material record of this occupation is preserved in the archaeological sites of central western NSW, most of which probably date to the period since the last Ice Age (after around 18,000 years ago). All that remains at many of these sites are flakes of stone debris from the making and resharpening of stone tools. These were made both at Aboriginal open and closed habitation areas (campsites and rockshelters) or special activity areas such as axe grinding groove sites.

As well as being the sites of manufacture and maintenance of stone implements, habitation areas usually contain evidence of domestic and other activities such as cooking and food preparation. Campfires or oven hearths are common, marked by charcoal and heat retaining stones or hearthstones. Organic remains consist of marsupial, rodent, bird, lizard, snake and fish bones, eggshell and freshwater mussel shell. Modified trees show where bark may have been removed by Aboriginal people to manufacture canoes, shelters and dishes, or carved to mark burial grounds and ceremonial sites.

### 6.3 TYPES OF ABORIGINAL CULTURAL HERITAGE SITES IN THE REGION

Based on the results and analytical conclusions of previous archaeological surveys in similar landscape contexts on the southwest slopes of central western NSW, it is possible to predict the types and topographic contexts of Aboriginal cultural heritage sites in the Modification area. The occurrence and survival of archaeological sites is, however, dependent on many factors including micro-topography and the degree of land surface disturbance.

The types of Aboriginal cultural heritage sites previously recorded on the southwest slopes of central western NSW are described in Sections 6.3.1-6.3.11.

#### 6.3.1 Stone Artefact Scatters

Scatters of stone artefacts exposed at the ground surface are one of the most commonly occurring types of archaeological site in the region. The remains of fire hearths may also be associated with the artefacts. In rare instances, sites that were used over a long period of time may accumulate sediments and become stratified. That is, there may be several layers of occupation buried one on top of another.

Stone artefact scatters are almost invariably located near permanent or semi-permanent water sources. Local topography is also important in that open campsites tend to occur on level, well drained ground elevated above the local water source. In central western NSW they are commonly located on river terraces and along creek-lines and also around the margins of lakes and swamps.

#### 6.3.2 Modified Trees

Slabs of bark were cut from trees by Aboriginal people and used for a variety of purposes including roofing shelters and constructing canoes, shields and containers. Scars also resulted from the cutting of toeholds for climbing trees to obtain honey or to capture animals such as possums. Some trees were carved, whereby Aboriginal people cut designs through the bark onto the wood beneath. Ethno-historic records indicate that some carved trees were associated with burials whilst others may have been sacred or totemic sites.

In central western NSW, River Red Gums and Box are the most commonly scarred species. Carvings are often on Box or Cypress Pine. The classification of scarred trees as natural, European or Aboriginal is often problematic. However, if the scar is associated with Aboriginal activity the tree must now be more than approximately 150 years old (Long, 2005).

#### 6.3.3 Hearths

Hearths consist of lumps of burnt clay or stone cobble hearthstones. Sometimes ash and charcoal are preserved. Other materials found in hearths include animal bone, freshwater mussel shell, emu eggshell and stone artefacts. Hearths probably represent the remains of cooking ovens, similar to those described in ethnographic accounts by Major Thomas Mitchell (Mitchell, 1839). These were lined with baked clay nodules and stone cobbles, possibly to retain heat. Hearths may be isolated or occur in clusters and may be associated with open campsites or middens. They are sometimes located on floodplain terraces of central western NSW.

#### 6.3.4 Stone Quarries

These are locations where Aboriginal people obtained raw material for their stone tools or ochre for their art and decoration. Materials commonly used for making flaked stone tools include chert, silcrete, quartz and quartzite. These materials were obtained from exposed sedimentary formations or picked up as loose rock on the surface. Stone quarries may also be associated with volcanic rock outcrops, which provided the raw material for ground stone tools such as stone axes. Gobondery Mountains to the northeast of Fifield has one such axe quarry (Beuzeville, 1917).

#### 6.3.5 Stone Arrangements, Ceremonial Rings and Ceremony and Dreaming Sites

Stone arrangements range from cairns or piles of rock to more elaborate arrangements such as stone circles or standing slabs of rock held upright by stones around the base. Beuzeville (1917) describes concentric stone circles measuring 4 metres (m) to 5 m in diameter near The Troffs, east of Fifield. Some stone arrangements were used in ceremonial activities whilst others may represent sacred or totemic sites. Other features associated with the spiritual aspects of Aboriginal life are those now called 'ceremony and dreaming' sites. These can be either stone arrangements or natural features such as rock outcrops, waterholes or mountains, which may be associated with initiation ceremonies or the activities of ancestral creators.

#### 6.3.6 Water Holes

These result from Aboriginal people modifying rock outcrops to collect or trap surface or groundwater. Water holes may be in the beds of creeks or hill slopes where sheets of rock may have been hollowed out to pool water. In most instances, soft stone such as limestone or sandstone outcrops provided the most suitable surface for excavating water holes. A notable example in the Fifield area was a stone trough cut by Aboriginal people at a spring, which gave its name to the locality "The Troffs" (Beuzeville, 1917; this site has subsequently been destroyed by railway construction).

#### 6.3.7 Freshwater Shell Middens

Shell middens are deposits of shell and other food remains accumulated by Aboriginal people as food refuse. In inland NSW these middens typically comprise shells of the freshwater lacustrine mussel (*Velesunio ambiguous*) or the freshwater riverine mussel (*Alathyria jacksoni*). Freshwater middens are most frequently found as thin layers or small patches of shell and often contain stone or bone artefacts and evidence of cooking. Such sites are relatively common along the watercourses of central western NSW and their associated wetlands.

#### 6.3.8 Earth Mounds

Earth mounds may have been used by Aboriginal people as cooking ovens or as campsites. Originally they appear to have ranged from 3 m to 35 m in diameter and from 0.5 m to 2 m in height. Today, however, they may be difficult to recognise because of the effects of ploughing, grazing and burrowing rabbits. Earth oven material, stone artefacts, food refuse and the remains of hut foundations have been exposed in excavated earth mounds.

#### 6.3.9 Rockshelter Sites

Caves or shelters in cliff lines and beneath boulder overhangs were often used by Aboriginal people as campsites. Because of the confined area in these shelters and because of repeated Aboriginal occupation of such sites, the occupation deposits that they contain are often richer than open campsites and are usually stratified. Rockshelters will only be found where suitable geological formations are present. They may occur as sandstone overhangs, shelters beneath granite tors or as limestone caves.

### 6.3.10 Rock Art Sites

Rock art consists of paintings, drawings and/or engravings on rock surfaces. In most instances in the wider region, rock art is related to the distribution of rockshelters but it may also be found on freestanding rocks.

### 6.3.11 Burials

Aboriginal burial grounds may consist of a single interment or a suite of burials. In the drier parts of the Murray-Darling Basin, skeletal material is regularly found eroding from sand deposits (Bonhomme, 1990; Hope, 1993). In the higher southwest slopes burial sites are rarely found because conditions for the preservation of bone are poor. Knowledge of Aboriginal burial grounds is best sought from local Aboriginal communities.

## 6.4 PREVIOUS ABORIGINAL CULTURAL HERITAGE INVESTIGATIONS

An understanding of the past Aboriginal occupation of central western NSW has begun to emerge from a number of studies including some undertaken within and in proximity to the Modification area. However, there have been few systematic regional investigations, with most undertaken in discrete areas including management studies of conservation reserves in the region and for mining and infrastructure developments. These include surveys of the Cowal Gold Operations near West Wyalong (south of the Modification area) (Paton, 1989; Cane, 1995, 1996, 1997; Huys and Johnston, 1995; Nicholson, 1997; Stone, 2002; Pardoe, 2009, 2011, 2013) and the approved Project (Appleton, 2000; Landskape, 2017a; 2017b). Also relevant is Flood's (1980) broad-scale study of the uplands further east, which identified general features of the regional archaeological record of the southwest slopes of central western NSW.

Surface scatters of flaked stone artefacts are the most common site type in central western NSW. These stone assemblages are dominated by flakes and flaked pieces mostly struck from quartz, and less commonly, silcrete, chert and quartzite. Few formalised tool types have been recorded, but include ground-edged axes and grinding dishes. Eucalypt trees modified by Aboriginal people are also well represented along creeklines of central western NSW and are particularly abundant on the adjacent plains. Other site types on the plains include earthen features such as hearths and mounds. Rockshelters, rock art sites, axe-head grinding grooves, waterholes, stone sources and stone arrangements also occur in the foothills of the southwest slope.

Aboriginal occupation of central western NSW is known to date from at least 29,000 to 34,000 years ago. The oldest ages have been obtained from the Pleistocene (Ice Age) sites of Cuddie Springs and Tambar Springs at the downstream end of the Macquarie River catchment some 300 km north of the Modification area (e.g. Field and Dodson, 1999). Closer to the Modification area, a burial of a very tall and robust Aboriginal male, Kiacatoo Man, from Kiacatoo some 30 km downstream on the Lachlan River from Condobolin, has been dated to 17,000 years ago (Kemp *et al.*, 2014).

The Lachlan River was a particular focus of past Aboriginal occupation. Trees carved by Aboriginal people are a prominent site type along the river. Carved trees had designs cut into their trunks, commonly a type of zigzag motif, and marked ceremonial areas and burial grounds (Etheridge, 1918; Bell, 1982). This practice appears to have been peculiar to the central part of western NSW. Bell (1982) located a total of 205 carved trees in this region. Most were concentrated along the Bogan and Macquarie Rivers and the middle reaches of the Lachlan River.

The distribution of modified trees probably reflects wider Aboriginal settlement patterns of the southwest slopes. People seem to have spent much of their time near the more reliable water sources. Paton and Hughes (1984), who examined areas near Condobolin, recorded that stone artefact densities drop from one artefact per square metre (m<sup>2</sup>) close to the Lachlan River, to as little as one artefact per 400 m<sup>2</sup> away from the river. These stone artefact assemblages are dominated by quartz (77 %) with the remainder comprising chert.

Similar stone artefact scatters close to water sources in the Lachlan River valley have been described by Silcox (1986) at West Wyalong and Paton (1989), Cane (1995, 1996, 1997), Huys and Johnston (1995), Nicholson (1997), Stone (2002) and Pardoe (2009, 2011, 2013) at Lake Cowal. These studies found that quartz, silcrete and chert were prevalent in lithic assemblages, the latter often used to manufacture backed blades. Other formal artefact types such as modified flakes, scrapers, adze slugs and seed grinding implements were less abundant.

Rock art sites tend to occur in the bedrock ranges of the southwest slopes, mainly to the northeast of the Modification area. Paintings include both figurative and non-figurative motifs. Lines, dots, tracks, hand stencils and depictions of humans, emus and kangaroos are represented (Gunn, 1983; Martin, 1991).

Flood's (1980) investigation of the higher uplands of central western NSW to the east of the Modification area provides insights into possible regional patterns of past Aboriginal land use. Flood (1980) found that lowland sites often either comprised large base camps, open occupation areas covering two or three square kilometres found on sand dunes and near lakes and rivers, or smaller camps distributed along river banks in a lineal pattern.

Flood (1980) noted typical landscape settings of Aboriginal campsites. All sites are within 1 km and most within 100 m of a river, creek, lake or spring. However, no sites are located right at the water's edge. All sites are located on well-drained ground with a reasonably good view of the approaches. When sites occur on the side of a mountain range or valley their aspect is usually east or north thus obtaining shelter from the prevailing westerly winds (Flood, 1980).

## 6.5 PREVIOUSLY RECORDED ABORIGINAL CULTURAL HERITAGE IN THE MODIFICATION AREA

The most recent archaeological investigations pertinent to the Modification area are Appleton's (2000, 2005) and Landskape's (2017a, 2017b) previous assessments undertaken for the approved Clean TeQ Sunrise Project (and subsequent modifications).

Appleton (2000, 2005) identified 14 Aboriginal cultural heritage sites in or near the Project area. These comprised one stone artefact scatter (AHIMS site number 35-4-0015), eight isolated finds of stone artefacts (AHIMS site numbers 35-4-0010, 35-4-0011, 35-4-0012, 35-4-0013, 35-4-0014, 35-4-0016, 43-2-0049, 43-2-0050), four scarred trees (AHIMS site numbers 43-4-0009, 43-4-0010, 43-4-0011, 35-4-0017) and a site complex with stone artefacts, hearths, a scarred tree and hundreds of flaked lithics (AHIMS site number 43-4-0014).

A more recent assessment undertaken by Landskape (2017a) identified an additional 13 Aboriginal cultural heritage sites in or near the Project area, including two stone artefact scatters (AHIMS site numbers 35-4-0024, 36-4-0132), eight isolated finds of stone artefacts (AHIMS site numbers 35-4-0027, 35-4-0028, 35-4-0030, 35-4-0031, 35-4-0032, 35-4-0033, 35-5-0170, 35-5-0171), two stone quarries (AHIMS site numbers 35-4-0025, 35-4-0026) and a scarred tree (AHIMS site number 35-4-0029).

There are no previously recorded Aboriginal cultural heritage sites within or immediately adjacent to the Modification area (AHIMS search number 310117; accessed 31 October 2017) (Appendix 5). The closest previously recorded Aboriginal cultural heritage sites are a scarred tree (AHIMS site number 35-4-0029) in the Wilmatha Road reserve approximately 1.5 km east of the Modification area (Landskape, 2017b) and an isolated find of a volcanic flake (AHIMS site number 35-4-0016) east of Wilmatha Road approximately 1.5 km north of the Modification area (Appleton, 2000). **Table 1** provides a summary of Aboriginal cultural heritage sites previously identified proximal to the Modification area.

**Table 1.** Previously Identified Aboriginal Cultural Heritage Sites Proximal to the Modification Area.

<b>AHIMS Site Number</b>	<b>Site Name</b>	<b>Site Type</b>	<b>Eastings GDA94 mE (Zone 55)</b>	<b>Northings GDA94 mN (Zone 55)</b>
35-4-0016	Syerston 3	Isolated find of a stone artefact	538403	6373254
35-4-0029	Fifield Scarred Tree 1	Culturally modified tree	539945	6371468



## 7 CULTURAL HERITAGE FIELD INVESTIGATION

In accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales* (OEH, 2011) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b), an archaeological design and survey methodology was prepared as a key component of the cultural heritage field assessment. Details of the archaeological design and survey methodology are presented in the following sections.

### 7.1 CULTURAL HERITAGE SITE PREDICTIVE MODEL

Previous archaeological studies indicate that the most frequently recorded Aboriginal cultural heritage places in central western NSW are open occupation areas represented by scatters of stone artefacts and culturally modified trees (NSW OEH AHIMS site database). Burials, earthen features including mounds and hearths and stone features including stone quarries, ceremonial rings, water holes, rockshelters and rock art sites are also represented in the archaeological record.

The potential for encountering Aboriginal cultural heritage in the Modification area is mitigated to a large extent by the high degree of previous disturbance. For example, the extent of tree clearance from past agricultural land use reduces the probability of encountering scarred and carved trees. Similarly, modification of the original land surface during past agricultural land use and grading tracks and fencelines could have destroyed earthen features such as mounds and stone features such as arrangements and ceremonial rings, had they previously existed in this area. Stone artefacts, alternatively, are more likely to survive in the cultivated soil.

Based on past observations of archaeological site types and their distribution and landscape setting, the following predictive model of Aboriginal cultural heritage site locations for the activity can be proposed:

- **Trees scarred or carved by Aboriginal people** may occur wherever mature Eucalypt trees grow. However, given the extent of vegetation clearance the probability of encountering culturally modified trees is not particularly high.
- **Stone artefact scatters and isolated finds** of stone artefacts are possible at the Modification area. They are typically found within 200 m of water sources, so are most likely to be encountered on the margins of the ephemeral drainage lines that bisect the Modification area. They are also possible around natural depressions such as ephemeral swamps.
- **Burial sites** are possible, particularly in sandy deposits elevated above waterways. However, there is a low likelihood of occurrence within the Modification area.
- **Freshwater shell middens** will not occur, given the absence of permanent sources of water.
- **Earthen features** including **mounds, ovens** and **hearths, stone arrangements** and **ceremonial rings** are normally restricted to level ground, the former usually adjacent to water sources. They are possible near the ephemeral drainage lines in the study area, but their likelihood is lessened because previous land disturbance such as earthworks associated with grading tracks and fence lines and ploughed cultivation during agricultural cropping is likely to have destroyed earthen and stone features, had these site types originally occurred in the Modification area.
- **Rockshelters, grinding grooves, water holes, stone quarries** and **rock art sites** are not likely to occur, given the absence of suitable rock outcrops in the Modification area.

While predictive studies such as this can be expected to identify areas in which sites associated with subsistence activities may be present (notably open habitation areas) other sites may fall outside such a predictive framework. For example, places associated with spiritual aspects of traditional Aboriginal society such as ceremony and dreaming sites are often located at topographically distinct or unique features, which cannot be identified from an examination of maps or other records. For this reason, it was essential that local Aboriginal communities be consulted so that sites of significance to them can be identified.

## 7.2 FIELD METHODOLOGY

### 7.2.1 Logistics

The field investigation for the Modification was completed on 30 October 2017 by project archaeologist Dr Matt Cupper, with the assistance of the following Aboriginal community representatives: Tiara Dunn (Murie Elders Group), Joseph Coe (Wiradjuri Condobolin Corporation), Jamie Gray (Binjang Wellington Wiradjuri Aboriginal Heritage Survey), Leeanne Hampton (West Wyalong Local Aboriginal Land Council), Andrew (Condobolin Local Aboriginal Land Council), Joe Peckham (Joshua Aboriginal Corporation Dandaloo District) and Louise Davis.

### 7.2.2 Survey Methods

To allow for flexibility in the final design of the Modification components, a larger area was initially considered and subject to systematic survey.

The Modification area was inspected on foot by the project archaeologist and Aboriginal community representatives (in portions of the area) (**Figures 9 and 10**). The field teams examined the ground surface for any archaeological traces such as stone artefacts, hearths, hearthstones, shells, bones and mounds. All mature trees in the areas of proposed disturbance were inspected for scarring or carving by Aboriginal people.

Particular attention was paid to areas with high ground surface visibility such as along stock and vehicle tracks and in scalds, gullies and other eroded areas.

The team members walked abreast across the surveyed areas in a series of closely spaced transects. These were evenly distributed over the areas of proposed disturbance and approximately 20 m apart. Due to the general openness of the landscape, it was usually possible to identify likely site locations from at least 20 m and deviate from the transects to make closer inspections.

Indicative survey unit mapping is presented in **Figure 11**.

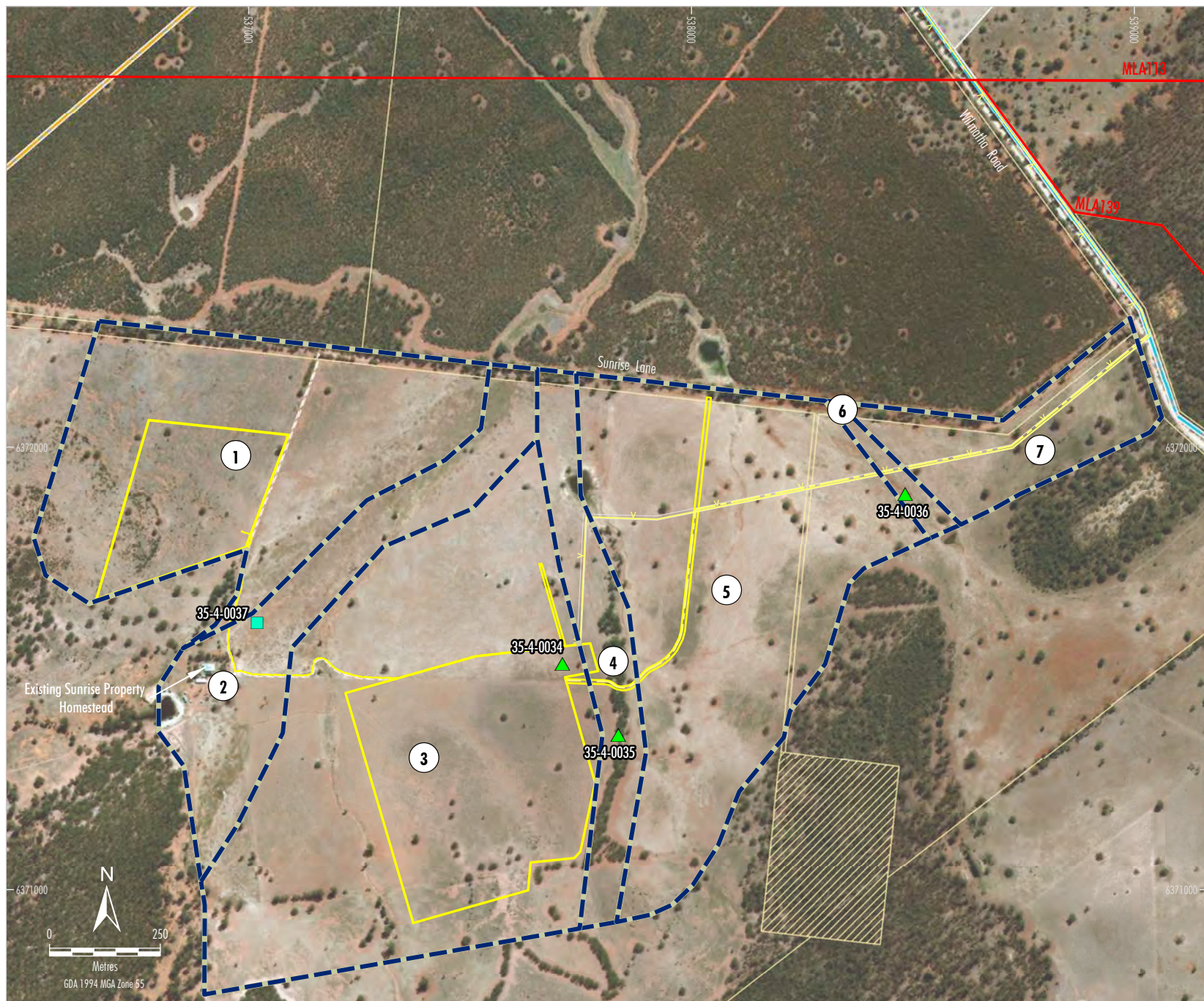


**Figure 9.** Survey team members inspecting the Modification area.



**Figure 10.** Survey team members inspecting the Modification area.





**Figure 11**

### 7.2.3 Access to Survey Areas and Weather Conditions

Access was available to all of the Modification area and weather conditions were good during the survey.

## 7.3 CULTURAL HERITAGE SITE DEFINITION AND RECORDING

For this investigation, Aboriginal archaeological sites were defined as a concentration of stone artefacts. Stone artefacts that were not part of a concentration were recorded as isolated finds. When a site was located, the following variables were recorded:

- *Site designation*: sites were designated a geographic descriptor followed by a numeric identifier.
- *Site type*: site types recorded were scarred trees, quarries, stone artefact scatters and isolated finds of stone artefacts.
- *Grid reference*: this information was obtained using a Garmin handheld Global Positioning System.
- *Environmental setting*: this describes the sites' environmental context including such factors as landform, slope, vegetation and local hydrology.
- *Site size*: refers to the dimensions over which artefacts are visible.
- *Visibility*: a measurement of the conditions of ground surface visibility in the survey area. Ground surface visibility conditions will affect whether sites are detected and whether their full extent has been recorded.
- *Site contents*: this is a description of the artefacts at the site. With open campsites the features recorded included raw material, artefact type, artefact dimensions, presence of retouch or use wear and any general comments considered relevant. It is important to realise that these artefact descriptions are only preliminary descriptions, as more detailed recording is considered to be more appropriate if a mitigation phase is undertaken for this or other regional projects.
- *Site condition*: describes the condition of the site in terms of factors which may have disturbed it or which may have the potential to disturb.

## 7.4 SURVEY COVERAGE DATA

### 7.4.1 Conditions of Visibility

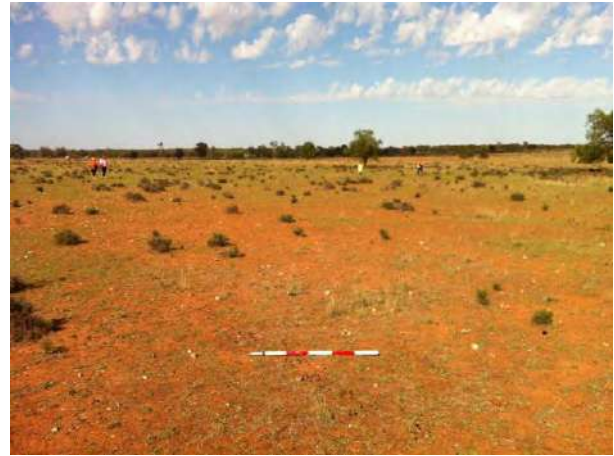
Conditions of ground surface visibility affect how many sites are located. Visibility may also skew the results of a survey. If, for example, conditions of ground surface visibility vary dramatically between different environments, then this would be reflected in the numbers of sites reported for each area. The area with the best visibility may be reported as having the most sites (because they are visible on the ground) while another area with less visibility but perhaps more sites would be reported as having very little occupation. It is important therefore to consider the nature of ground surface visibility as part of any archaeological investigation.

Conditions of ground surface visibility typically ranged from approximately 50 % to 90 % across the Modification area (**Table 2, Figures 12 and 13**). Grass and herbaceous plant growth was very sparse, with extensive areas of the ground surface exposed by erosion from scalding and gullying and stock and vehicular traffic.





**Figure 12.** Excellent visibility conditions within the Modification area.



**Figure 13.** Excellent visibility conditions within the Modification area.

#### 7.4.2 Coverage Analysis

Coverage analysis is a useful measurement to allow cultural resource managers to assess surveys from adjacent areas and it also allows some meaningful calculation of the actual sample size surveyed. The 'actual' or 'effective' area surveyed by a study depends on the conditions of ground surface visibility. Conditions of surface visibility are affected by vegetation cover, geomorphic processes such as sedimentation and erosion rates, and the abundance of natural rock that may obscure the remains of cultural activities.

Approximately 22 % of the surface of the Modification area was inspected on foot (**Tables 2 and 3**)<sup>3</sup>. This is a relatively high coverage and was a result of the generally intensive nature of the survey and the typically excellent conditions of surface visibility.

**Table 2.** Effective Survey Coverage of the Modification Area.

Survey Unit	Landform	Survey Unit Area (m <sup>2</sup> )	Visibility (%)	Exposure (%)	Effective Cover (m <sup>2</sup> )	Effective Cover (%)	No. of Sites
1	Sandplain	440,000	50	50	75,000	17	-
2	Drainage line	203,000	90	90	63,000	31	1
3	Sandplain	707,000	80	80	184,000	26	1
4	Drainage line	124,000	60	60	24,000	19	1
5	Sandplain	516,000	50	50	85,000	16	-
6	Drainage line	18,000	90	90	5400	30	1
7	Sandplain	132,000	70	70	28,000	21	-
<b>Total</b>		<b>2,140,000</b>			<b>464,400</b>	<b>22</b>	<b>4</b>

m<sup>2</sup> – square metres.

<sup>3</sup> The results presented in **Tables 3 and 4** allow for a correction for transect spacing (i.e. the calculations allow for the areas between survey team members [who are assumed to be able to view a maximum 8-m-wide strip of the ground surface] to be deducted).

**Table 3.** Landform Summary of Sampled Areas of the Modification Area.

Landform	Landform Area (m <sup>2</sup> )	Area Effectively Covered (m <sup>2</sup> )	Landform Effectively Surveyed (%)	No. of Sites
Sandplain	1,795,000	372,000	21	1
Drainage line	345,000	92,400	27	3
<b>Total</b>	<b>2,140,000</b>	<b>464,400</b>	<b>22</b>	<b>4</b>

## 7.5 SURVEY RESULTS

Four Aboriginal cultural heritage sites were newly identified in the Modification area. These sites are three stone artefact sites (with one or two artefacts at each) (AHIMS site numbers 35-4-0034, 35-4-0035, and 35-4-0036) and a hearth site (AHIMS site number 35-4-0037). Summary descriptions of the newly identified Aboriginal cultural heritage sites are below, and in **Table 4**:

- AHIMS site number 35-4-0034 - one silcrete flake on the scalded sandplain proximal to an ephemeral drainage line in the centre of the Modification area;
- AHIMS site number 35-4-0035 - two sandstone millstones/mullers near the ephemeral drainage line in the centre of the Modification area;
- AHIMS site number 35-4-0036 - two silcrete flakes near the ephemeral drainage line in the east of the Modification area; and
- AHIMS site number 35-4-0037 - a possible hearth of baked clay heat retaining hearthstones near the ephemeral drainage line in the west of the Modification area.

**Table 4.** Newly Identified Aboriginal Cultural Heritage Sites within and near the Modification Area.

Name	Location GDA94 mE (Zone 55)	Location GDA94 mN (Zone 55)	Landform	Size (m)	Contents
35-4-0034	537709	6371510	Sandplain	N/A	1 silcrete flake
35-4-0035	537835	6371349	Drainage line	5 x 1	2 sandstone millstones/mullers
35-4-0036	538483	6371894	Drainage line	2 x 2	2 silcrete flakes
35-4-0037	537019	6371603	Drainage line	1 x 1	1 hearth

Images of Aboriginal cultural heritage sites at and near the Modification area are depicted in **Figures 14 to 17**. The locations of the sites are shown on **Figure 11**.





**Figure 14.** AHIMS site number 35-4-0034.



**Figure 15.** AHIMS site number 35-4-0035.



**Figure 16.** AHIMS site number 35-4-0036.



**Figure 17.** AHIMS site number 35-4-0037.

## 7.6 IDENTIFIED ABORIGINAL CULTURAL VALUES

As described in earlier sections, this assessment has been prepared in accordance with the Consultation Guidelines (DECCW, 2010a) and the NP&W Regulation.

The cultural values assessment undertaken to date has been based on the following:

- Review of background resources including previous archaeological investigations for the surrounding region and the approved Project (Appleton, 2000; Landskape, 2017a, 2017b).
- Historical research.
- Discussions with RAPs during field survey.
- Discussions with RAPs during community information sessions.
- Requests for comments during the review period for the Proposed Methodology.
- Specific meetings with RAPs upon request.

These points of consultation provided the opportunity for the Aboriginal community to have direct input into the management of Aboriginal cultural heritage values (both tangible and intangible) in the Modification area.

During the archaeological surveys the attending RAPs did not identify any specific locations within the Modification area or wider surrounds as being of high or specific cultural significance.

During the archaeological surveys, various species of flora and fauna were sometimes observed by the attending RAPs who identified them as being culturally significant. Mostly the identified species were stated to be significant for their uses as bushfood or bush medicine. None of the identified species are rare or endangered, and in all cases they are considered better represented in other locations outside the Modification area.

RAPs identified the Modification area as a place that Aboriginal people had occupied in the past. Generally, the Aboriginal representatives viewed all the Aboriginal cultural heritage sites as significant because they preserve a record of how and where people lived in the past.

## 8 CULTURAL HERITAGE VALUES

### 8.1 ABORIGINAL CULTURAL HERITAGE SIGNIFICANCE

The significance of Aboriginal cultural heritage sites such as that found during this study are usually assessed in terms of their importance to archaeologists (i.e. their scientific or research significance), their importance to contemporary Aboriginal people and their importance to the general public. Once the significance of a site has been assessed it can be ranked against others and specific recommendations formulated. Criteria for assessing scientific significance are set out below. The values used in this assessment have been the subject of some discussion in the archaeological literature and the information provided is drawn from a number of sources (e.g. Bowdler, 1983).

#### 8.1.1 Scientific Significance

A number of criteria are used to assess the scientific significance of a site. These include the integrity of a site, its structure and contents. All of these criteria combine to give a site its value as a research tool for archaeologists. In addition to the above criteria a site may also be of scientific significance because of its representativeness or rarity. It is a basic tenet of archaeology that any site which is not represented elsewhere is of great value because archaeologists are concerned with preserving a representative sample of all site types for future generations.

##### Site Integrity

Site integrity refers to its state of preservation or condition. A site can be disturbed through a number of factors including natural erosional processes, destructive land use practices or repeated use of a site in the past by both humans and animals.

low	highly disturbed or poorly preserved with little research potential.
moderate	some disturbance but remaining cultural material allows for some research potential.
high	little or no disturbance to site, good preservation and considerable research potential.

In terms of site integrity the sites located during this survey would rate low. This assessment is based on the degree of disturbance noted during the investigation. The stone artefact scatters were typically identified in modified contexts such as along gullied drainage lines or graded fence lines. They have been disturbed by repeated ploughed cultivation, traffic of hooved animals and vehicles, coupled with erosion by wind and water.

The hearth site (AHIMS site number 35-4-0037) is partly *in situ*. The possibility that the burnt clay is natural in origin, however, limits its research potential.

##### Site Structure

Site structure refers to the physical dimensions of a site (i.e. its area and depth or stratification). A large site, or a site with stratified deposits, usually has more research potential than a small site or surface scatter. In some instances, however, specific research questions may be aimed at smaller sites in which case they would be rated at a higher significance than normal.

low	small surface scatters with no stratified deposit.
moderate	medium to large surface scatters with or without stratification.
high	large <i>in situ</i> surface scatters, any site with stratified deposit.

All of the stone artefact sites are very small in size, with one or two artefacts, and have a low site structure. Artefacts form a lag deposit on scalded or exposed surfaces. The surfaces of all these sites are degrading.

The hearth site (AHIMS site number 35-4-0037) is partly *in situ*. The possibility that the burnt clay is natural in origin, however, limits its research potential.

### Site Contents

Site contents refers to the range and type of occupation debris found in a site. Generally, sites that contain a large and varied amount of organic and non-organic material are considered to have greater research potential than those sites with small, uniform artefacts.

low	small amount and low diversity of cultural material.
moderate	medium amount and diversity of cultural material.
high	large and diverse amount of cultural material.

The original cultural materials of the sites recorded during the survey have been exposed to weathering. Only stone artefacts remain at almost all of the open sites, with the only organic material preserved being possible charcoal in the hearth (AHIMS site number 35-4-0037).

Stone artefacts are of silcrete or sandstone. The flaked lithics are unmodified flakes, with two ground implements (millstones/mullers) also present. Artefact density at these sites is very low.

The stone artefact sites rate low by the site contents criterion. The hearth site (AHIMS site number 35-4-0037) similarly rates low.

### Site Representativeness and Rarity

Representativeness or rarity refers to how often a particular site type occurs in an area and requires some knowledge of the background archaeology of the area in which the study is being undertaken. Sites that are representative of the local and regional archaeological record may have value for that reason and if a site is rare or unique in some way then it is *ipso facto* significant (Bowdler, 1983).

low	many of the same site type occurring in a single area or region.
moderate	site type occurs elsewhere but not in great quantity or with good preservation.
high	site type is rare or unique.

On the basis of the results of previous archaeological investigations (e.g. Cane, 1995, 1996, 1997; Huys and Johnston, 1995; Appleton, 2000; Pardoe, 2009, 2011, 2013; Landskape, 2017a, 2017b) and information held on the OEH AHIMS site register it is clear that stone artefacts and hearths are widespread in the region. These types of archaeological sites located during this study are therefore not unique and are well represented outside the Modification area.

A summary of the archaeological significance assessment of the sites is presented in **Table 5**.

**Table 5.** Assessment of Significance of the Aboriginal Cultural Heritage Sites.

Site Name	Scientific Significance				Cultural Significance*	Educational Significance	Aesthetic Significance
	Integrity	Structure	Contents	Rarity			
35-4-0034	Low	Low	Low	Low	-	Low	Low
35-4-0035	Low	Low	Low	Low	-	Low	Low
35-4-0036	Low	Low	Low	Low	-	Low	Low
35-4-0037	Low	Low	Low	Low	-	Low	Low

\* To be determined following consultation with the Aboriginal community.

### 8.1.2 Aboriginal Social, Cultural, Spiritual and Historical Significance

The significance of a site is not restricted to its scientific or research value. The views of Aboriginal people on the significance of archaeological sites are also important. Their perceptions usually stem from traditional, cultural and educational beliefs although most local Aboriginal communities also value the scientific information that archaeological sites may be able to provide.

Archaeological sites provide connections to the past for the present Aboriginal community and for future generations. Aboriginal cultural heritage sites such as those identified during this survey can also provide information about past lifestyles and strengthen the links between Aboriginal people and the land.

The level of significance attributed to individual sites may vary according to a number of factors including the nature and integrity of the heritage items and the landscape in which the site is located. The views of the Aboriginal representatives involved in the field survey and community field inspections and discussion forums are considered to be indicative of Aboriginal community attitudes.

The Aboriginal significance of the sites listed in **Table 5** was established through consultation with the Aboriginal stakeholders involved with the field survey.

Generally, the Aboriginal community view all archaeological sites as significant because they preserve a record of how and where people lived in the past. Such cultural heritage sites also stand as testimony to the continuation of Aboriginal culture and association with the land. However, the Aboriginal community representatives involved in this assessment did not have particularly high spiritual, traditional, historical or contemporary associations with the archaeological sites identified in the Modification area.

### 8.1.3 Educational Significance

The value of archaeological sites to the general public is generally assessed by their potential to educate the public about the Aboriginal past. The sites rank low by this criterion. They are small, isolated and unlikely to attract particular interest in Aboriginal heritage.

### 8.1.4 Aesthetic Significance

Aesthetic significance relates to the scale, form, materials, texture, colour, space and relationship of the components of the place. The relationship of the place with its setting is equally important. The sites are subdued features in the landscape and lack high aesthetic value.

## 8.2 ABORIGINAL CULTURAL LANDSCAPE

Scientific information collected from the Aboriginal archaeological sites identified during this assessment, combined with social and cultural information provided by the Aboriginal community stakeholders and ethno-historical sources, allows interpretation of the Aboriginal cultural landscape of the Modification area, provided in the following sections.

### 8.2.1 Summary of the Archaeological Record

The material culture of past Aboriginal occupants of the Modification area comprises three stone artefact sites and a hearth site.

### 8.2.2 Aboriginal Settlement Patterns

The locations of freshwater sources are likely to have been the main controlling factor of past Aboriginal occupation of the Modification area. Humans carry out most of their activities close to fresh water, rarely straying far from reliable water sources (see Gould, 1969, 1980; Allen, 1974; Jochim, 1976; Mitchell, 1990; McNiven, 1998). They also prefer larger or more persistent water sources to smaller, ephemeral water bodies. As well as the obvious abundance of aquatic molluscs, fish and birds at large, permanent water sources, mammals (such as macropods) that were hunted for protein and skins are also limited by water availability.



The fact that all of the Aboriginal cultural heritage sites identified during the survey were on the margins of ephemeral drainage lines confirms predictive models that occupation will favour well drained land adjacent to waterways (e.g. see Flood, 1980).

There are no permanent streams or wetlands in the proposed mine area. There are a number of unnamed, ephemeral watercourses that episodically flow for brief periods after heavy rain, but any pools of water rapidly seep away and evaporate. Peak occupation of the Modification area is likely to have corresponded to when these transient supplies were available.

### 8.2.3 Aboriginal Subsistence Strategies

Hunter-fisher-gatherers obtain the resources necessary for life by foraging and collecting subsistence strategies. Foragers gather food as it is encountered, regularly moving between resource zones and rarely storing food (Binford, 1989). Collectors, alternatively, adopt a logistical strategy for procuring resources. They often rely on stores of food and may maintain base camps, with smaller groups dispersing to collect resources. Foraging and collecting are two end-members of a subsistence continuum, with most hunter-fisher-gatherer societies engaging in a combination of both strategies (Yellen, 1977; Binford, 1989; Renfrew and Bahn, 1991).

Sites occupied by hunter-fisher-gatherer people may reflect these strategies (Binford, 1989). For example, base camps were generally occupied for long periods of the year and were used for a range of domestic and industrial activities. Alternatively, base camps may have been intensively used for part of the year, acting as congregative focal points. Temporary field camps were dispersive sites, created when groups charged with carrying out a specific task journeyed beyond the daily foraging radius.

The frequency of site occupation can sometimes be determined from their contents and structure. Residential base campsites, occupied over relatively long periods of time, tend to have a more complex structure than short-term campsites. Base camps may contain evidence of a wide variety of activities associated with daily habitation. Short-term sites were probably only occupied for a specific reason, such as to collect a particular resource. These usually display evidence of being occupied only once or twice, and are often smaller, with fewer and less diverse archaeological remains.

It is probable that the Aborigines who occupied the Modification area were hunter-fisher-gatherers employing both foraging and collecting subsistence strategies. These people would have primarily occupied the riparian zones of the Lachlan River and its more permanent anabranches including Goobang Creek, dispersing from the riverine corridors to exploit ephemeral resources of the more poorly watered hinterland during favourable climatic conditions, as invoked in the subsistence model of Pearson (1984).

Only relatively small areas were investigated in a heterogeneous landscape, but it is probable that the archaeological record of the Modification area reflects the occupation of the backcountry by small, mobile bands. Cultural heritage sites in the Modification area probably derive both from temporary habitation sites used by small groups during periods of seasonal dispersal and temporary field camps used by small groups engaging in specific tasks such as procuring lithic resources. This is because the drier bedrock hills and slopes seasonally supported food plants and animals and also contained mineral outcrops exploited for utilitarian purposes.

Plant resources in the Modification area that could have been harvested by winter foragers include seeds and fruits from Quandong (*Santalum acuminatum*) and grasses (e.g. Gott, 1983; Porteners, 1993; Latz, 1995). The presence of grinding implements (mullers/millstones) at one cultural heritage site is indicative of processing seeds, tubers and nuts. When holding surface water, the ephemeral drainage line could have become havens for birds such as wading species, which may have been hunted. Ephemeral water sources would have also attracted macropods.



#### 8.2.4 Synthesis

Aboriginal people probably occupied the Modification area following the end of the last Ice Age some 18,000 years ago. The Aboriginal archaeological record of the Modification area is probably late Holocene (less than a few thousand years) in age. The lack of reliable, permanent sources of water in the hinterland of the Lachlan valley would have made the Modification area unattractive for permanent habitation.

The non-stratified stone artefact sites and hearth at the Modification area probably represent temporary occupation sites. People from the small, mobile groups that probably periodically journeyed into the backcountry from the rivers and streams of the Lachlan valley to forage for food and other resources may have occupied such an area for brief durations. Past Aboriginal people probably also transited through the region to access the ranges to the northeast including the nearby Gobondery Mountains for resource exploitation and cultural purposes.

Foraging and collecting subsistence strategies are clearly artificial divisions, and these tactics undoubtedly overlapped. The people primarily tasked with collecting stone resources are likely to have engaged in domestic activities. Foragers probably exploited the stone outcrops.

## 9 POTENTIAL IMPACTS OF THE MODIFICATION ON ABORIGINAL CULTURAL HERITAGE

The Modification could potentially directly and indirectly impact upon Aboriginal cultural heritage sites. Potential negative direct and indirect impacts may result from the proposed accommodation camp and could include the destruction of the sites via earthmoving, indirect physical affects (e.g. dust deposition) or aesthetic affects.

In accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH, 2011), the principles of ecologically sustainable development were considered in assessing the likely harm of the Modification to Aboriginal cultural heritage sites.

### 9.1 POTENTIAL DIRECT IMPACTS

Construction of the proposed accommodation camp would disturb the current land surface and could directly impact Aboriginal cultural heritage associated with the affected landforms and its landscape context.

Such impacts on cultural heritage values typically fall into three categories:

- the loss of information which could otherwise be gained by conducting research today;
- the loss of the cultural heritage resource for future research using methods and addressing questions not available today; and
- the permanent loss of the physical record.

These impacts can usually be mitigated to various degrees, depending on the nature and significance of the cultural heritage. Where sites are of low scientific significance, their destruction may have little scientific consequence. This could be due to the lack of useful information that could be gained from research, or the availability of many equivalent and alternative sites for study.

Aboriginal cultural heritage sites with greater scientific significance may be the subject of investigation prior to their disturbance. This allows for the salvage of information, and the recovery of a sample of artefactual materials according to current methods and research priorities. Sites and site groupings that are common elsewhere may not require the same degree of salvage attention as those which are rare, of high significance, and subject to active deterioration.

Salvage investigations can provide for the discovery of new knowledge about the past human occupation and land use of an area. Despite the loss of physical evidence involved, the information gained can in turn aid the interpretation and better management of the remaining cultural heritage resource.

#### 9.1.1 Ancillary Infrastructure

In addition to the potential direct impacts described above, the Modification may also include the development of ancillary infrastructure. Ancillary infrastructure comprises additional minor surface infrastructure, although the location of such infrastructure cannot be determined at this stage in the Project (and would be determined during development). Ancillary infrastructure includes, for example, the following activities:

- The construction and/or maintenance of access tracks (e.g. for the installation and/or maintenance of surface infrastructure).
- Internal power infrastructure.
- Minor water infrastructure such as pipelines.
- Other associated minor infrastructure, equipment and activities.

The location and design of ancillary infrastructure would be flexible and would be located in an attempt to avoid known Aboriginal cultural heritage sites and areas of cultural sensitivity as far as practicable. The location of the ancillary infrastructure would be determined as required over the life of the Modification. While the design and location of the ancillary infrastructure is somewhat flexible, some Aboriginal cultural heritage sites may not be able to be avoided completely (e.g. artefact scatters extending over large areas). Where this occurs, appropriate management measures would be implemented including salvage activities where necessary.

## 9.2 POTENTIAL INDIRECT IMPACTS

In areas where the proposed works for the Modification would not involve significant earthmoving, impacts may be limited to minor surface disturbance, limited disturbance of the associated substrates or landforms and no significant alteration of the landscape context.

Potential indirect impacts to cultural heritage sites could include:

- deposition of dust generated by construction;
- accidental disturbance by peripheral activities; and
- inappropriate visitation including the unauthorised removal of cultural heritage objects.

## 9.3 CULTURAL HERITAGE AVOIDED BY THE MODIFICATION

Harm can be avoided to one Aboriginal cultural heritage site near the proposed disturbance areas for the Modification. This is the hearth site AHIMS site number 35-4-0037.

## 9.4 CULTURAL HERITAGE POTENTIALLY IMPACTED BY THE MODIFICATION

Three Aboriginal cultural heritage sites are located within proposed disturbance areas for the Modification. The Aboriginal cultural heritage sites are three stone artefact sites (AHIMS site numbers 35-4-0034, 35-4-0035, and 35-4-0036). This assessment has concluded that these sites are not of high scientific significance. The impact of the Modification on Aboriginal cultural heritage sites is determined by the nature and the degree of harm that the construction works for the accommodation camp will cause. The type of harm is either direct or indirect and therefore the consequence of harm is a total or a partial loss in value (DECCW, 2010b). A total loss in value would occur when the entire site is impacted by the Modification. A partial loss of value would occur when only part of the site (such as in the case of an artefact scatter) is impacted by the Modification.

The potential impacts of the Modification on each of the Aboriginal cultural heritage sites in the Modification area are summarised in **Table 6**.

For the purposes of this assessment, it is conservatively assumed that the construction of the accommodation camp would be of a nature that would cause direct harm to any Aboriginal objects or areas of cultural value (should they occur), however ancillary infrastructure would be located to avoid known sites where practicable.

**Table 6.** Summary of Potential Impacts to Aboriginal Cultural Heritage Sites.

AHIMS Site Number	Site Type	Type of Harm	Degree of Harm	Consequence of Harm
35-4-0034	Artefact (n=1)	Direct	Total	Total loss of value
35-4-0035	Artefacts (n=2)	Direct	Total	Total loss of value
35-4-0036	Artefacts (n=2)	Direct	Total	Total loss of value
35-4-0037	Hearth (n=1)	Indirect	None/Partial <sup>1</sup>	Partial/No loss of value

<sup>1</sup> While these sites would be avoided by direct impacts associated with the approved Modification, they may be subject to some indirect impacts during operational and construction works.

## 9.5 POTENTIAL FOR PREVIOUSLY UNIDENTIFIED ABORIGINAL CULTURAL HERITAGE TO OCCUR IN THE MODIFICATION AREA

Although the Modification area was sufficiently surveyed, there remains the potential for Aboriginal cultural heritage sites to be located within this area (e.g. sites that may have been obscured by grass or soil at the time of survey). Such previously unidentified features, should they occur, would probably be isolated finds or low-density concentrations of stone artefacts (based on the predictive model outlined in Section 7.1 and informed by the results of the current survey, summarised in Section 7.5).

The shallow soils of the Modification area, coupled with past disturbance from pastoralism, agriculture, and track and fence construction, means that significant *in situ* subsurface cultural deposits are highly improbable.

The Modification area does not contain culturally sensitive landforms such as lunettes or source-bordering sand dunes where subsurface Aboriginal cultural deposits (e.g. burials) have been recorded previously.

A strategy for managing any newly identified Aboriginal objects during the life of the Modification is outlined in Section 10.

## 9.6 FLEXIBILITY OF THE MODIFICATION DESIGN

The potential area of disturbance associated with the Modification currently allows for optimum design location for the accommodation camp, and is relatively inflexible. Engineering constraints mean that camp components cannot be relocated away from Aboriginal heritage sites to avoid disturbance. However, the associated ancillary infrastructure will be modified to avoid harm to Aboriginal cultural heritage where possible.

## 9.7 POTENTIAL CUMULATIVE IMPACTS

The Modification is located within a region that contains a number of currently approved or operational mine sites and other large-scale infrastructure projects. These existing operations have caused adverse heritage impacts to a range of Aboriginal cultural heritage sites, principally archaeological ones. For the most part, these adverse impacts have been associated with the disturbance or destruction of Aboriginal cultural heritage sites subsequent to archaeological investigation and assessment.

The surveys undertaken for this assessment indicate that the types of Aboriginal cultural heritage sites within the Modification area that may be impacted by the Modification generally comprise part of a region-wide distribution of very small open occupation sites including disturbed artefacts and hearths of low scientific significance. Given the low scientific significance of these Aboriginal cultural heritage sites, the cumulative effect that may result from the development of the Modification is considered to be low, and would be mitigated by the ongoing program of archaeological recording/salvage recommended by this assessment.

In terms of cultural values, the Modification is located within an area that has already been heavily modified by past clearing, pastoral and agricultural activities. The Modification is considered likely to cause few impacts additional to those that have already occurred. On this basis, it is considered that the Modification would not appreciably increase cumulative impacts to Aboriginal heritage in the region.

## 10 MANAGEMENT STRATEGIES FOR CULTURAL HERITAGE

This section presents proposed strategies for the management of Aboriginal cultural heritage values within the Modification area that may be subject to direct impacts by the construction of the accommodation camp. These recommendations have been developed in consideration of the management approved in the EIS.

### 10.1 GENERAL RECOMMENDATIONS

#### 10.1.1 Heritage Management Plan

The optimal means of co-ordinating and implementing the proposed management strategies is to integrate them into a single programme and document in the form of a *Heritage Management Plan* (HMP). The HMP would reflect the proposed management of the cultural heritage sites within the Project area and should incorporate the Modification and the recommendations of this assessment. The HMP would cover all relevant actions and requirements to be conducted at the Modification area. The HMP should remain active for the life of the Project and the Modification and define the tasks, scope and conduct of all Aboriginal cultural heritage management activities.

#### 10.1.2 Role of the Local Aboriginal Community

Clean TeQ is committed to involving the local Aboriginal community as an integral participant in the management of Aboriginal cultural heritage values in the Modification area. The strategies outlined in this report have incorporated the views of community representatives and the HMP would be drafted following receipt of the Development Consent in consultation with the local Aboriginal community.

The recording, collection, curation, storage and replacement of moved Aboriginal objects would occur with the invited participation of local Aboriginal community representatives.

#### 10.1.3 Site Management and Cultural Awareness Training

The effective application of the HMP and its strategies is dependent on an appreciation of its content and function by on-site staff and employees.

It is proposed to provide training to all on-site personnel regarding the HMP strategies relevant to their employment tasks.

### 10.2 MANAGEMENT OF CULTURAL HERITAGE IN PROXIMITY TO THE DISTURBANCE AREAS

Harm to the hearth site (AHIMS site number 35-4-0037) must be avoided. A temporary barrier/fence should be erected around the site (a minimum 10 m radius buffer). At a minimum, this should include star pickets and flagging. This barrier would remain in place throughout the life of the Modification.

### 10.3 MANAGEMENT OF CULTURAL HERITAGE WITHIN THE DISTURBANCE AREAS

The Aboriginal cultural heritage sites are three stone artefact sites (with one or two artefacts at each) (AHIMS site numbers 35-4-0034, 35-4-0035, 35-4-0036). This assessment has concluded that these sites are not of high scientific significance.

The area of disturbance for the accommodation camp, which would disturb the Aboriginal cultural heritage sites, is relatively inflexible. Engineering constraints mean that camp components cannot be relocated away from the Aboriginal cultural heritage sites to avoid disturbance. Additionally, any such relocation would not remove threats to the sites from indirect disturbance. However, the associated ancillary infrastructure (Section 9.1.1) will be modified to avoid harm to Aboriginal cultural heritage where possible.

Representatives of the RAPs visited the Aboriginal cultural heritage sites, where options for their management were discussed. Based on the results of these discussions, it is recommended that Clean TeQ apply for an AHIP under section 90 of the NP&W Act (and/or a variation application to the existing approved AHIP #C0003049) to allow collection of the Aboriginal objects prior to the commencement of disturbance activities. Clean TeQ should engage a suitably qualified archaeologist and representatives of the RAPs to record and collect the artefacts. These items should be properly curated and stored at the approved "Keeping Place". Artefacts should be replaced within rehabilitated areas in consultation with local Aboriginal groups and OEH.

Clean TeQ's application for an AHIP (and/or a variation application to the existing approved AHIP #C0003049) should also apply to the management of any newly identified Aboriginal cultural heritage items that may be encountered during construction activities. The application should be made for all of the proposed work areas prior to the start of construction. This pre-emptive AHIP application should seek approval to record and collect a representative sample of any newly identified Aboriginal cultural heritage items from work areas to avoid their disturbance.

Examination of the artefacts and their contexts should form an integral part of the recording programme in order to better understand and interpret local and regional patterns of past Aboriginal settlement and resource use. In particular, this could involve investigating lithic technologies and reduction strategies adopted at the Aboriginal cultural heritage sites. These strategies of information collection would complement the salvage programme.

#### 10.4 SUMMARY OF MANAGEMENT RECOMMENDATIONS

Proposed site management strategies for the Aboriginal cultural heritage sites identified during the field survey are summarised in **Table 7**.

**Table 7.** Proposed Specific Management Strategies for known Aboriginal Cultural Heritage Sites.

AHIMS Site Number	Type	Summary Scientific Significance	Potential Impacts	Proposed Management Measures
35-4-0034	Artefact (n=1)	Low	Direct	Collect Aboriginal object
35-4-0035	Artefacts (n=2)	Low	Direct	Collect Aboriginal objects
35-4-0036	Artefacts (n=2)	Low	Direct	Collect Aboriginal objects
35-4-0037	Hearth (n=1)	Low	Indirect	Avoid harm. Erect protective barrier



## 11 SUMMARY RECOMMENDATIONS

Based on the results of this cultural heritage investigation and consultation with representatives of the RAPs the following is recommended:

- Harm to the hearth site (AHIMS site number 35-4-0037) must be avoided. A temporary barrier should be erected around the site (a minimum 10 m radius buffer).
- Clean TeQ apply for an AHIP (or variation to the existing approved AHIP #C0003049) to collect Aboriginal objects at the three known stone artefact sites (AHIMS site numbers 35-4-0034, 35-4-0035, 35-4-0036) and any additional Aboriginal objects located within the disturbance areas for the Modification. A suitably qualified archaeologist and representatives of the local Aboriginal community should be engaged to record and collect the Aboriginal objects. These items should be properly curated and stored at the approved "Keeping Place". Following the relinquishment of the mining lease for the mine, artefacts should be replaced within rehabilitated areas in consultation with local Aboriginal groups and the OEH.
- In the unlikely event that human skeletal remains are encountered during the course of activities associated with the Modification, all work in that area must cease. Remains must not be handled or otherwise disturbed except to prevent further disturbance. Clean TeQ should notify the Police or the State Coroner's Office (tel: 02 9552 4066) immediately. If there is reason to suspect that the skeletal remains are more than 100 years old and of Aboriginal origin, Clean TeQ should contact the OEH's Environmental Line (tel: 131 555) for advice. In the unlikely event that an Aboriginal burial is encountered, strategies for its management would need to be developed with the involvement of the local Aboriginal community.
- The Project HMP, which outlines the management and mitigation measures for Aboriginal cultural heritage, should be updated in consultation with the Aboriginal community and the OEH to incorporate the Modification and the recommendations of this assessment. The HMP should continue to remain active for the life of the Modification and define the tasks, scope and conduct of all Aboriginal cultural heritage management activities.
- Clean TeQ should continue to provide training to all on-site personnel regarding the HMP strategies relevant to their employment tasks.
- Clean TeQ should continue to involve the RAPs and any other relevant Aboriginal community groups or members in matters pertaining to the Modification.

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**APPENDIX 1**  
**GLOSSARY**

## GLOSSARY

**Archaeological site** - A place with evidence of past human activity. This evidence may include Aboriginal and/or historic artefacts, features, structures or organic traces.

**Artefact scatter** - A surface scatter of Aboriginal or historic cultural material. Scatters of stone artefacts are a common archaeological site type. These scatters may also contain charcoal, discarded animal bones, shell and ochre.

**Assemblage** - A collection of artefacts from a single archaeological site.

**Burial site** - A place with a concentration of human remains. Ochre, stone tools, charcoal and grave goods may be associated with burials. Most burial sites are found in sand dunes but dead trees, caves and rock shelters were also used.

**Ceremonial ring** - Place that may be associated with initiation ceremonies, meetings or sacred rituals. Stone arrangements may be present, including cairns, stone circles or standing slabs of rock.

**Chert** - A fine-grained opaline rock ranging in colour from white to black, but most often grey, brown, grayish brown and light green to rusty red.

**Cultural material** - Any material remains or objects resulting from human activity.

**Flake** - A piece of stone detached from a core that typically displays a striking platform, bulb of percussion and flake scars on the ventral surface.

**Flaked piece** - Small fragments of stone resulting from the manufacture of stone tools. A striking platform or bulb of percussion may not be evident.

**Ground surface visibility** - The amount of bare ground exposed, usually expressed as a percentage.

**Hearth** - The remains of a campfire containing charcoal, discoloured soil, and possibly, hearthstones, heat retainers or the remains of animals or shellfish cooked and consumed at the campsite.

**Hearthstone** – Stone cobble placed in a campfire to retain heat for cooking.

**Heat retainer** - Nodule of baked clay, thought to have been placed in campfires to retain heat for cooking.

***in situ*** - An artefact or other feature that has not been disturbed from its original position.

**Mound** - Raised areas of earth ranging from 3 m to 35 m in diameter and from 0.5 m to 2 m in height. Earth oven material, stone artefacts, food refuse and the remains of hut foundations have been recovered from excavated earth mounds in the central and western parts of Victoria.

**Ochre** - Soft varieties of the iron oxides goethite, limonite or haematite usually coloured red or yellow and used as pigment for painting.

**Quarry** - An outcrop of stone or ochre where Aboriginal people have extracted the raw material for use or trade. Stone quarries are identifiable by a dense scatter of broken stone and flakes or consist of pits or hollows where material has been dug out of the ground.

**Quartz** – A silica mineral resistant to weathering because of its hardness. It is commonplace in the landscape as a consequence.

**Quartzite** - A metamorphic rock formed by the re-crystallization of quartz.

**Scarred tree** - A tree with a scar on its trunk caused by bark removal.



**Shell midden** - A surface scatter or heap of discarded shell often with charcoal, animal bones and stone artefacts. Middens may be found near coastlines, rivers, creeks, swamps and ancient lakes.

**Silcrete** - A hard, fine-grained rock composed of silica cement.

**Stone feature** - Cairns, rock wells, grinding groves, stone structures, fish traps and stone arrangements are examples of stone features.

**Survey** - An inspection of land either by foot or vehicle for the purpose of identifying archaeological sites.

**Transect** - A predetermined area or a path that directs the course of a survey.

**APPENDIX 2**  
**CONSULTATION LOG**

DATE	ORGANISATION CONTACTED	HOW CONTACTED	CONTACTED BY	NATURE OF CONSULTATION
2/12/2016	Office of Environment and Heritage, Condobolin Local Aboriginal Land Council, Peak Hill Local Aboriginal Land Council, Lachlan Shire Council, Forbes Shire Council, Parkes Shire Council, Native Title Services Corporation Limited, National Native Title Tribunal, Office of the Registrar Aboriginal Land Rights Act 1983, Central West Local Land Services	Post	Mick Ryan, Scandium21	Step 1 letters sent out to relevant organisation requesting details of Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or place(s) in the Area of Interest for the Modification.
7/12/2016	Scandium21	Email	Office of the Registrar Aboriginal Land Rights Act 1983	Provided a response to the Step 1 letter.
9/12/2016	Scandium21	Email	Kylie Rowe, Office of Environment and Heritage	Provided a response to the Step 1 letter.
14/12/2016	Scandium21	Email	Irene Assumpter, National Native Title Tribunal	Provided a response to the Step 1 letter.
19/12/2016	Scandium21	Email	Paul Bennet, Forbes Shire Council	Provided a registration on behalf of the Forbes Aboriginal & Community Working Party
6/01/2017	Interested Aboriginal Stakeholders	Post/Email	Mick Ryan, Scandium21	Step 2 letters sent out to groups/individual identified during Step 1, inviting Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or place(s) in the Area of Interest to register an interest in the Project.
6/01/2017	Scandium21	Email	Return Email Service	Returned email received from Joy Russell (copy of Step 2 letter). Unable to be delivered. No alternative contact details on file.
11/01/2017	Scandium21	Telephone	George, NTSCORP	Left message requesting a call back in relation to the Syerston Extension Modification Project.
11/01/2017	Interested Aboriginal Stakeholders	Public Notice	Scandium21	A public notice was published in the Koori Mail on 11 January 2017, inviting Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or place(s) in the Area of Interest to register an interest in the Project.
12/01/2017	George, NTSCORP	Telephone	Scandium21	Called George, returning his call. Left message with contact details and advising that would try and call again on Monday.
16/01/2017	Scandium21	Post	Australia Post	Returned mail received from Bogan River Peak Hill Wiradjuri Aboriginal Corporation (copy of Step 2 letter). The correspondence was marked "return to sender". No alternative contact details on file.
16/01/2017	George, NTSCORP	Telephone	Scandium21	Called George, returning his call. George advised that the Ngemba, Ngiyampaa, Wangaaypuwan and Wayilwan Native Title Claimants boundary was outside of the Project area and that they claimants were unlikely to register an interest.
18/01/2017	Scandium21	Post	Lachlan Shire Council	Provided a response to the Step 1 letter.
18/01/2017	Scandium21	Post	Australia Post	Returned mail received from Trevor Robinson (copy of Step 2 letter). The correspondence was marked "return to sender". No alternative contact details on file.
18/01/2017	Scandium21	Post	Australia Post	Returned mail received from Bulgandramine Youth Development Aboriginal Corporation (copy of Step 2 letter). The correspondence was marked "return to sender". No alternative contact details on file.
18/01/2017	Scandium21	Post	Australia Post	Returned mail received from Little Burning Mountain Aboriginal Corporation (copy of Step 2 letter). The correspondence was marked "return to sender".
18/01/2017	Little Burning Mountain Aboriginal Corporation	Post	Scandium21	Posted additional copy of Step 2 letter to alternative contact details (as per registered company address available on website).

18/01/2017	Interested Aboriginal Stakeholders	Public Notice	Scandium21	A public notice was published in the Condobolin Argus on 18 January 2017, inviting Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or place(s) in the Area of Interest to register an interest in the Project.
19/01/2017	Interested Aboriginal Stakeholders	Post/Email	John Hanrahan, Clean TeQ	Additional step 2 letters sent out to groups/individual identified during Step 1, inviting Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or place(s) in the Area of Interest to register an interest in the Project. Additional letters due to late response to Step 1 correspondence.
23/01/2017	Clean TeQ	Email	Laurie Hutchison, Wiradjuri Condobolin Corporation	Registered an interested in the Project.
1/02/2017	Clean TeQ	Email	Lois Goolagong, Murie Elders Group	Registered an interested in the Project.
1/02/2017	Clean TeQ	Email	Jamie Gray, Binjang Wellington Wiradjuri Aboriginal Heritage Surveys	Registered an interested in the Project.
3/02/2017	Clean TeQ	Telephone	Lois Goolagong, Murie Elders Group	Called to confirm receipt of registration. Provided telephone contact details.
8/02/2017	West Wyalong Local Aboriginal Land Council	Post	Clean TeQ	Step 1 letters sent out to relevant organisation requesting details of Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or
15/02/2017	Clean TeQ	Telephone	Louise Davis	Registered an interested in the Project.
22/02/2017	West Wyalong Local Aboriginal Land Council, Condobolin Local Aboriginal Land Council, OEH	Post	Clean TeQ	Copies of OEH and LALC letters distributed.
6/03/2017	David Acheson, Forbes Aboriginal & Community Working Party	Telephone	Clean TeQ	David advised that the Forbes Aboriginal & Community Working Party no longer wished to be consulted in relation to the Syerston Project, and that they did not wish to receive any further correspondence.
6/03/2017	David Acheson, Forbes Aboriginal & Community Working Party	Email	Clean TeQ	Provided email correspondence to advise that as requested, Clean TeQ will no longer provide correspondence to the Forbes Aboriginal & Community Working Party in relation to the Syerston Project.
13/10/2017	Registered Aboriginal Parties	Email/Post	Clean TeQ	Copy of Proposed Methodology distributed for review and comment. Feedback on the Proposed Methodology was requested by 10 November 2017.
13/10/2017	Registered Aboriginal Parties	Email/Post	Clean TeQ	Invitation to attend field surveys provided at all Registered Aboriginal Parties.
13/10/2017	Clean TeQ	Email	Rebecca Shepherd, Murie Elders Group	Confirmed receipt of Proposed Methodology.
13/10/2017	Clean TeQ	Email	Rebecca Shepherd, Murie Elders Group	Confirmed receipt of field survey invitation and advised would provide requested documentation separately.
16/10/2017	Clean TeQ	Email	Leanne Hampton, West Wyalong Local Aboriginal Land Council	Confirmed receipt of field survey invitation and advised that she would be representing the LALC during the field surveys.
17/10/2017	Ally Coe, Wiradjuri Condobolin Corporation	Telephone	Clean TeQ	Returned call. Ally confirmed receipt of field survey invitation.
17/10/2017	Dave Carter, Condobolin Local Aboriginal Land Council	Telephone	Clean TeQ	Returned call. Left voicemail requesting call back to confirm email address and noting that postal correspondence had been sent out.
17/10/2017	Peter Peckham	Telephone	Clean TeQ	Called to confirm contact details for Sandra, following his call with John Hannrahan. Peter advised that he would pass Clean TeQ's contact details to Sandra and that she would contact to provide her details.
20/10/2017	Sandra Peckham	Telephone	Clean TeQ	Returned Sandra's call. She requested to be involved as a Registered Aboriginal Party and provided her contact details.
24/10/2017	Sandra Peckham	Email	Clean TeQ	Provided invitation to attend field surveys and copy of Proposed Methodology.
27/10/2017	Ally Coe, Wiradjuri Condobolin Corporation	Telephone	Clean TeQ	Spoke with Tenille. Confirmed that WCC would be providing a representative for the field survey, and that insurances would be sent through.
27/10/2017	Leeanne Hampton, West Wyalong Local Aboriginal Land Council	Telephone	Clean TeQ	Confirmed that WWLALC would be providing a representative for the field survey, and that insurances would be sent through.
27/10/2017	Dave Carter, Condobolin Local Aboriginal Land Council	Telephone	Clean TeQ	Confirmed that CLALC would be providing a representative for the field survey, and that insurances would be sent through.
27/10/2017	Peter Peckham	Telephone	Clean TeQ	Called to confirm attendance at field surveys. Left message for Peter.
27/10/2017	Sandra Peckham	Telephone	Clean TeQ	Called to confirm attendance at field surveys. Left message for Sandra.

27/10/2017	Clean TeQ	Telephone	Sandra Peckham	Returned call. Advised that would be sending representative for field surveys and that insurances would be sent through.
27/10/2017	Louise Davis	Telephone	Clean TeQ	Confirmed that she would attending the field surveys, and that she would be using the WWLALC insurances.
30/10/2017	Registered Aboriginal Parties	Field Survey	Clean TeQ and Landskape	Field survey held for Modification 6 study area.
26/11/2017	Clean TeQ	Meeting	Peter White	Registered an interest in the Modification.
26/11/2017	Clean TeQ	Meeting	Isabel Goolagong	Registered an interest in the Modification.

**APPENDIX 3**  
**CORRESPONDENCE TO ABORIGINAL COMMUNITY STAKEHOLDERS**



## **STEP 1 CORRESPONDENCE**

2 December 2016

Office of Environment and Heritage  
PO Box 2111  
DUBBO NSW 2830

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sir/Madam,

Scandium21 Pty Ltd (Scandium21), a wholly owned subsidiary of Clean TeQ Limited, owns the rights to develop the approved, but not yet developed, Syerston Project. The Syerston Project is situated approximately 350 km west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

Development Consent (DA 374-11-00) for the Syerston Project was issued under Part 4 of NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) in 2001, and has since been modified on two occasions. The approval allows for processing of up to 2.5 million tonnes per annum of ROM ore to produce up to 53,000 tonnes per annum of nickel and cobalt sulphides at the mine processing facility.

Scandium21 lodged a separate application to modify Development Consent (DA 374-11-00) under section 75W of the EP&A Act in May 2016 to allow for the production of scandium oxide at the Project and this separate application is currently being assessed by the NSW Department of Planning and Environment.

Scandium21 proposes to seek NSW Government approval for changes to the approved Syerston Project, herein referred to as the Modification. The Modification would allow for the concurrent development of nickel-cobalt and scandium mining actions. The main activities associated with the development of the Modification would include an increase in the extent of the approved surface development area to allow for relocation of waste rock emplacements and infrastructure, changes to local road network and realignment and an extension to the currently approved water supply pipeline and supporting infrastructure.

Approval for the Modification would be sought from the NSW Minister for Planning under the section 75W of the EP&A Act and the NSW *Environmental Planning and Assessment Regulation, 2000*.

As part of the application process, Scandium21 will be preparing an Aboriginal Cultural Heritage Assessment, and therefore may seek an Aboriginal Heritage Impact Permit under section 90 of the NSW *National Parks and Wildlife Act, 1974*.

The subject area of the Modification and any such application is depicted as the "Area of Interest" and includes the entire extent shown on the enclosed plan.

**Scandium21 Pty Ltd**

(A Clean TeQ Company)  
Head Office – Victoria  
12/21 Howleys Rd  
Notting Hill, Victoria 3168 Australia  
PO Box 227  
Mulgrave VIC 3170 Australia  
t: +61 3 9797 6700  
f: +61 3 9706 8304  
e: info@cleanteq.com

For the purposes of meeting its consultation requirements as set out in the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010) (Consultation Guidelines) issued by the NSW Office of Environment and Heritage (OEH), Scandium21 hereby notifies you that it would like to consult with any Aboriginal persons or groups who may hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal objects and/or places in the "Area of Interest".

Should you know of any Aboriginal person or group who may wish to be consulted in relation to the process described above, could you please provide their details **before 5.00 pm on Wednesday 21 December 2016** to Scandium21 via the following contact details:

Scandium21  
C/- Danielle Wallace  
PO Box 379, WEST RYDE, NSW 2114  
Mobile: 0414 833 397  
Email: [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

Scandium21 will then write to each Aboriginal person or group whose details are provided by you to notify them of the process and invite them to register an interest in the process of community consultation to be carried out in accordance with the Consultation Guidelines.

Scandium21 advises that the details of any Aboriginal person or group who registers an interest in the Modification will be forwarded to the OEH and the Condobolin Local Aboriginal Land Council and Peak Hill Local Aboriginal Land Council in accordance with Section 4.1.5 of the Consultation Guidelines, unless they specify that they do not want their details released.

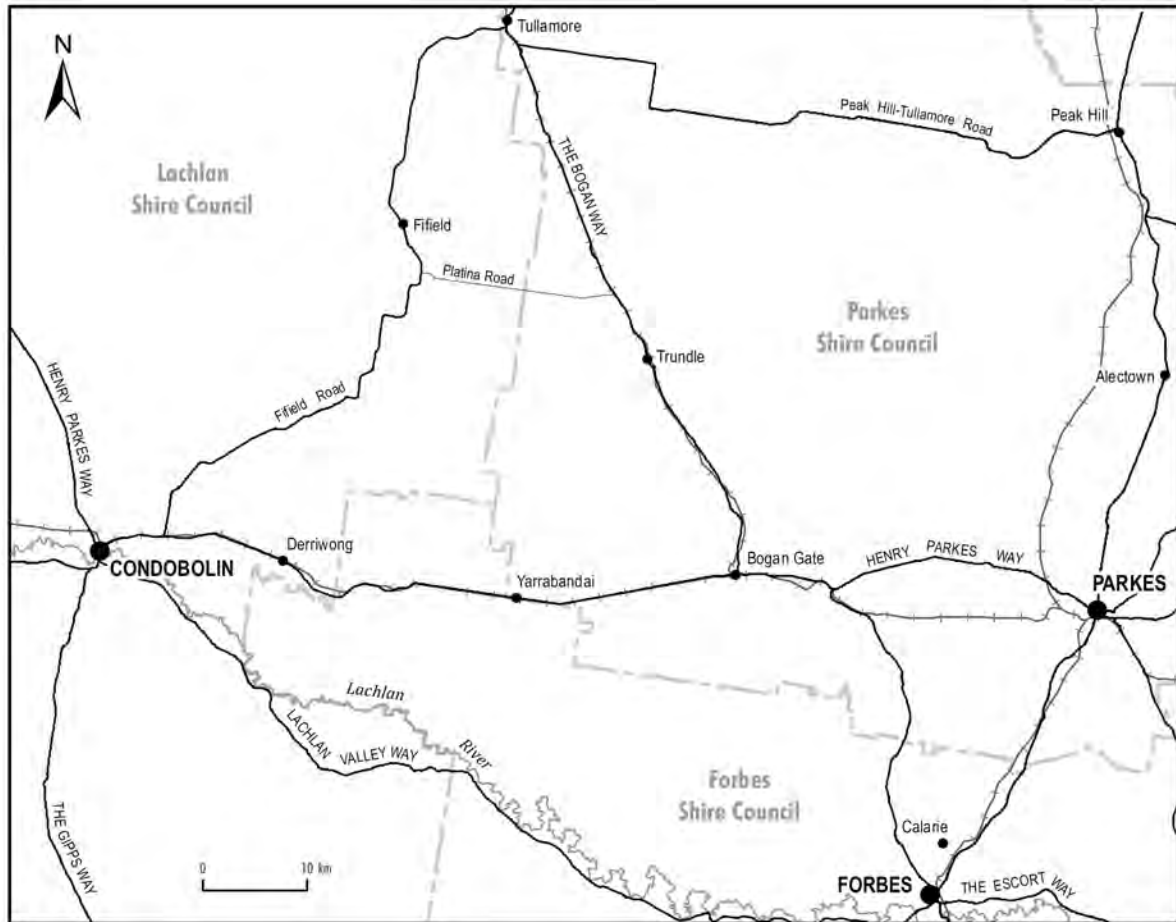
If any additional information or clarification is required, please do not hesitate to contact Scandium21 via the contact details provided above.

Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING "AREA OF INTEREST"



2 December 2016

Condobolin Local Aboriginal Land Council  
PO Box 114  
CONDOBOLIN NSW 2877

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sir/Madam,

Scandium21 Pty Ltd (Scandium21), a wholly owned subsidiary of Clean TeQ Limited, owns the rights to develop the approved, but not yet developed, Syerston Project. The Syerston Project is situated approximately 350 km west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

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*(A Clean TeQ Company)*

Head Office – Victoria

12/21 Howleys Rd

Notting Hill, Victoria 3168 Australia

PO Box 227

Mulgrave VIC 3170 Australia

t: +61 3 9797 6700

f: +61 3 9706 8304

e: [info@cleanteq.com](mailto:info@cleanteq.com)

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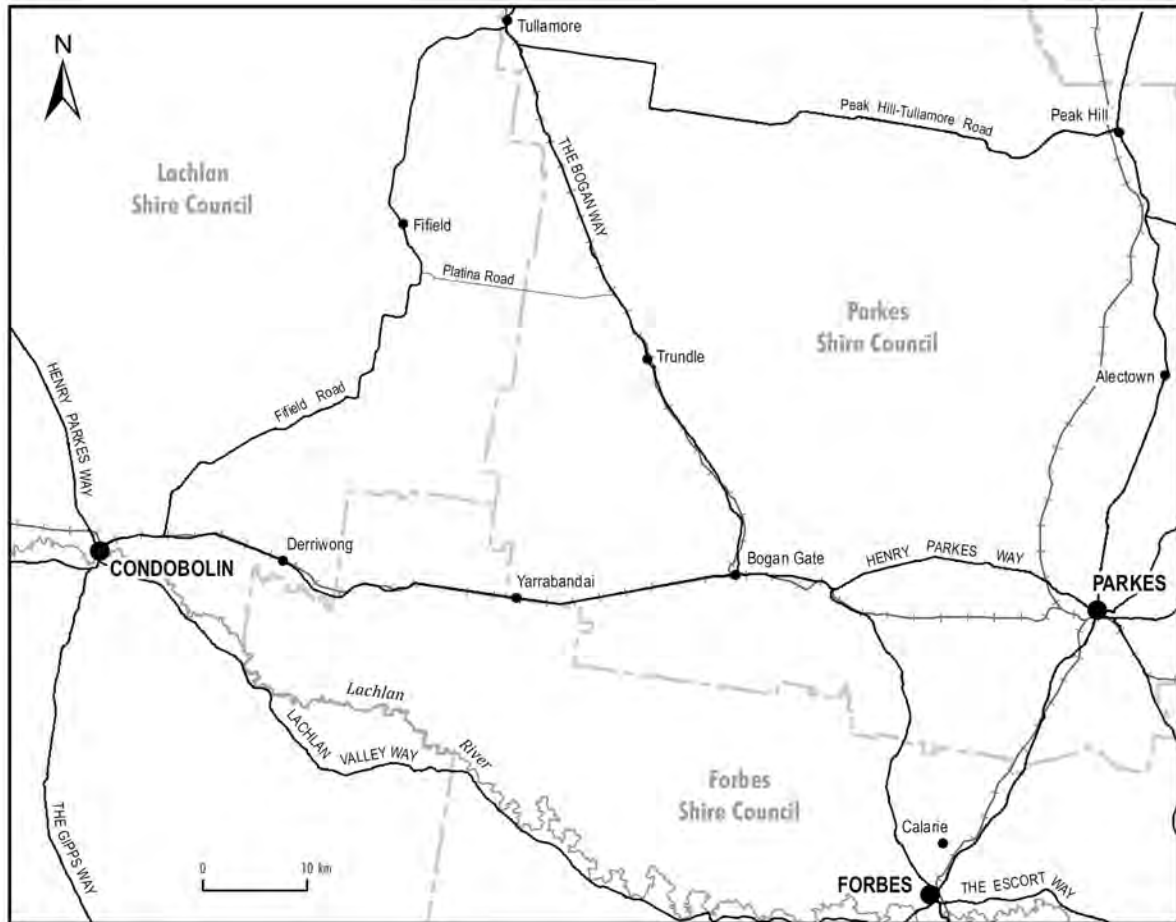
Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**



# PLAN SHOWING "AREA OF INTEREST"



2 December 2016

Peak Hill Local Aboriginal Land Council  
PO Box 63  
PEAK HILL NSW 2869

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sir/Madam,

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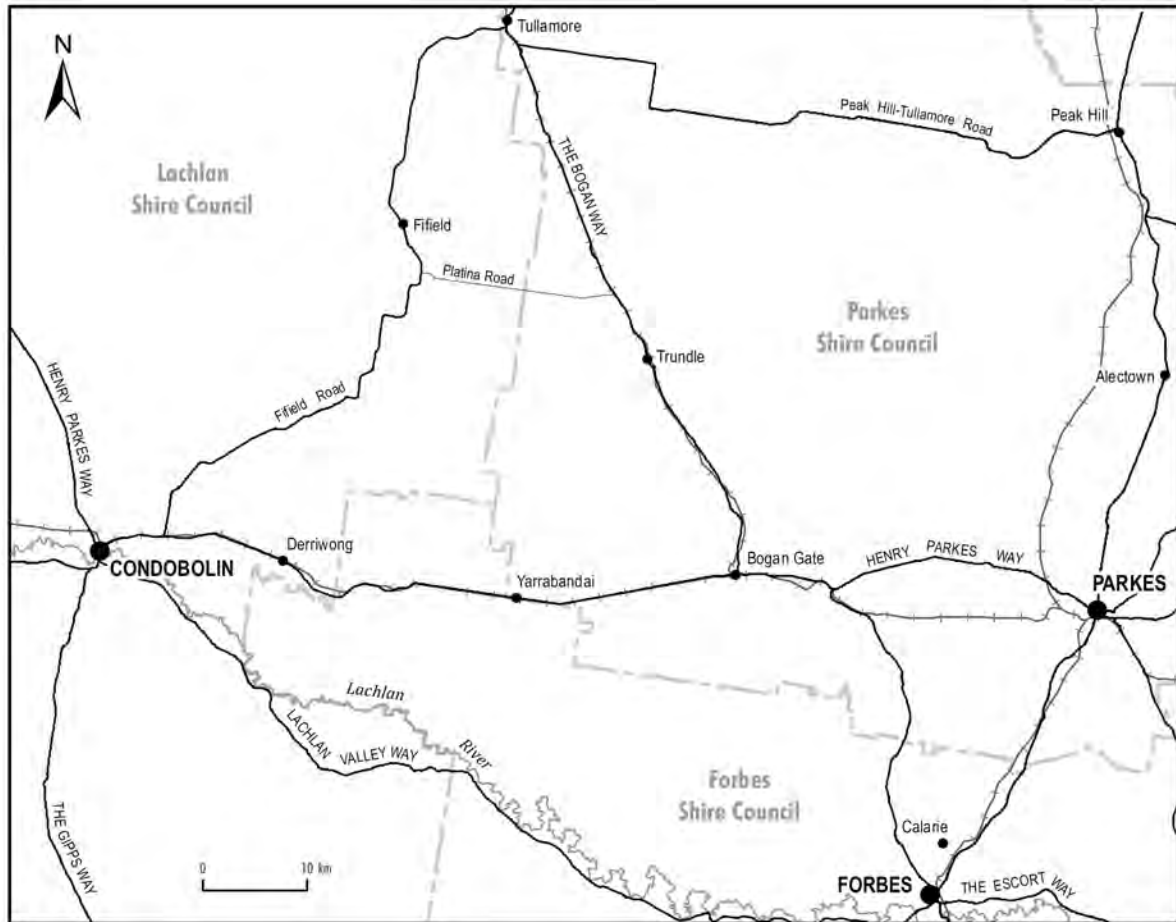
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Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

## PLAN SHOWING “AREA OF INTEREST”



2 December 2016

Lachlan Shire Council  
Attention: Robert Hunt, General Manager  
PO Box 216  
CONDOBOLIN NSW 2877

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Robert,

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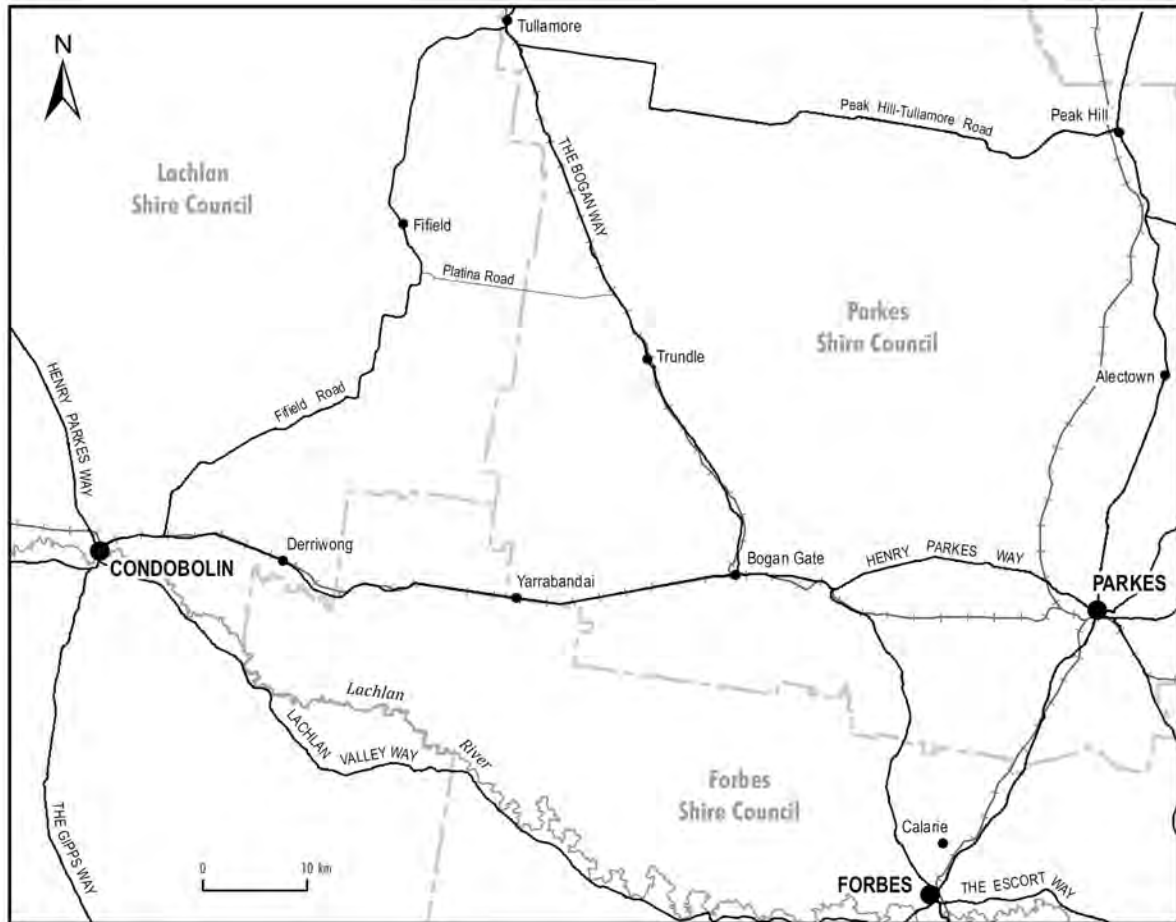
Kind Regards,

A handwritten signature in blue ink, appearing to read 'PP' followed by a stylized surname.

**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**



## PLAN SHOWING “AREA OF INTEREST”



2 December 2016

Forbes Shire Council  
Attention: Danny Green, General Manager  
PO Box 333  
FORBES NSW 2871

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Danny,

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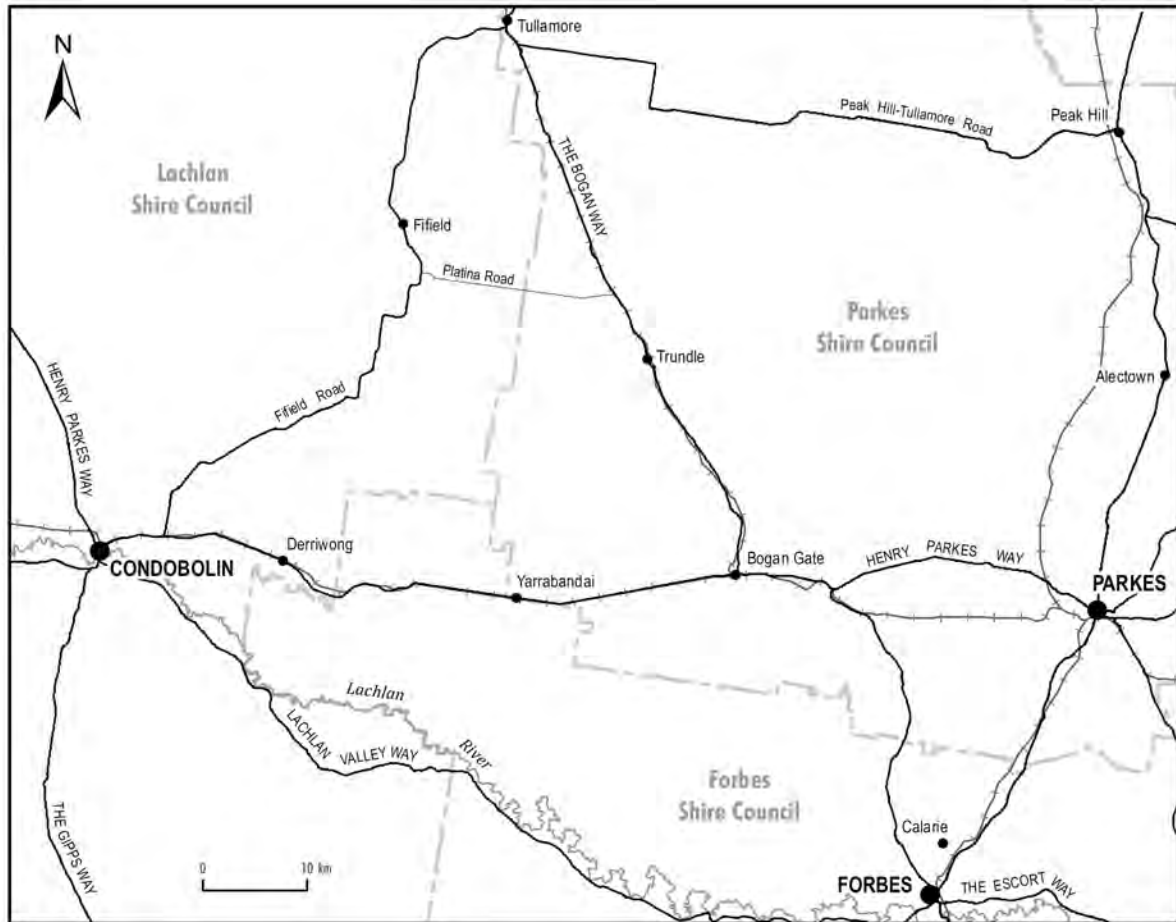
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Kind Regards,

A handwritten signature in blue ink, appearing to read 'PP' followed by a stylized name, likely Mick Ryan.

**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

## PLAN SHOWING “AREA OF INTEREST”



2 December 2016

Parkes Shire Council  
Attention: Kent Boyd, General Manager  
PO Box 337  
PARKES NSW 2870

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Kent,

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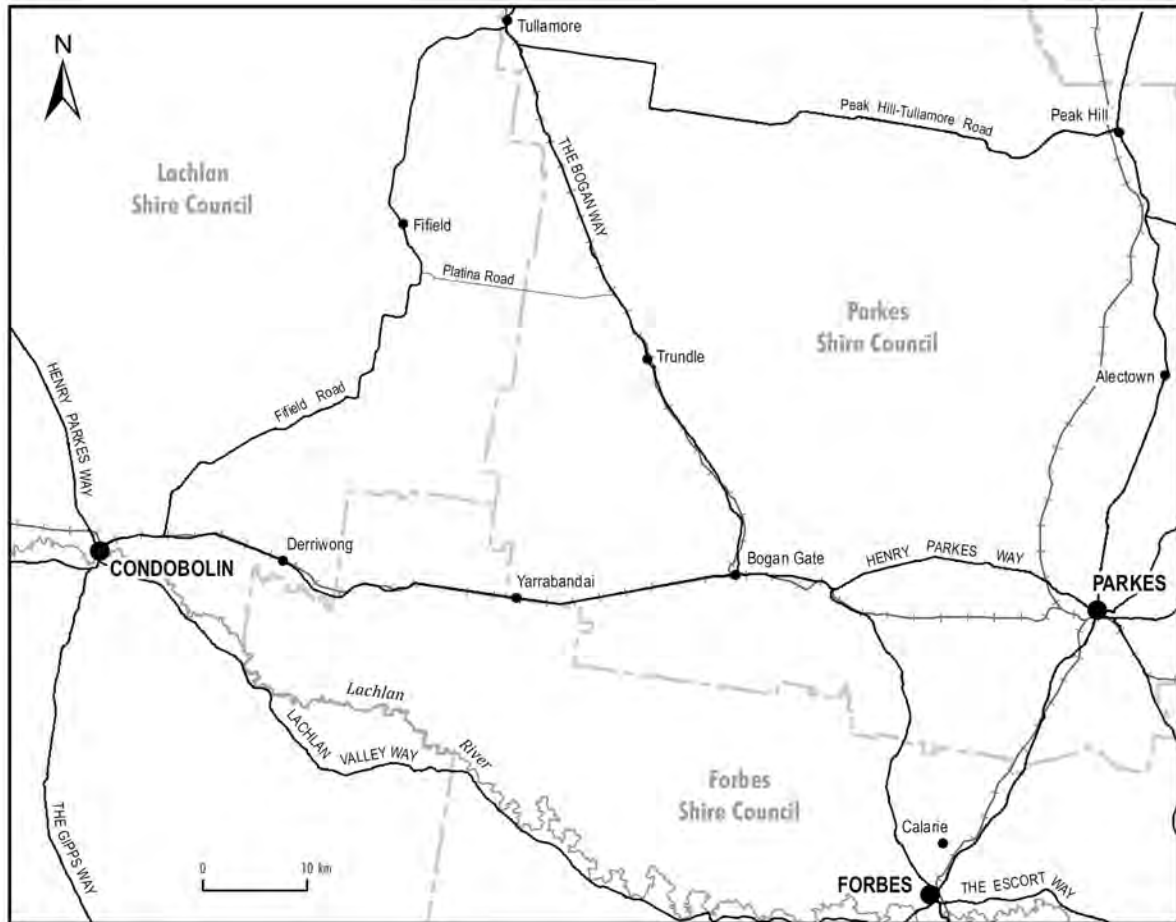
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**PROJECT MANAGER – SYERSTON**



# PLAN SHOWING "AREA OF INTEREST"



2 December 2016

Native Title Services Corporation Limited  
PO Box 2105  
STRAWBERRY HILLS NSW 2012

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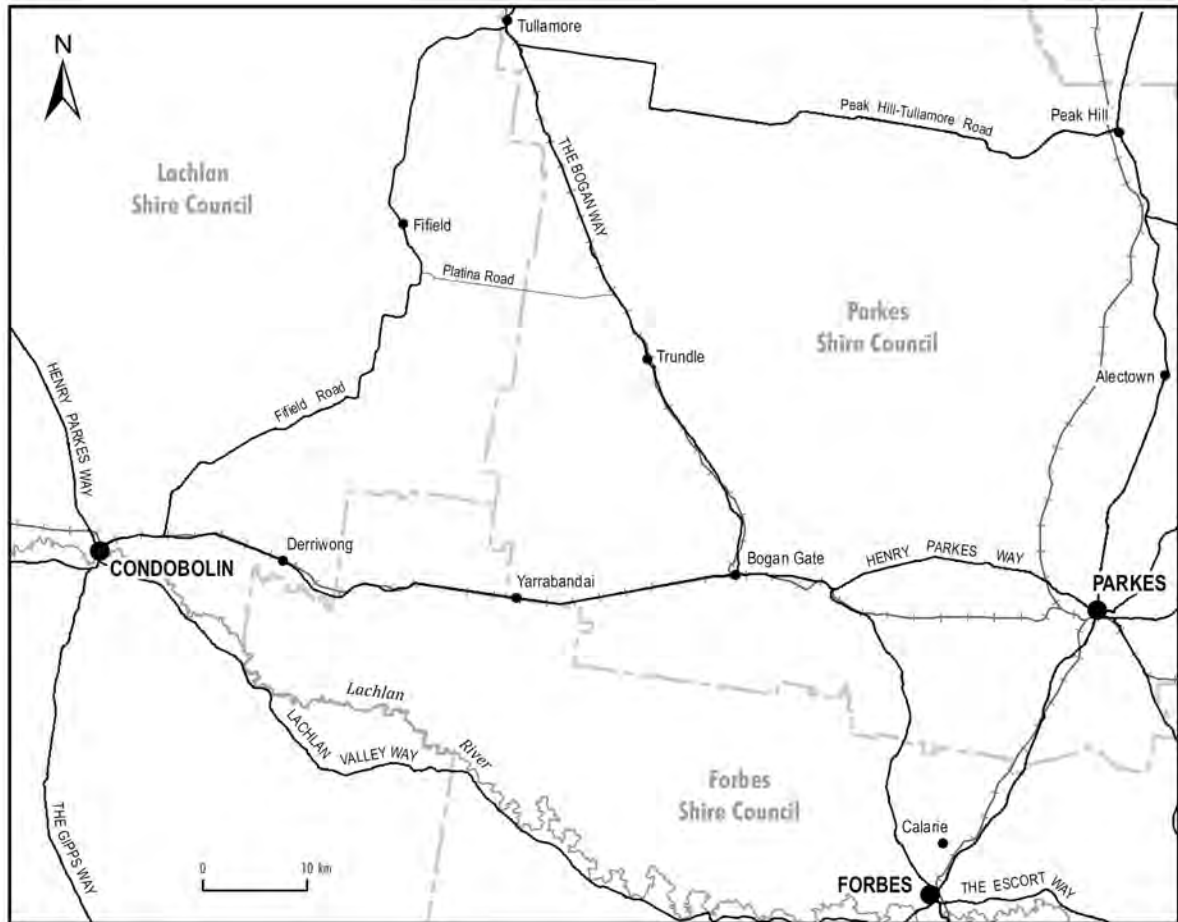
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# PLAN SHOWING "AREA OF INTEREST"



2 December 2016

National Native Title Tribunal  
NSW & ACT Registry  
GPO Box 9973  
SYDNEY NSW 2001

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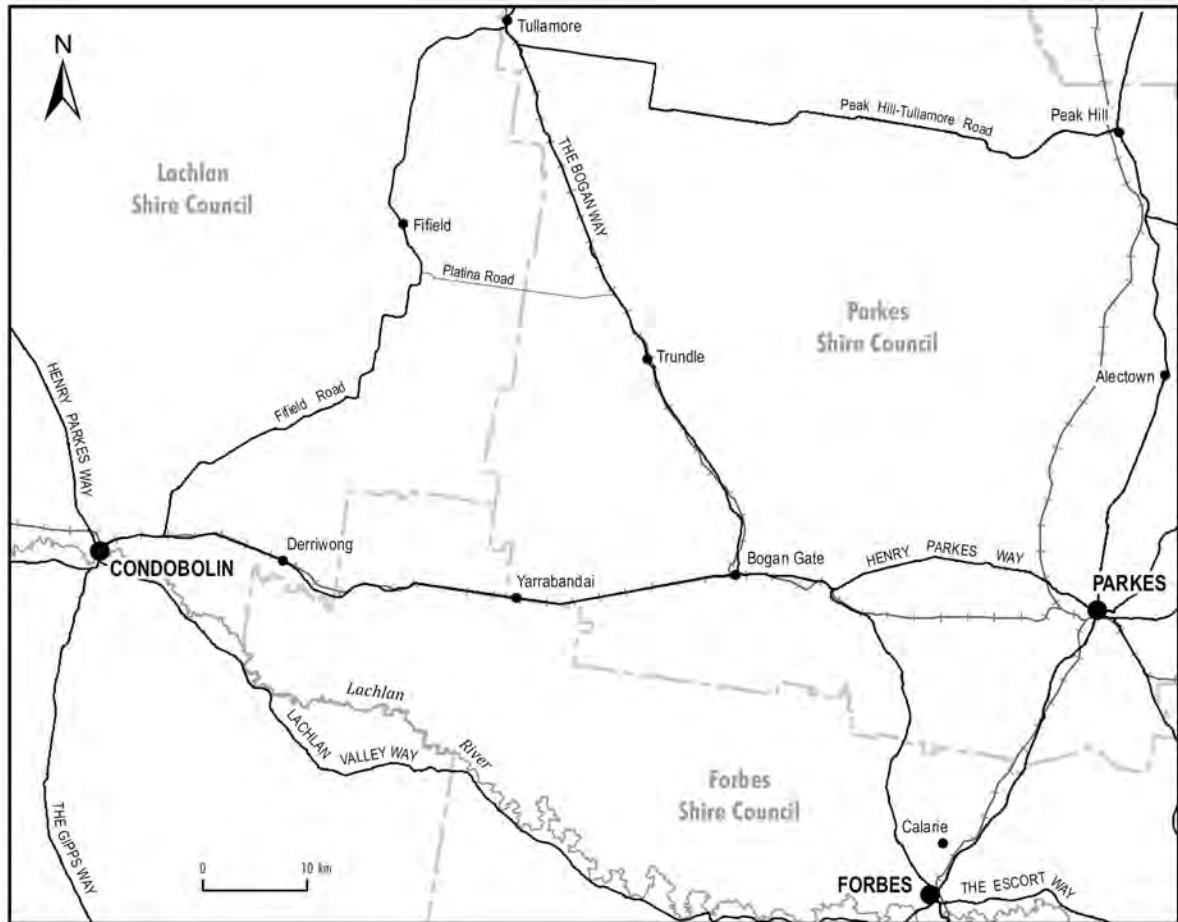
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**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**



## PLAN SHOWING “AREA OF INTEREST”



2 December 2016

The Registrar  
Office of the Registrar, Aboriginal Land Rights Act 1983  
PO Box 112  
GLEBE NSW 2037

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

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**Scandium21 Pty Ltd**  
(A Clean TeQ Company)  
Head Office – Victoria  
12/21 Howleys Rd  
Notting Hill, Victoria 3168 Australia  
PO Box 227  
Mulgrave VIC 3170 Australia  
  
t: +61 3 9797 6700  
f: +61 3 9706 8304  
e: info@cleanteq.com

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Scandium21  
C/- Danielle Wallace  
PO Box 379, WEST RYDE, NSW 2114  
Mobile: 0414 833 397  
Email: [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

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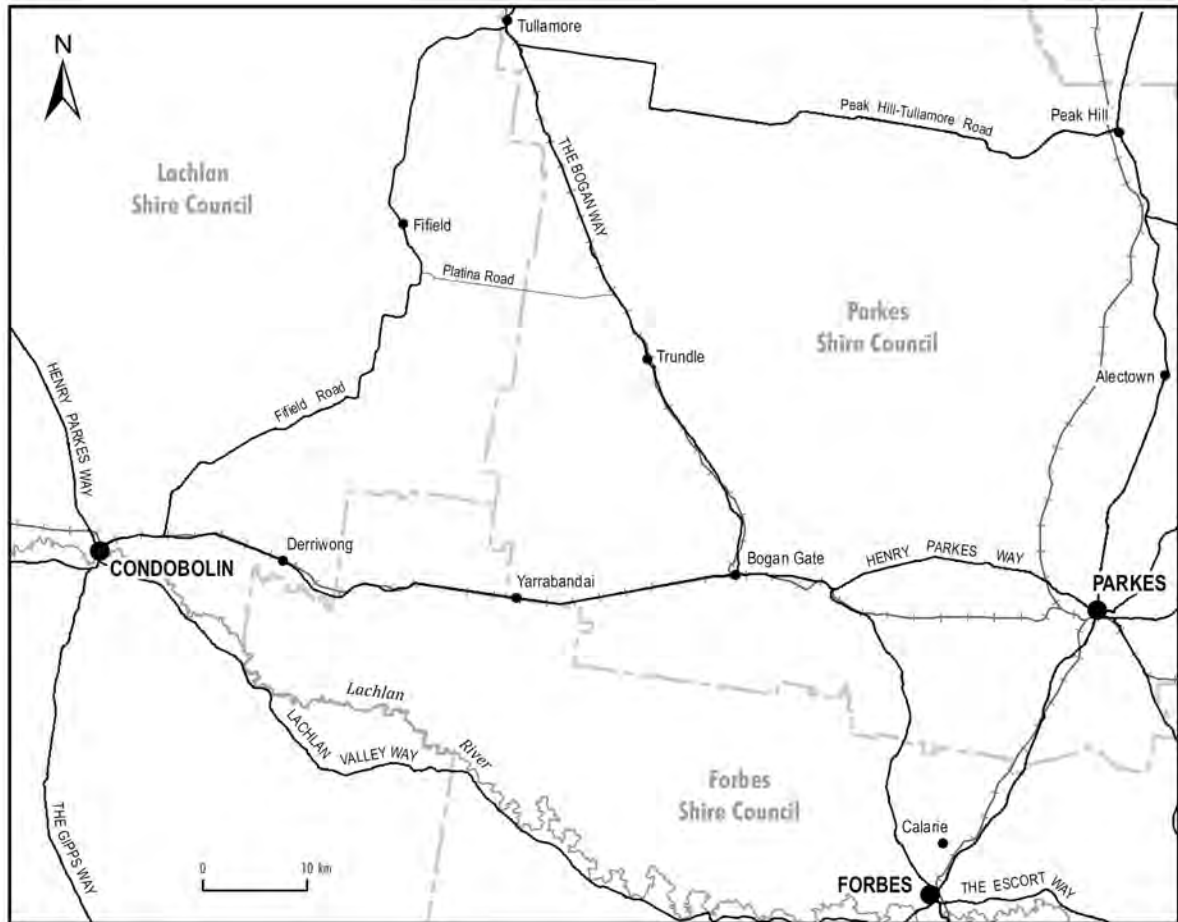
If any additional information or clarification is required, please do not hesitate to contact Scandium21 via the contact details provided above.

Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING "AREA OF INTEREST"



2 December 2016

Central West Local Land Services  
PO Box 100  
CONDOBOLIN NSW 2877

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sir/Madam,

Scandium21 Pty Ltd (Scandium21), a wholly owned subsidiary of Clean TeQ Limited, owns the rights to develop the approved, but not yet developed, Syerston Project. The Syerston Project is situated approximately 350 km west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

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**Scandium21 Pty Ltd**

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Notting Hill, Victoria 3168 Australia

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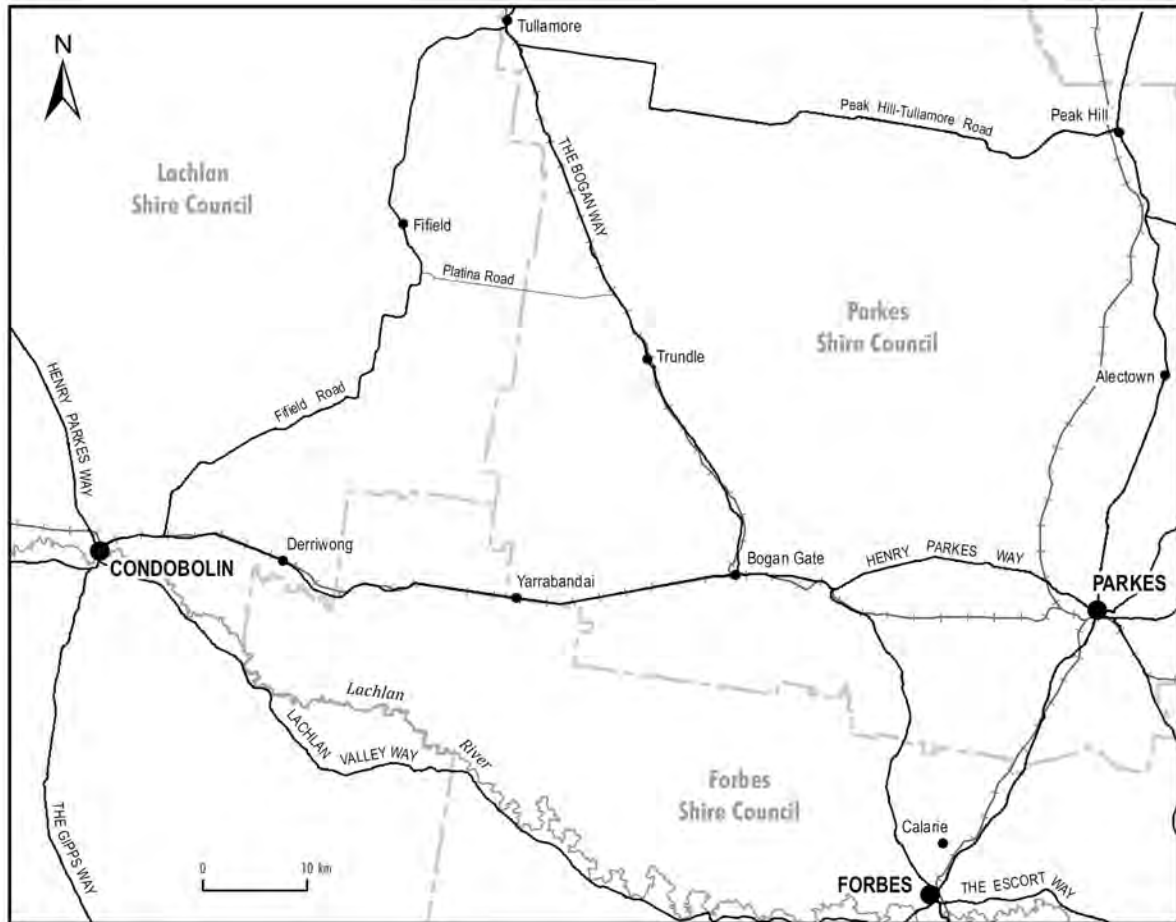
Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**



## PLAN SHOWING “AREA OF INTEREST”



3 February 2017

West Wyalong Local Aboriginal Land Council  
PO Box 332  
WEST WYALONG NSW 2671

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sir/Madam,

Scandium21 Pty Ltd (Scandium21), a wholly owned subsidiary of Clean TeQ Limited, owns the rights to develop the approved, but not yet developed, Syerston Project. The Syerston Project is situated approximately 350 km west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

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Should you know of any Aboriginal person or group who may wish to be consulted in relation to the process described above, could you please provide their details **before 5.00 pm on Wednesday 22 February 2017** to Scandium21 via the following contact details:

Scandium21  
C/- Danielle Wallace  
PO Box 379, WEST RYDE, NSW 2114  
Mobile: 0414 833 397  
Email: [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

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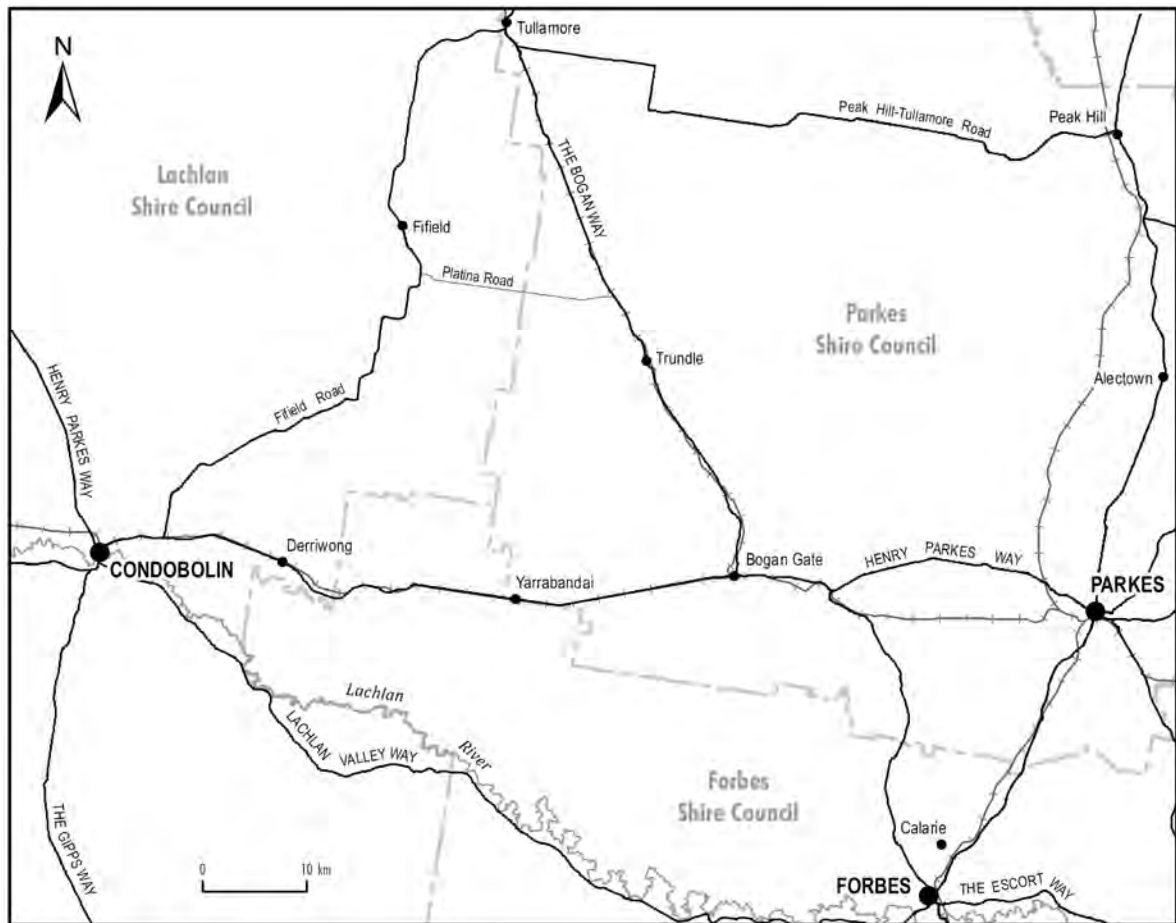
If any additional information or clarification is required, please do not hesitate to contact Scandium21 via the contact details provided above.

Kind Regards,

A handwritten signature in black ink, appearing to read 'J. Hanrahan', with a stylized flourish at the end.

**JOHN HANRAHAN**  
**APPROVALS LEAD – THE SYERSTON PROJECT**

# PLAN SHOWING "AREA OF INTEREST"



## **STEP 2 CORRESPONDENCE**

6 January 2017

Condobolin Local Aboriginal Land Council  
Chairperson  
PO Box 114  
CONDOBOLIN NSW 2877

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

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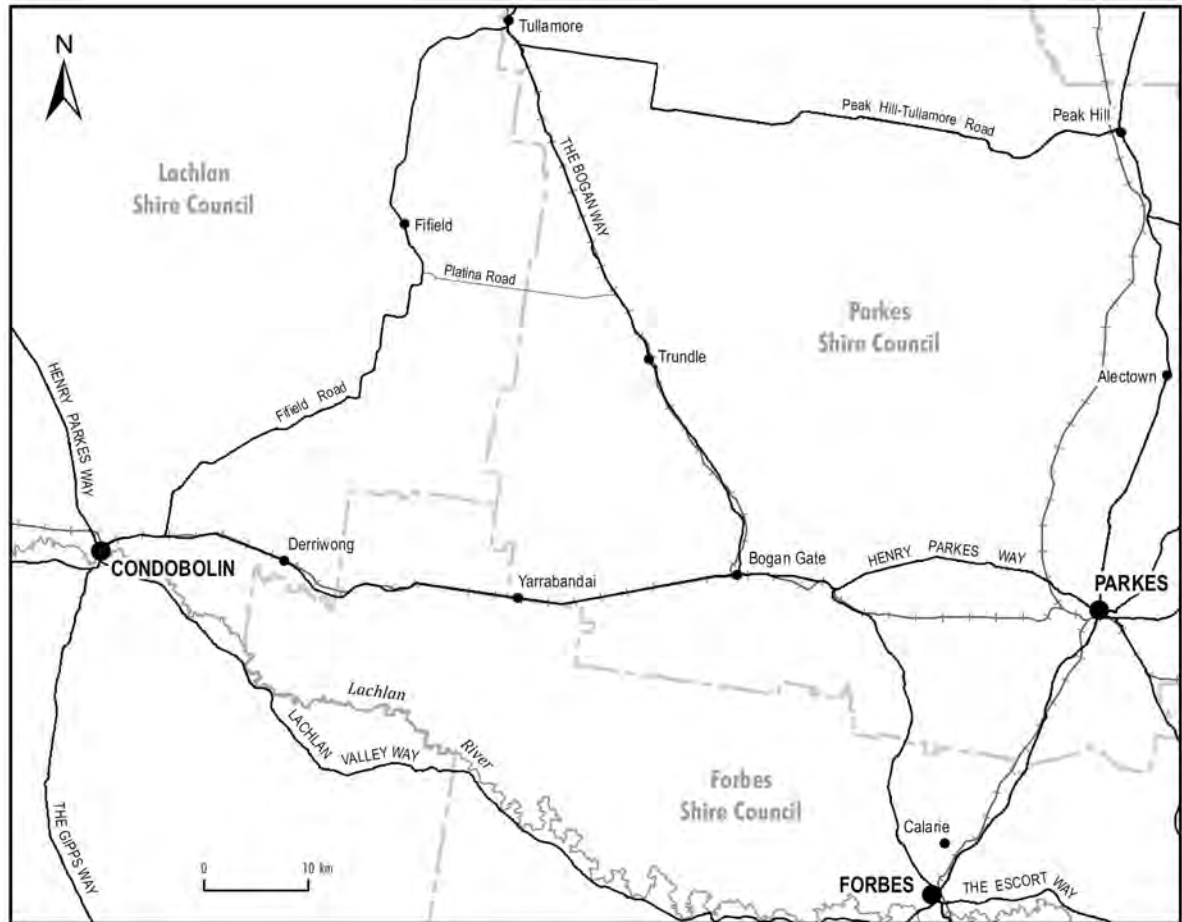
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Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING “AREA OF INTEREST”



6 January 2017

Hunter Central Rivers Catchment Management Authority  
Aboriginal Reference Group  
Private Bag 2010  
PATERSON NSW 2421

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

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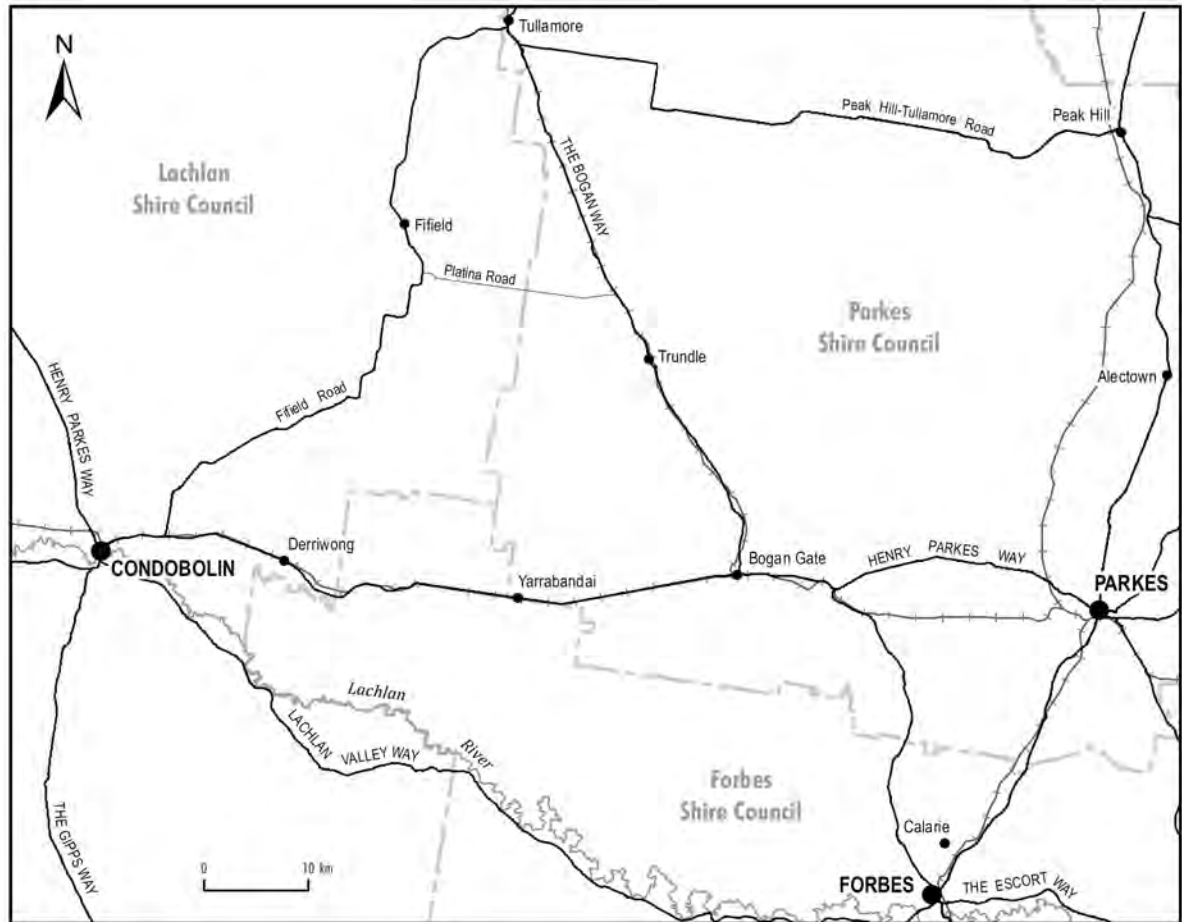
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**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING "AREA OF INTEREST"



6 January 2017

Lachlan Catchment Management Authority  
Aboriginal Reference Group  
2 Sheriff Street  
FORBES NSW 2871

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

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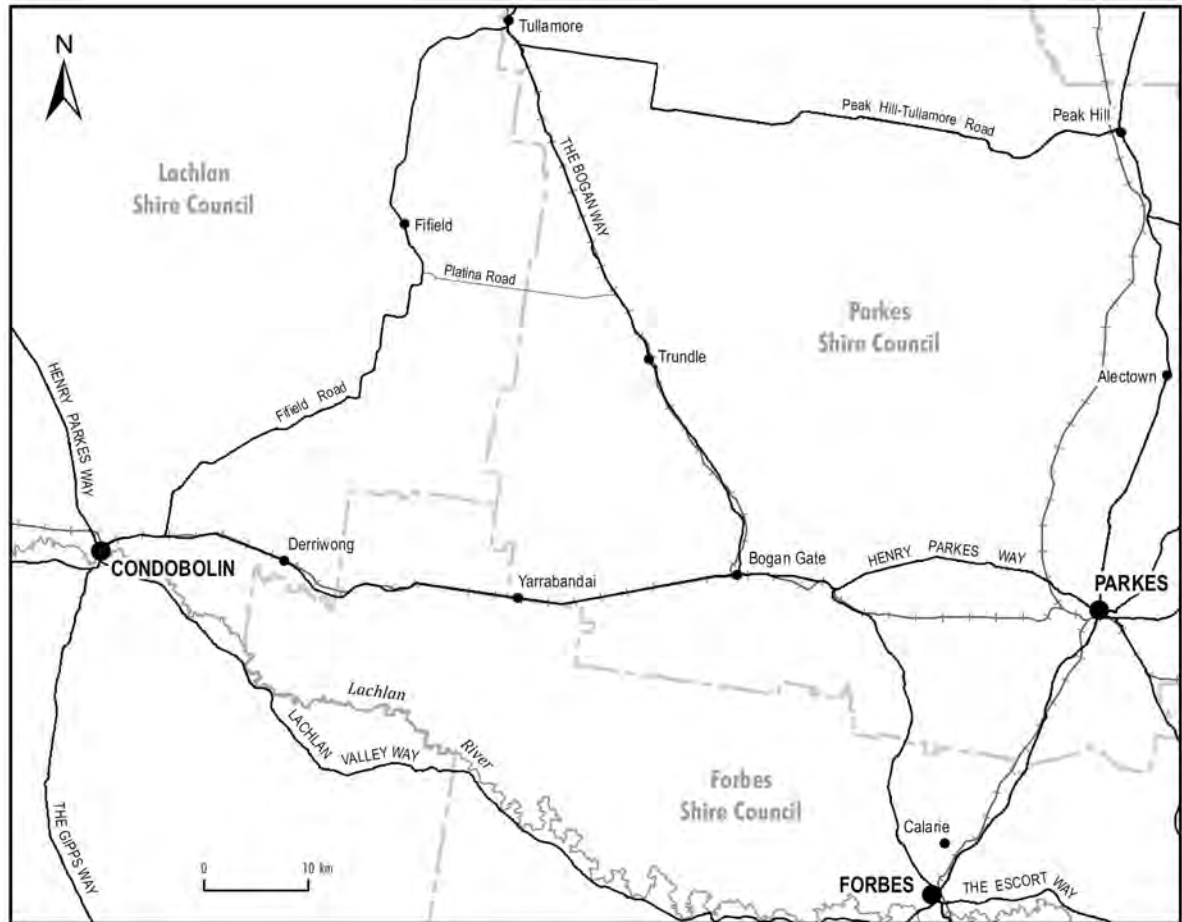
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Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING “AREA OF INTEREST”



6 January 2017

Mooka  
Neville Williams  
PO Box 70  
COWRA NSW 2794

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Neville,

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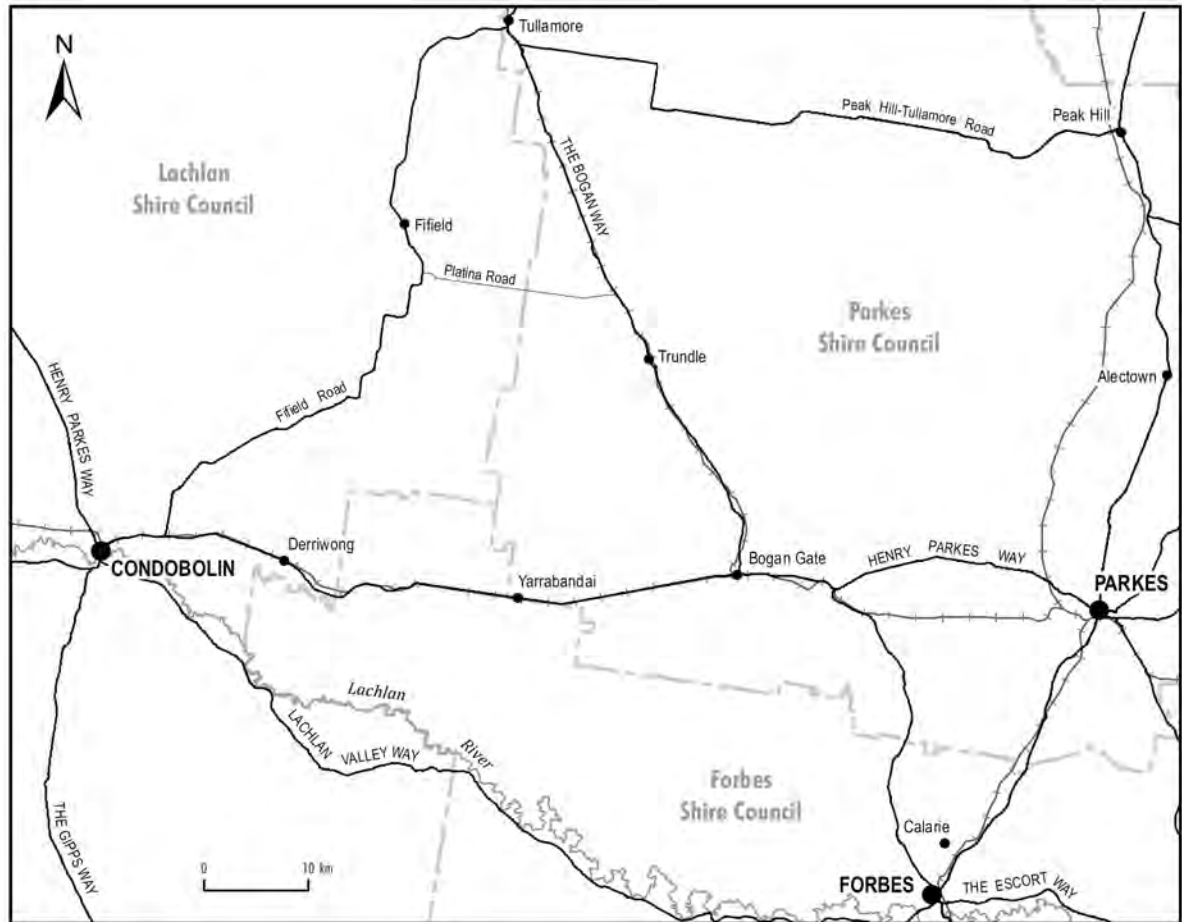
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Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING "AREA OF INTEREST"



6 January 2017

Peak Hill Bogan River Traditional Owner  
C/- Sylvana Keating, A/Area Manager  
NPWS Lachlan Area, PO Box 774  
FORBES NSW 2871

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sylvana,

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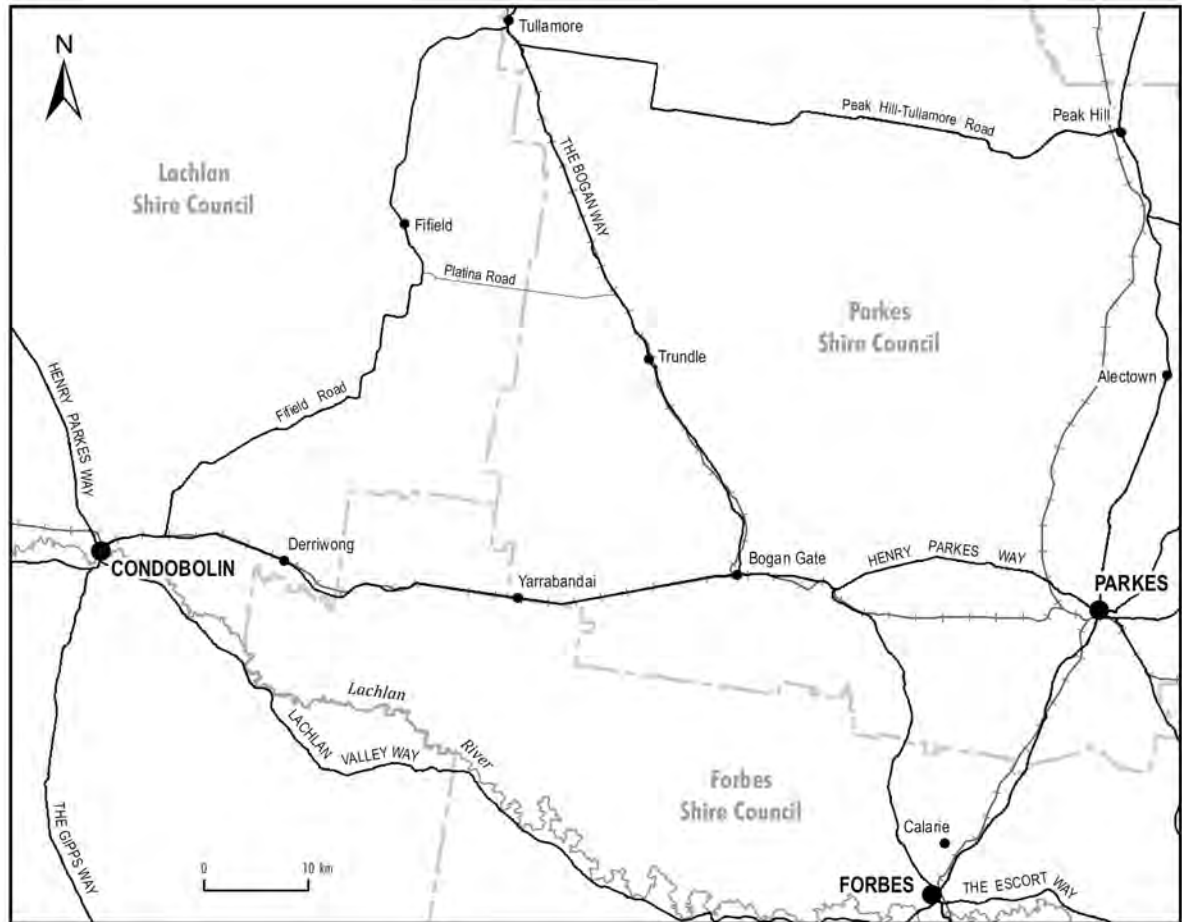
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Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING "AREA OF INTEREST"



6 January 2017

Trevor Robinson  
PO Box 73  
PEAK HILL NSW 2869

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Trevor,

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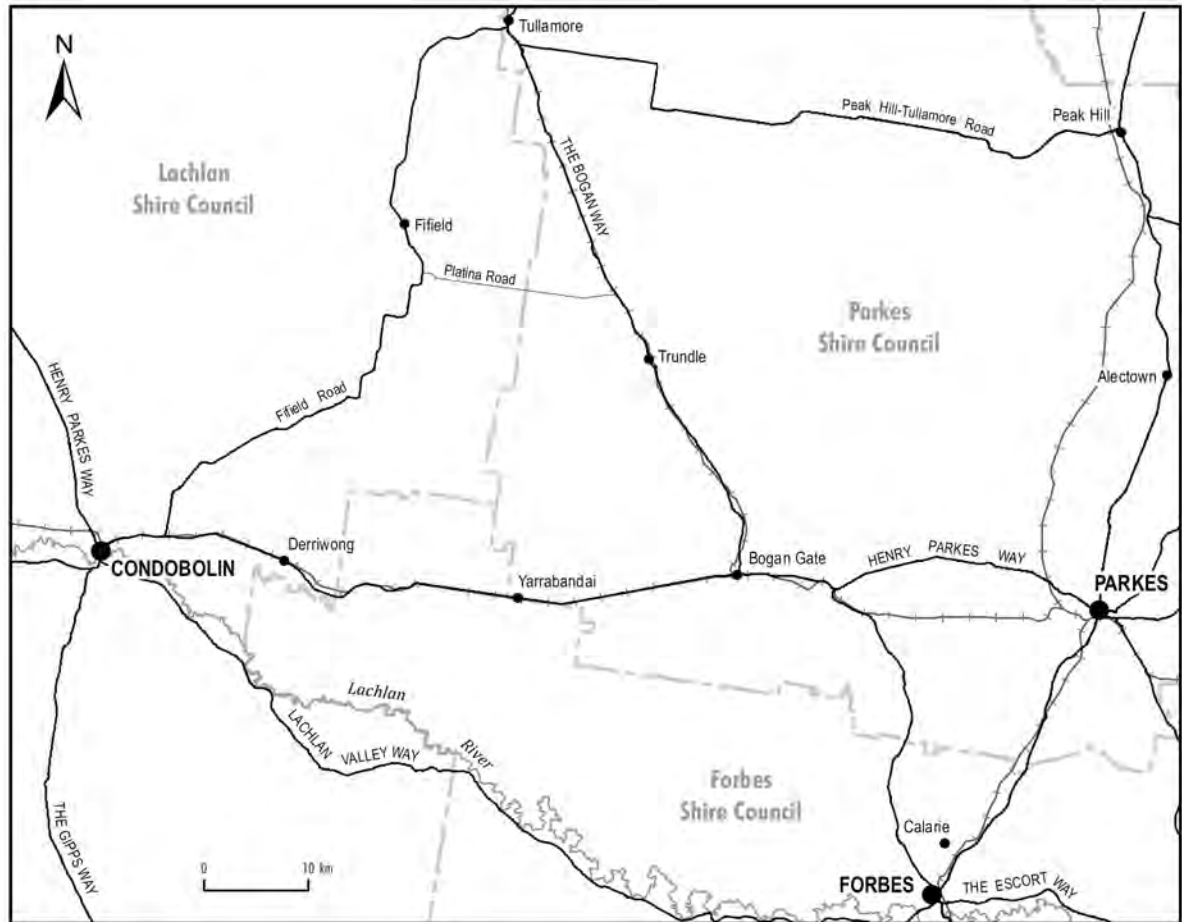
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**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING “AREA OF INTEREST”



6 January 2017

Kullila Site Consultants  
Paul Charles  
14 Werrang Road  
PRIMBEE NSW 2502

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Paul,

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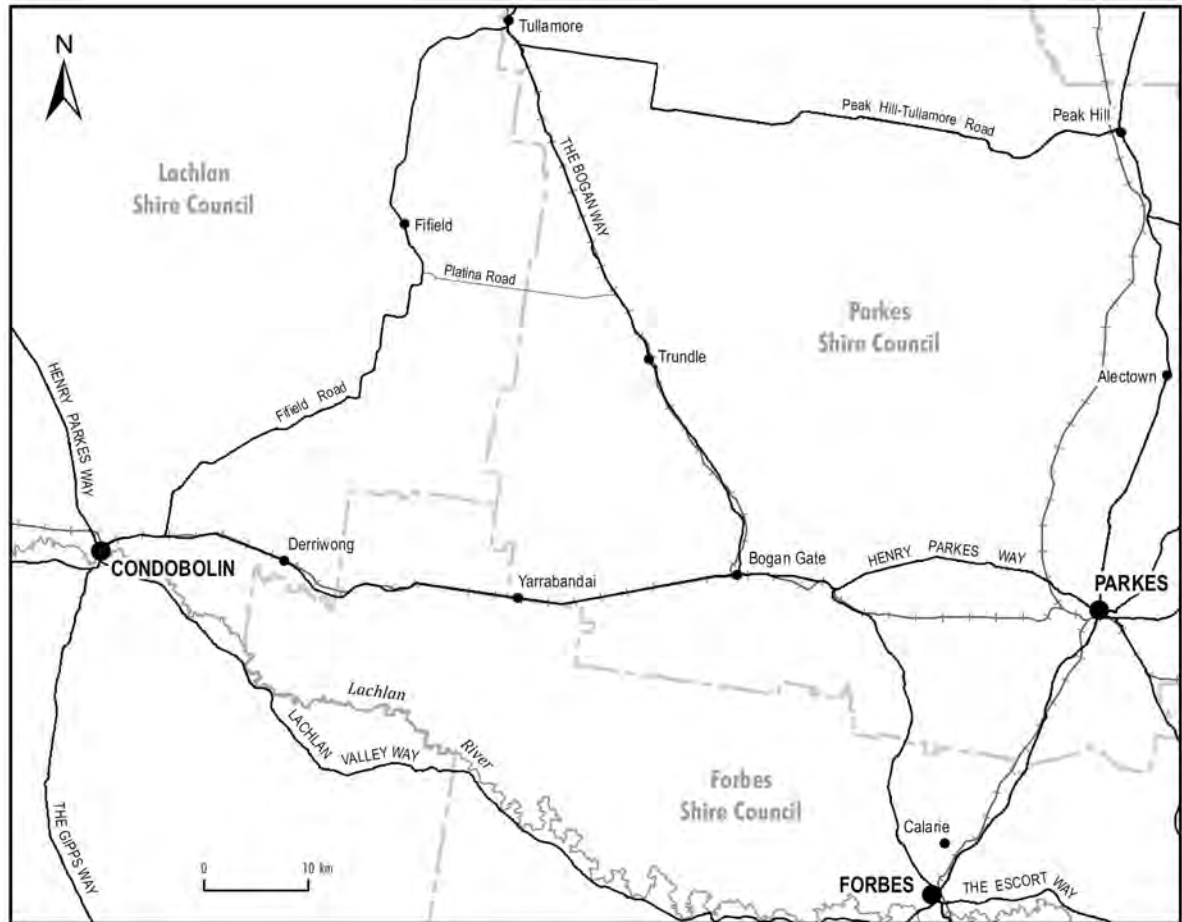
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Kind Regards,



**MICK RYAN**  
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# PLAN SHOWING "AREA OF INTEREST"



6 January 2017

Mulli Mulli Local Aboriginal Land Council  
Chairperson  
PO Box 68  
WOODENBONG NSW 2476

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

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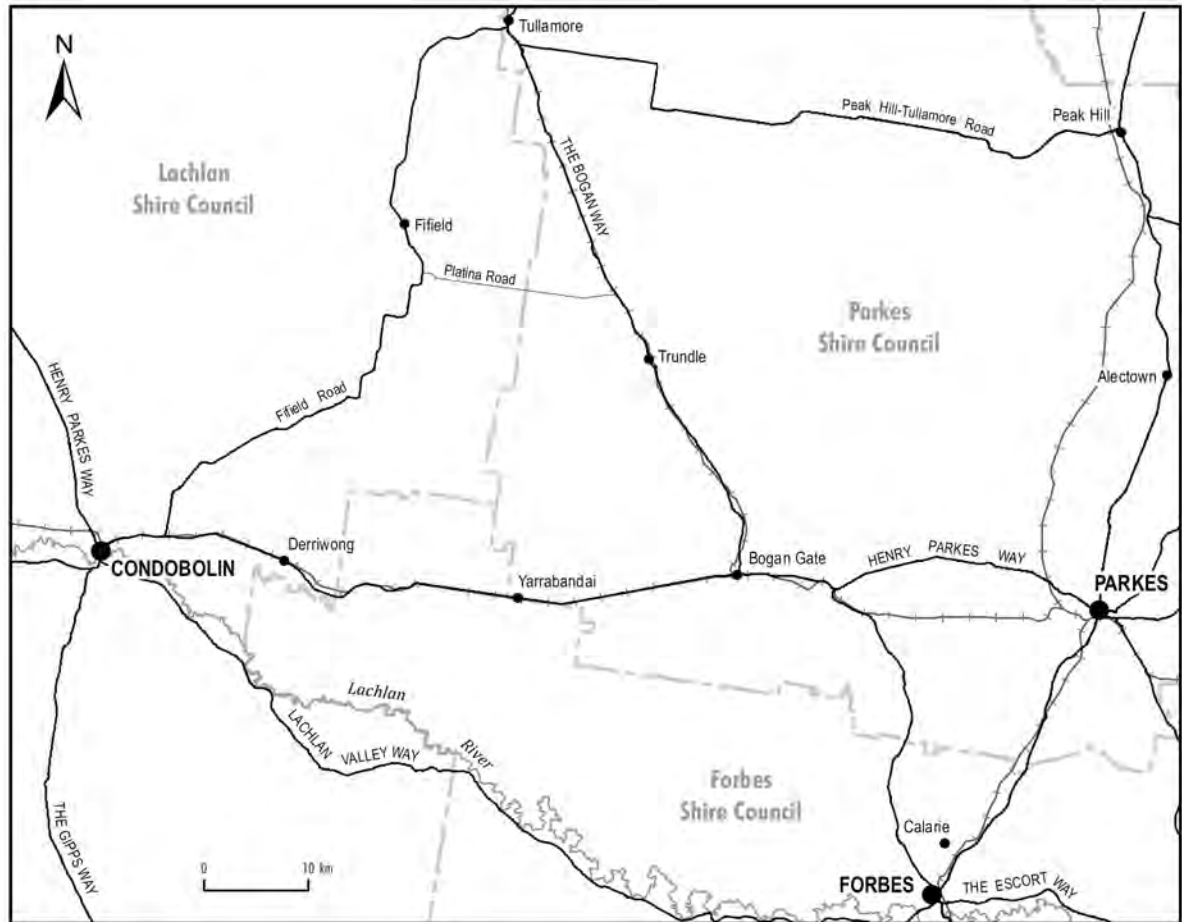
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# PLAN SHOWING “AREA OF INTEREST”



6 January 2017

Murie Elders Group  
Chairperson  
161 Bathurst Street  
CONDOBOLIN NSW 2877

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

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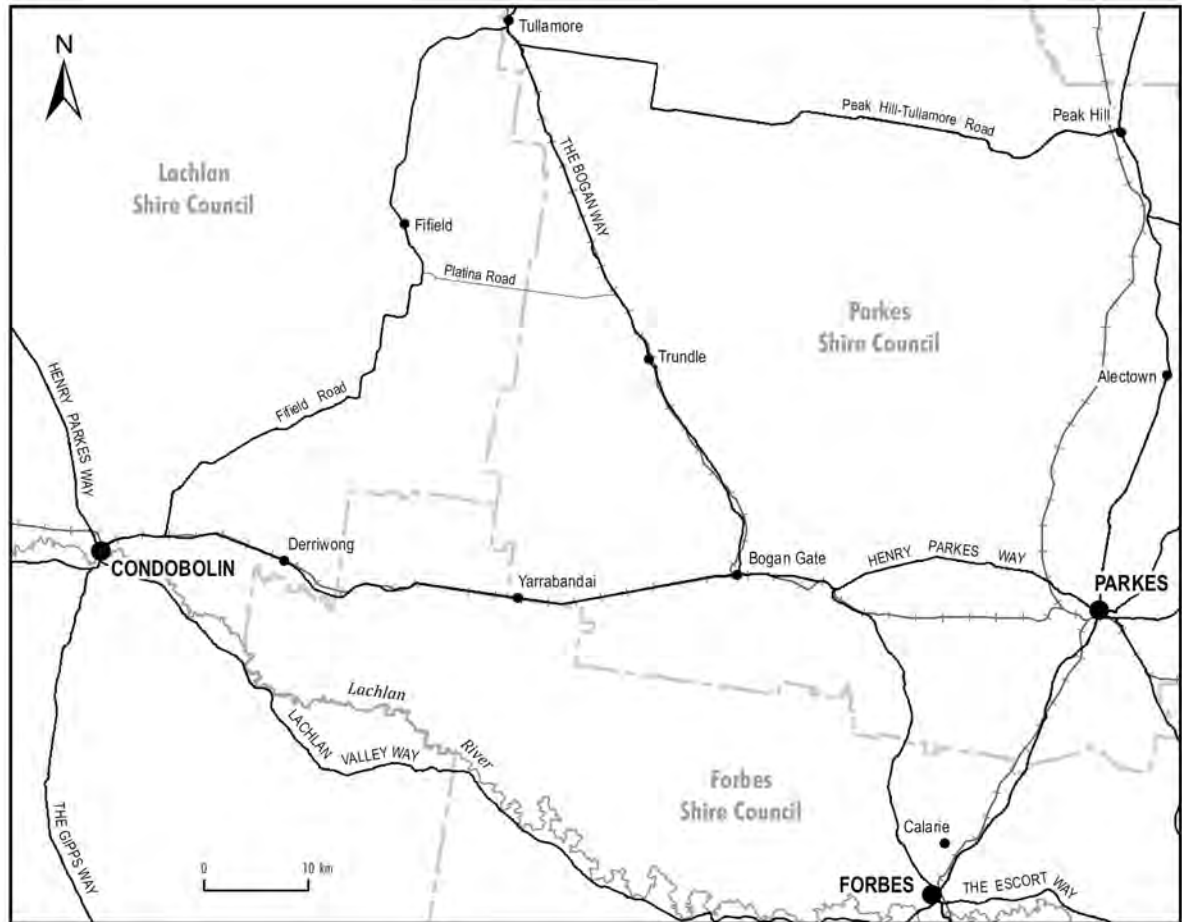
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6 January 2017

Murrin Bridge Local Aboriginal Land Council  
Chairperson  
PO Box 157  
LAKE CARGELLIGO NSW 2672

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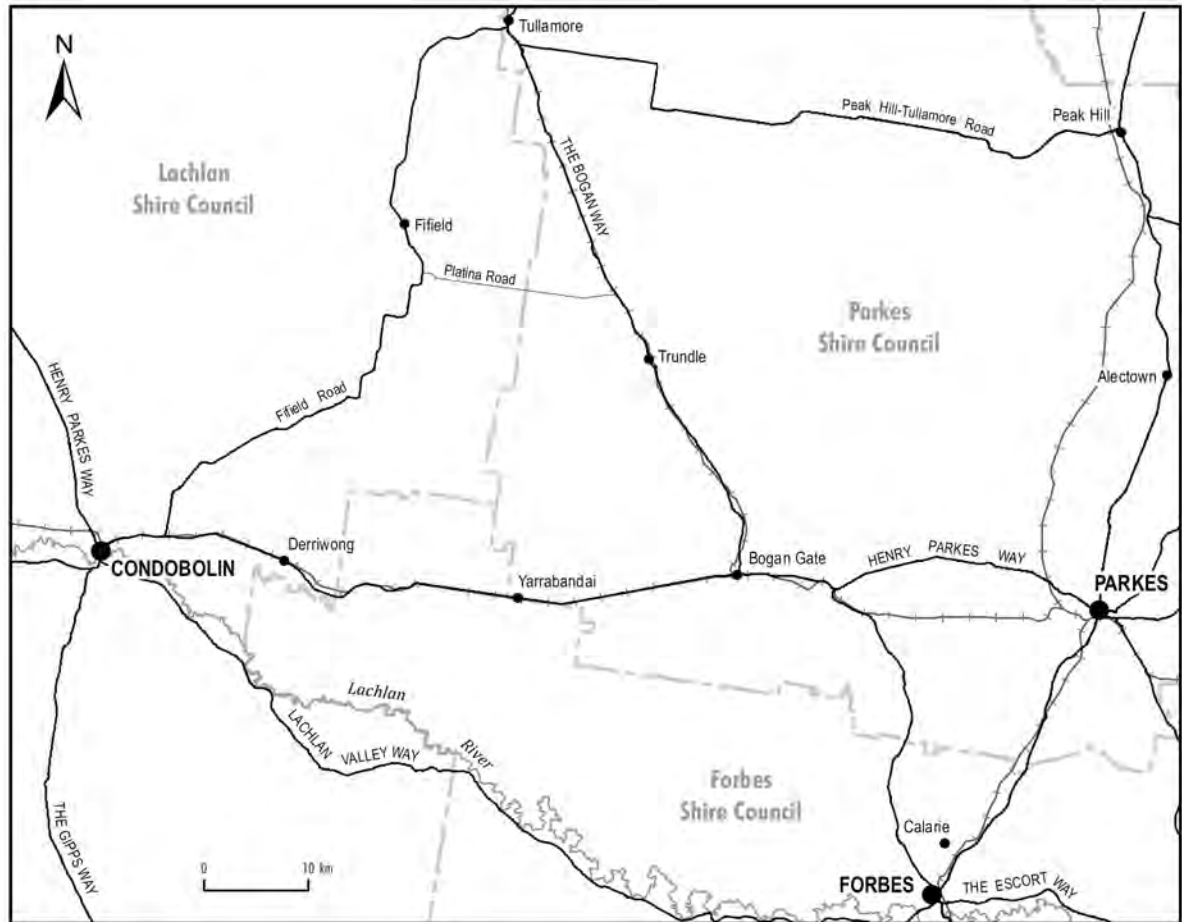
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# PLAN SHOWING "AREA OF INTEREST"



6 January 2017

Peter Peckham  
27 Jennings Street  
GEURIE NSW 2831

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

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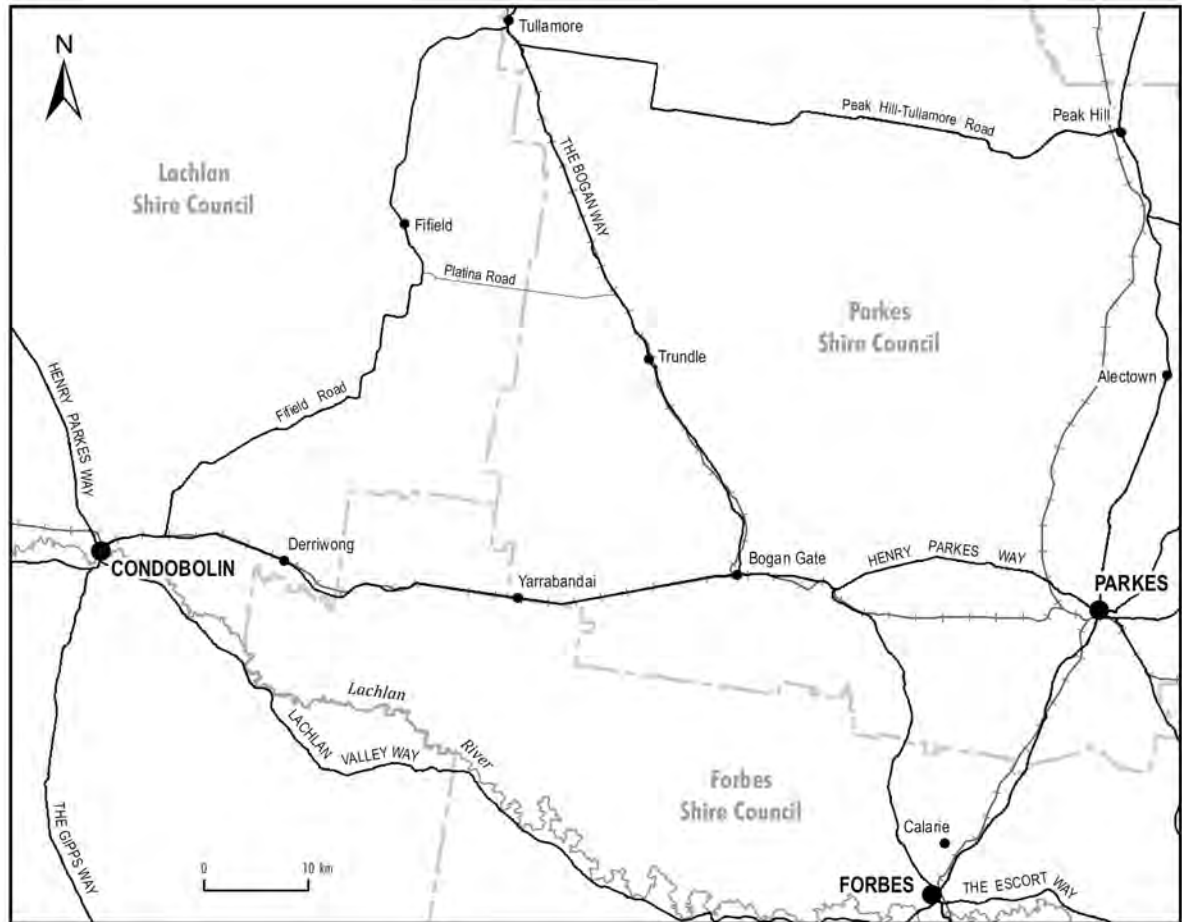
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6 January 2017

Trevor Robinson  
PO Box 73  
PEAK HILL NSW 2869

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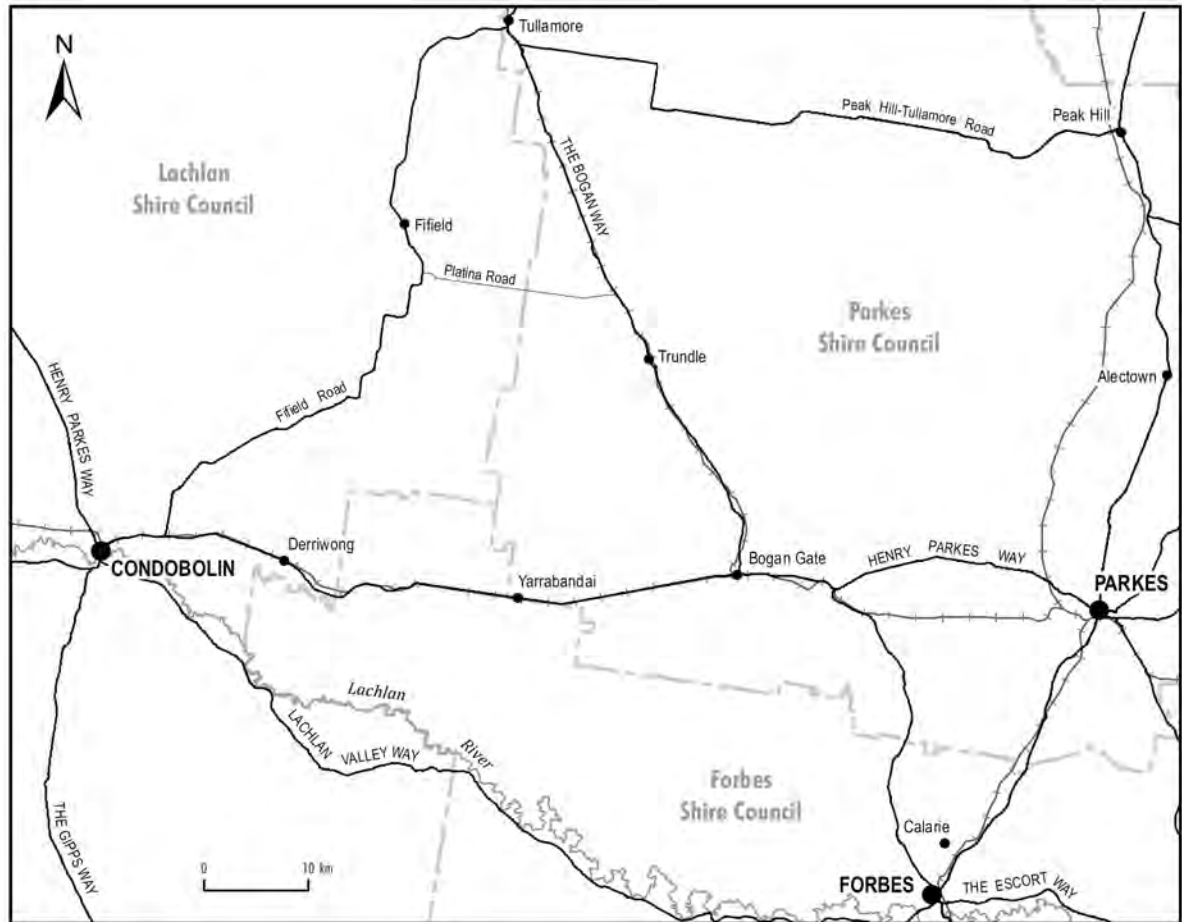
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Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING “AREA OF INTEREST”



6 January 2017

Wiradjuri Condobolin Corporation  
PO Box 194  
CONDOBOLIN NSW 2877

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sir/Madam,

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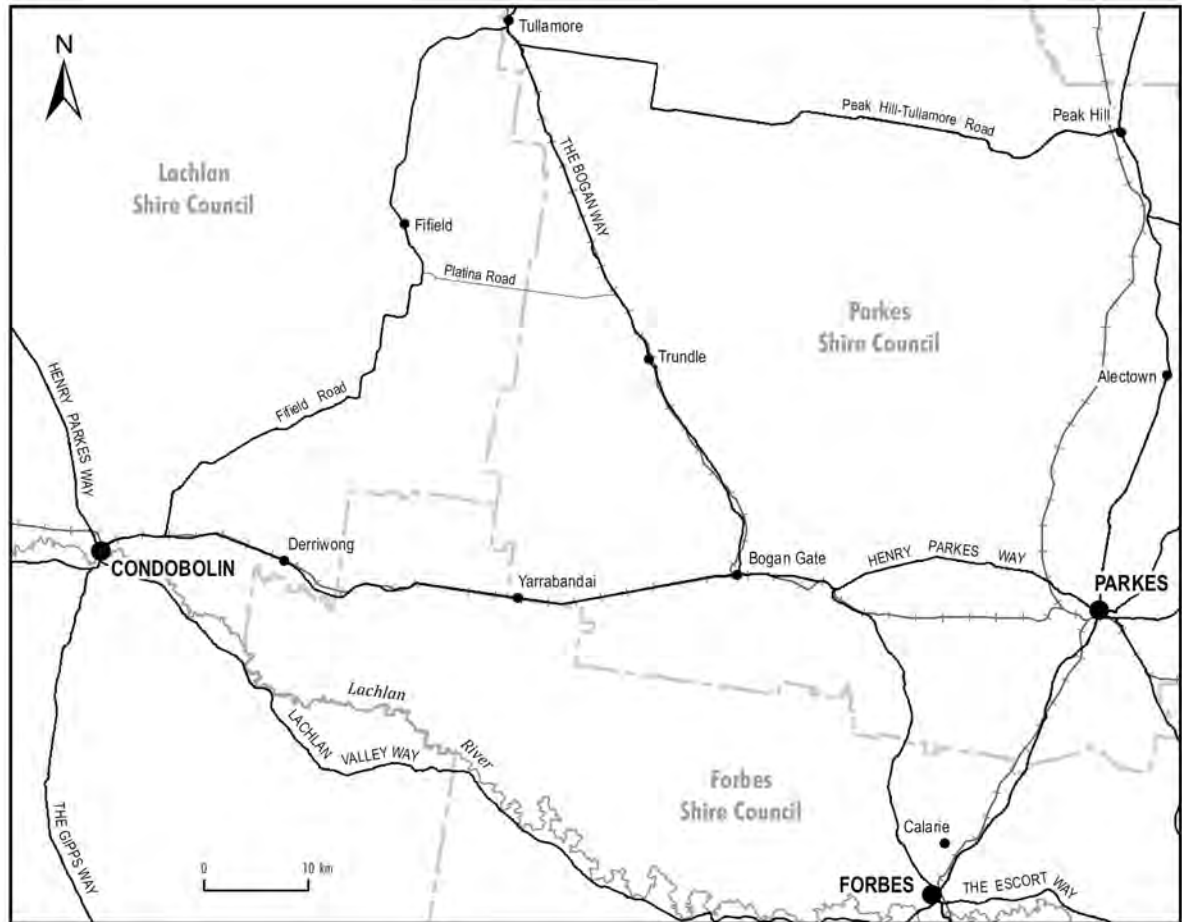
Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**



# PLAN SHOWING “AREA OF INTEREST”



6 January 2017

Wiradjuri Council of Elders  
Robert Clegg  
7 Keast Street  
PARKES NSW 2870

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Robert,

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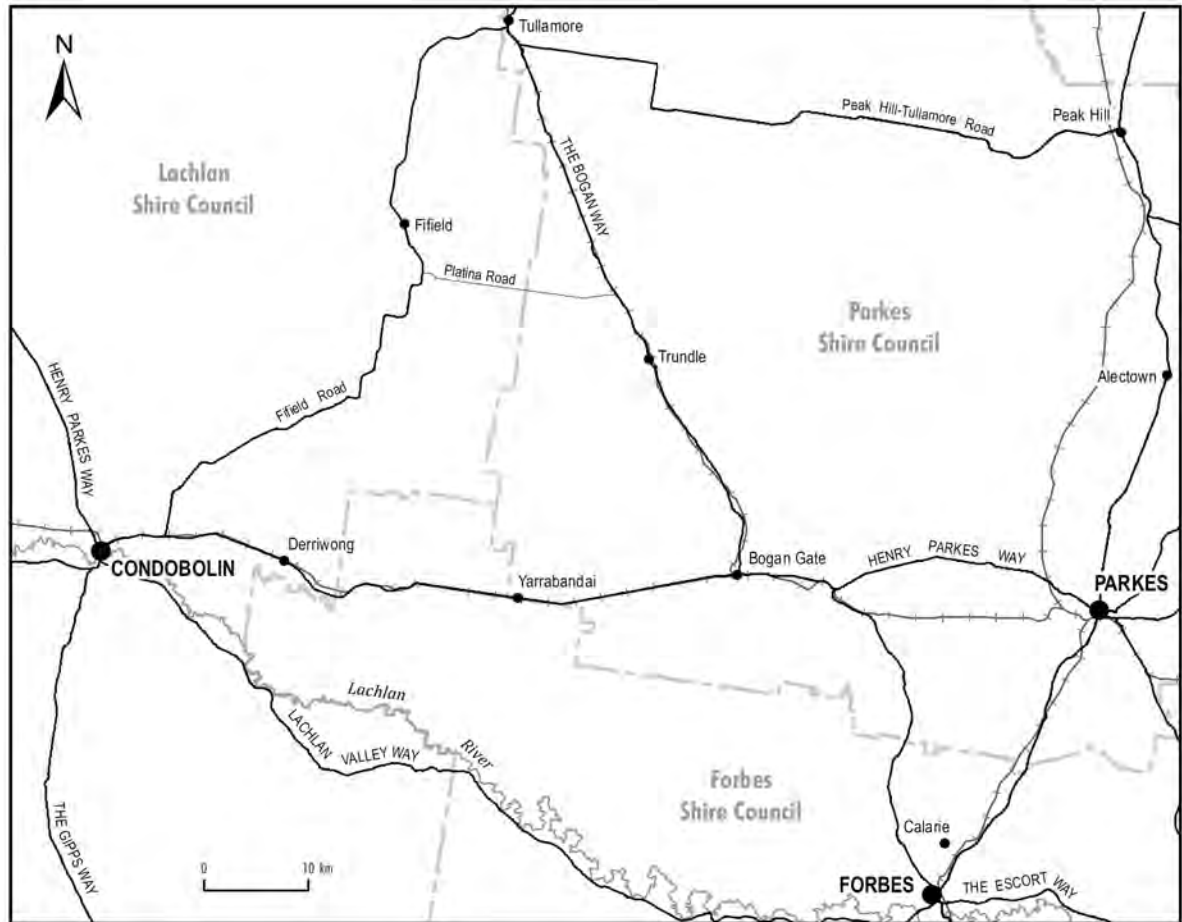
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Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING "AREA OF INTEREST"



6 January 2017

Binjang Wellington Wiradjuri Heritage Survey  
Dorothy Stewart  
260 Myall Street  
DUBBO NSW 2830

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Dorothy,

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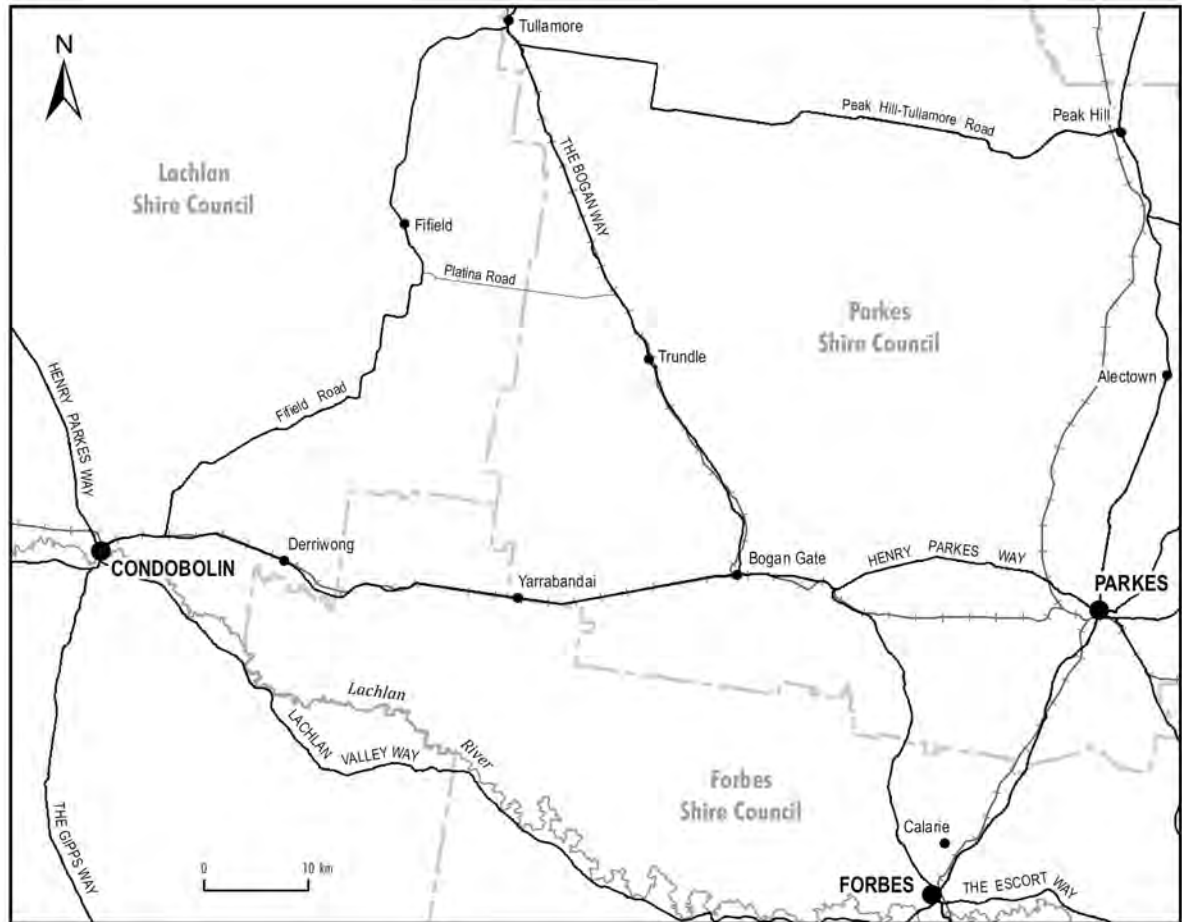
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# PLAN SHOWING “AREA OF INTEREST”





6 January 2017

Bogan River Peak Hill Wiradjuri Aboriginal Corporation  
Chairperson  
PO Box 42  
PEAK HILL NSW 2869

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

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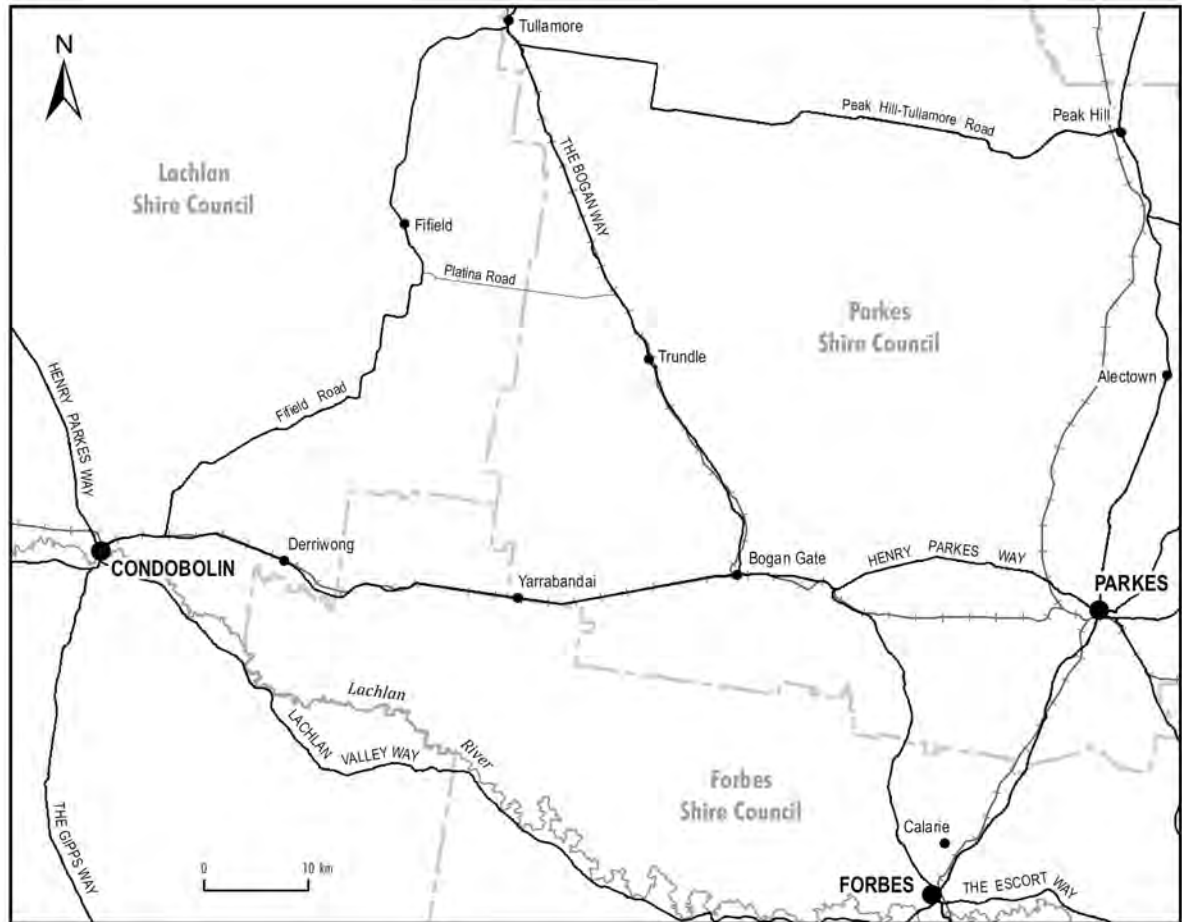
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# PLAN SHOWING "AREA OF INTEREST"



6 January 2017

Bulgandramine Youth Development Aboriginal Corporation  
Chairperson  
PO Box 119  
PEAK HILL NSW 2869

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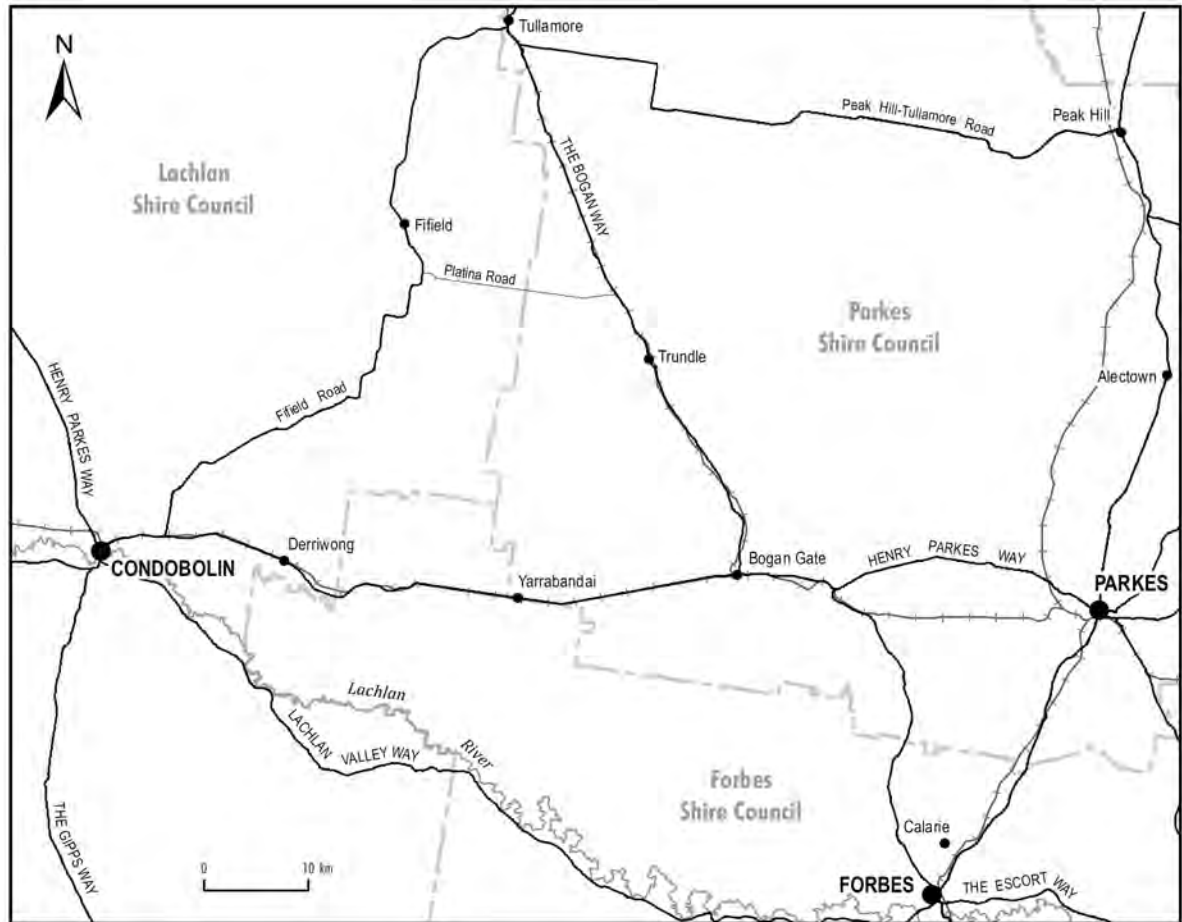
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**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING “AREA OF INTEREST”



6 January 2017

Eva Coe  
3 Yarnbildine Place  
COWRA NSW 2794

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Eva,

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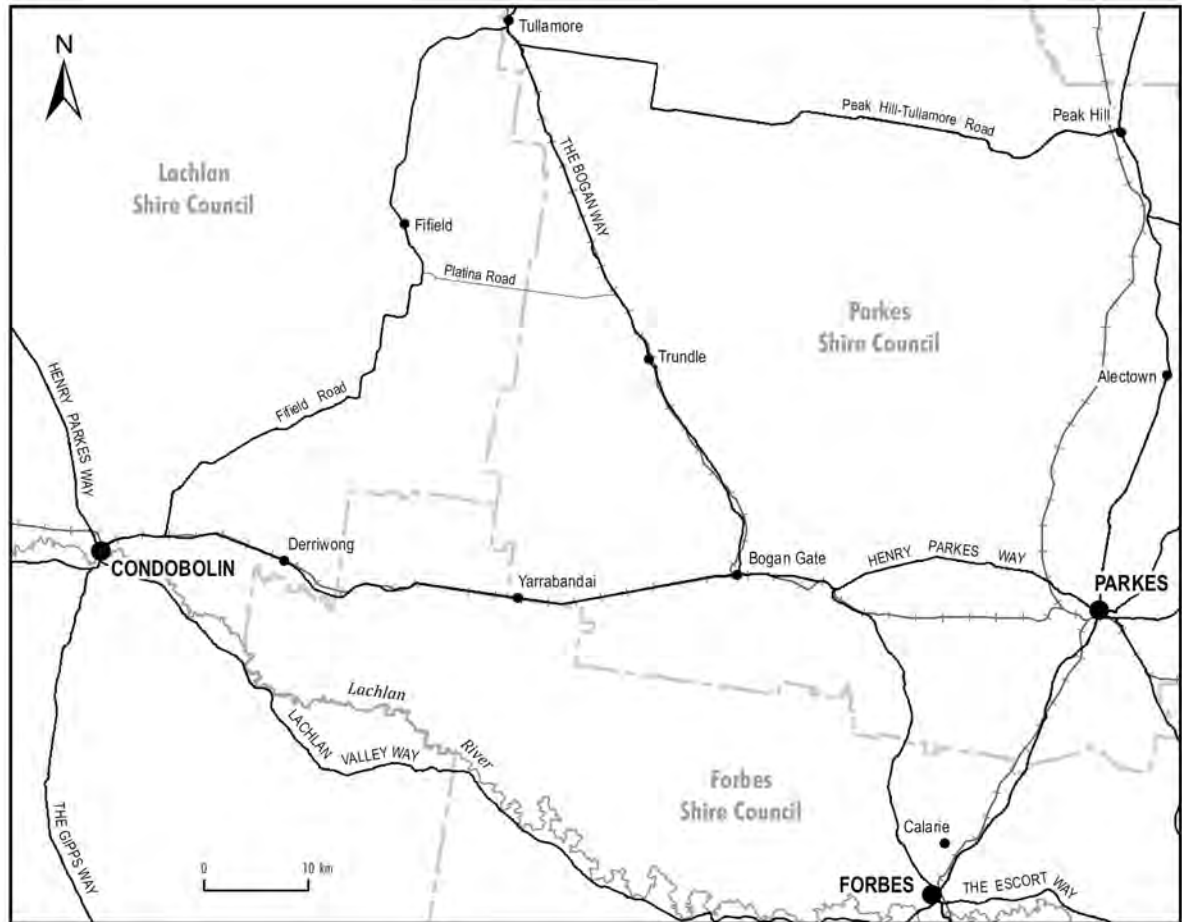
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**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING "AREA OF INTEREST"



6 January 2017

Cowra Local Aboriginal Land Council  
Chairperson  
PO Box 769  
COWRA NSW 2794

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

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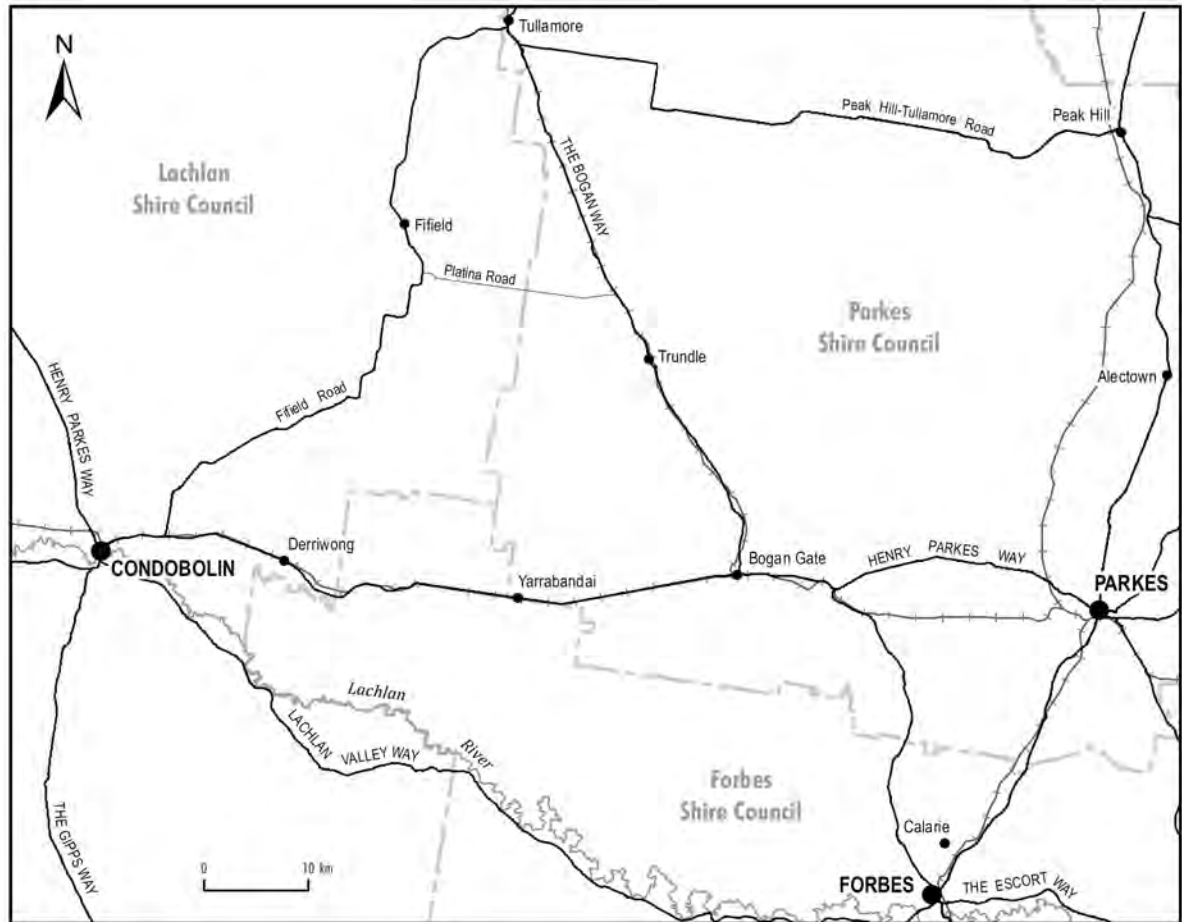
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Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING “AREA OF INTEREST”



6 January 2017

Little Burning Mountain Aboriginal Corporation  
Chairperson  
PO Box 152  
PEAK HILL NSW 2869

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sir/Madam,

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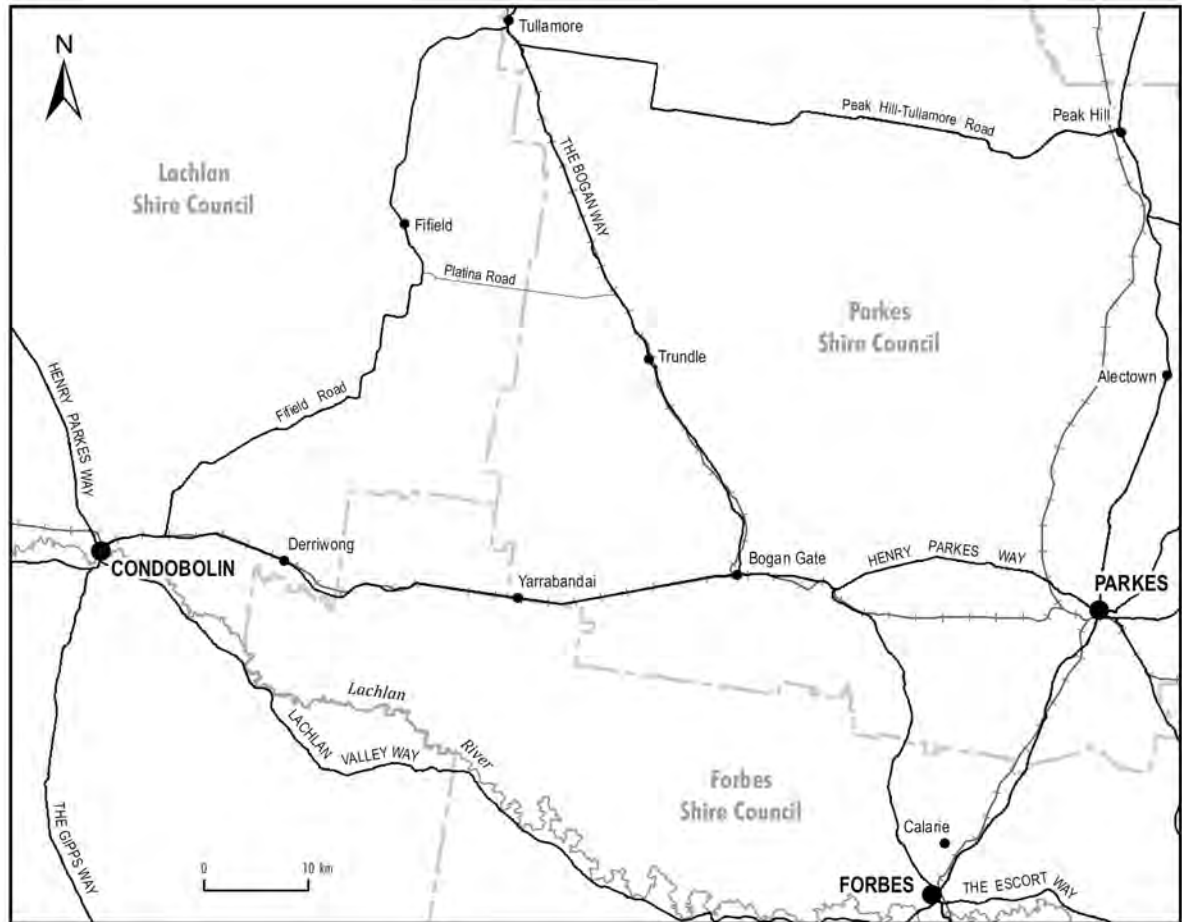
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**PROJECT MANAGER – SYERSTON**



# PLAN SHOWING “AREA OF INTEREST”



6 January 2017

Peak Hill Local Aboriginal Land Council  
Chairperson  
PO Box 63  
PEAK HILL NSW 2869

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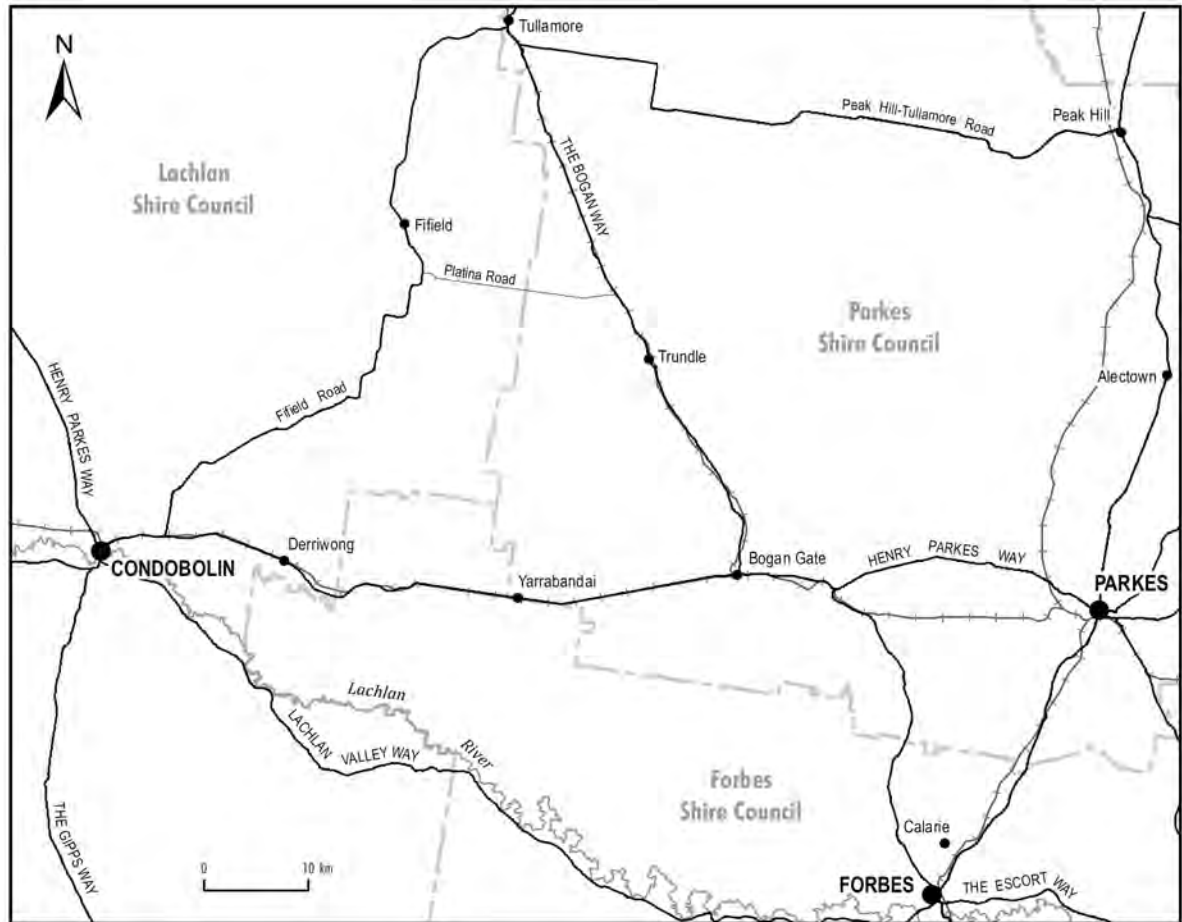
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**MICK RYAN**  
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# PLAN SHOWING “AREA OF INTEREST”



6 January 2017

Warramunga Community Advancement Co-operative Society Ltd  
Chairperson  
79 Caswell Street  
PEAK HILL NSW 2869

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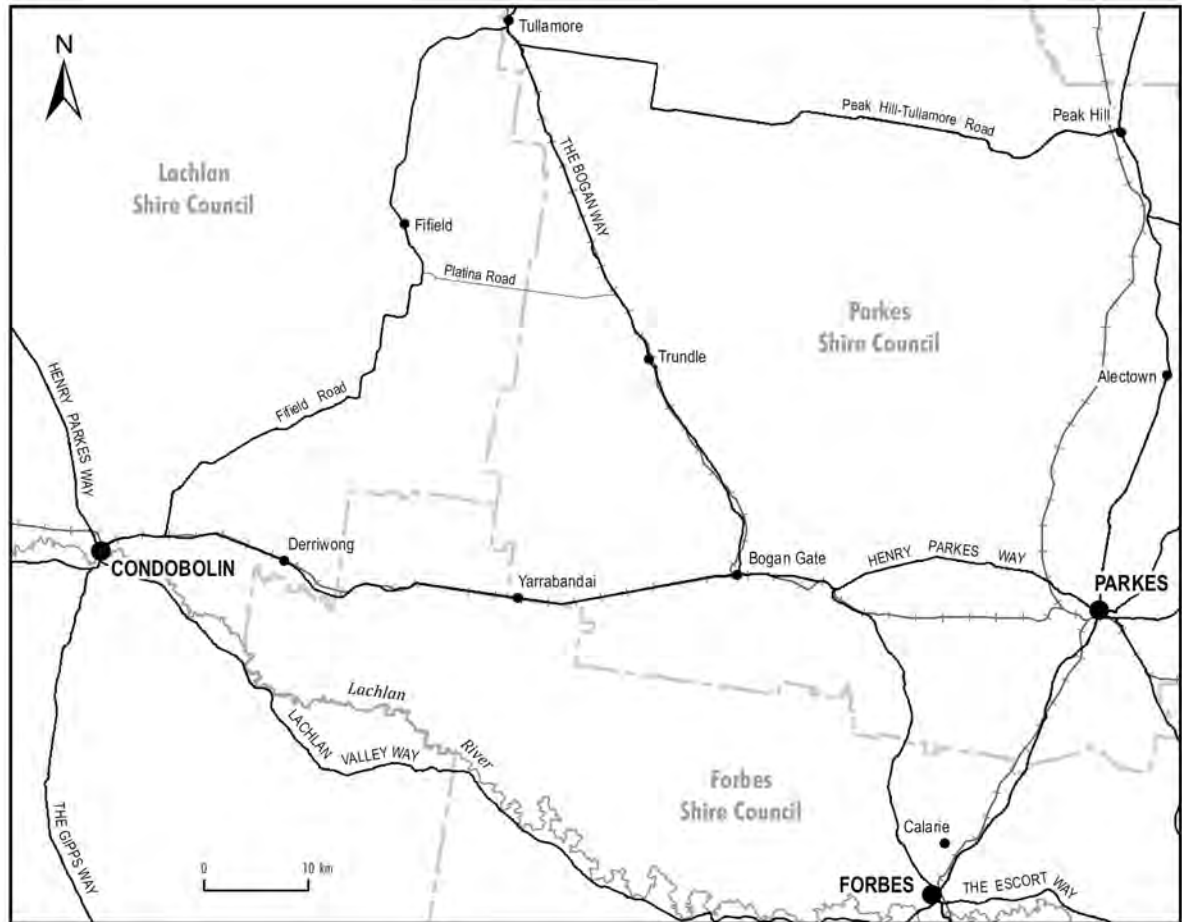
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# PLAN SHOWING “AREA OF INTEREST”





6 January 2017

Ngemba, Ngayampaa, Wangaaypuwan and Wayilwan Native Title Claimants  
Native Title Services Corporation Limited  
Principal Solicitor  
Unit 1a Suite 2.02, 44-70 Rosehill Street  
REDFERN NSW 2016

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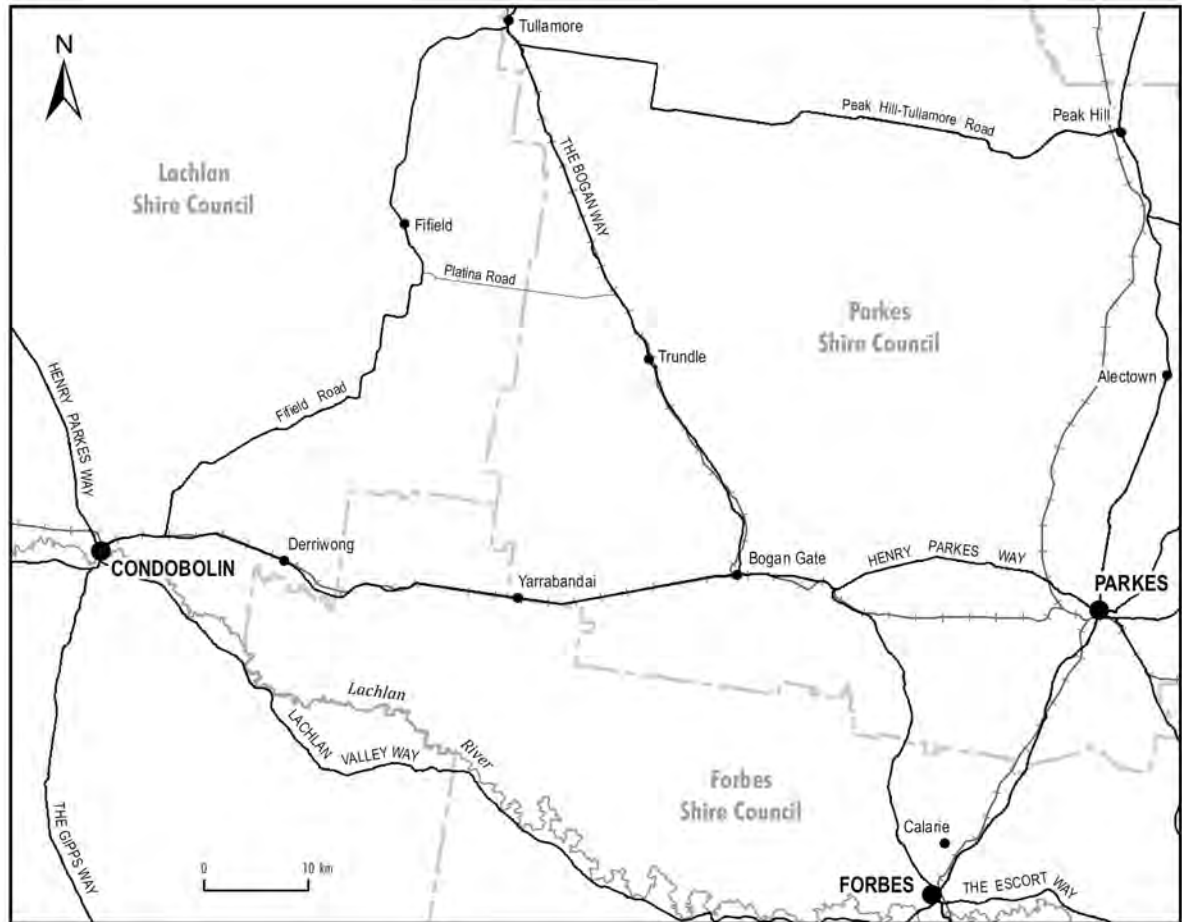
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6 January 2017

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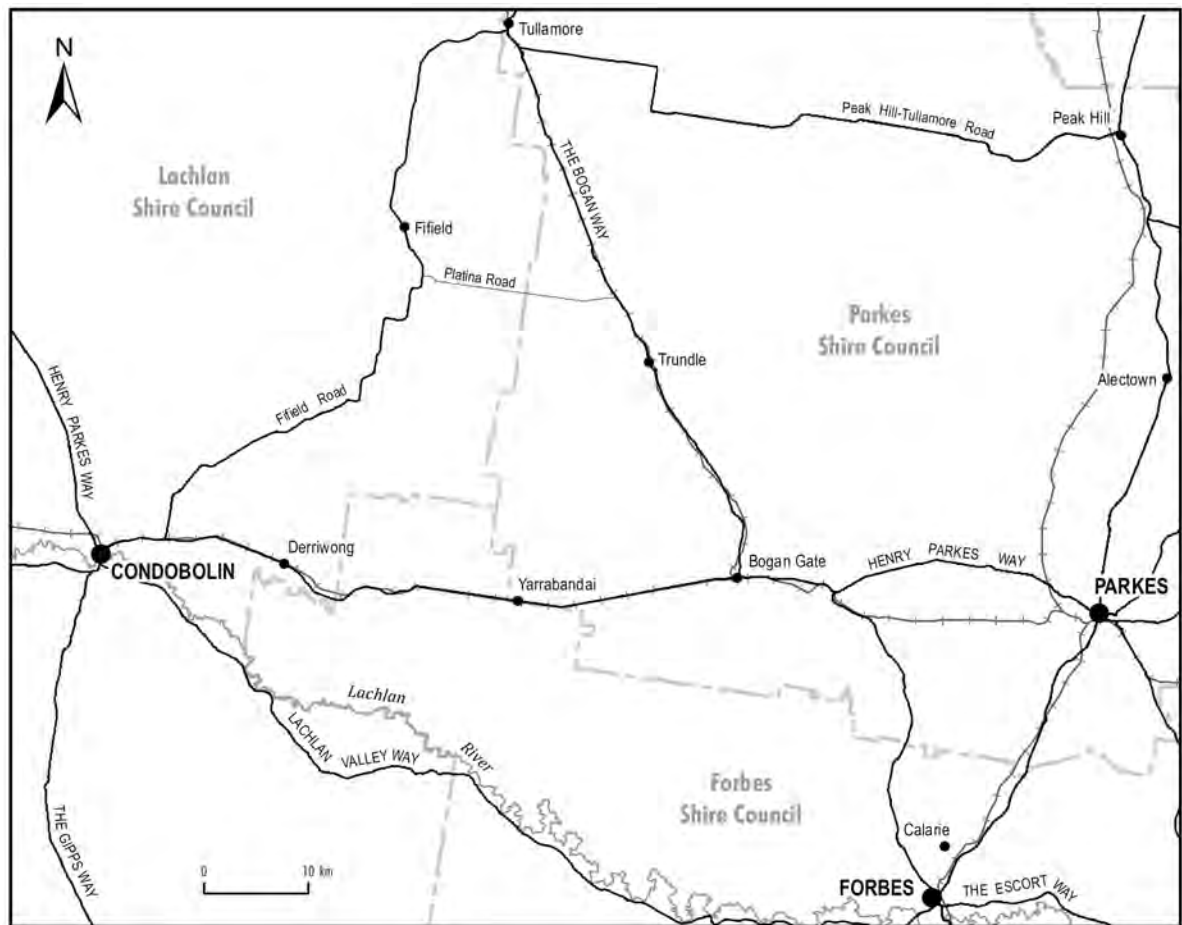
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**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING "AREA OF INTEREST"



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**From:** Danielle Wallace  
**Sent:** Friday, 6 January 2017 9:35 AM  
**Subject:** Syerston Project - Proposed Modification  
**Attachments:** ltr - Scandium21 Correspondence.pdf

Dear Sir/Madam,

Please find attached correspondence from Scandium21 Pty Ltd regarding the Aboriginal community consultation process for a proposed modification to the Syerston Project.

Please don't hesitate to call should you wish to discuss.

Regards

**Danielle Wallace**

Environmental Project Manager

e [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

m 0414 833 397

Resource Strategies Pty Ltd  
Suite 2 Level 3, 24 McDougall Street  
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t 07 3367 0055 f 07 3367 0053

[www.resourcestrategies.com.au](http://www.resourcestrategies.com.au)

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6 January 2017

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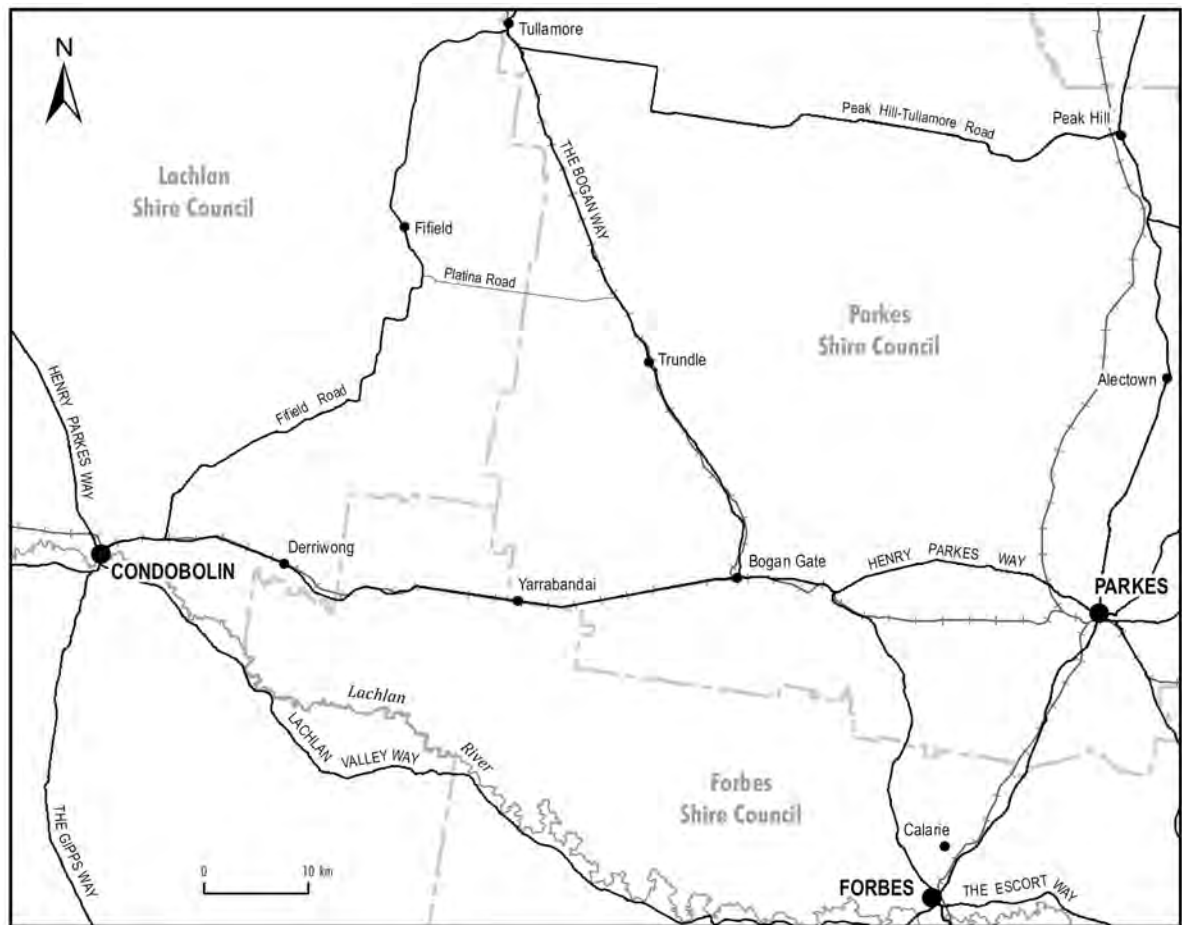
If any additional information or clarification is required, please do not hesitate to contact Scandium21 via the contact details provided above.

Kind Regards,



**MICK RYAN**  
**PROJECT MANAGER – SYERSTON**

# PLAN SHOWING “AREA OF INTEREST”



Contact Name	Email Address
David Acheson	dgajp@hotmail.com
Delma Butler	delmabutler@bigpond.com
Jacqueline Flannery	jacqueline.hodges@det.nsw.edu.au
Jodie Markwort	jodie.markwort1@det.nsw.edu.au
Joy Russell	Joy.Russell@det.nsw.edu.au
Kelly Bowden	kelly@binaalbilla.com.au
Larry Towney	larry.towney@lls.nsw.gov.au
Mary Hodge	marytommy27@hotmail.com

18 January 2017

Condobolin Aboriginal Health Service  
PO Box 321  
CONDOBOLIN NSW 2877

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sir/Madam,

Scandium21 Pty Ltd (Scandium21), a wholly owned subsidiary of Clean TeQ Limited, owns the rights to develop the approved, but not yet developed, Syerston Project. The Syerston Project is situated approximately 350 km west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

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As part of the application process, Scandium21 will be preparing an Aboriginal Cultural Heritage Assessment, and therefore may seek an Aboriginal Heritage Impact Permit under section 90 of the NSW *National Parks and Wildlife Act, 1974*.

**Scandium21 Pty Ltd**

*(A Clean TeQ Company)*

Head Office – Victoria

12/21 Howleys Rd

Notting Hill, Victoria 3168 Australia

PO Box 227

Mulgrave VIC 3170 Australia

t: +61 3 9797 6700

f: +61 3 9706 8304

e: [info@cleanteq.com](mailto:info@cleanteq.com)

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Scandium21  
C/- Danielle Wallace  
PO Box 379, WEST RYDE, NSW 2114  
Mobile: 0414 833 397  
Email: [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

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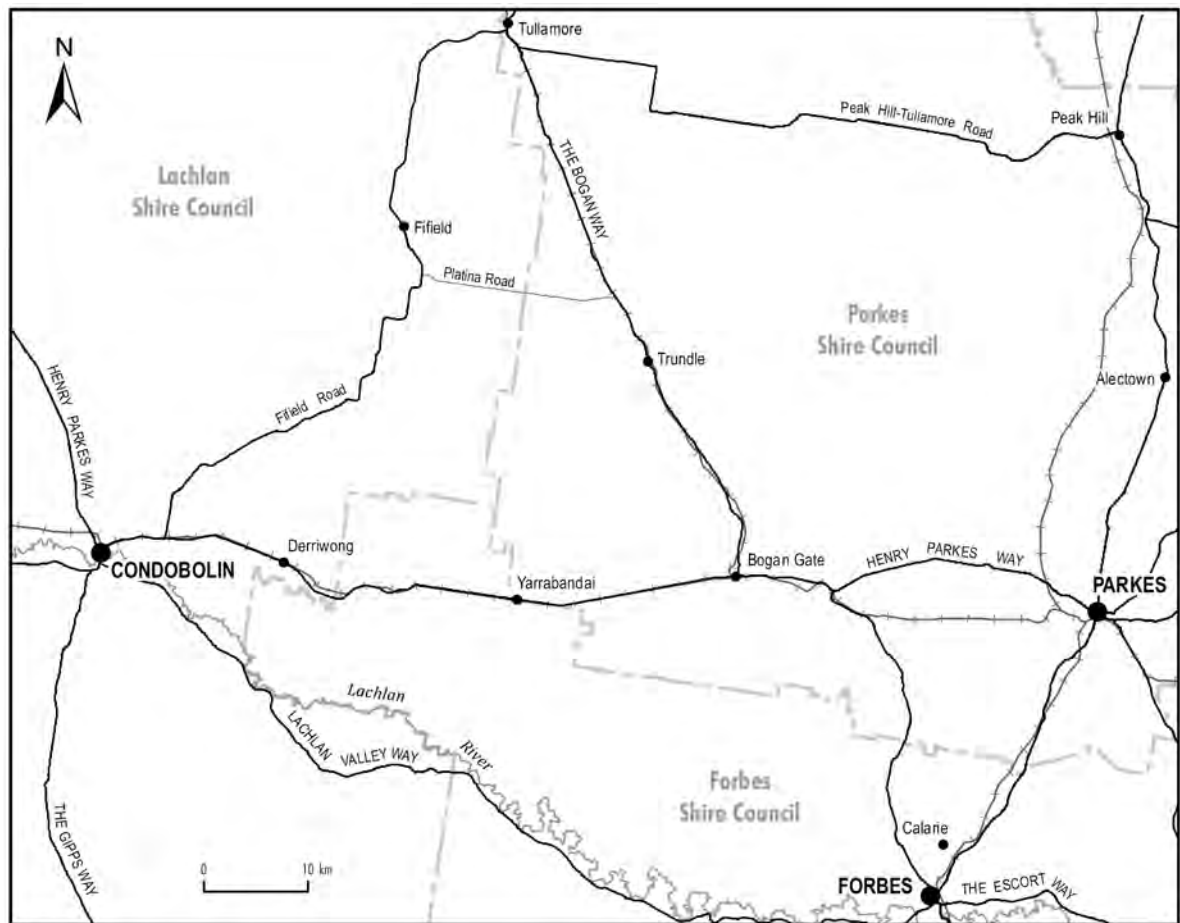
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Kind Regards,

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**JOHN HANRAHAN**  
**APPROVALS LEAD – THE SYERSTON PROJECT**

# PLAN SHOWING "AREA OF INTEREST"





18 January 2017

Trangie Local Aboriginal Land Council  
48 Dandaloo Street  
TRANGIE NSW 2823

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sir/Madam,

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(A Clean TeQ Company)

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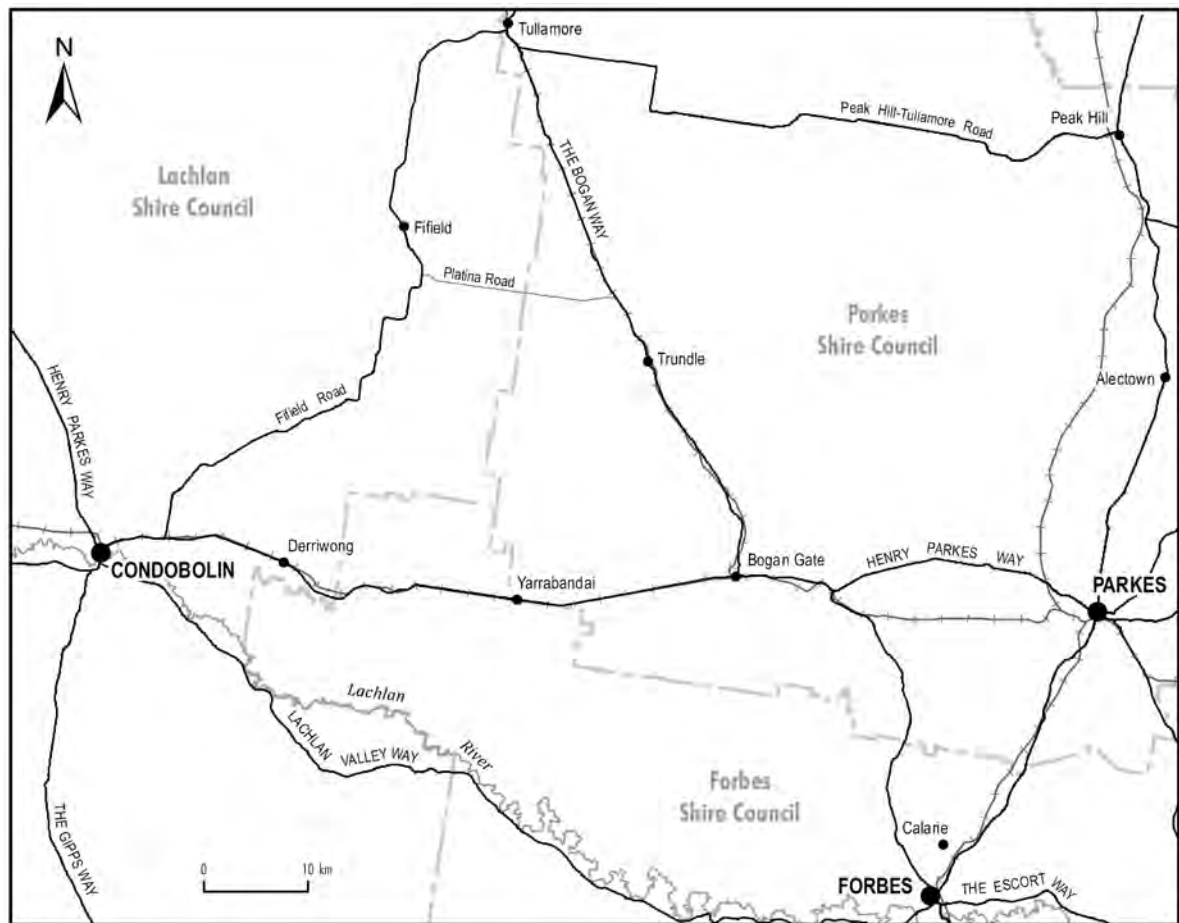
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**JOHN HANRAHAN**  
**APPROVALS LEAD – THE SYERSTON PROJECT**

# PLAN SHOWING “AREA OF INTEREST”



18 January 2017

Yawarra Aboriginal Corporation  
15 Molong Street  
CONDOBOLIN NSW 2877

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Dear Sir/Madam,

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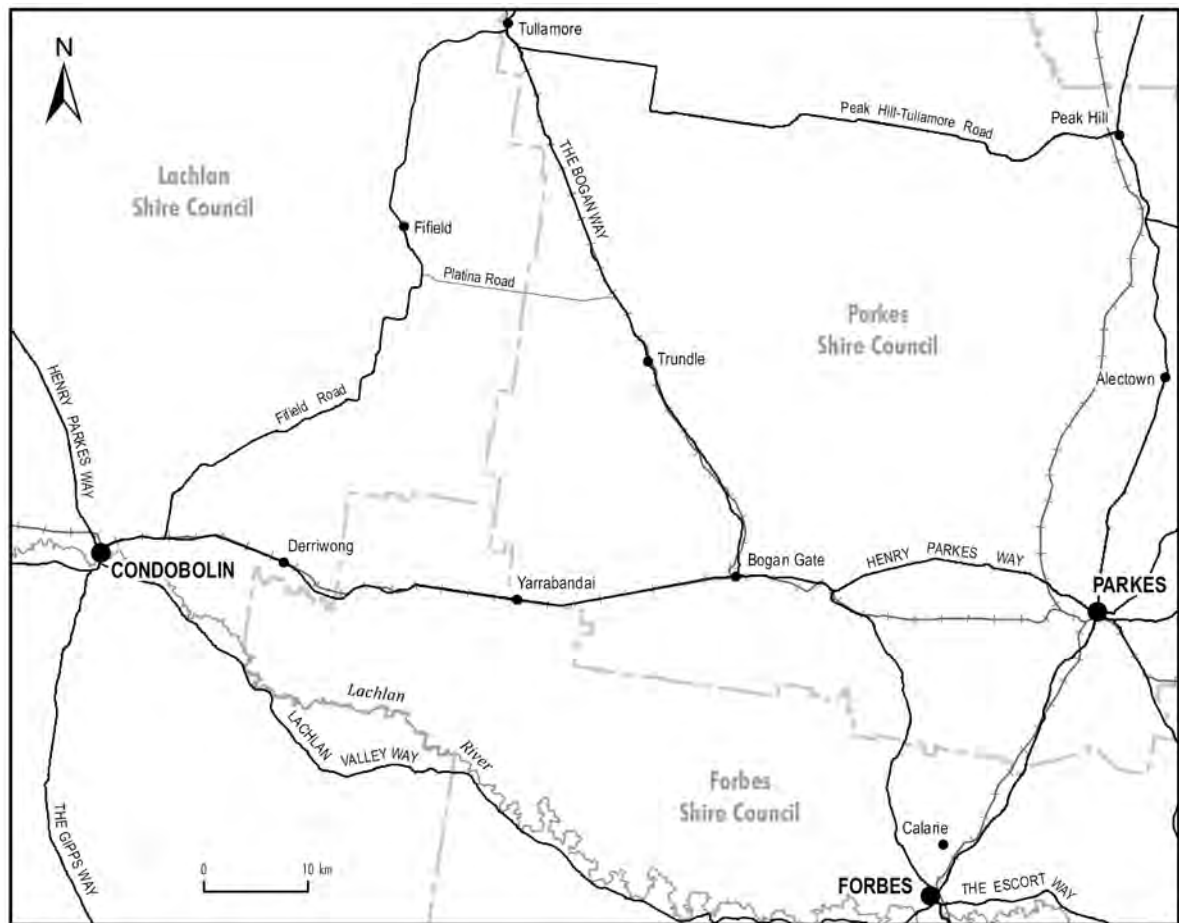
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# PLAN SHOWING "AREA OF INTEREST"





POSITION VACANT



WAREHOUSE ALL ROUNDER  
CONDOBOLIN  
Full time permanent position.

Moses & Son are currently seeking a motivated person to join our team in the Condobolin warehouse. Working alongside a close knit team, the storeperson's primary focus will be to manage inbound and outbound wool as well as maintaining the warehouse and its equipment.

Your job will be varied with your main responsibilities including:

- Manage the receiving, shipping, handling, distribution, input and storage of all wool, product, and supplies that come in and out of the warehouse.
- Rural merchandise sales and inventory maintenance including stocktake.
- Maintain a safe and tidy warehouse.

The position would ideally suit someone with a rural background and holds the following licences & qualifications:

- Forklift Licence (or willing to obtain)
- Drivers Licence
- Average computer skills
- Registered Wool Classer (not essential)

For full position description visit [mosesandson.com.au](http://mosesandson.com.au) or for further information contact Tim Foster on 0428 952 851

Applications with references to be sent to Liz Oliver, PO Box 85 Temora NSW 2666 or emailed to [liz@mosesandson.com.au](mailto:liz@mosesandson.com.au)

**Applications close: 30 January 2017**

PUBLIC NOTICES



Central West Family Support

Group activities 2016  
Activities include sport, handball, arts & craft, cooking, swimming or whatever the group decides on the day.

**Monday**  
Boys Group (all ages)  
3.30 - 5pm

**Tuesday**  
Kids in Care (specific children)  
3.30 – 5pm

**Wednesday**  
Youth afternoon (all age groups)  
3.30 – 5pm

**Thursday**  
Girls group (yr5 to high school)  
3.30 – 5pm

Country kids and Wiradjuri playgroups  
0 – 5yrs

**Mondays and Tuesdays from 11.00am**  
Afternoon/morning tea is provided.  
Please advise of any food allergies.  
For more information call:  
**02 6895 2533**



**ALL SAINTS ANGLICAN CHURCH SERVICES**  
**Sunday 22nd January 9am Morning Prayer.**  
**Saturday 28th January 4pm Holy Communion**  
**Sunday 29th January NO SERVICE**



Our service is based on our high quality, play-based learning philosophy, delivered in a fun, caring, supportive, learning environment that exceeds the National Quality Standard.

We are seeking a highly motivated person or persons to join our dedicated team suitable for;

**CHILDCARE EDUCATOR  
PERMANENT POSITION  
4 DAYS (32 hours)  
or Job Share 2 Days (16 hours)**

**ESSENTIAL skills include:**

- Certificate 111 or Diploma in Children's Services
- Current First Aid Certificate or the ability to obtain these
- Experience working in a centre based children's service
- Knowledge of the National Quality Standard

**CHILDCARE TRAINEE  
12 month Contract**

This position is for a one year contract with ongoing employment possibilities once the traineeship is completed. Successful applicants will complete a Certificate III in Children's Services whilst they gain hands on practical experience and mentoring by our existing team of educators.

**ESSENTIAL skills include:**

- To be enthusiastic and be willing to learn
- To show a passion for working with children and catering for their needs
- Show a strong sense of initiative
- Work well in a team
- Be friendly, punctual and energetic

**Indigenous Applications are encouraged to apply**

Any offer of employment will be conditional upon a satisfactory Working-with-Children Check.

**Applications Close: Wednesday 25th January 2017**  
Enquires Phone: 02 6895 2784

The Director  
Condobolin Preschool and Childcare Centre. PO Box 135. Condobolin NSW 2877

**SENIOR FARM HAND**

Senior Farm Hand wanted for busy mixed farming property at Condobolin. Must be experienced with farming and stock and have own dog(s) and tools. Heavy vehicle licence and chemical card preferred or prepared to train.

This is a career position with above award wage for the first 6 months with progression to overseer with lucrative package negotiated for the right person.

Apply for full Job description or express your interest and send your resume with two recent work references to [condofarmer@gmail.com](mailto:condofarmer@gmail.com). Immediate start available.

**NAME BADGES NOW AVAILABLE**

Only \$8.00 each- full colour  
Bulk discounts available  
Phone your order to 68 953301  
Email [condoctc@qualitel.com.au](mailto:condoctc@qualitel.com.au)  
  
18 William Street, Condobolin.

PUBLIC NOTICES

**Syerston Project Extension Modification  
Aboriginal Cultural Heritage Assessment**

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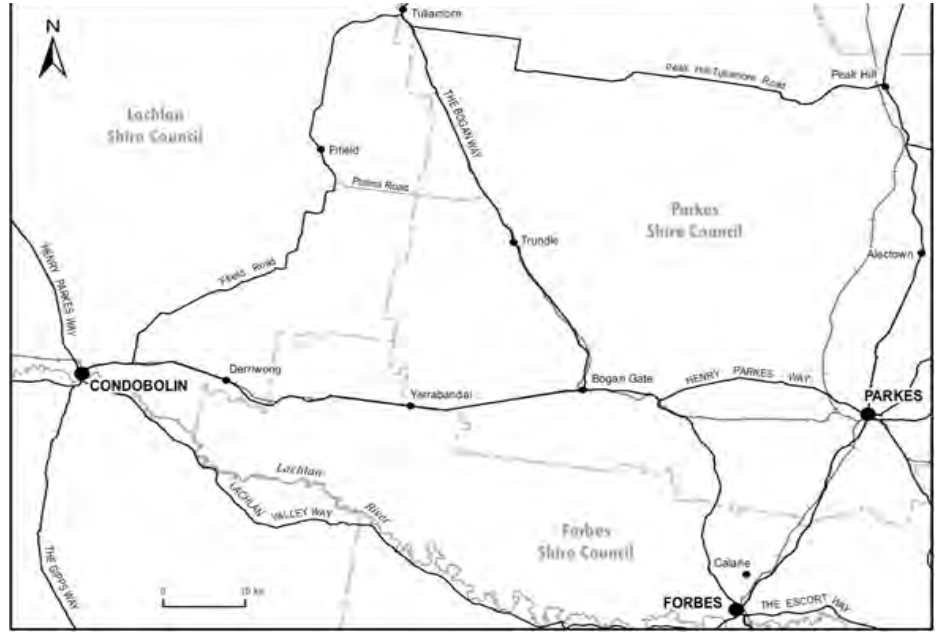
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**Boating Licence Course**

Boating licence course in Condobolin.  
Saturday 22nd of January 2017. For bookings call 0422 438 733.



**GET YOUR PRECIOUS PHOTOS  
PRINTED**

Professional quality photo printer  
Great for family history, family albums, wedding and special occasions.  
Bulk deals available.

Western Plains Regional Development Inc  
18 William Street, Condobolin.  
NSW. ph: 68953301



## Syerston Project Extension Modification Aboriginal Cultural Heritage Assessment

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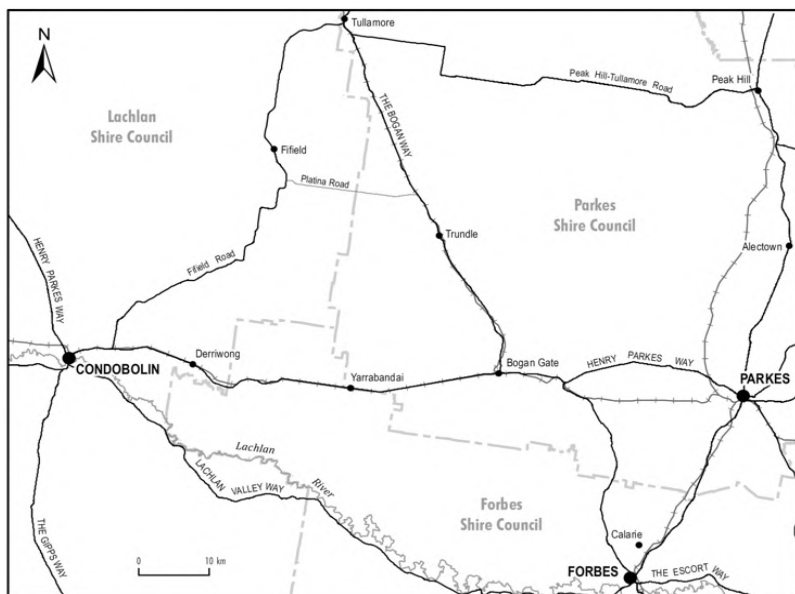
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Mobile: 0414 833 397  
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## WATERNSW

### MURRUMBIDGEE UNREGULATED & ALLUVIAL WATER SOURCE

An application for a new WATER SUPPLY WORK AND USE APPROVAL has been received from **ROBERT WILLIAM BEEGLING** for a 65 mm pump on Little Gilmore Creek, 300/1222752 for irrigation on 210/1183335, Parish of Selwyn, County of Wynard.

Objections to the granting of this approval must be registered in writing to WaterNSW, PO Box 156, Leeton NSW 2705 within 28 days of this notice. The objection must include your name and address to specify the grounds of the objection. (A9186)

Any queries please call (02) 6951 2711 Sarah O'Brien, Water Regulation Officer.

A04560

## WATERNSW

### BARWON-DARLING UNREGULATED RIVER WATER SOURCE

An application for an amended COMBINED WATER SUPPLY WORK AND USE APPROVAL has been received from **SALTO (NSW) PTY LTD** for one 660mm axial flow pump (to replace an existing currently authorised 400mm axial flow pump at Lot 19 DP 752692, Parish of Euminbah, County of Finch.

Objections to the granting of this approval must be registered in writing to WaterNSW, PO Box 717, Dubbo NSW 2830 within 28 days of this notice. The objection must include your name and address to specify the grounds of objection. (A009109)

Any queries please call (02) 6841 7414, Richard Wheatley, Senior Water Regulation Officer.

A04558

## WATERNSW

### UPPER MURRAY GROUNDWATER WATER SOURCE

An application to AMEND A COMBINED WORK APPROVAL has been received from **PACE LAND HOLDING PTY LTD** for an additional bore proposed to be on Lot 160 DP753754 for irrigation purposes.

Objections to the granting of this approval must be registered in writing to WaterNSW, PO Box 829, Albury NSW 2640, within 28 days of this notice. The objection must include your name and address to specify the grounds of objection. (A009145).

Any queries please call (02) 6024 8852, David Finnimore, Water Regulation Officer.

A04564

## WATERNSW

### LACHLAN FOLD BELT MDB GROUNDWATER SOURCE

An application for a new WATER SUPPLY WORKS APPROVAL has been received from **ANNIE LEE** for a new bore proposed to be on Lot 2 DP1131729 for commercial purposes.

Objections to the granting of this approval must be registered in writing to WaterNSW, PO Box 829, Albury NSW 2640, within 28 days of this notice. The objection must include your name and address to specify the grounds of objection. (A009185).

Any queries please call (02) 6024 8852, David Finnimore, Water Regulation Officer.

A04562

## WATERNSW

### WOOLGOOLGA CREEK WATER SOURCE

An application to amend a WATER SUPPLY WORKS AND USE APPROVAL section has been received from **SWARAN SINGH DHALIWAL AND MANJIT KAUR DHALIWAL** for a dam and a pump on an Unnamed Watercourse, on Lot 8, DP 787536 Parish Woolgoolga, County Fitzroy, for conservation of water and irrigation purposes.

Objections to the granting of this approval must be registered in writing to WaterNSW, Locked Bag 10, Grafton NSW 2460 within 28 days of this notice. The objection must include your name and address to specify the grounds of objection. (A009132)

Any queries please phone (02) 6641 6500, Mark Bonner, Water Regulation Officer.

A04563

## WATERNSW

### BILLABONG FLOODPLAIN MANAGEMENT PLAN AREA

An application for a Flood Work Approval has been received from **GREGORY ALLAN, ROBERT ORMOND AND SELWYN LESLIE FERGUSON** for three levees within the Billabong Floodplain on Lot 5 DP 706153 and Lot 100 DP 800050, Parish of North Gunambill, County of Urana.

Objections to the granting of this Approval must be registered in writing to WaterNSW, PO Box 829, ALBURY NSW 2640, within 28 days of this notice. Any objection must include your name and address to specify the grounds of objection.

Any queries please call (02) 6024 8859, Clare Purtle, Senior Water Regulation Officer.

A04561

## WATERNSW

### LACHLAN REGULATED RIVER WATER SHARING PLAN THAT PART OF THE WATER SOURCE DOWNSTREAM OF LAKE CARGELLIGO WEIR

An application for an amended WATER SUPPLY WORKS and/or WATER USE APPROVAL has been received from **ROSELLA SUB TC PTY LTD** for 4 x 450mm pumps, total capacity 121 ML/day, on Lot 1 DP 1180971, Parish Huntawong, County Nicholson, for Irrigation purposes.

Objections to the granting of this approval must be registered in writing to WaterNSW, PO Box 291, Forbes NSW 2871 within 28 days of this notice. The objection must include your name and address to specify the grounds of objection (A009100)

Any queries please call (02) 6850 2808, Andrew Glasson, Senior Water Regulation Officer.

A04559

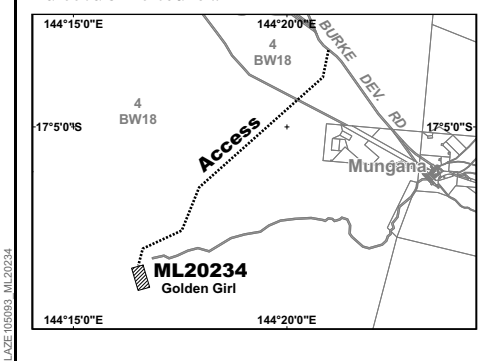
**For all your advertising needs  
email: [advertising@koorimail.com](mailto:advertising@koorimail.com)  
or call 02 6622 2666**

## NOTICE OF PROPOSED RENEWAL OF A MINING LEASE

### NATIVE TITLE ACT 1993 (CTH) SECTION 29

The Queensland Minister for Natural Resources and Mines, PO Box 15216, City East, Queensland, 4002, hereby gives notice in accordance with section 29 of the *Native Title Act 1993* (Cth) of the proposed renewal of the Mining Lease shown below under the *Mineral Resources Act 1989* (Qld).

Mining Lease 20234 sought by Wandoo Tenements Pty Ltd, over an area of 50 ha, centred approximately 13 km South West of Mungana, in the locality of Mareeba Shire Council.



**Nature of Act(s):** The renewal of the Mining Lease under the *Mineral Resources Act 1989* (Qld), authorises the holder to mine and carry out associated activities subject to the *Mineral Resources Act 1989* (Qld), for a term not exceeding six (6) years, with the possibility of renewal for a term not exceeding six (6) years.

**Name and address of person doing acts:** It is proposed that the Mining Lease be renewed by the Queensland Minister for Natural Resources and Mines, PO Box 15216, City East, Queensland, 4002.

**Further Information:** Further information about the proposed renewal of the Mining Lease, including extract of plans showing the boundaries of the Mining Lease may be obtained from the Department of Natural Resources and Mines, Principal Mining Registrar, Mineral Hub, Level 9, Verde Tower, 445 Flinders Street, Townsville, Queensland 4810, Telephone: (07) 4447 9230, or email [MineralHub@dnrm.qld.gov.au](mailto:MineralHub@dnrm.qld.gov.au)

**Native Title Parties:** Under the *Native Title Act 1993* (Cth) any person who is a "native title party" is entitled to certain rights in relation to the proposed renewal of the Mining Lease. Under section 30 of the *Native Title Act 1993* (Cth), persons have until three (3) months after Notification Day to take certain steps to become native title parties in relation to this notice. Enquiries in relation to filing a native title determination application may be directed to the Federal Court, Brisbane Registry, Level 6, Commonwealth Law Courts, 119 North Quay, Brisbane, Queensland 4000. Telephone: (07) 3248 1100 or Email: [qldreg@fedcourt.gov.au](mailto:qldreg@fedcourt.gov.au)

Enquiries in relation to the registration of a native title determination application may be directed to the National Native Title Tribunal, Brisbane Registry, Level 5, 119 North Quay, Brisbane, Queensland 4000, Telephone: (07) 3307 5000 or 1800 640 501.

**Notification Day: 1 February 2017**

---

**From:** Danielle Wallace  
**Sent:** Monday, 6 March 2017 4:43 PM  
**To:** 'facp2014@gmail.com'  
**Subject:** Syerston Project and Syerston Project Modification 4 - Registration

Hi David,

As discussed and as requested, Clean TeQ will remove the Forbes Aboriginal & Community Working Party from the list of Registered Aboriginal Parties for the Syerston Project and will not provide any further correspondence in relation to this project.

Please don't hesitate to call should you wish to discuss.

Regards

**Danielle Wallace**

Environmental Project Manager

e [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

m 0414 833 397

Resource Strategies Pty Ltd  
Suite 2 Level 3, 24 McDougall Street  
PO Box 1842  
Milton Qld 4064  
t 07 3367 0055 f 07 3367 0053  
[www.resourcestrategies.com.au](http://www.resourcestrategies.com.au)

NOTICE

This email and any attachments are confidential. If you are not the intended recipient please notify the sender by return email and immediately delete this message. Please note that any unauthorised use, forwarding, printing or copying of this email is strictly prohibited. Whilst this communication is believed to be free of any virus it is the responsibility of the recipient to ensure that it is virus free and no responsibility is accepted by Resource Strategies Pty Ltd for any loss or damage arising in any way from its receipt or use.

## **PROPOSED METHODOLOGY AND CORRESPONDENCE**

SYERSTON PROJECT MODIFICATION 6  
PROPOSED METHODOLOGY  
FOR THE  
ABORIGINAL CULTURAL HERITAGE ASSESSMENT

October 2017  
Project No. CTL-16-02  
Document No. 00879230

## **1 INTRODUCTION**

Clean TeQ Holdings Limited (Clean TeQ) owns the rights to develop the approved, but yet to be developed, Syerston Project. The Syerston Project is situated approximately 350 kilometers west northwest of Sydney, near the village of Fifield, New South Wales (NSW) (Figure 1).

Development Consent (DA 374-11-00) for the Syerston Project was issued under Part 4 of NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) in 2001. The Development Consent (DA 374-11-00) has been modified on three occasions since it was issued:

- 2005 – to allow for the increase of run-of-mine ore processing rate, limestone quarry extraction rate and adjustments to ore procession operations.
- 2006 – to allow for the reconfiguration of the water supply borefield.
- 2017 – to adjust mining and processing operations at the mine processing facility to initially focus on scandium oxide production in addition to nickel and cobalt precipitate production.

In addition, Clean TeQ will submit two separate modification applications in 2017 (i.e. Modifications 4 and 5).

### **1.1 Approved Syerston Project**

The approved Syerston Project includes the establishment and operation of the following:

- nickel cobalt mine and processing facility;
- limestone quarry and processing facility;
- rail loading and unloading facility;
- natural gas pipeline;
- two water supply borefields and pipelines; and
- associated transport and infrastructure.

The approved Syerston Project is presented on Figure 1.

### **1.2 Syerston Project Modification 6**

Clean TeQ is seeking approval for a modification to the Development Consent for the approved Syerston Project under section 75W of the EP&A Act – herein referred to as Modification 6 (MOD 6).

MOD 6 involves the relocation of the approved accommodation camp for the approved Syerston Project. The indicative location of the relocated accommodation camp is shown on Figure 2. Note that the actual disturbance associated with MOD 6 will be significantly smaller than the indicative area shown on Figure 2, however the assessment will consider the entire Study Area in order to provide flexibility in the final design and location.

Clean TeQ is seeking to engage with the Aboriginal community as part of the preparation of an Aboriginal Cultural Heritage Assessment(s) (ACHA[s]), which will be used to support an application for an Aboriginal Heritage Impact Permit (AHIP) (and/or a variation application to any relevant approved AHIPs) under section 90 of the NSW *National Parks and Wildlife Act, 1974* (NP&W Act) for the MOD 6. Consultation with Aboriginal people and communities will be guided by the NSW Office of Environment and Heritage's (OEH) *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water [DECCW], 2010). The community consultation process undertaken for this assessment will also assist the Director-General of the OEH in his or her consideration and determination of the AHIP application.

### **1.3 Structure of this Document**

Section 2 of this document describes the previous archaeological investigations undertaken for the approved Syerston Project, while Section 3 outlines the Proposed Methodology for the cultural and archaeological assessment of Aboriginal objects, places and/or Aboriginal cultural heritage values within the approved Syerston Project area and the MOD 6 Study Area.

Section 4 outlines the sensitive cultural information management protocol and Section 5 provides further information on the preparation of the ACHA report(s). Relevant personnel and critical timeframes for the assessment(s) are outlined in Sections 6 and 7, respectively.

## **2 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS**

A number of archaeological surveys and assessments have been conducted within the approved Syerston Project area and in the surrounds. Relevant to the immediate area are the studies prepared by Appleton (2000, 2005), Landscape Natural and Cultural Heritage Management (2017), and Archaeological Surveys and Reports (2000).

The surveys undertaken by Archaeological Surveys and Reports in 2000 resulted in the recording of 14 Aboriginal heritage sites – comprising of six isolated artefacts, six scarred trees, an open artefact scatter and an extensive camp site. Three carved tree sites previously listed on the Aboriginal Heritage Information Management System (AHIMS) register were also inspected during this survey and assessment.

A more recent assessment by Landscape (2017) identified 13 Aboriginal heritage sites in or near the approved Syerston Project area, including two stone artefact scatters, eight isolated finds of stone artefacts, two stone quarries and a scarred tree.

The previously recorded sites located in proximity to the Study Area are presented on Figure 2 and include isolated artefacts, artefact scatters, scarred trees and stone quarry sites.

## **3 PROPOSED ASSESSMENT METHODOLOGY**

The Proposed Methodology for the cultural and archaeological assessment for the ACHA(s) is as follows:

- Conduct a desktop assessment to delineate areas of known and predicted Aboriginal objects, places and/or Aboriginal cultural heritage values, including a detailed review of the previous assessments and investigations.

- Identify the Aboriginal cultural heritage values associated with the Study Area through consulting with Aboriginal people with cultural knowledge or responsibilities for Country in which the Study Area occurs, utilising written, oral research and field investigation(s).
- The conduct of a cultural and archaeological assessment with representatives of the local Aboriginal community, to identify Aboriginal objects, places and/or Aboriginal cultural heritage values. The field investigation(s) would be carried out by the project archaeologist with the assistance of Aboriginal representatives.
- Record/document any Aboriginal objects, places and/or Aboriginal cultural heritage values within the Study Area and assessment of their significance with representatives of the Registered Aboriginal Parties (RAPs).
- In consultation with the RAPs, develop recommended management and mitigation measures for Aboriginal objects, places and/or Aboriginal cultural heritage values.
- Provide a consideration of the potential impacts of MOD 6 on Aboriginal objects, places and/or Aboriginal cultural heritage values within the Study Area.
- Describe and justify the outcomes and alternatives.
- Document the Aboriginal cultural heritage impact assessment and the recommendations to minimise potential impacts on Aboriginal cultural heritage.
- Provide a copy of the draft ACHA(s) to the RAPs for their review and feedback.
- Documentation of feedback received as part of the cultural assessment from RAPs for presentation in the final ACHA(s) report (subject to the sensitivity of the information provided).
- As part of the process, Clean TeQ will seek an AHIP (or a variation to an existing AHIP) under section 90 of the NP&W Act.

In accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010) Clean TeQ requests that RAPs provide, where relevant during the conduct of the ACHA(s), cultural information regarding:

- whether there are any Aboriginal sites/objects of cultural value to Aboriginal people in the relevant area or surrounds; and
- whether there are any places of cultural value to Aboriginal people in the relevant area or surrounds.

This may include places of social, spiritual and cultural value, historic places with cultural significance, and potential places/areas of historic, social, spiritual and/or cultural significance.

#### **4 SENSITIVE CULTURAL INFORMATION – MANAGEMENT PROTOCOL**

In the event that a RAP has sensitive or restricted public access information, it is proposed that Clean TeQ would manage this information (if provided by the Aboriginal community) in accordance with a sensitive cultural information management protocol.

It is anticipated that the protocol would include making note of and managing the material in accordance with the following key limitations/requirements as advised by the relevant RAP at the time of the information being provided:

- any restrictions on access to the material;
- any restrictions on communication of the material;



- any restrictions on the location/storage of the material;
- any cultural recommendations on handling the material;
- any contextual information;
- any names and contact details of persons authorised by the relevant Aboriginal party to make decisions concerning the Aboriginal material and the degree of authorisation;
- any details of any consent given in accordance with customary law;
- the level of confidentiality to be accorded to the material; and
- any access and use by the RAP, of the cultural information in the material.

All RAPs should be aware of the mandatory OEH requirement that all feedback provided must be documented in the final ACHA(s), including copies of any submissions received and the proponents response to the issues raised.

## 5 ABORIGINAL CULTURAL HERITAGE ASSESSMENT

Following consultation on the Proposed Methodology of the cultural and archaeological assessment, and undertaking any required field components, a draft ACHA(s) report will be prepared. The draft ACHA(s) will be provided to all RAPs for their review and comment, and will include:

- details of the Aboriginal objects, places and/or Aboriginal cultural heritage values within the Study Area and how they may be impacted by MOD 6;
- details of the consultation undertaken and how comments received at various times were considered; and
- management and mitigation recommendations drawing on information provided by RAPs and the results of the cultural and archaeological assessments.

## 6 PERSONNEL

*Project Archaeologist:* Dr Matt Cupper would be the project archaeologist. Matt has a wide range of experience in cultural and natural heritage management and an academic background in archaeology, geology and botany, including a PhD in the palaeoecology and early Aboriginal occupation of the Darling River. His particular area of expertise is the interaction of Aboriginal people and arid ecosystems in the interior of Australia. As a consultant archaeologist he has been engaged in many management and research-oriented studies of the Murray Darling Basin for industry and government. These have included investigation of the cultural heritage of the dunefields of western NSW for petroleum and mineral sands developments, and archaeological surveys of water supply and irrigation infrastructure along the Lachlan, Murray and Darling Rivers.

*Aboriginal Field Representatives:* It is anticipated that Aboriginal field representatives would be engaged by Clean TeQ for the duration of the cultural heritage field survey (the number may be subject to change based on the extent of the area requiring survey or due to workplace health and safety constraints). Aboriginal field representatives (including community leaders and Elders attending community consultation meetings) would invoice and, where appropriate, negotiate with Clean TeQ directly in relation to engagement for the field surveys. Aboriginal field personnel may be engaged on a rotational basis (e.g. a different team of representatives each day) as required.

## 7 CRITICAL TIMEFRAMES

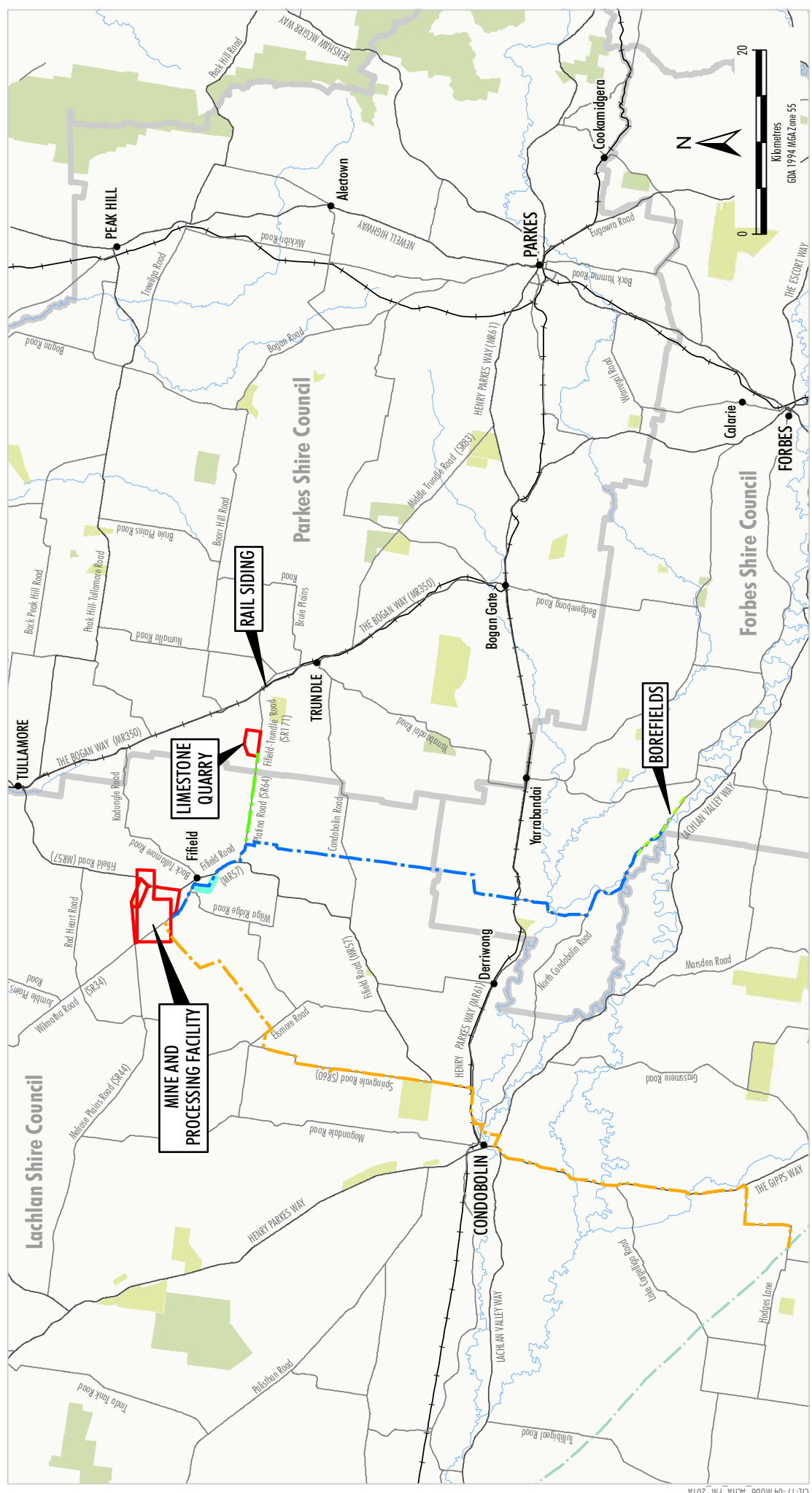
Critical timeframes for the ACHA(s) are outlined below:

1. Collation of cultural significant information – ongoing throughout process until the end of the draft ACHA(s) review period.
2. Provision of comments on the Proposed Methodology to Clean TeQ – November 2017.
3. Field survey(s) – anticipated to occur October/November 2017 (noting that survey dates will be confirmed with relevant representatives of the RAPs as required).
4. Provision of a draft ACHA(s) (including proposed management and mitigation measures) to RAPs for review and comment – anticipated to occur November/December 2017 (following field survey).
5. Provision of comments from RAPs on draft ACHA(s) to Clean TeQ – anticipated to occur November-January 2017.
6. Finalise ACHA(s) in consideration of comments received – December/January 2017.
7. As part of the process, Clean TeQ will seek an AHIP (or a variation to an existing AHIP) under section 90 of the NP&W Act. This would occur following finalisation of the ACHA(s).

## 8 REFERENCES

- Appleton, J. (2000) *Proposed Syerston Project Aboriginal Heritage Assessment*. Report to Resource Strategies Pty Limited.
- Appleton, J. (2005) *Archaeological Investigation: Syerston Nickel Cobalt Project Preliminary Report*. Report to Ivanplats Syerston Pty Limited.
- Archaeological Surveys and Reports (2000) *The report of the archaeological investigation of the Mine site and sites of Associated Ancillary Infrastructure for the Syerston Nickel-Cobalt Project*. Report prepared for Black Range Minerals Ltd.
- Department of Environment, Climate Change and Water (2010) *Aboriginal cultural heritage consultation requirements for proponents 2010*.
- Landskape Natural and Cultural Heritage Management (2017) *Syerston Project Aboriginal Cultural Heritage Assessment*. Report to Clean TeQ Limited.

## **FIGURES**



**CLEAN**  
**TEQ**  
Engineering & Construction

**SYERSTON PROJECT MODIFICATION 6  
Regional Location**

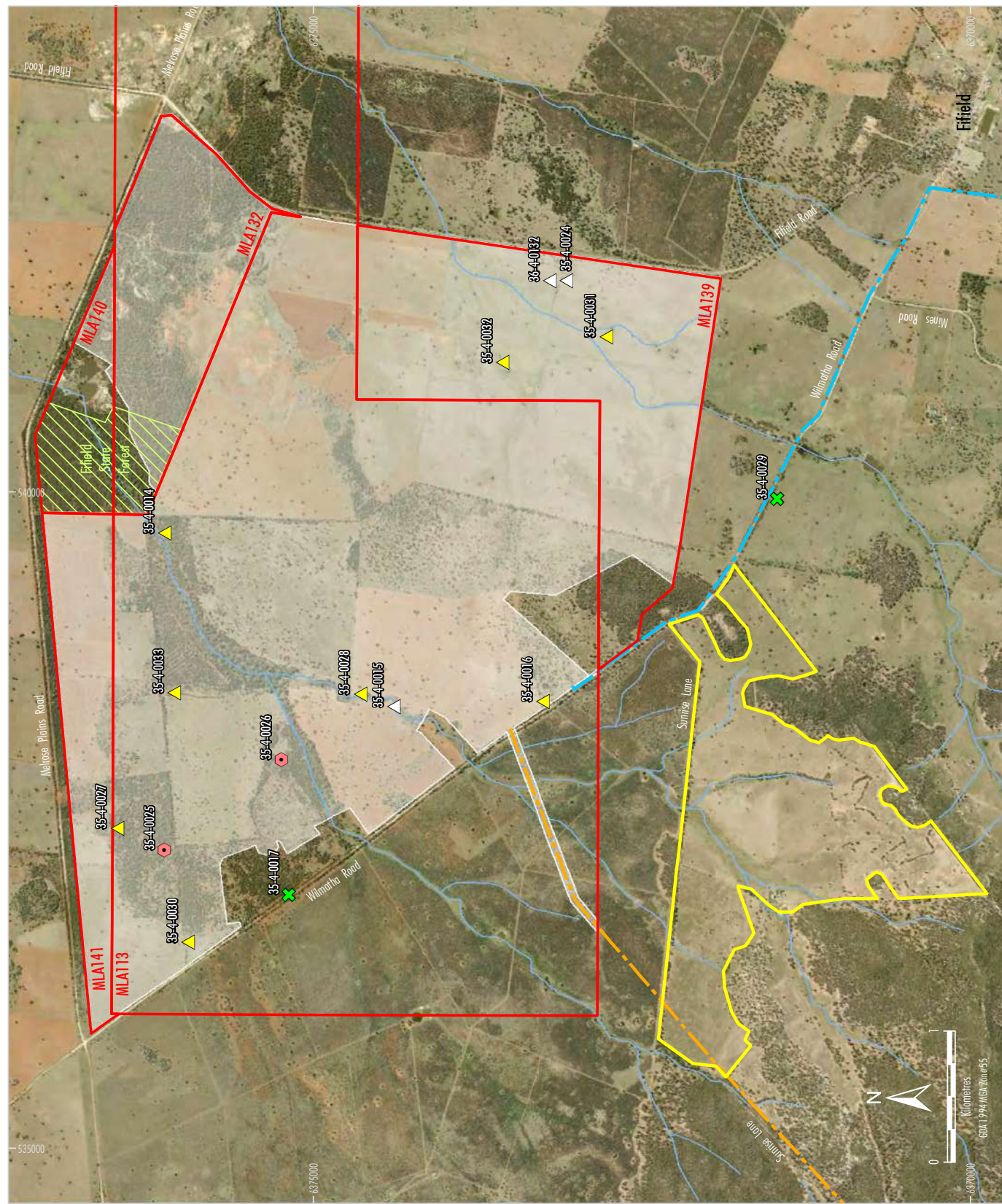
Source: Black Range Minerals (2000); NSW Department of Industry (2017);  
NSW Land & Property Information (2017); Office of Environment  
and Heritage NSW (2017)

- LEGEND**
- National Park/Conservation Area
  - State Forest
  - Local Government Boundary
  - Existing Gas Pipeline
  - Mining Lease Application Boundary
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - Approved Limestone Quarry Water Pipeline
  - Approved Linking Pipeline
  - Approved Filled Bypass



**Figure 1**





Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
NSW Imagery: © Department Finance, Services & Innovation (2017)

## Figure 2

13 October 2017

Binjang Wellington Wiradjuri Aboriginal Heritage Survey  
Jamie Gray  
260 Myall Street  
DUBBO NSW 2830

Via email: [jamiegray66@gmail.com](mailto:jamiegray66@gmail.com)

Dear Jamie,

**RE: ABORIGINAL CULTURAL HERITAGE ASSESSMENT PROPOSED METHODOLOGY FOR THE SYERSTON PROJECT MODIFICATION 6**

As you are aware, Clean TeQ Holdings Limited (Clean TeQ) owns the rights to develop the approved, but yet to be developed, Syerston Project which is situated approximately 350 kilometres west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

### **Proposed Methodology**

Please find enclosed for your review, a copy of the Proposed Methodology for the Aboriginal Cultural Heritage Assessment(s) for the Syerston Project Modification 6 (MOD 6).

In accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010) issued by the NSW Office of Environment and Heritage, we have provided the Proposed Methodology for your review and feedback. Your feedback may include the identification of issues or areas of cultural significance that may be used to affect, inform or refine the Proposed Methodology.

If you wish to provide input on the following, please make a submission to Clean TeQ Holdings Limited (via the contact details provided at the end of this letter) by **5:00pm Friday 10 November 2017**:

- The nature of the Proposed Methodology.
- Any Aboriginal objects or places of cultural value within the investigation area, or issues of cultural significance, that you are aware of.
- Any restrictions or protocols you may consider necessary in relation to any information of sensitivity that you may provide.
- Any other factors you consider to be relevant to the heritage assessment.

All comments received will be taken into consideration as the Methodology is finalised.

### **Contact Details**

Any feedback with respect to the Proposed Methodology can be provided to Clean TeQ via the following contact details:

Clean TeQ  
C/- Danielle Wallace  
PO Box 379, WEST RYDE, NSW 2114  
Mobile: 0414 833 397  
Email: [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

Yours sincerely,

**CLEAN TEQ HOLDINGS LIMITED**

A handwritten signature in black ink, appearing to read 'J. Hanrahan', with a large, stylized initial 'J'.

**JOHN HANRAHAN**

**APPROVALS LEAD – THE SYERSTON PROJECT**



13 October 2017

Condobolin Local Aboriginal Land Council  
Dave Carter  
PO Box 114  
CONDOBOLIN NSW 2877

Via email: [condolalc@hotmail.com](mailto:condolalc@hotmail.com)

Dear Dave,

**RE: ABORIGINAL CULTURAL HERITAGE ASSESSMENT PROPOSED METHODOLOGY FOR THE SYERSTON PROJECT MODIFICATION 6**

As you are aware, Clean TeQ Holdings Limited (Clean TeQ) owns the rights to develop the approved, but yet to be developed, Syerston Project which is situated approximately 350 kilometres west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

### **Proposed Methodology**

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Email: [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

Yours sincerely,

**CLEAN TEQ HOLDINGS LIMITED**

A handwritten signature in black ink, appearing to read 'J. Hanrahan', with a stylized flourish at the end.

**JOHN HANRAHAN**

**APPROVALS LEAD – THE SYERSTON PROJECT**

13 October 2017

Louise Davis

Via email: [louise.davis28@hotmail.com](mailto:louise.davis28@hotmail.com)

Dear Louise,

**RE: ABORIGINAL CULTURAL HERITAGE ASSESSMENT PROPOSED METHODOLOGY FOR THE SYERSTON PROJECT MODIFICATION 6**

As you are aware, Clean TeQ Holdings Limited (Clean TeQ) owns the rights to develop the approved, but yet to be developed, Syerston Project which is situated approximately 350 kilometres west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

**Proposed Methodology**

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Yours sincerely,

**CLEAN TEQ HOLDINGS LIMITED**

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**JOHN HANRAHAN**

**APPROVALS LEAD – THE SYERSTON PROJECT**

13 October 2017

Murie Elders Group  
Rebecca Shepherd  
Via email: [condowag@gmail.com](mailto:condowag@gmail.com)

Dear Rebecca,

**RE: ABORIGINAL CULTURAL HERITAGE ASSESSMENT PROPOSED METHODOLOGY FOR THE SYERSTON PROJECT MODIFICATION 6**

As you are aware, Clean TeQ Holdings Limited (Clean TeQ) owns the rights to develop the approved, but yet to be developed, Syerston Project which is situated approximately 350 kilometres west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

### **Proposed Methodology**

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Email: [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

Yours sincerely,

**CLEAN TEQ HOLDINGS LIMITED**

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**JOHN HANRAHAN**

**APPROVALS LEAD – THE SYERSTON PROJECT**

13 October 2017

Peter Peckham

Via email: [peterpeckham53@gmail.com](mailto:peterpeckham53@gmail.com)

Dear Peter,

**RE: ABORIGINAL CULTURAL HERITAGE ASSESSMENT PROPOSED METHODOLOGY FOR THE SYERSTON PROJECT MODIFICATION 6**

As you are aware, Clean TeQ Holdings Limited (Clean TeQ) owns the rights to develop the approved, but yet to be developed, Syerston Project which is situated approximately 350 kilometres west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

#### **Proposed Methodology**

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All comments received will be taken into consideration as the Methodology is finalised.

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Yours sincerely,

**CLEAN TEQ HOLDINGS LIMITED**

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**JOHN HANRAHAN**

**APPROVALS LEAD – THE SYERSTON PROJECT**

13 October 2017

West Wyalong Local Aboriginal Land Council  
Leeanne Hampton  
PO Box 332  
WEST WYALONG NSW 2671

Via email: [ww.lalc@bigpond.com](mailto:ww.lalc@bigpond.com)

Dear Leeanne,

**RE: ABORIGINAL CULTURAL HERITAGE ASSESSMENT PROPOSED METHODOLOGY FOR THE SYERSTON PROJECT MODIFICATION 6**

As you are aware, Clean TeQ Holdings Limited (Clean TeQ) owns the rights to develop the approved, but yet to be developed, Syerston Project which is situated approximately 350 kilometres west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

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- Any Aboriginal objects or places of cultural value within the investigation area, or issues of cultural significance, that you are aware of.
- Any restrictions or protocols you may consider necessary in relation to any information of sensitivity that you may provide.
- Any other factors you consider to be relevant to the heritage assessment.

All comments received will be taken into consideration as the Methodology is finalised.

### **Contact Details**

Any feedback with respect to the Proposed Methodology can be provided to Clean TeQ via the following contact details:

Clean TeQ  
C/- Danielle Wallace  
PO Box 379, WEST RYDE, NSW 2114  
Mobile: 0414 833 397  
Email: [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

Yours sincerely,

**CLEAN TEQ HOLDINGS LIMITED**

A handwritten signature in black ink, appearing to read 'J. Hanrahan', with a stylized flourish at the end.

**JOHN HANRAHAN**

**APPROVALS LEAD – THE SYERSTON PROJECT**

13 October 2017

Wiradjuri Condobolin Corporation  
Laurie Hutchinson and Ally Coe  
PO Box 194  
CONDOBOLIN NSW 2877

Via email: [laurie@wiradjuricondocorp.com](mailto:laurie@wiradjuricondocorp.com)  
[Ally.coewsc@bigpond.com](mailto:Ally.coewsc@bigpond.com)

Dear Laurie and Ally,

**RE: ABORIGINAL CULTURAL HERITAGE ASSESSMENT PROPOSED METHODOLOGY FOR THE SYERSTON PROJECT MODIFICATION 6**

As you are aware, Clean TeQ Holdings Limited (Clean TeQ) owns the rights to develop the approved, but yet to be developed, Syerston Project which is situated approximately 350 kilometres west-northwest of Sydney, near the village of Fifield, New South Wales (NSW).

### **Proposed Methodology**

Please find enclosed for your review, a copy of the Proposed Methodology for the Aboriginal Cultural Heritage Assessment(s) for the Syerston Project Modification 6 (MOD 6).

In accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010) issued by the NSW Office of Environment and Heritage, we have provided the Proposed Methodology for your review and feedback. Your feedback may include the identification of issues or areas of cultural significance that may be used to affect, inform or refine the Proposed Methodology.

If you wish to provide input on the following, please make a submission to Clean TeQ Holdings Limited (via the contact details provided at the end of this letter) by **5:00pm Friday 10 November 2017**:

- The nature of the Proposed Methodology.
- Any Aboriginal objects or places of cultural value within the investigation area, or issues of cultural significance, that you are aware of.
- Any restrictions or protocols you may consider necessary in relation to any information of sensitivity that you may provide.
- Any other factors you consider to be relevant to the heritage assessment.

All comments received will be taken into consideration as the Methodology is finalised.

### **Contact Details**

Any feedback with respect to the Proposed Methodology can be provided to Clean TeQ via the following contact details:

Clean TeQ  
C/- Danielle Wallace  
PO Box 379, WEST RYDE, NSW 2114  
Mobile: 0414 833 397  
Email: [dwallace@resourcestrategies.com.au](mailto:dwallace@resourcestrategies.com.au)

Yours sincerely,

**CLEAN TEQ HOLDINGS LIMITED**

A handwritten signature in black ink, appearing to read 'J. Hanrahan', with a large, stylized initial 'J'.

**JOHN HANRAHAN**

**APPROVALS LEAD – THE SYERSTON PROJECT**

**CORRESPONDENCE TO NSW OFFICE OF ENVIRONMENT AND HERITAGE  
AND RELEVANT LOCAL ABORIGINAL LAND COUNCILS**

22 February 2017

Condobolin Local Aboriginal Land Council  
PO Box 114  
CONDOBOLIN NSW 2877

Dear Sir/Madam,

**RE: SYERSTON PROJECT AND SYERSTON PROJECT MODIFICATION 4 – ABORIGINAL CULTURAL HERITAGE ASSESSMENT**

In accordance with the New South Wales (NSW) Office of Environment and Heritage (OEH) policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water [DECCW], 2010), a list of the Registered Aboriginal Parties that registered an interest in the community consultation process with Clean TeQ Holdings Limited for the Syerston Project and the Syerston Project Modification 4 is provided below:

- Forbes Aboriginal & Community Working Party.
- Wiradjuri Condobolin Corporation.
- Murie Elders Group.
- Binjang Wellington Wiradjuri Aboriginal Heritage Survey.
- Louise Davis.

Copies of the notification letters sent to the Aboriginal stakeholders and the public notice published in accordance with Section 4.1.6 of the OEH policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010) are provided in Enclosures A and B respectively.

Kind Regards,

**CLEAN TEQ HOLDINGS LIMITED**



**JOHN HANRAHAN**

**APPROVALS LEAD – SYERSTON PROJECT**

*Enclosure A: Correspondence sent to Aboriginal Stakeholders*

*Enclosure B: Public Notice*



22 February 2017

Office of Environment and Heritage  
PO Box 2111  
DUBBO NSW 2830

Dear Sir/Madam,

**RE: SYERSTON PROJECT AND SYERSTON PROJECT MODIFICATION 4 – ABORIGINAL CULTURAL HERITAGE ASSESSMENT**

In accordance with the New South Wales (NSW) Office of Environment and Heritage (OEH) policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water [DECCW], 2010), a list of the Registered Aboriginal Parties that registered an interest in the community consultation process with Clean TeQ Holdings Limited for the Syerston Project and the Syerston Project Modification 4 is provided below:

- Forbes Aboriginal & Community Working Party.
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Copies of the notification letters sent to the Aboriginal stakeholders and the public notice published in accordance with Section 4.1.6 of the OEH policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010) are provided in Enclosures A and B respectively.

Kind Regards,

**CLEAN TEQ HOLDINGS LIMITED**



**JOHN HANRAHAN**

**APPROVALS LEAD – SYERSTON PROJECT**

*Enclosure A: Correspondence sent to Aboriginal Stakeholders*

*Enclosure B: Public Notice*

22 February 2017

West Wyalong Local Aboriginal Land Council  
PO Box 332  
WEST WYALONG NSW 2671

Dear Sir/Madam,

**RE: SYERSTON PROJECT AND SYERSTON PROJECT MODIFICATION 4 – ABORIGINAL CULTURAL HERITAGE ASSESSMENT**

In accordance with the New South Wales (NSW) Office of Environment and Heritage (OEH) policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water [DECCW], 2010), a list of the Registered Aboriginal Parties that registered an interest in the community consultation process with Clean TeQ Holdings Limited for the Syerston Project and the Syerston Project Modification 4 is provided below:

- Forbes Aboriginal & Community Working Party.
- Wiradjuri Condobolin Corporation.
- Murie Elders Group.
- Binjang Wellington Wiradjuri Aboriginal Heritage Survey.
- Louise Davis.

Copies of the notification letters sent to the Aboriginal stakeholders and the public notice published in accordance with Section 4.1.6 of the OEH policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010) are provided in Enclosures A and B respectively.

Kind Regards,

**CLEAN TEQ HOLDINGS LIMITED**



**JOHN HANRAHAN**

**APPROVALS LEAD – SYERSTON PROJECT**

*Enclosure A: Correspondence sent to Aboriginal Stakeholders*

*Enclosure B: Public Notice*

**APPENDIX 4**  
**CORRESPONDENCE FROM ABORIGINAL COMMUNITY STAKEHOLDERS**

## **STEP 1 CORRESPONDENCE**

7 December 2016

Danielle Wallace  
Scandium21  
PO Box 379  
WEST RYDE NSW 2114

Dear Danielle

**Re: Request - Search for Registered Aboriginal Owners**

I refer to your letter dated 2 December 2016 regarding Aboriginal Cultural Heritage Assessment within Fifield NSW.

I have searched the Register of Aboriginal Owners and the project area described *does not appear* to have Registered Aboriginal Owners pursuant to Division 3 of the *Aboriginal Land Rights Act 1983* (NSW).

I suggest that you contact the Condobolin Local Aboriginal Land Council on 02 6895 2377. They will be able to assist you in identifying other Aboriginal stakeholders for this project.

Yours sincerely



Tabatha Dantoine  
**Directorate Support Officer**  
Office of the Registrar, *Aboriginal Land Rights Act 1983*



Office of  
Environment  
& Heritage

Our Ref: DOC16/623324

Ms Danielle Wallace  
Scandium21  
PO Box 379  
WEST RYDE NSW 2114  
dwallace@resourcestrategies.com.au

Dear Danielle,

**Written Notification as Required under the Office of Environment and Heritage  
Aboriginal Cultural Heritage Requirements for Proponents 2010: Syerston Project  
Extension Modification**

I refer to your letter dated 2 December 2016 to the Office of Environment and Heritage (OEH) regarding the above matter.

A list of known Aboriginal parties that OEH considers is likely to have an interest in this development is listed in **Attachment 1**. Please note this list is not necessarily an exhaustive list of all interested Aboriginal parties and receipt of this list does not remove the requirement for a proponent/consultant to advertise in local print media and contact other bodies seeking interested Aboriginal parties, in accordance with the requirements.

Should you require further information regarding issues that are the responsibility of OEH, please contact Phil Purcell, Archaeologist, on 6883 5341.

Yours faithfully,

**STEVEN COX**  
**Senior Team Leader - Planning**  
**North West Region**

Contact officer: PHIL PURCELL  
(02) 6883 5341

09 December 2016

## ATTACHMENT 1

**Table 1: List of aboriginal stakeholder groups within the Forbes, Lachlan and Parkes local government areas that may have an interest in the project, provided as per OEH aboriginal cultural heritage requirements for proponents (2010).**

<b>Forbes LGA</b>		
<b>Organisation/Association</b>	<b>Name/Title</b>	<b>Address</b>
Condobolin LALC	Chairperson	PO Box 114, Condobolin NSW
	Danny Molloy	<i>No known contact details available</i>
	David Acheson	dgajp@hotmail.com
	Delma Butler	delmabutler@bigpond.com
Hunter Central Rivers Catchment Management Authority	Aboriginal Reference Group	Private Bag 2010, Paterson NSW 2421
	Jacqueline Flannery	jacqueline.hodges@det.nsw.edu.au
	Jodie Markwort	jodie.markwort1@det.nsw.edu.au
	Joy Russell	Joy.Russell@det.nsw.edu.au
	Karen Howell	<i>No known contact details available</i>
	Kelly Bowden	kelly@binaalbilla.com.au
Lachlan Catchment Management Authority	Kerry Stirling	<i>No known contact details available</i>
	Aboriginal Reference Group	2 Sheriff Street, Forbes NSW 2871
	Larry Towney	larry.towney@lls.nsw.gov.au
	Mary Hodge	marytommy27@hotmail.com
Mooka	Neville Williams	PO Box 70, Cowra NSW 2794
	Nichole Back	<i>No known contact details available</i>
Peak Hill Bogan River Traditional Owner	C/- Sylvana Keating, A/Area Manager	NPWS Lachlan Area PO Box 774, Forbes NSW 2871
	Trevor Robinson	PO Box 73, Peak Hill NSW 2869
	Wayne Markwort	<i>No known contact details available</i>
<b>Lachlan LGA</b>		
<b>Organisation/Association</b>	<b>Name/Title</b>	<b>Address</b>
Condobolin LALC	Chairperson	PO Box 114, Condobolin NSW
Kullila Site Consultants	Paul Charles	14 Werrang Road, Primbee NSW 2502
Mooka	Neville Williams	PO Box 70, Cowra NSW 2794
Mulli Mulli LALC	Chairperson	PO Box 68, Woodenbong NSW 2476
Murie Elders Group	Chairperson	161 Bathurst Street, Condobolin NSW 2877
Murrin bridge LALC	Chairperson	PO Box 157, Lake Cargelligo NSW 2672
	Peter Peckham	27 Jennings Street, Geurie, NSW 2831
	Trevor Robinson	PO Box 73, Peak Hill NSW 2869
Wiradjuri Condobolin Corporation		PO Box 194, Condobolin NSW 2877
Wiradjuri Council of Elders	Robert Clegg	7 Keast Street, Parkes NSW 2870



<b>Parkes LGA</b>		
<b>Organisation/Association</b>	<b>Name/Title</b>	<b>Address</b>
Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart	260 Myall St, Dubbo NSW 2830
Bogan River Peak Hill Wiradjuri Aboriginal Corporation	Chairperson	PO Box 42, Peak Hill NSW 2869
Bulgandramine Youth Development Aboriginal Corporation	Chairperson	PO Box 119, Peak Hill NSW 28369
Condobolin LALC	Chairperson	PO Box 114, Condobolin NSW
Cowra LALC	Chairperson	PO Box 769, Cowra NSW 2794
	Eva Coe	3 Yarnbildine Place, Cowra NSW 2794
Little Burning Mountain Aboriginal Corporation	Chairperson	PO Box 152, Peak Hill NSW 2869
Mooka	Neville Williams	PO Box 70, Cowra NSW 2794
Peak Hill LALC	Chairperson	PO Box 63, Peak Hill NSW 2869
	Peter Peckham	27 Jennings Street, Geurie, NSW 2831
	Trevor Robinson	PO Box 73, Peak Hill NSW 2869
Warramunga Community Advancement Co-operative Society Ltd	Chairperson	79 Caswell Street, Peak Hill NSW 2869
Wiradjuri Council of Elders	Robert Clegg	7 Keast Street, Parkes NSW 2870

---

**From:** Irene Assumpter [Irene.Assumpter@nntt.gov.au]  
**Sent:** Wednesday, 14 December 2016 1:50 PM  
**To:** info@cleanteq.com; Danielle Wallace  
**Cc:** Enquiries  
**Subject:** RE: NSW Native Title Search over Fifield - Lachlan Shire Council LGA  
**Attachments:** 20161214\_sr2004\_LachlanLGA\_Overlap\_Reports.xls; 20161214\_sr2004\_ParkesLGA\_Overlap\_Reports.xls; 20161214\_sr2004\_ForbesLGA\_Overlap\_Reports.xls

## UNCLASSIFIED

**Native title search –NSW:** *Fifield, NSW, within Lachlan Shire Council LGA*

**Your ref:** N/A - **Our ref:** SR2004

**Att:** Mick Ryan  
Project Manager - Syerston  
c/-Scandium21 Pty Ltd

**Dear Sir/Madam,**

Thank you for your search request received on 12 December 2016 in relation to the above area, please find your results attached. The proposed project location identified in your correspondence dated 2 December 2016 appears to be located within the Lachlan Shire Council Local Government Area ('Lachlan LGA'), and by extension, Parkes Shire Council and Forbes Shire Council Local Government Areas ('Parkes and Forbes LGAs'). On this basis the National Native Title Tribunal has provided native title overlap results for Lachlan LGA as well as Parkes and Forbes LGAs. All overlaps shown within Lachlan LGA have been verified as real.

Based on the records held by the National Native Title Tribunal as at 14 December 2016, it would appear that there are no Indigenous Land Use Agreements, Scheduled or Registered Native Title Claims or Determined Claims over Parkes and Forbes LGAs.

If you would like more specific information regarding the proposed project location, please provide identifiers such as lot numbers and Deposit Plan IDs. Please note that the relevant parcel/parcels may or may not be freehold. For confirmation of freehold data, please contact NSW's Land and Property Information office.

### Search Results

The results provided are based on the information you supplied and are derived from a search of the following Tribunal databases:

- Schedule of Applications
- Register of Native Title Claims
- National Native Title Register
- Register of Indigenous Land Use Agreements
- Notified Indigenous Land Use Agreements

Copies of the relevant register extracts are now available on our website [here](#).

**Please note:** There may be a delay between a native title determination application being lodged in the Federal Court and its transfer to the Tribunal. As a result, some native title determination applications recently filed with the Federal Court may not appear on the Tribunal's databases.

The search results are based on analysis against external boundaries of applications only. Native title applications commonly contain exclusions clauses which remove areas from within the external boundary. To determine

whether the areas described are in fact subject to claim, you need to refer to the “Area covered by claim” section of the relevant Register Extract or Schedule Extract and any maps attached.

**Search results and the existence of native title**

Please note that the enclosed information from the Register of Native Title Claims and/or the Schedule of Applications is **not** confirmation of the existence of native title in this area. This cannot be confirmed until the Federal Court makes a determination that native title does or does not exist in relation to the area. Such determinations are registered on the National Native Title Register.

**Tribunal accepts no liability for reliance placed on enclosed information**

The enclosed information has been provided in good faith. Use of this information is at your sole risk. The National Native Title Tribunal makes no representation, either express or implied, as to the accuracy or suitability of the information enclosed for any particular purpose and accepts no liability for use of the information or reliance placed on it.

If you have any further queries, please do not hesitate to contact me on the number below or on the free call number 1800 640 501.

Regards,

**Enquiries**

**National Native Title Tribunal**

**Freecall 1800 640 501**

Email [enquiries@nntt.gov.au](mailto:enquiries@nntt.gov.au)

Website [www.nntt.gov.au](http://www.nntt.gov.au)

*Shared country, shared future.*

# Overlap Analysis Report

### Disclaimer

This information product has been created to assist in understanding the spatial characteristics and relationships of this native title matter and is intended as a guide only. Spatial data used has been sourced from the relevant custodians in each jurisdiction, and/or the Tribunal, and is referenced to the GDA94 datum.

While the Native Title Registrar (**Registrar**) has exercised due care in ensuring the accuracy of the information provided, it is provided for general information only and on the understanding that neither the Native Title Registrar nor the Commonwealth of Australia (Commonwealth) is providing professional advice. Appropriate professional advice relevant to your circumstances should be sought rather than relying on the information provided. In addition, you must exercise your own judgment and carefully evaluate the information provided for accuracy, currency, completeness and relevance for the purpose for which it is to be used.

As the interpretation of any particular native title determination area provided is based upon the best information available to the Registrar at the time of creation, any effective analysis must include reference to **both** the relevant determination of native title made by the Federal Court of Australia and the entry made in relation to that determination on the National Native Title Register maintained by the Registrar.

### Please note:

- Calculated areas may not be the same as the legal area of a parcel.
- Where shown, NNTT Tenure Class for a non freehold parcel refers to a tenure grouping derived for the purposes of the Tribunal, and does not necessarily represent the jurisdictional tenure type.
- Overlap results are returned only for the currently active jurisdiction.

## Selected feature

Name	Lachlan
Full name	Lachlan Shire Council
As at	1/08/2016
Calculated area SqKm	14,966.7120



## Overlap details

Schedule of Native Title Determination Applications

Overlap Tribunal ID	Name	FC No	Date Lodged	RT Status	Area sq km(calculated)	Overlap Area sq km (calculated)
NC2012/001	Ngemba, Ngiyampaa, Wangaaypuwan and	NSD415/2012	14/03/2012	Accepted for registration	95,059.4626	2,455.4380

Register of Native Title Claims

Overlap Tribunal ID	Name	FC No	Date Lodged	RT Status	Combined	Area sq km(calculated)	Overlap Area sq km (calculated)
NC2012/001	Ngemba, Ngiyampaa, Wangaaypuwan and Wayilwan native title determination	NSD415/2012	14/03/2012	Accepted for registration	N	95,059.4626	2,455.4380

Native Title Determinations

No overlap found

Native Title Determination Outcomes

No overlap found

Indigenous Land Use Agreements

No overlap found

RATSIB areas

Name	Organisation	RATSIB Status	Area sq km(calculated)	Overlap Area sq km (calculated)
New South Wales	NTSCORP Limited	NTSP	1,723,577.6084	14,966.7118

**Disclaimer**

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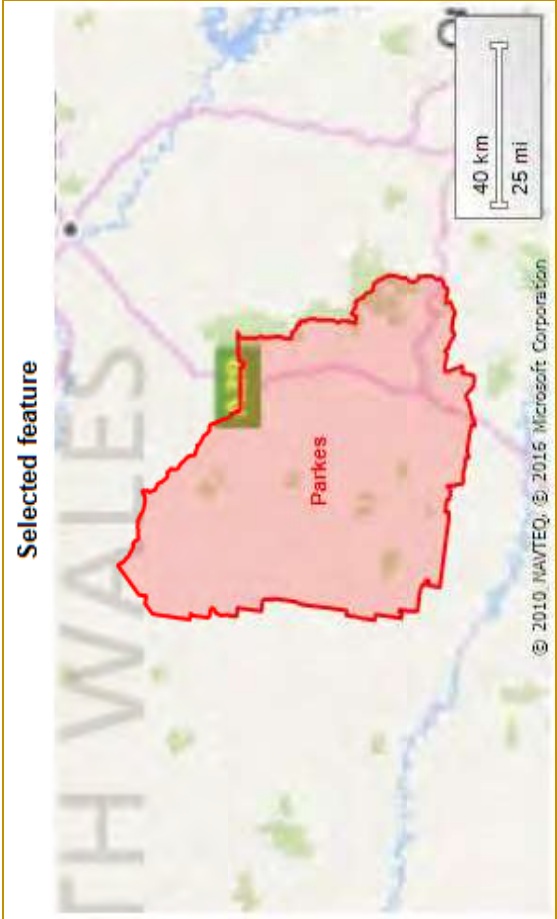
As the interpretation of any particular native title determination area provided is based upon the best information available to the Registrar at the time of creation, any effective analysis must include reference to **both** the relevant determination of native title made by the Federal Court of Australia and the entry made in relation to that determination on the National Native Title Register maintained by the Registrar.

**Please note:**

- Calculated areas may not be the same as the legal area of a parcel.
- Where shown, NNTT Tenure Class for a non freehold parcel refers to a tenure grouping derived for the purposes of the Tribunal, and does not necessarily represent the jurisdictional tenure type.
- Overlap results are returned only for the currently active jurisdiction.

## Selected feature

Name	Parkes
Full name	Parkes Shire Council
As at	1/08/2016
Calculated area SqKm	5,956.7546



## Overlap details

Schedule of Native Title Determination Applications

No overlap found

Register of Native Title Claims

No overlap found

Native Title Determinations

No overlap found

Native Title Determination Outcomes

No overlap found

Indigenous Land Use Agreements

No overlap found

RATSIB areas

Name	Organisation	RATSIB Status	Area sq km(calculated)	Overlap Area sq km (calculated)
New South Wales	NTSCORP Limited	NTSP	1,723,577.6084	5,956.7547



# Overlap Analysis Report

## Disclaimer

This information product has been created to assist in understanding the spatial characteristics and relationships of this native title matter and is intended as a guide only. Spatial data used has been sourced from the relevant custodians in each jurisdiction, and/or the Tribunal, and is referenced to the GDA94 datum.

While the Native Title Registrar (**Registrar**) has exercised due care in ensuring the accuracy of the information provided, it is provided for general information only and on the understanding that neither the Native Title Registrar nor the Commonwealth of Australia (Commonwealth) is providing professional advice. Appropriate professional advice relevant to your circumstances should be sought rather than relying on the information provided. In addition, you must exercise your own judgment and carefully evaluate the information provided for accuracy, currency, completeness and relevance for the purpose for which it is to be used.

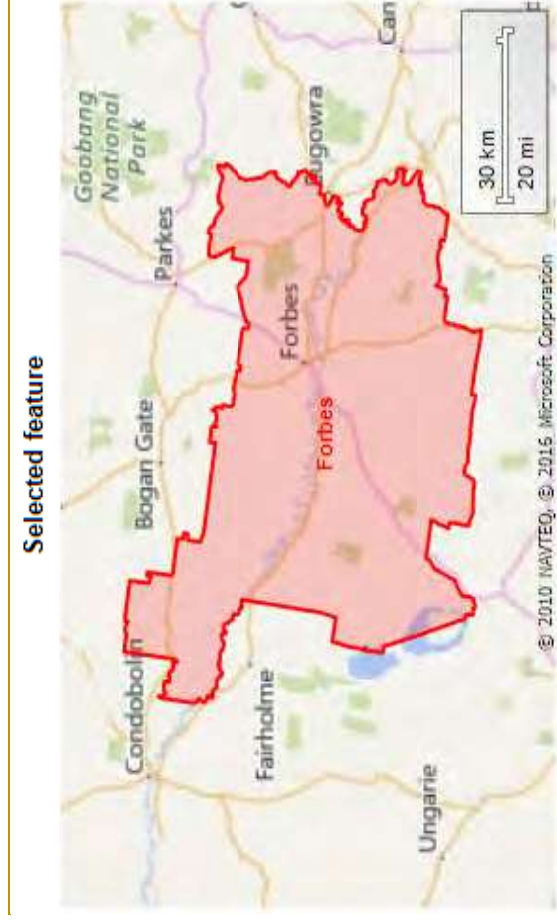
As the interpretation of any particular native title determination area provided is based upon the best information available to the Registrar at the time of creation, any effective analysis must include reference to **both** the relevant determination of native title made by the Federal Court of Australia and the entry made in relation to that determination on the National Native Title Register maintained by the Registrar.

## Please note:

- Calculated areas may not be the same as the legal area of a parcel.
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- Overlap results are returned only for the currently active jurisdiction.

## Selected feature

Name	Forbes
Full name	Forbes Shire Council
As at	1/08/2016
Calculated area SqKm	4,710.5405



## Overlap details

Schedule of Native Title Determination Applications

No overlap found

Register of Native Title Claims

No overlap found

Native Title Determinations

No overlap found

Native Title Determination Outcomes

No overlap found

Indigenous Land Use Agreements

No overlap found

RATSIB areas

Name	Organisation	RATSIB Status	Area sq km(calculated)	Overlap Area sq km (calculated)
New South Wales	NTSCORP Limited	NTSP	1,723,577.6084	4,710.5403



7 December 2016

Scandium 21  
C/- Danielle Wallace  
PO Box 379  
WEST WYDE NSW 2221

Dear Ms Wallace

**Syerston Project Extension Modification – Aboriginal Cultural Heritage Assessment**

Reference is made to your letter of 2<sup>nd</sup> December 2016 requesting advice from Council as to any Aboriginal groups that should be consulted as part of the modification of this project.

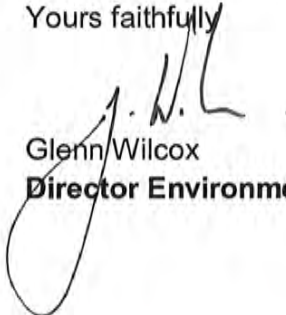
Council would like to advise that the following organisations should be contacted for advice;

- Condobolin Aboriginal Health Service  
99 Bathurst Street PO Box 321 Condobolin NSW 2877  
Phone: (02) 6895 4311 Fax: (02) 6895 4322
- Wiradjuri Condobolin Corporation Ltd  
Cnr Cunningham & McDonnell Street Condobolin NSW 2877  
t (02) 6895 4664 f (02) 6895 3663  
PO Box 194 Condobolin NSW 2877
- Aboriginal Lands Council  
18 William St, Condobolin, NSW, 2877  
Phone: 02 6895 3639
- Yawarra Aboriginal Corporation  
15 Molong St, Condobolin NSW 2877
- Trangie Local Aboriginal Lands Council  
48 Dandaloo St, Trangie NSW 2823

Council would like to advise you that this may not be all groups that represent Aboriginal people in the locality of the project proposal and you should seek your own advice as to people, families and groups that may have an interest within the project area and the regional impact of this development.

Should you require further advice on this matter please contact me.

Yours faithfully

  
Glenn Wilcox

**Director Environment and Planning**

---

**From:** Paul Bennett [Paul.Bennett@forbes.nsw.gov.au]  
**Sent:** Monday, 19 December 2016 3:49 PM  
**To:** Danielle Wallace  
**Subject:** Syerston Project - Aboriginal Cultural Assessment

Danielle

Could you please include the Forbes Aboriginal & Community Working Party in your consultation. David Acheson is the convener and can be contacted on 0429 007 129 or [facwp2014@gmail.com](mailto:facwp2014@gmail.com)

Paul Bennett | Director | Environmental Services & Planning

Forbes Shire Council | Court Street | PO Box 333 Forbes NSW 2871  
P: 02 6850 2344 | F: 02 6850 2399 | E: [PaulBe@forbes.nsw.gov.au](mailto:PaulBe@forbes.nsw.gov.au)  
*Please consider the environment before printing this email.*

## **STEP 2 CORRESPONDENCE**

---

**From:** Laurie Hutchison [laurie@wiradjuricondocorp.com]  
**Sent:** Monday, 23 January 2017 10:19 AM  
**To:** Danielle Wallace  
**Subject:** Registration of Interest - Syerston Project Extension Modification - Fifield NSW

Dear Danielle,

Wiradjuri Condobolin Corporation is an Aboriginal organisation who holds significant cultural knowledge and a right in determining the cultural significance of Aboriginal objects and/or places in the "Area of Interest" and therefore formally wishes to register our interest in the process of community consultation with Scandium21.

Assuring you that we are at the forefront of participating with those seeking to develop our country for the benefit of all communities in the Lachlan Shire Council region.

Warm regards,

Laurie Hutchison  
Chief Executive Officer  
Wiradjuri Condobolin Corporation  
Tel: (02) 6895 4664

---

**From:** Ally Coe [ally.coe@wiradjuricondocorp.com]  
**Sent:** Wednesday, 1 February 2017 3:08 PM  
**To:** Danielle Wallace  
**Subject:** Register of Interest in Community Consultation Process

Please register our organisation in the community consultation process please

Name : Murie Elders Group

Contact: Lois Goolagong

Address: 161 Bathurst St Condobolin NSW 2877

Thank You

Lois Goolagong



---

**From:** Jamie Gray [jamiegray66@gmail.com]  
**Sent:** Wednesday, 1 February 2017 5:52 PM  
**To:** Danielle Wallace  
**Subject:** Syerston Project Extension Modification-Aboriginal Cultural Heritage Assessment

Dear Mick Ryan

Binjang Wellington Wiradjuri Aboriginal Heritage Surveys,(B.W.W.A.H.S) would like to register our interest as stakeholders to above project.

As per the required information in your email dated 6th January 2017

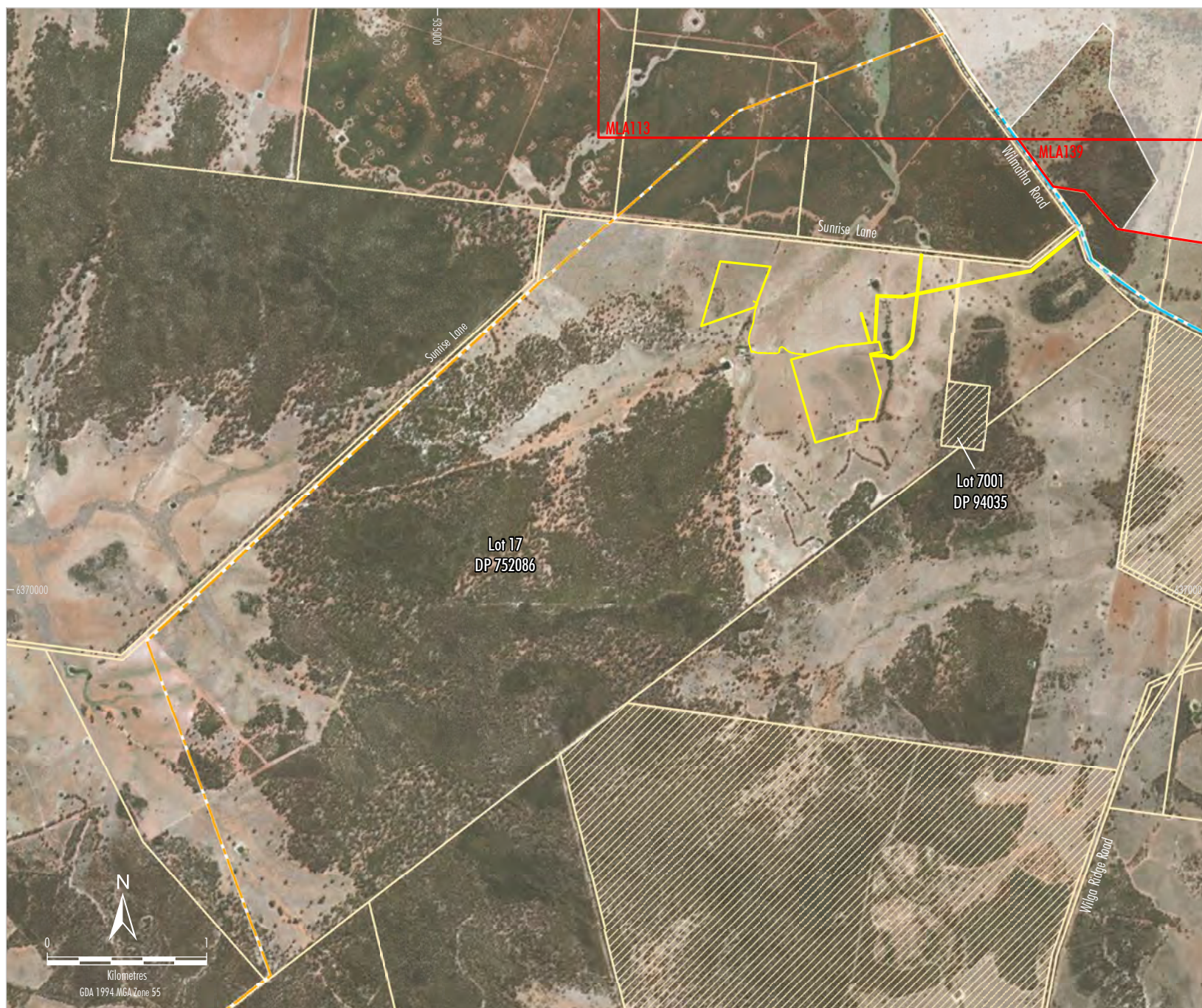
Thanks you  
Jamie Gray

Sent from my iPhone

**APPENDIX 5**  
**AHIMS REGISTER SEARCH**

Note: This appendix contains culturally sensitive material and is available upon request and subject to approval by the NSW Office of Environment and Heritage.

**APPENDIX 6**  
**CADASTRE INFORMATION**



**LEGEND**

- Mining Lease Application Boundary
- Approved Surface Development Area
- Approved Gas Pipeline
- Approved Water Pipeline
- Property Boundary
- Crown Land
- Modified Layout

Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
NSW Imagery: Esri Basemap

**CLEAN  
TEQ**  
Powering innovation

CLEAN TEQ SUNRISE PROJECT  
Cadastral Information

**Figure A6-1**



# CLEAN TEQ SUNRISE PROJECT

## ACCOMMODATION CAMP MODIFICATION

### ENVIRONMENTAL ASSESSMENT

### APPENDIX C

### Land Contamination Assessment



# **Ground Doctor Pty Ltd**

## **Stage 1 Land Contamination Assessment**

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**Part of Lot 17 DP 752086  
Sunrise Lane, Fifield, NSW**

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**On Behalf Of:  
Clean TeQ Holdings Limited**



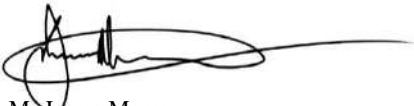
**20 December 2017  
2017-GD012-RP1-FINAL**

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# 1 Introduction

The Clean TeQ Sunrise Project (the Project) is an approved nickel cobalt scandium mining project situated approximately 350 kilometres (km) west-northwest of Sydney, near the village of Fifield, New South Wales (NSW). Scandium21 Pty Ltd owns the rights to develop the Project. Scandium21 Pty Ltd is a wholly owned subsidiary of Clean TeQ Holdings Limited (Clean TeQ).

Development Consent DA 374-11-00 for the Project was issued under Part 4 of the Environmental Planning and Assessment Act, 1979 (EP&A Act) in 2001. The Project includes the establishment and operation of the following mine (including the processing facility); limestone quarry; rail siding; gas pipeline; borefields and water pipeline; and associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

An accommodation camp is approved to be located on the western side of the mine site in the vicinity of Wilmatha Road. Clean TeQ has identified an alternative location for the approved accommodation camp that would provide improved amenity for the workforce in the accommodation camp and minimise potential operational constraints at the mine site. Clean TeQ also identified the preference to maintain the accommodation camp (at reduced capacity) during operations for the short-term use of temporary contractors and visitors.

Clean TeQ is proposing a modification to Development Consent DA 374-11-00 under section 75W of the EP&A Act. The Modification would include:

- development of the accommodation camp (including supporting infrastructure) at an alternative location at the “Sunrise” property approximately 4km to the south of the mine site;
- construction of an electricity transmission line and water pipeline from the mine site to the modified accommodation camp site;
- minor road upgrades;
- increased accommodation camp capacity (from approximately 1,000 to 1,300 personnel); and
- the accommodation camp (at reduced capacity) would continue to be operated post-construction.

The Modification would not involve changes to any aspects of the approved mine and processing operations, limestone quarry, rail siding, borefields, water pipeline or gas pipeline.

Ground Doctor Pty Ltd (Ground Doctor) was commissioned by Clean TeQ to conduct a Stage 1 Land Contamination Assessment of part of the “Sunrise” property (Lot 17 of Deposited Plan (DP) 752086), Sunrise Lane, Fifield, NSW. The extent of the assessed area (the assessment area) is shown in *Figure 1* of *Annexure A*.

The Stage 1 Land Contamination Assessment was undertaken on behalf of Scandium21 Pty Ltd, which owns the “Sunrise” property.

At the time of this assessment the assessment area was used for agriculture (more specifically grazing of livestock and dryland cropping).

## 1.1 Assessment Objectives

Clause 7 of the NSW State Environmental Planning Policy (SEPP) No. 55 stipulates that contamination and remediation need to be considered in determining a development (or the Modification) application. Clause 7 of NSW SEPP No. 55 states:

- (1) A consent authority must not consent to the carrying out of any development on land unless:
  - (a) it has considered whether the land is contaminated, and*
  - (b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*
  - (c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.**
- (2) Before determining an application for consent to carry out development that would involve a change of use on any of the land specified in subclause (4), the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.*
- (3) The applicant for development consent must carry out the investigation required by subclause (2) and must provide a report on it to the consent authority. The consent authority may require the applicant to carry out, and provide a report on, a detailed investigation (as referred to in the contaminated land planning guidelines) if it considers that the findings of the preliminary investigation warrant such an investigation.*

The objectives of the Stage 1 Land Contamination Assessment were to:

- identify past and present land uses within the assessment area and within adjoining land;
- identify potential sources of land contamination associated with past or present use of the assessment area and associated potential contaminants of concern;
- assess the assessment area setting, subsurface conditions and the environment surrounding the assessment area to allow development of a conceptual site model (CSM) relevant to assessing potential risks to human health and/or the environment; and
- use the previously mentioned information to assess the suitability of the assessment area for the proposed Modification or to recommend remediation works where land contamination proposed an unacceptable risk to human health or the environment.

## 1.2 Scope of Work

The scope of work performed was considered appropriate for assessment of land within a rural setting and was in general accordance with the NSW Office of Environment and Heritage (2011) *Guidelines for Consultants Reporting on Contaminated Sites*. Ground Doctor completed the following work.

- Inspected the assessment area to establish current conditions, surrounding land uses and potential human and environmental receptors.
- Reviewed several aerial photographs of the assessment area taken between 1966 and 2013.
- Reviewed available Lachlan Shire Council records related to the assessment area.

- Interviewed the former “Sunrise” property owner to obtain information related to previous uses with particular focus on use of the assessment area.
- Conducted a search of the NSW Environment Protection Authority (EPA) database for notices pertaining to the site under the Contaminated Land Management Act 1997.
- Conducted a search of the EPA public register of licences, applications and notices made under the Protection of the Environment Operations Act 1997.
- Conducted a search of the NSW Department of Primary Industries Water (DPI Water) registered groundwater works database to identify groundwater works located within 2km of the assessment area.
- Conducted a search of the NSW Safework dangerous goods licensing database for records of dangerous goods storage at the assessment area.
- Reviewed available geology maps to assess subsurface conditions at the assessment area.
- Used all of the reviewed data to prepare a sampling and analytical plan for a preliminary surface soil assessment.
- Collected surface soil samples at nine locations within selected regions of the assessment area most relevant to the proposed Modification.
- Analysed soil samples for potential contaminants of concern identified by the review of site history.
- Developed a CSM using the site history, the site setting, preliminary soil data and the proposed future land use. The CSM was used to assess the suitability of the assessment area for the proposed Modification.
- Prepared this report outlining the methodology and results of the assessment and providing conclusions with respect to the assessment objectives (Section 1.1).

## 2 Site Description

### 2.1 Assessment Area Details

The assessment area was situated in the north eastern portion of the “Sunrise” property (see *Figure 1 of Annexure A*).

The assessment area was located within Lot 17 DP 752086. The assessment area was irregularly shaped and covered an area of approximately 90ha. The assessment area is shown relative to the boundary of Lot 17 DP 752086 in *Figure 1 of Annexure A*.

The irregular shaped assessment area includes the footprint of the modified accommodation camp and associated infrastructure, as well as a buffer around these proposed developments.

The assessment area was traversed in a north-south direction by an easement which provides access to a survey marker situated immediately to the south within Lot 7001 DP 94035 (see *Figure 1 of Annexure A*).

The footprint of the modified accommodation camp is located in the assessment area. *Figure 2 of Annexure A* shows the footprint of the modified accommodation camp in relation to the assessment area. The modified accommodation camp footprint consists of three distinct areas. The central component of the modified accommodation camp would consist of accommodation camp buildings and site access road. The westernmost portion of the modified accommodation camp would be a treated effluent irrigation area. The easternmost portion would be an ETL and water pipeline.

The assessment area is located within the Lachlan Shire Council local government area (LGA). Lachlan Local Environment Plan (2013) indicated that the assessment area was zoned “RU1-Primary Production”. Zone RU1 allows for a wide range of development with consent including rural works dwellings, agriculture and residential use.

Property details are summarised in *Table 1*.

**Table 1: Summary of Site Details**

	Description
Street Address:	“Sunrise”, Sunrise Lane, Fifield, NSW, 2875
Lot and DP Number:	Part of Lot 17 DP 752086
Local Government Area:	Lachlan Shire Council
Zoning	RU1 – Primary Production
Geographical Coordinates (MGA94 Zone 55):	East 537700 North 6371550 (Approximate Assessment Area Site Centre)

### 2.2 Site Layout and Features

A site inspection was conducted by Mr James Morrow of Ground Doctor on 27 October 2017.

The majority of the assessment area was cleared open space occupied by cultivated pasture with sparsely placed trees. Native vegetation was situated on ridgelines to the south east, south, south west and west of the assessment area.



At the time of the inspection the only identified man-made features within the assessment area were as follows:

- An unsealed driveway provided access to the “Sunrise” property from Sunrise Lane. Other minor access tracks were located across the assessment area.
- Stock fencing was present across the assessment area.

The extent of the assessment area relative to “Sunrise” property is shown in *Figure 1* of *Annexure A*. The proposed layout and features of the assessment area are shown in *Figure 2* of *Annexure A*.

### **2.3 Adjoining Land-use**

At the time of the site inspection use of land adjoining the assessment area was as follows.

- North – Part of the “Sunrise” outside of the assessment area and Sunrise Lane beyond which is privately owned agricultural land which appeared to be used for as a carbon farm.
- East – Wilmatha Road beyond which was agricultural land used for cropping and grazing. A former gravel quarry was situated immediately south east of the assessment area adjacent to Wilmatha Road.
- South – Part of “Sunrise” outside of the assessment area and other privately owned agricultural land which appeared to be used for grazing of livestock.
- West – Part of “Sunrise” outside of the assessment area that was predominantly remnant native vegetation and/or used for livestock grazing. The “Sunrise” homestead was situated close to the to the central western boundary of the assessment area.

At the time of the inspection the “Sunrise” homestead precinct included the following features.

- A single storey dwelling.
- A metal clad open sided machinery shed was present approximately 10 metres (m) to the south west of the dwelling. The shed was used to park vehicles, store equipment, store packaged farm chemicals and was used for maintenance work.
- A metal clad shearing shed was situated approximately 15m south of the dwelling. Additional undercover space used for machinery and equipment storage adjoined the western side of the shearing shed. The adjoining shed was used to park vehicles, store equipment, store packaged farm chemicals and was used for maintenance work.
- Several transportable metal grain silos were present approximately 70m south west of the dwelling.
- Three above ground fuel storage tanks were situated in the centre of a turning circle / laydown area to the south west of the dwelling. One of the tanks was approximately 2500 litres (L) capacity and was used to store diesel. One of the tanks was approximately 900L capacity and was used to store petrol. The third tank was approximately 900L capacity and was not in use at the time of the assessment. The tanks appeared to be single skinned. The tanks each featured a direct mounted hand operated dispenser. The tanks were situated above unsealed ground. Soil in the immediate vicinity of the above ground tanks had dark staining most likely caused by spills of fuel during vehicle refuelling.
- A horse burial area was situated approximately 150m to the south east of the dwelling. The area contained the remains of five horses that had previously lived at the property. Each horse grave site was clearly marked with a headstone.

- A former gravel quarry was situated in the eastern portion of “Sunrise”, immediately south east of the assessment area and adjacent to Wilmatha Road. The quarry was used by Lachlan Shire Council to supply roadbase for local roads. The quarry was situated on top of a ridgeline. It appeared that extraction had been limited to scraping of loose weathered bedrock from the ridgetop to a depth of less than 2m below the pre-extraction ground surface. The quarried area remained elevated in relation to the surrounding natural ground level and was not easy to distinguish from surrounding undisturbed ground level. At the time of the site inspection the quarried area was occupied by significant regrowth including shrubs and small trees.

## 2.4 Topography

Topographic information published on the NSW Government Spatial Information Exchange (NSW Government, 2017) indicated that the assessment area elevation ranged from approximately 320 metres Australian Height Datum (m AHD) in the south east to approximately 305m AHD in the centre of the northern boundary.

Areas along the eastern, western and southern boundaries were typically situated at an elevation of approximately 320m AHD. These areas drained toward the northern assessment area boundary via three relatively shallow drainage lines. The western portion of the assessment area sloped toward the north east. The centre of the assessment area sloped toward the north and the eastern portion of the assessment area drained toward the north west.

Drainages across the assessment area were typically less than 1m deep. The site drained to Bullock Creek, which was situated approximately 20km to the north east of the assessment area. Bullock Creek flows into the Bogan River approximately 50km to the north east of the assessment area.

## 2.5 Geology and Soils

The assessment area was located entirely within the Narromine 1:250,000 Geological Series Sheet SI 55-3, 2<sup>nd</sup> Edition (Geological Survey of NSW, 1997). The mapping indicates the site is situated on “*undifferentiated multiply deformed quartzite and phyllite with numerous quartz veins*” of the “*Girilambone Group*”.

Cainozoic alluvium overlays the Girilambone Group along the lower drainage lines in the centre of the assessment area. The Cainozoic alluvium is described as “*dominantly red silt with some pebble bands and quartz grit; includes relict meanders but is currently being eroded*”.

There was no obvious filling evident at the assessment area during the site inspection. The gently sloping topography of the assessment area did not lend itself to easy filling opportunities, such as steep gullies.

## 2.6 Hydrogeology

Ground Doctor reviewed the DPI-Water’s registered groundwater works database for works located within 2km of the assessment area (*Table 2*). Registered groundwater works were not identified within the assessment area.

Three registered groundwater works were identified within a 2km radius of the assessment area. The identified groundwater works are Clean TeQ monitoring bores.

The identified bores and a summary of groundwater works details are presented in *Annexure E*.

**Table 2: Summary of Registered Groundwater Works within 2km**

Bore ID	Distance From Assessment Area (m)	Direction	Depth (m bgl)	SWL (m bgl)	Water Bearing Zone	Registered Use
GW701197	1000m	North East	57.4	48.2	Gabbro / Diorite (48m+)	Monitoring - Mining
GW701195	1600m	North	57.4	45.2	Pyroxenite (45m+)	Monitoring - Mining
GW701194	1600m	North	48.2	27.5	Pyroxenite (27m+)	Monitoring - Mining

The identified bores were situated in areas underlain by 10-20m of weathered rock overlying bedrock. Bedrock was descriptions included ironstone, gabbro, diorite and pyroxenite. Driller's Logs for the identified groundwater works indicate that groundwater was encountered in fractured bedrock between 27m and 58m below ground level. Standing water levels ranged from 27m to 48m below ground level. Work summary forms for the identified groundwater works did not include any information on groundwater quality or yield (DPI-Water, 2017).

No registered potable or stock water supply bores were identified within 2km of the assessment area. This indicates that groundwater is likely to have quantity and/or quality limitations.

## **2.7 Sensitive Environments**

No registered potable water supply bores were situated within 2km of the assessment area (Section 2.6).

The nearest residence is the "Sunrise" property dwelling which is situated to the immediate west of the assessment area (*Figure 2 of Annexure A*). There were no other residences within 2km of the assessment area.

There were no other sensitive environments identified within 2km of the assessment area.

## 3 Site History and Relevant Information

### 3.1 Interview with Former Property Owner

On 27 October 2017 James Morrow (of Ground Doctor) conducted an interview with Mr Brian Nelson. Information provided by Brian Nelson indicated the following.

Brian and Wendy Nelson owned the “Sunrise” property until recently when the property was sold to Clean TeQ. Brian Nelson was living at the “Sunrise” property at the time of the assessment and had lived at and farmed the property since he and his wife Wendy purchased it in 1979.

Brian Nelson indicated that the “Sunrise” property was initially part of the much larger “Melrose Plains Station”. The “Sunrise” property was subdivided from “Melrose Plains Station” in the 1930s. The “Sunrise” property was first owned and run by the Howe family. The “Sunrise” property was owned and operated by the Moon family from the mid 1960s to 1979.

The Nelson’s operation of the property consisted primarily of sheep grazing and growing of cereal fodder crops to support the livestock kept at the property. Brian indicated that cereal crops had been grown for sale on a few occasions but that cropping was typically undertaken to support the property’s livestock.

Brian indicated that herbicides and fertilisers had been applied as required within cropped areas of the property.

There was no plunge dipping of livestock within the assessment area.

Fuel Lubricants, fertilisers, herbicides, pesticides and chemicals used at the property were stored adjacent to the dwelling (i.e. outside the assessment area). There was no bulk liquid storage at the property with the exception of petroleum hydrocarbons, which were also situated outside of the assessment area.

Rubbish generated at the “Sunrise” property was disposed in an area more than 1km to the south west of the assessment area.

An easement exists through the assessment area providing access to a survey trig station situated on high ground immediately south east of the assessment area (*Figure 2 of Annexure A*).

The Nelson family had buried five horses in an area approximately 150m to the south east of the dwelling. The burial sites were each marked with a headstone. The horse burial area was situated outside of the assessment area.

### 3.2 Aerial Photography Review

In order to assess past land uses at the site and on adjoining properties, Ground Doctor reviewed aerial photographs taken in 1966, 1974, 1983, 1989, 1992, 2004, 2012 and 2013. The photographs reviewed are presented in *Annexure E*.

#### 3.2.1 The Assessment Area

In all of the reviewed aerial photographs (1966 to 2017) the basic layout and operation of the assessment area appears to be consistent. The assessment area appears to be cleared of remnant native vegetation and used for agriculture (more specifically grazing of livestock and dryland cropping). In some photographs there is evidence of cropping within open areas of the assessment area.

In the 1974 aerial photograph patterns in the ground surface in open space indicate that cropping was undertaken across most of the open space of the assessment area at the time of the photograph. A bright area is apparent in open space within the centre of the assessment area. The light coloured area may indicate recent soil disturbance, could be related to spread of stock feed on the ground surface or may be a stockpile of fertiliser.

No other features of note were observed within the assessment area in the aerial photographs reviewed.

### 3.2.2 Adjacent Land Use

Land adjacent to the assessment area appeared to have been used for similar purposes to land within the assessment area. That is for agricultural purposes (predominantly grazing with some dryland cropping). Land clearing and later regeneration is apparent in areas of “Sunrise” that are close to the assessment area.

The “Sunrise” homestead and outbuildings are evident in all aerial photographs with various degrees of clarity depending on photo quality and scale. The photos indicate that the “built up” area of “Sunrise” was situated in the same area (outside of the assessment area) for the period 1966 to 2017, and most likely for the life of the property.

Quarry activity is evident adjacent to the south east corner of the assessment area in the 1992 aerial photograph. The quarry footprint appears to progressively rehabilitate (with regrowth of shrubs and trees) in subsequent aerial photographs spanning 2004 to 2013.

### 3.3 Council Document Review

Ground Doctor submitted a Government Information Public Access (GIPA) request to Lachlan Shire Council to access available council records that may be relevant to the assessment area. Ground Doctor visited the Lachlan Shire Council office at Condobolin on 27 October 2017 to view the property files made available by Lachlan Shire Council.

Two files were identified in the Lachlan Shire Council archives. The files viewed are summarised in *Table 3*.

**Table 3: Lachlan Shire Council Files Reviewed**

Reference	Description	Relevance
DA/2000/0085	Development application for addition and alterations to the dwelling.	The development application file did not contain any detail relevant to this assessment.
DA/2001/07	Development application for Gravel Pit.	This development application requested consent to recommence extraction of road base from the former quarry situated immediately south east of the assessment area. The development application was made by Brian and Wendy Nelson. The development application files did not contain any information relevant to this assessment.

### 3.4 NSW EPA Notified Contaminated Sites

Ground Doctor engaged Lotsearch Pty Ltd to conduct searches of the NSW EPA list of sites notified under section 60 of the Contaminated Land Management Act 1997, and other databases maintained by the NSW EPA identifying potentially contaminated land based on historical land use (Lotsearch Pty Ltd, 2017). The search was conducted on 25 October 2017. Search results are presented as *Annexure E*.

There were no notifications listed for the assessment area or within a 250m buffer of the assessment area.

### **3.5 NSW Protection of the Environment Operations Act Licenced Activities**

Ground Doctor engaged Lotsearch Pty Ltd to conduct a search the NSW EPA register of licences made under the Protection of the Environment Operations Act 1997. These searches were conducted on 25 October 2017. Search results are presented in *Annexure E*.

The records search indicated the licenses formerly existed permitting the application of herbicides along waterways throughout NSW. The search identified drainage lines (waterways) within the assessment area and by default, indicated that application of herbicides was a licenced activity in these locations, as it was along any waterway in NSW. The search result does not imply that herbicides were applied along waterways within the site, but that it was permitted by one of more former licenses that cover waterways throughout NSW.

No other licensed activities were identified within the assessment area or within adjoining areas.

### **3.6 NSW Safework Dangerous Good Records**

NSW Safework conducted a search of their database for records pertaining to the storage of dangerous goods within the “Sunrise” property (Lot 17 DP 752086). NSW Safework did not find any records. Results of the search are presented as *Annexure F*.

### **3.7 Section 149 Certificate**

Ground Doctor reviewed Section 149 Certificate for the “Sunrise” property (Lot 17 DP 752086). The Section 149 Certificate is presented as *Annexure D*.

The certificate dated 24 October 2017 does not provide any information with regard to the land being contaminated. With respect to meanings outlined in the Contaminated Land Management Act 1997, Section 149 Certificates typically indicate whether a property is:

- significantly contaminated;
- subject to a management order;
- is subject to an approved voluntary management proposal;
- is subject to an ongoing maintenance order; and/or
- subject of a site audit.

The absence of information relating to the Contaminated Land Management Act 1997 is inferred to indicate that Lachlan Shire Council is not aware of significant contamination affecting the property.

### **3.8 Summary of Assessment Area History**

The assessment area was within land described as the “Sunrise” property, Sunrise Lane, Fifield, NSW.

The “Sunrise” property was originally part of a much larger property referred to as “Melrose Plains Station”. The “Sunrise” property was subdivided out of “Melrose Plains Station” circa 1930s. The property has had a history of pastoral use. A large portion of the assessment area has been cleared for agriculture (more specifically grazing of livestock and dryland cropping).

The “Sunrise” property was recently purchased by Clean TeQ.

## 4 Potential Areas of Environmental Concern

Ground Doctor assessed potential areas of environmental concern at the assessment area based on the information presented in *Sections 2 and 3*. Potential areas of environmental concern are discussed in *Table 4*.

**Table 4: Summary of Potential Areas of Environmental Concern**

Potential Area of Concern	Summary of Issue	Potential Contaminants of Concern / Hazards
Cropping Areas	Cereal crops have been grown regularly across a large area of the assessment area. Brian Nelson indicated that he had applied herbicides and fertilisers to these areas periodically as required. Pesticides may also have been used in these areas. Former landowners may also have applied similar products.	Organochlorine pesticides (OCPs), Organophosphate pesticides (OPPs), metals, Phenoxo Acid Herbicides.

Cropping activity within the assessment area appears to have been conducted on a seasonal basis at a relatively small scale. It was considered unlikely that cropping would have resulted in significant land contamination. Cropping has been undertaken within the proposed footprint of the modified accommodation camp.

Several potential sources of contamination were identified outside of the assessment areas in close proximity to the “Sunrise” homestead. These included:

- Bulk petroleum hydrocarbon storage in above ground tanks;
- Grain storages, which may have been treated with fumigants (pesticides);
- Machinery and equipment storage sheds and laydown areas in which mechanical repairs or maintenance may have been undertaken; and
- Storage of packaged farm chemicals which may have included pesticides and herbicides.

These potential sources of land contamination were located outside of the assessment area. The identified sources of contamination outlined above were relatively minor in nature and were unlikely to impact on the assessment area. For example, the petroleum storage was relatively small, only used to fill farm machinery infrequently and were situated above ground. Mechanical repairs would have been limited to infrequent maintenance of “Sunrise” machinery and equipment only. Grain storages were relatively small. There was no bulk storage of farm chemicals, just retail sized packaged products.



## 5 Preliminary Sampling and Analytical Plan

The Data Quality Objectives (DQO) process was used to develop a preliminary sampling and analytical plan.

### 5.1 State the Problem

#### 5.1.1 Potential Areas of Environmental Concern

One potentially contaminating activity was identified based on results of the desktop study of the site history (*Table 4*).

#### 5.1.2 Site Conceptual Model

Clean TeQ proposes to use part of the assessment area for the establishment of an accommodation camp. The camp would house mine workers from the Project.

For the purpose of the assessment, the proposed landuse was assumed to be residential with access to soils. This is the most conservative landuse for the assessment of land contamination. It assumes that people live within the assessment area permanently and utilise unsealed open space for recreation, gardening, growing food and keeping poultry.

If contamination existed within the assessment area potential human health exposure pathways that would require consideration would include:

- Direct contact with soil; and
- Inhalation of dust.

The contaminants of concern within the assessment area do not pose a vapour intrusion risk as they are only semi-volatile.

The identified potential source of contamination within the assessment area was surface application of pesticides, herbicides and fertilisers. This is a diffuse source and if a significant problem existed it should exist relatively uniformly across the cropped areas of the assessment area. Near surface soil was most likely to have been impacted, if significant impacts had occurred. Therefore, collection of near surface soil samples was considered appropriate for preliminary assessment purposes.

With respect to potential environmental risks the proposed future use would be considered low density residential use. It is envisaged that landscaped open space would be established around the modified accommodation camp. Native vegetation or pasture would be encouraged to grow in the proposed treated effluent irrigation area.

### 5.2 Identify the Decision

The primary objective of this assessment was to assess the suitability of the assessment area for the proposed future use (i.e. the Modification) as required by NSW SEPP No. 55.

### 5.3 Identify Inputs to the Decision

A desktop assessment of site history was used to identify past land uses that had potential to have resulted in land contamination within the assessment area. The findings of the desktop assessment are summarised in *Section 4*.

Preliminary soil samples were collected at selected locations within footprint of the proposed accommodation camp and treated effluent irrigation area. The need for a more detailed Stage 2 assessment was to be evaluated based on the results of preliminary soil sampling and analysis. If significant impacts were not observed in near surface soil within the development footprints then it was unlikely that significant contamination existed in those areas.

#### **5.4 Define the Assessment Area Boundary**

The assessment area boundary is marked on *Figure 1* and *Figure 2* of *Annexure A*.

Characterisation of potential soil impacts by sampling and analysis was limited to the assessment area.

#### **5.5 Decision Rule – How to Assess Risk**

Ground Doctor used field observations to identify potential aesthetic impacts such as discolouration and odour.

Soil analytical data was assessed against thresholds published in the published in the National Environment Protection Council (NEPC) (1999) *National Environment Protection (Assessment of Contamination) Measure (NEPM)* (amended April 2013).

##### **5.5.1 Health Investigation Levels**

Ground Doctor adopted Health Investigation Levels (HILs) outlined in the NEPM (2013) for assessment of potential human health impacts in soil. Ground Doctor adopted the most conservative (lowest) of the published HILs (HIL A) as a preliminary screening threshold. The adopted screening thresholds are summarised in *Table 5*.

Where no HIL was published for analytes of concern, Ground Doctor used detection of any such compound as preliminary screening criteria.

##### **5.5.2 Ecological Investigation Levels**

Ground Doctor adopted Ecological Investigation Levels (EILs) outlined in the NEPM (2013) for assessment of potential ecological impacts in soil. Ground Doctor adopted the published EILs for “urban residential or public open space” as preliminary screening thresholds. This is an equivalent level of protection as “HIL A”. The adopted screening thresholds are summarised in *Table 5*.

##### **5.5.3 Summary of Screening Thresholds**

The adopted preliminary screening thresholds used to assess analytical data are summarised in *Table 5*.

**Table 5: Preliminary Screening Threshold for Soil Analytical Data**

Potential Contaminants / Analyte	Ecological Threshold	Health Based Threshold
<b>Metals</b>		
Arsenic	100	100
Cadmium	-	20
Chromium	190*	100
Copper	60*	6000
Lead	1100*	300
Mercury	-	40
Nickel	30*	400
Zinc	70*	7400
<b>OCPs</b>		
Hexachlorobenzene	-	10
Heptachlor	-	6
Aldrin	-	6a
gamma-chlordane	-	50b
alpha-chlordane	-	50b
Endosulfan I	-	270d
DDE	-	240c
Dieldrin	-	6a
Endrin	-	10
DDD	-	240c
Endosulfan II	-	270d
DDT	180	240c
Methoxychlor	-	300
<b>OPPs</b>		
Chlorpyrifos	-	160
<b>Herbicides</b>		
2,4,5-T	-	600
2,4-D	-	900
MCPA	-	600
MCPB	-	600
Picloram	-	4500
a Guideline applies to the sum of Aldrin and Dieldrin concentrations b Guideline applies to the sum of alpha and gamma chlordane concentrations c Guideline applies to the sum of DDE, DDD and DDT concentrations d Guideline applies to the sum of Endosulfan I and Endosulfan II concentrations * EIL is the most conservative "Added Contaminant Limit", not total concentration		

#### 5.5.4 Soil Decision Rule

The adopted assessment criteria were not intended to be a site suitability criteria. The assessment criteria were intended to provide some preliminary limits which prompt further consideration of site specific conditions where exceeded.

A result exceeding the adopted assessment criteria required further consideration. If the contaminant concentration in any sample was not more than 250% of the assessment criteria the 95% upper confidence limit (95% UCL) of the mean contaminant concentration could be used to assess the soil within the assessment area.

## **5.6 Specify Limits on Decision Errors**

Ground Doctor collected and analysed a field duplicate sample for quality assurance and quality control (QAQC) purposes. Ground Doctor adopted the following criteria with which to assess the results of duplicate sampling:

- Calculated relative percentage difference (RPD) values should be less than 50% where the reported concentrations of analytes are greater than 10 times the EQL;
- Calculated RPD values should be less than 75% where the reported concentrations of analytes are greater than 5 times the EQL but less than 10 times the EQL; and
- Calculated RPD values should be less than 100% where the reported concentrations of analytes are less than 5 times the EQL.

## **5.7 Optimise the Design for Collecting Data**

The potential areas of concern identified within the assessment area were cropping areas. More specifically, the application of pesticides, herbicides and or fertilisers at the surface within the cropped areas.

Soil samples (SS1-SS9) were collected from the upper 0.2m of soil within the footprint of the assessment area. Near surface soil was considered appropriate as the samples were targeting application of agricultural chemicals at the surface.

Soil sampling locations were selected using an informal systematic pattern to achieve an even coverage of the cropping areas within the assessment area.

Soil sampling locations are shown in *Figure 2 of Annexure A*.

Each soil sample was analysed for OCPs, OPPs, phenoxy acid herbicides and heavy metals.

### **5.7.1 Quality Assurance and Quality Control**

A field duplicate sample ("SS10") was collected at "SS1" to assess the repeatability of the adopted soil sampling and analytical procedures.

### **5.7.2 Sampling Methodology**

Soil samples were collected by hand from near surface soils. A hand tool was used to break up near surface soil. Care was used to ensure the sampled soil had not come into direct contact with the hand tool.

The sampler wore a clean disposable nitrile gloves at each sampling location. Sample was placed directly into a new laboratory supplied 125 millilitres glass jar that was labelled with appropriate sample identification, the project identification and sampling date.

Soil samples were placed on ice inside an esky immediately after collection.

### **5.7.3 Soil Sample Analysis**

Sample analysis was sub-contracted to Envirolab Services (Sydney). The soil samples were sent to Envirolab services (Sydney, NSW) by express overnight courier. Envirolab Services had National Association of Testing Authorities (NATA) accreditation for the proposed analysis and used analytical methods which comply with the NEPM (2013) guidelines.

## 6 Results

Analytical results are presented and compared to the preliminary assessment thresholds in *Table B1* and *Table B2* of *Annexure B*.

The laboratory certificate of analysis is presented as *Annexure C*.

### 6.1 Field Observations

Ground Doctor did not identify any areas of discolouration or staining within the assessment area. Soil samples were free of unnatural odour.

Soil was found to be relatively uniform across the assessment area. Soil had the texture of sandy gravelly silt, was light brown in colour and was dry at all locations.

### 6.2 Pesticides

The reported OCPs and OPPs concentrations in all soil samples were less than the laboratory estimated quantification limits (EQLs) and the adopted human health and ecological assessment thresholds.

### 6.3 Herbicides

The reported herbicide concentrations in all soil samples were less than the laboratory estimated quantification limits (EQLs) and the adopted human health and ecological assessment thresholds.

### 6.4 Metals

The reported concentrations of cadmium, chromium, copper, lead, mercury, nickel and zinc in each sample were less than the adopted human health and ecological assessment thresholds.

The reported concentrations of arsenic in all but one soil sample were less than the adopted human health and ecological assessment thresholds. The reported arsenic concentration in sample “SS3” was 120 milligram per kilogram (mg/kg), which exceeded the adopted HIL and EIL (both being 100mg/kg).

### 6.5 Discussion of Results

Evidence of pesticide and herbicide residue was not identified in any soil sample.

With the exception of one sample, reported concentrations of heavy metals were less than the adopted assessment criteria. The reported arsenic concentration in one of nine soil samples exceeded the adopted HIL and EIL.

The source of identified arsenic concentration at “SS3” is not known. The arsenic may be associated with prior use of agricultural chemicals at the property. Arsenic is present at trace levels in some fertilisers and is/was present in some pesticides used to treat sheep. It is also possible that the arsenic identified in soil is naturally occurring. Soil and rock in the vicinity of the assessment area is known to contain heavy metal mineralisation, and this is being targeted by Clean TeQ at Fifield.

The identified arsenic is unlikely to pose an unacceptable risk to human health or the environment for the following reasons:

- The reported arsenic concentration in sample “SS3” exceeded the adopted HIL and EIL by 20%. Sample SS3 was one of seven surface soil samples collected in the footprint of the proposed accommodation camp. Statistical assessment of the reported arsenic concentrations in seven samples within the accommodation camp footprint indicates that the 95% UCL of the mean arsenic concentration was 65mg/kg. The 95% UCL of the mean arsenic concentration was less than the adopted HIL and EIL, which were both 100mg/kg.
- The adopted HIL A is considered conservative. It has been calculated on the basis that a person lives permanently at the location for a considerable amount of their life. It assumes that the resident will maintain a garden, eat produce from the garden and potentially keep poultry. The proposed use of the Modification is much less sensitive. The modified accommodation camp would provide part time accommodation for mine workers who would only live in the facility part time. Mine works would not undertake any gardening. Produce would not be grown in accommodation camp area.

## 7 Quality Assurance and Quality Control

Multiple sources of information were used to establish the site history. Sources were cross checked and where overlap occurred and were found to be consistent.

Surface soil was sampled in a systematic manner across the proposed footprint of the mining camp and effluent reuse area. The sampling density was low but considered appropriate for assessing diffuse potential sources of environmental concern.

The sampler wore clean disposable nitrile gloves when collecting each sample to minimise cross contamination. Where a hand tool was used to break soil for sampling, care was taken to collect soil that had not come into direct contact with the hand tool.

Ground Doctor labelled samples appropriately and placed samples on ice in an esky immediately after collection. Samples remained on ice until they were sent to the analytical laboratory. Samples were sent by overnight courier service to minimise transit time and ensure samples remained on ice whilst in transit. Envirolab indicated that the esky was approximately 2 degrees Celsius upon receipt.

A field duplicate sample was analysed to assess the repeatability of the sampling and analytical procedure. Analytical results for the duplicate and primary sample are presented in *Table B3* of *Annexure B*. Reported concentrations of most analytes within the duplicate and primary sample were less than the EQL, so an RPD could not be calculated. Where analytes were detected the RPD were less than 12%, which indicated good agreement. Duplicate sample results indicated that field procedures and laboratory analysis could achieve repeatable results.

Envirolab performed a number of quality assurance checks as part of the analytical procedures. These include, adding and recovering surrogate compounds to each sample, spiking some samples to measure recovery, analysing blank samples to check for false positives and analysis laboratory duplicate samples. Ground Doctor reviewed lab QAQC data and found that all results were within the laboratory performance criteria.

The level of data QAQC was considered appropriate given the objective of the assessment. Results for QAQC parameters indicate that data was of acceptable quality to assess potential risks to human health and the environment associated with the assessment area. The data could be relied upon to make the conclusions outlined in *Section 8*.



## 8 Conclusions

The assessment area history and site setting were assessed using a range of data sources. The potential areas of concern identified within the assessment area were cropping areas. More specifically, the application of pesticides, herbicides and or fertilisers at the surface within the cropped areas.

Preliminary soil sampling and analysis was undertaken in the assessment area to quantify potential contamination associated with past cropping and pastoral activity. Results of soil sample analysis indicated that there was no significant (unacceptable) impacts to soil within the footprint of the modified accommodation camp and treated effluent irrigation area.

Ground Doctor believes that the assessment area is suitable for the proposed development (i.e. the Modification) in its current state.

## 9 Limitations of this Report

The findings of this report are based on the Scope of Work outlined in *Section 1.2*. Ground Doctor performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental consulting profession. No warranties, express or implied are made.

The results of this assessment are based upon the information documented and presented in this report. All conclusions and recommendations regarding the site are the professional opinions of Ground Doctor personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, Ground Doctor assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Ground Doctor, or developments resulting from situations outside the scope of this project.

Ground Doctor collected preliminary soil samples at nine locations within the assessment area to quantify potential areas of concern identified in the review of the site history. The absence of the compounds of concern in soil samples cannot be interpreted as a guarantee that such materials, or other potentially toxic or hazardous compounds, do not exist at the site in soil, water or other media.

Statements in this report regarding the suitability of the assessment area for future development relate to presence of land contamination only. Statements are made based on the data collected at the time of the assessment and presented in this report. Ground Doctor will not be liable to revise the report to account for any changes in site characteristics, regulatory requirements, guidelines or the availability of additional information, subsequent to the issue date of this report. Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report, including the data, findings and conclusions contained within it remains the intellectual property Ground Doctor Pty Ltd. A licence to use the report for the specific purpose identified is granted to Clean TeQ subject to full payment of the agreed project fees. Ground Doctor Pty Ltd accepts no liability for use or interpretation by any person or body other than Clean TeQ. This report should not be reproduced without prior approval by Clean TeQ. The report should not be amended in any way without prior approval by Ground Doctor Pty Ltd. The report should not be relied upon by other parties, who should make their own enquires.

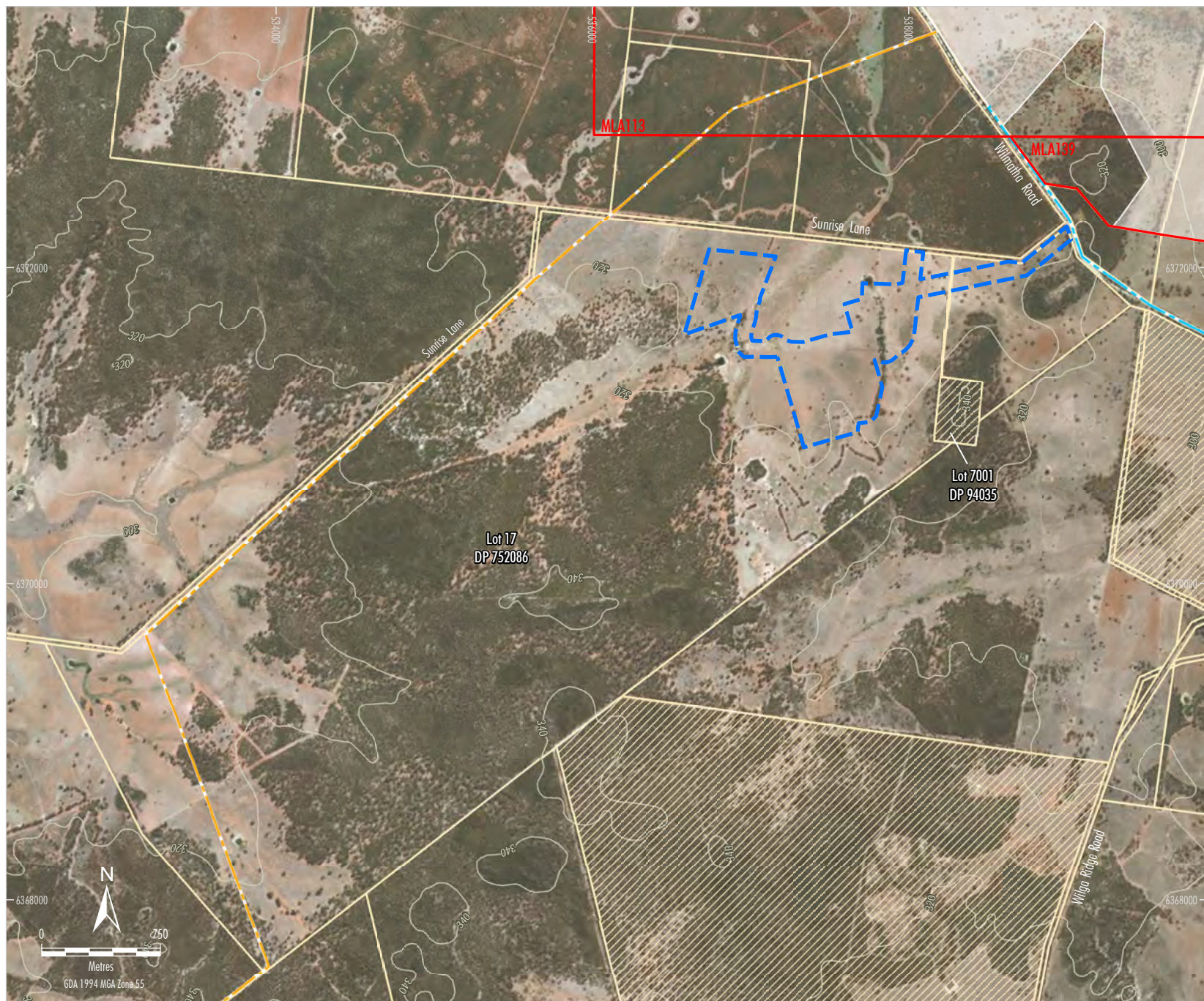
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# Annexure A

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## **Figures**



- LEGEND**
- Mining Lease Application Boundary
  - Approved Surface Development Area
  - Approved Gas Pipeline
  - Approved Water Pipeline
  - Property Boundary
  - Crown Land
  - Assessment Area

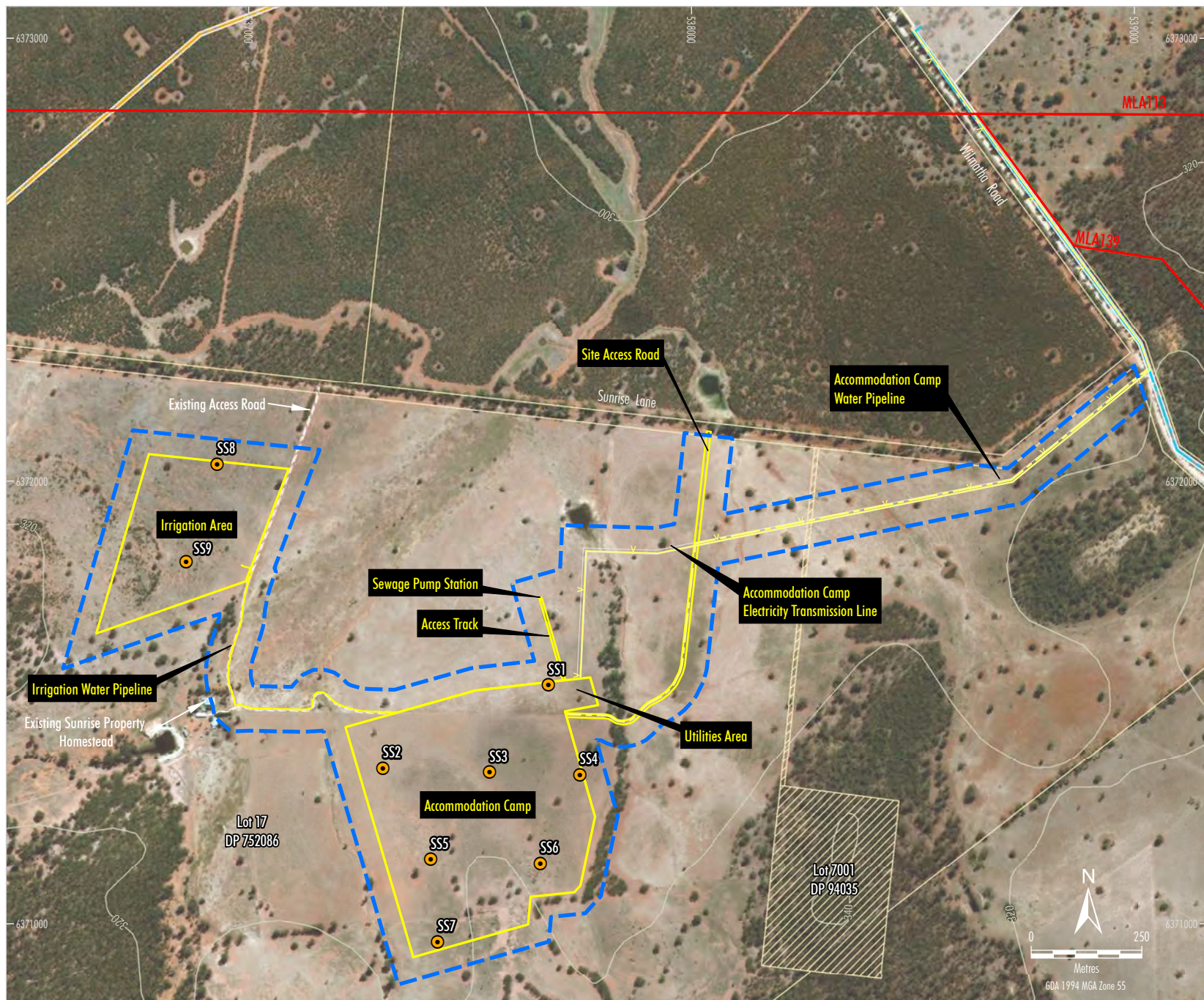
Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
 NSW Imagery: Esri Basemap

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**Assessment Area**

**Figure 1**





**LEGEND**

- Mining Lease Application Boundary
- Approved Surface Development Area
- Approved Gas Pipeline
- Approved Water Pipeline
- Property Boundary
- Crown Land
- Modified Layout
- Assessment Area
- Sample Location

Source: Black Range Minerals (2000); NSW Department of Industry (2017); NSW Land & Property Information (2017)  
 NSW Imagery: Esri Basemap

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**Sample Locations**

**Figure 2**

## Annexure B

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### **Soil Analytical Results Summary Tables**

**TABLE B1**  
**Reported Concentrations of Metals, OCPs and OPPs in Soil (mg/kg)**  
**Stage 1 Contamination Assessment - Part of Lot 17 DP752086, Fifield, NSW**

Sample ID	EQL	NEPM (1999) Ecological	NEPM (1999) Human Health	SS1 27/10/17	SS2 27/10/17	SS3 27/10/17	SS4 27/10/17	SS5 27/10/17	SS6 27/10/17	SS7 27/10/17	SS8 27/10/17	SS9 27/10/17
<b>Phenoxy Acid Herbicides</b>												
Clopyralid	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-Dichlorobenzoic acid	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-chlorophenoxy acetic acid	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-CPA	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MCPP	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	0.5	-	600	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorprop	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-D	0.5	-	900	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoxynil	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Triclopyr	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-TP	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-T	0.5	-	600	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MCPB	0.5	-	600	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	1	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,4-DB	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ioxynil	1	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Picloram	0.5	-	4500	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DCPA (Chlorthal) Diacid	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	2	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
2,4,6-T	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-D	0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
<b>OCPs</b>												
Hexachlorobenzene	0.1	-	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
a-BHC	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
g-BHC (Lindane)	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
b-BHC	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	0.1	-	6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
d-BHC	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	0.1	-	6a	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-chlordane	0.1	-	50b	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	0.1	-	50b	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	0.1	-	270d	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	0.1	-	240c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	0.1	-	6a	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	0.1	-	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	0.1	-	240c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	0.1	-	270d	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	0.1	180	240c	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	0.1	-	300	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
<b>OPPs</b>												
Azinphos-methyl	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	0.1	-	160	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Shaded cell indicates concentration exceeds assessment criteria

a      Guideline applies to the sum of Aldrin and Dieldrin concentrations

b      Guideline applies to the sum of alpha and gamma chlordane concentrations

c      Guideline applies to the sum of DDE, DDD and DDT concentrations

d      Guideline applies to the sum of Endosulfan I and Endosulfan II concentrations

\*      EIL is the most conservative "Added Contaminant Limit", not total concentration



**TABLE B2**  
**Reported Concentrations of Phenoxy Acid Herbicides in Soil (mg/kg)**  
**Stage 1 Contamination Assessment - Part of Lot 17 DP752086, Fifield, NSW**

Sample ID	EQL	NEPM (1999) Ecological	NEPM (1999) Human Health	SS1 27/10/17	SS2 27/10/17	SS3 27/10/17	SS4 27/10/17	SS5 27/10/17	SS6 27/10/17	SS7 27/10/17	SS8 27/10/17	SS9 27/10/17
<b>Metals</b>												
Arsenic	4	100	100	20	38	120	41	8	10	5	4	4
Cadmium	0.5	-	20	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	1	190*	100	23	14	14	20	15	15	20	30	25
Copper	1	60*	6000	6	4	4	6	5	4	6	7	6
Lead	1	1100*	300	9	8	8	9	9	10	9	9	7
Mercury	0.1	-	40	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	1	30*	400	9	7	9	10	10	8	10	9	8
Zinc	5	70*	7400	13	10	15	19	16	39	16	15	8

Arsenic Statistical Analysis for Mining Camp Footprint (Samples SS1 - SS7)

No Samples	7
Average	35
St Dev	40.3
Coef Variation	1.15
T(7,0.05)	1.943

95% UCL Average	65
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Shaded cell indicates concentration exceeds assessment criteria

**TABLE B3**  
**Duplicate Sample Results - Metals, OCPs, OPPs and Herbicides in Soil (mg/kg)**  
**Stage 1 Contamination Assessment - Part of Lot 17 DP752086, Fifield, NSW**

Sample ID	EQL	SS1 27/10/17	SS10 27/10/17	RPD (%)
<b>Metals</b>				
Arsenic	4	20	19	5
Cadmium	0.5	<0.4	<0.4	-
Chromium	1	23	21	9
Copper	1	6	6	0
Lead	1	9	8	12
Mercury	0.1	<0.1	<0.1	-
Nickel	1	9	8	12
Zinc	5	13	12	8
<b>OCPs</b>				
Hexachlorobenzene	0.1	<0.1	<0.1	-
a-BHC	0.1	<0.1	<0.1	-
g-BHC (Lindane)	0.1	<0.1	<0.1	-
b-BHC	0.1	<0.1	<0.1	-
Heptachlor	0.1	<0.1	<0.1	-
d-BHC	0.1	<0.1	<0.1	-
Aldrin	0.1	<0.1	<0.1	-
Heptachlor epoxide	0.1	<0.1	<0.1	-
gamma-chlordane	0.1	<0.1	<0.1	-
alpha-chlordane	0.1	<0.1	<0.1	-
Endosulfan I	0.1	<0.1	<0.1	-
pp-DDE	0.1	<0.1	<0.1	-
Dieldrin	0.1	<0.1	<0.1	-
Endrin	0.1	<0.1	<0.1	-
pp-DDD	0.1	<0.1	<0.1	-
Endosulfan II	0.1	<0.1	<0.1	-
pp-DDT	0.1	<0.1	<0.1	-
Endrin Aldehyde	0.1	<0.1	<0.1	-
Endosulfan sulphate	0.1	<0.1	<0.1	-
Methoxychlor	0.1	<0.1	<0.1	-
<b>OPPs</b>				
Azinphos-methyl	0.1	<0.1	<0.1	-
Bromophos-ethyl	0.1	<0.1	<0.1	-
Chlorpyrifos	0.1	<0.1	<0.1	-
Chlorpyrifos-methyl	0.1	<0.1	<0.1	-
Diazinon	0.1	<0.1	<0.1	-
Dichlorvos	0.1	<0.1	<0.1	-
Dimethoate	0.1	<0.1	<0.1	-
Ethion	0.1	<0.1	<0.1	-
Fenitrothion	0.1	<0.1	<0.1	-
Malathion	0.1	<0.1	<0.1	-
Parathion	0.1	<0.1	<0.1	-
Ronnel	0.1	<0.1	<0.1	-
<b>Phenoxy Acid Herbicides</b>				
Clpyralid	0.5	<0.5	<0.5	-
3,5-Dichlorobenzoic acid	0.5	<0.5	<0.5	-
o-chlorophenoxy acetic acid	0.5	<0.5	<0.5	-
4-CPA	0.5	<0.5	<0.5	-
Dicamba	0.5	<0.5	<0.5	-
MCPP	0.5	<0.5	<0.5	-
MCPA	0.5	<0.5	<0.5	-
Dichlorprop	0.5	<0.5	<0.5	-
2,4-D	0.5	<0.5	<0.5	-
Bromoxynil	0.5	<0.5	<0.5	-
Triclopyr	0.5	<0.5	<0.5	-
2,4,5-TP	0.5	<0.5	<0.5	-
2,4,5-T	0.5	<0.5	<0.5	-
MCPB	0.5	<0.5	<0.5	-
Dinoseb	1	<1	<1	-
2,4-DB	0.5	<0.5	<0.5	-
Ioxynil	1	<1	<1	-
Picloram	0.5	<0.5	<0.5	-
DCPA (Chlorthal) Diacid	0.5	<0.5	<0.5	-
Acifluorfen	2	<2	<2	-
2,4,6-T	0.5	<0.5	<0.5	-
2,6-D	0.5	<0.5	<0.5	-

# Annexure C

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## **Laboratory Certificate of Analysis**

## SAMPLE RECEIPT ADVICE

### Client Details

<b>Client</b>	Ground Doctor Pty Ltd
<b>Attention</b>	James Morrow

### Sample Login Details

<b>Your reference</b>	Syerston Project
<b>Envirolab Reference</b>	178823
<b>Date Sample Received</b>	31/10/2017
<b>Date Instructions Received</b>	31/10/2017
<b>Date Results Expected to be Reported</b>	07/11/2017

### Sample Condition

<b>Samples received in appropriate condition for analysis</b>	YES
<b>No. of Samples Provided</b>	10 Soil
<b>Turnaround Time Requested</b>	Standard
<b>Temperature on Receipt (°C)</b>	2.1
<b>Cooling Method</b>	Ice
<b>Sampling Date Provided</b>	YES

### Comments

Nil

Please direct any queries to:

#### Aileen Hie

**Phone:** 02 9910 6200  
**Fax:** 02 9910 6201  
**Email:** ahie@envirolab.com.au

#### Jacinta Hurst

**Phone:** 02 9910 6200  
**Fax:** 02 9910 6201  
**Email:** jhurst@envirolab.com.au

*Analysis Underway, details on the following page:*

Sample ID	VTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides	Acid Extractable metals in soil	Asbestos ID - soils	On Hold
SS1-0-0.2				✓	✓	✓		
SS2-0-0.2				✓	✓	✓		
SS3-0-0.2				✓	✓	✓		
SS4-0-0.2				✓	✓	✓		
SS5-0-0.2				✓	✓	✓		
SS6-0-0.2	✓	✓	✓			✓		
SS7-0-0.2	✓	✓	✓			✓		
SS8-0-0.2				✓	✓	✓		
SS9-0-0.2								✓
SS10-0-0.2							✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

### Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

## **CERTIFICATE OF ANALYSIS 178823**

### **Client Details**

<b>Client</b>	Ground Doctor Pty Ltd
<b>Attention</b>	James Morrow
<b>Address</b>	PO Box 6278, Dubbo, NSW, 2830

### **Sample Details**

<b>Your Reference</b>	<u><b>Syerston Project</b></u>
<b>Number of Samples</b>	10 Soil
<b>Date samples received</b>	31/10/2017
<b>Date completed instructions received</b>	07/11/2017

### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.  
 Samples were analysed as received from the client. Results relate specifically to the samples as received.  
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.  
**Please refer to the last page of this report for any comments relating to the results.**

### **Report Details**

<b>Date results requested by</b>	15/11/2017
<b>Date of Issue</b>	16/11/2017
<b>Reissue Details</b>	This report replaces R00 created on 06/11/2017 due to: revised report with additional results.
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. <b>Tests not covered by NATA are denoted with *</b>	

#### **Asbestos Approved By**

Analysed by Asbestos Approved Identifier: Lucy Zhu  
 Authorised by Asbestos Approved Signatory: Lulu Scott

#### **Results Approved By**

Dragana Tomas, Senior Chemist  
 Long Pham, Team Leader, Metals  
 Nancy Zhang, Assistant Lab Manager  
 Steven Luong, Senior Chemist

#### **Authorised By**



David Springer, General Manager

**Client Reference: Syerston Project**

Organochlorine Pesticides in soil						
Our Reference		178823-1	178823-2	178823-3	178823-4	178823-5
Your Reference	UNITS	SS1	SS2	SS3	SS4	SS5
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		27/10/2017	27/10/2017	27/10/2017	27/10/2017	27/10/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2017	01/11/2017	01/11/2017	01/11/2017	01/11/2017
Date analysed	-	01/11/2017	01/11/2017	01/11/2017	01/11/2017	01/11/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	77	71	85	77	76



**Client Reference: Syerston Project**

Organochlorine Pesticides in soil						
Our Reference		178823-6	178823-7	178823-8	178823-9	178823-10
Your Reference	UNITS	SS6	SS7	SS8	SS9	SS10
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		27/10/2017	27/10/2017	27/10/2017	27/10/2017	27/10/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2017	01/11/2017	01/11/2017	01/11/2017	01/11/2017
Date analysed	-	08/11/2017	08/11/2017	01/11/2017	08/11/2017	08/11/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	85	82	81	79	79

**Client Reference: Syerston Project**

Organophosphorus Pesticides						
Our Reference		178823-1	178823-2	178823-3	178823-4	178823-5
Your Reference	UNITS	SS1	SS2	SS3	SS4	SS5
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		27/10/2017	27/10/2017	27/10/2017	27/10/2017	27/10/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2017	01/11/2017	01/11/2017	01/11/2017	01/11/2017
Date analysed	-	01/11/2017	01/11/2017	01/11/2017	01/11/2017	01/11/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	77	71	85	77	76

Organophosphorus Pesticides						
Our Reference		178823-6	178823-7	178823-8	178823-9	178823-10
Your Reference	UNITS	SS6	SS7	SS8	SS9	SS10
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		27/10/2017	27/10/2017	27/10/2017	27/10/2017	27/10/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2017	01/11/2017	01/11/2017	01/11/2017	01/11/2017
Date analysed	-	08/11/2017	08/11/2017	01/11/2017	08/11/2017	08/11/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	85	82	81	79	79

**Client Reference: Syerston Project**

Acid Extractable metals in soil						
Our Reference		178823-1	178823-2	178823-3	178823-4	178823-5
Your Reference	UNITS	SS1	SS2	SS3	SS4	SS5
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		27/10/2017	27/10/2017	27/10/2017	27/10/2017	27/10/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/11/2017	01/11/2017	01/11/2017	01/11/2017	01/11/2017
Date analysed	-	01/11/2017	01/11/2017	01/11/2017	01/11/2017	01/11/2017
Arsenic	mg/kg	20	38	120	41	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	23	14	14	20	15
Copper	mg/kg	6	4	4	6	5
Lead	mg/kg	9	8	8	9	9
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	7	9	10	10
Zinc	mg/kg	13	10	15	19	16

Acid Extractable metals in soil						
Our Reference		178823-6	178823-7	178823-8	178823-9	178823-10
Your Reference	UNITS	SS6	SS7	SS8	SS9	SS10
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		27/10/2017	27/10/2017	27/10/2017	27/10/2017	27/10/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/11/2017	01/11/2017	01/11/2017	07/11/2017	07/11/2017
Date analysed	-	01/11/2017	01/11/2017	01/11/2017	07/11/2017	07/11/2017
Arsenic	mg/kg	10	5	<4	<4	19
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	15	20	30	25	21
Copper	mg/kg	4	6	7	6	6
Lead	mg/kg	10	9	9	7	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	10	9	8	8
Zinc	mg/kg	39	16	15	8	12

# Client Reference: Syerston Project

Moisture						
Our Reference	UNITS	178823-1	178823-2	178823-3	178823-4	178823-5
Your Reference		SS1	SS2	SS3	SS4	SS5
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		27/10/2017	27/10/2017	27/10/2017	27/10/2017	27/10/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/11/2017	01/11/2017	01/11/2017	01/11/2017	01/11/2017
Date analysed	-	02/11/2017	02/11/2017	02/11/2017	02/11/2017	02/11/2017
Moisture	%	10	11	15	14	14

Moisture						
Our Reference	UNITS	178823-6	178823-7	178823-8	178823-9	178823-10
Your Reference		SS6	SS7	SS8	SS9	SS10
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		27/10/2017	27/10/2017	27/10/2017	27/10/2017	27/10/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/11/2017	01/11/2017	01/11/2017	01/11/2017	01/11/2017
Date analysed	-	02/11/2017	02/11/2017	02/11/2017	02/11/2017	02/11/2017
Moisture	%	5.3	8.5	15	9.5	12

**Client Reference: Syerston Project**

Phenoxy Acid Herbicides in Soil						
Our Reference		178823-1	178823-2	178823-3	178823-4	178823-5
Your Reference	UNITS	SS1	SS2	SS3	SS4	SS5
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		27/10/2017	27/10/2017	27/10/2017	27/10/2017	27/10/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/11/2017	15/11/2017	15/11/2017	15/11/2017	15/11/2017
Date analysed	-	15/11/2017	15/11/2017	15/11/2017	15/11/2017	15/11/2017
Clopyralid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-Dichlorobenzoic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
o-chlorophenoxy acetic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-CPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPP	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorprop	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoxynil	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Triclopyr	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-TP	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	mg/kg	<1	<1	<1	<1	<1
2,4-DB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ioxynil	mg/kg	<1	<1	<1	<1	<1
Picloram	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
DCPA (Chlorthal) Diacid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	mg/kg	<2	<2	<2	<2	<2
2,4,6-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate 2,4- DCPA	%	91	85	93	93	94

**Client Reference: Syerston Project**

Phenoxy Acid Herbicides in Soil						
Our Reference		178823-6	178823-7	178823-8	178823-9	178823-10
Your Reference	UNITS	SS6	SS7	SS8	SS9	SS10
Depth		0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
Date Sampled		27/10/2017	27/10/2017	27/10/2017	27/10/2017	27/10/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/11/2017	15/11/2017	15/11/2017	15/11/2017	15/11/2017
Date analysed	-	15/11/2017	15/11/2017	15/11/2017	15/11/2017	15/11/2017
Clopyralid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-Dichlorobenzoic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
o-chlorophenoxy acetic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-CPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPP	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorprop	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoxynil	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Triclopyr	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-TP	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	mg/kg	<1	<1	<1	<1	<1
2,4-DB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ioxynil	mg/kg	<1	<1	<1	<1	<1
Picloram	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
DCPA (Chlorthal) Diacid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	mg/kg	<2	<2	<2	<2	<2
2,4,6-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate 2,4- DCPA	%	100	92	94	96	94

## Client Reference: Syerston Project

Method ID	Methodology Summary
<b>Ext-054</b>	Analysed by MPL Envirolab
<b>Inorg-008</b>	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
<b>Metals-020</b>	Determination of various metals by ICP-AES.
<b>Metals-021</b>	Determination of Mercury by Cold Vapour AAS.
<b>Org-005</b>	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
<b>Org-005</b>	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
<b>Org-008</b>	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.



**Client Reference: Syerston Project**

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			01/11/2017	[NT]	[NT]	[NT]	[NT]	01/11/2017	[NT]
Date analysed	-			01/11/2017	[NT]	[NT]	[NT]	[NT]	01/11/2017	[NT]
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	75	[NT]
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	79	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	77	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	76	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-005	90	[NT]	[NT]	[NT]	[NT]	99	[NT]

# Client Reference: Syerston Project

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			01/11/2017	[NT]	[NT]	[NT]	[NT]	01/11/2017	[NT]
Date analysed	-			01/11/2017	[NT]	[NT]	[NT]	[NT]	01/11/2017	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	81	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Dimethoate	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Fenitrothion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Malathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Parathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Surrogate TCMX	%		Org-008	90	[NT]	[NT]	[NT]	[NT]	92	[NT]

# Client Reference: Syerston Project

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			01/11/2017	[NT]	[NT]	[NT]	[NT]	01/11/2017	[NT]
Date analysed	-			01/11/2017	[NT]	[NT]	[NT]	[NT]	01/11/2017	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	120	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	108	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	123	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]

**Client Reference: Syerston Project**

QUALITY CONTROL: Phenoxy Acid Herbicides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	
Date extracted	-			15/11/2017	1	15/11/2017	15/11/2017		15/11/2017	[NT]
Date analysed	-			15/11/2017	1	15/11/2017	15/11/2017		15/11/2017	[NT]
Clopyralid	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
3,5-Dichlorobenzoic acid	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
o-chlorophenoxy acetic acid	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
4-CPA	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Dicamba	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	83	[NT]
MCPPP	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	88	[NT]
MCPA	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	87	[NT]
Dichlorprop	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
2,4-D	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	63	[NT]
Bromoxynil	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Triclopyr	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
2,4,5-TP	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
2,4,5-T	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	88	[NT]
MCPB	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Dinoseb	mg/kg	1	Ext-054	<1	1	<1	<1	0	[NT]	[NT]
2,4-DB	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Ioxynil	mg/kg	1	Ext-054	<1	1	<1	<1	0	[NT]	[NT]
Picloram	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
DCPA (Chlorthal) Diacid	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Acifluorfen	mg/kg	2	Ext-054	<2	1	<2	<2	0	[NT]	[NT]
2,4,6-T	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
2,6-D	mg/kg	0.5	Ext-054	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Surrogate 2,4- DCPA	%		Ext-054	85	1	91	90	1	88	[NT]

# Client Reference: Syerston Project

QUALITY CONTROL: Phenoxy Acid Herbicides in Soil					Duplicate		Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	178823-2
Date extracted	-			[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	15/11/2017
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	15/11/2017
Dicamba	mg/kg	0.5	Ext-054	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	89
MCPD	mg/kg	0.5	Ext-054	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	81
MCPA	mg/kg	0.5	Ext-054	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	73
2,4-D	mg/kg	0.5	Ext-054	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	68
2,4,5-T	mg/kg	0.5	Ext-054	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	82
Surrogate 2,4- DCPA	%		Ext-054	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	97

## Result Definitions

<b>NT</b>	Not tested
<b>NA</b>	Test not required
<b>INS</b>	Insufficient sample for this test
<b>PQL</b>	Practical Quantitation Limit
<b>&lt;</b>	Less than
<b>&gt;</b>	Greater than
<b>RPD</b>	Relative Percent Difference
<b>LCS</b>	Laboratory Control Sample
<b>NS</b>	Not specified
<b>NEPM</b>	National Environmental Protection Measure
<b>NR</b>	Not Reported

## Quality Control Definitions

<b>Blank</b>	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
<b>Duplicate</b>	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
<b>Matrix Spike</b>	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
<b>LCS (Laboratory Control Sample)</b>	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
<b>Surrogate Spike</b>	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.



## Report Comments

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Note: Sample 178823-10 was sub-sampled from jar provided by the client.

Acid Herbicides analysed by MPL Laboratories. Report No.203063.

# Annexure D

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## **Section 149 Certificate**



**PLANNING CERTIFICATE  
UNDER SECTION 149(2)  
ENVIRONMENTAL PLANNING AND  
ASSESSMENT ACT, 1979**

Lachlan Shire Council  
58-64 Molong Street  
PO Box 216  
CONDOBOLIN NSW 2877  
P: 02 6895 1900  
F: 02 6895 3478  
E: council@lachlan.nsw.gov.au  
ABN 82 815 250 829

**Certificate No:** 189.2017  
**Date:** 24/10/2017  
**Receipt No:** 179888  
**Application No:** 2042

**Applicant:**  
J Morrow  
PO Box 6278  
DUBBO NSW 2830

**Owner (as recorded by Council)**  
Scandium21 Pty Ltd  
PO BOX 227  
MULGRAVE VIC 3170

**Property:** Parish Ellerslie COUNTY CUNNINGHAM  
**Description:** Lot: 17 DP: 752086  
**Parcel No:** 14331

**INFORMATION PROVIDED PURSUANT TO SECTION 149(2) OF THE ACT.**

**1 Names of relevant planning instruments and DCP's**

- (1) The name of each environmental planning instrument that applies to the carrying out of development on the land.

As at the date of this Certificate the abovementioned land is land to which Environmental Planning Instruments apply. Details are set out as follows:

**Local Environmental Plans**

Draft Local Environmental Plan 2013 (Amendment 3)

**Regional Plans**

Central West and Orana Regional Plan 2036

**State Environmental Planning Policies**

- State Environmental Planning Policy No. 21 - Caravan Parks
- State Environmental Planning Policy No. 22 - Shops and Commercial Premises
- State Environmental Planning Policy No. 30 - Intensive Agriculture
- State Environmental Planning Policy No. 32 - Urban Consolidation (Redevelopment of urban land)
- State Environmental Planning Policy No. 33 - Hazardous and Offensive Development
- State Environmental Planning Policy No. 36 - Manufactured Home Estates
- State Environmental Planning Policy No. 50 - Canal Estate Development.
- State Environmental Planning Policy No. 55 - Remediation of Land
- State Environmental Planning Policy No. 64 - Advertising and Signage
- State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004
- State Environmental Planning Policy (Major Development) 2005
- State Environmental Planning Policy (Infrastructure) 2007

- State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
- State Environmental Planning Policy (Temporary Structures and Places of Public Entertainment) 2007
- State Environmental Planning Policy (Rural Lands) 2008
- State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
- State Environmental Planning Policy (Affordable Rental Housing) 2009

#### **Deemed SEPP's (Former Regional Environmental Plans (REP's))**

There are no deemed SEPP's applying to this land.

- (2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act**

#### **Draft LEP's**

Draft Local Environmental Plan 2013 (Amendment 3)

#### **Draft SEPP's**

Nil

#### **Draft Deemed SEPP's (Former REP)**

Nil

For further information go to [www.legislation.nsw.gov.au](http://www.legislation.nsw.gov.au)

#### **The name of each development control plan that applies to the carrying out of development on the land.**

Lachlan Local Development Control Plan 2015 (Amendment 1)

## **2 Zoning and land use under relevant LEP's**

Under the provisions of the Lachlan Local Environmental Plan 2013, the subject land is within the zone(s) referred to hereunder:

#### **Zone No RU1 Primary Production**

##### **(1) The objectives of this zone are to:**

- Encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- Encourage diversity in primary industry enterprises and systems appropriate for the area.
- Minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

##### **(2) Permitted without consent**

Environmental protection works; Extensive agriculture; Forestry;  
Home businesses; Home occupations; Intensive plant agriculture;  
Water supply systems

##### **(3) Permitted with consent**

Air transport facilities; Airstrips; Animal boarding or training establishments; Bed and breakfast accommodation; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cellar door

premises; Cemeteries; Charter and tourism boating facilities; Community facilities; Correctional centres; Crematoria; Depots; Dual occupancies (attached); Dwelling houses; Eco-tourist facilities; Educational establishments; Environmental facilities; Extractive industries; Farm buildings; Farm stay accommodation; Freight transport facilities; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home industries; Industrial training facilities; Information and education facilities; Intensive livestock agriculture; Jetties; Kiosks; Landscaping material supplies; Moorings; Open cut mining; Plant nurseries; Recreation areas; Recreation facilities (major); Recreation facilities (outdoor); Roads; Roadside stalls; Rural industries; Rural workers' dwellings; Secondary dwellings; Service stations; Timber yards; Veterinary hospitals; Water recreation structures; Wharf or boating facilities

**(4) Prohibited**

Any development not specified item 2 or 3

**Development standards applying to the land that fix minimum land dimensions for the erection of a dwelling house.**

Refer to LEP and DCP's.

The land does not include nor comprise Critical Habitat.

The land is not in a Conservation Area.

The land does not contain nor constitute an item of Environmental Heritage as listed in Schedule 5 of the Lachlan Shire Council Local Environmental Plan 2013.

**3 Complying development**

**State Environmental Planning Policy (Exempt and Complying Development Codes) 2008**

Exempt and complying development **may be** carried out under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

**4 Coastal protection**

The land is **not** affected by the operation of section 38 or 39 of the *Coastal Protection Act 1979* to the extent that Council has been so notified by the Department of Public Works.

**5 Mine subsidence**

The land is **not** proclaimed to be a mine subsidence district within the meaning of section 15 of the *Mines Subsidence Compensation Act 1961*.

**6 Road widening and road realignment**

The land is not affected by any road widening or road realignment under:

- (a) Division 2 of Part 3 of the Roads Act 1993 or
- (b) Any environmental planning instrument or
- (c) Any resolution of Council

**7 Council and other public authority policies on hazard risk restrictions**

The subject land is identified on the Lachlan Local Environmental Plan 2013 Terrestrial Biodiversity Maps and therefore Clause 6.4 Terrestrial Biodiversity of the Lachlan Local



Environmental Plan 2013 must be considered before determining a development application for development on the land.

**7A Flood related development controls information**

Development on the land or any part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is not subject to flood related development controls.

**8 Land reserved for acquisition**

There is no environmental planning instrument, deemed environmental planning instrument or draft environmental planning instrument applying to the subject land that provides for the acquisition of the land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

**9 Contributions plans**

The Lachlan Contributions Plan 2015 approved by Council under S94A, division 6 of part 4 of the Environmental Planning and Assessment Act 1979, applies to the subject land.

**9A Biodiversity certified land**

The land is not Biodiversity Certified Land (within the meaning of Part 8 of the Biodiversity Conservation Act 2016).

**10 Biobanking agreements**

Council has not been notified of a biobanking agreement under Part 7A of the Threatened Species Conservation Act 1995 that may apply to the land.

**11 Bush fire prone land**

The land is shown as Bushfire Prone Land in Council's records.

**12 Property vegetation plans**

Council has not been notified that a Property Vegetation Plan applies to the land.

**13 Orders under [Trees \(Disputes Between Neighbours\) Act 2006](#)**

Council has not been notified that an Order has been made under the Trees (Disputes between Neighbours) Act 2003 to carry out works in relation to a tree on the land.

**14 Directions under Part 3A**

Council has not been notified of any Directions by the Minister, in force under Section 75P(2) of the Environmental Planning and Assessment Act 1979, that a provision of an Environmental Planning Instrument prohibiting, or restricting, the carrying out of a project, or a stage of a project, on the land under Part 4 of the Act does not have affect.

**15 Site compatibility certificates and conditions for seniors housing**

The land is not land to which State Environmental Planning Policy (Housing for Seniors or people with a Disability) 2004 applies.

**16 Site compatibility certificates for infrastructure**

There is no valid Site Compatibility Certificate (Infrastructure) of which Council is aware in respect of proposed development on the land.

**17 Site compatibility certificates and conditions for affordable rental housing**

There is no valid Site Compatibility Certificate (Affordable Rental Housing) of which Council is aware in respect of proposed development on the land.



## Disclaimer

The information provided in this certificate has been obtained from the Council's records. The Council advises that:

- 1.1 Other authorities may hold information in respect of the property not contained in the Council's records and
- 1.2 The Council's records themselves may not be complete or accurate in respect of the property; and
- 1.3 The Council cannot and does not accept any liability in respect of any error, inaccuracy or omission in this certificate which relates to any information provided to the Council by another authority or by another person.
- 2 The instruments referred to in this certificate may contain other important information in respect of the property. In order to understand the effects of the instrument(s) on the property, the Council advises that the whole of each instrument should be read and considered. This certificate cannot be used as a substitute for reading the whole of the instrument(s) referred to in the certificate.
- 3 It may be appropriate or necessary to obtain legal or other expert advice in respect of the matters contained in the certificate or the instruments referred to in the certificate.



Sam Wythes  
**Environmental Service & Development Officer**  
**Environment & Planning**

For R Hunt  
**General Manager**

**ADDITIONAL INFORMATION PROVIDED UNDER SECTION 149(5) OF THE  
ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979**

**(1) Development consent from Council within the previous two years**

Council has not consented to development on this property within the previous two years.

**(2) Flooding**

Development on the land or any part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is not subject to flood related development controls.

**(3) Slip/Subsidence**

Nil

**(4) Residential District Proclamation**

Nil

**(5) Tree Preservation Order**

Nil



Sam Wythes  
Environmental Services & Development Officer  
Environment & Planning

For R Hunt  
General Manager

# Annexure E

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## **Property Search Results**

# Lotsearch



## Environmental Risk and Planning Report

**Sunrise Lane, Fifield, NSW 2875**

**Report Date: 25 Oct 2017 09:27:34**

**Disclaimer:**

The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features. You should obtain independent advice before you make any decision based on the information within the report. The detailed terms applicable to use of this report are set out at the end of this report.

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## Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

LC Code	Location Confidence
1	Georeferenced to the site location / premise or part of site
2	Georeferenced with the confidence of the general/approximate area
3	Georeferenced to the road or rail
4	Georeferenced to the road intersection
5	Feature is a buffered point
6	Land adjacent to Georeferenced Site
7	Georeferenced to a network of features

## Dataset Listing

Datasets contained within this report, detailing their source and data currency:

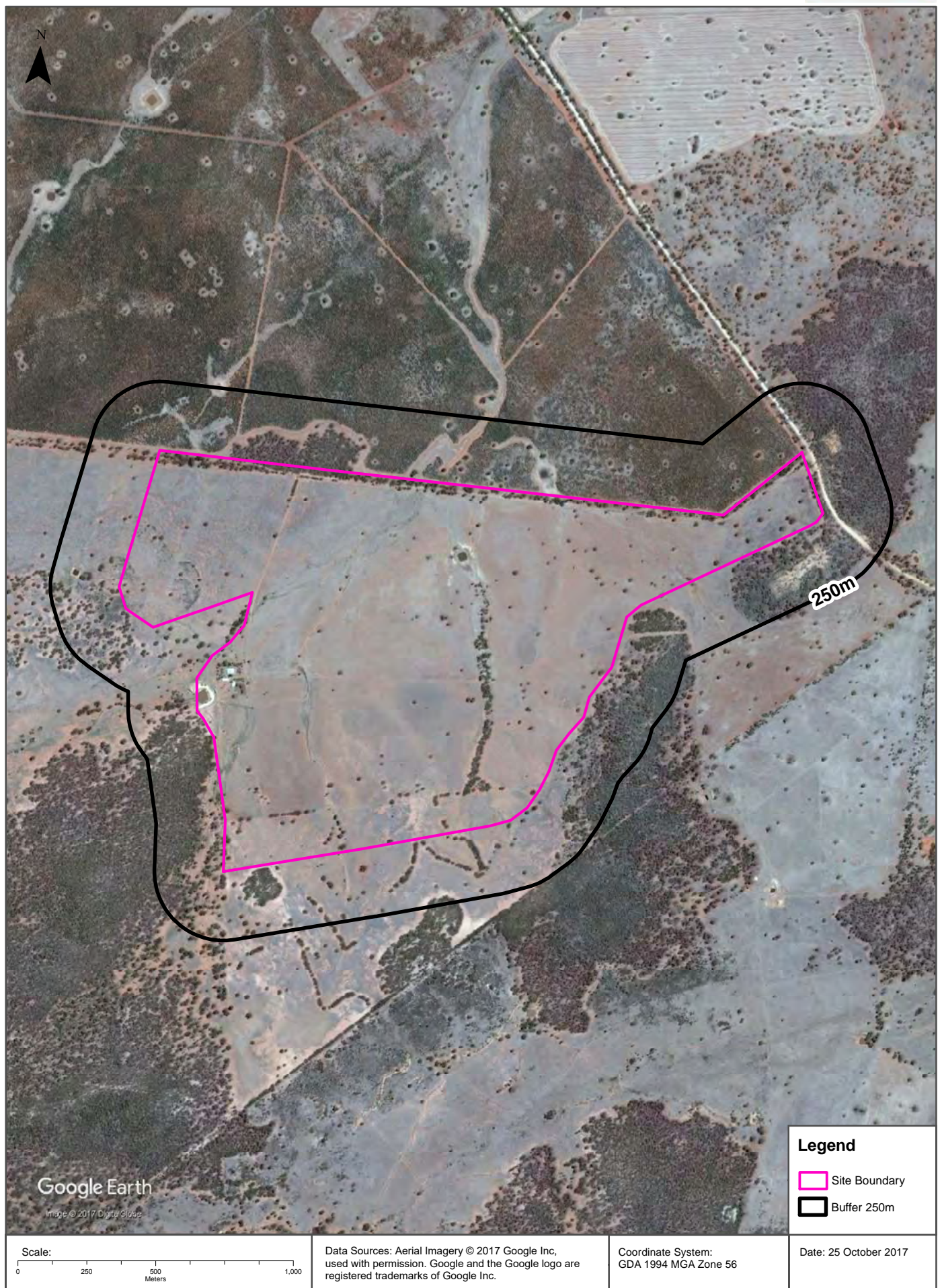
Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	Department Finance, Services & Innovation	25/10/2017	25/10/2017	Daily	-	-	-	-
Topographic Data	Department Finance, Services & Innovation	10/04/2015	01/04/2015	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	23/10/2017	04/09/2017	Monthly	1000	0	0	0
Contaminated Land: Records of Notice	Environment Protection Authority	03/10/2017	03/10/2017	Monthly	1000	0	0	0
Former Gasworks	Environment Protection Authority	23/10/2017	12/09/2017	Monthly	1000	0	0	0
National Waste Management Site Database	Geoscience Australia	23/10/2017	07/03/2017	Quarterly	1000	0	0	0
EPA PFAS Investigation Program	Environment Protection Authority	23/10/2017	23/10/2017	Monthly	2000	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	23/10/2017	23/10/2017	Quarterly	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	04/10/2017	04/10/2017	Monthly	1000	0	0	0
Delicensed POEO Activities still Regulated by the EPA	Environment Protection Authority	04/10/2017	04/10/2017	Monthly	1000	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	04/10/2017	04/10/2017	Monthly	1000	3	3	3
UPSS Environmentally Sensitive Zones	Department of Environment, Climate Change and Water	14/04/2015	12/01/2010	As required	1000	0	0	0
UBD Business Directory 1982 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1982 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1970 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1970 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1961 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1961 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1950 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1950 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	1000	0	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	1000	-	0	0
Points of Interest	Department Finance, Services & Innovation	01/02/2017	01/02/2017	Annually	1000	1	1	1
Tanks (Areas)	Department Finance, Services & Innovation	01/02/2017	01/02/2017	Annually	1000	0	0	0
Tanks (Points)	Department Finance, Services & Innovation	01/02/2017	01/02/2017	Annually	1000	0	0	0
Major Easements	Department Finance, Services & Innovation	01/02/2017	01/02/2017	As required	1000	0	0	0
State Forest	Department Finance, Services & Innovation	01/02/2017	29/06/2016	As required	1000	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment and Heritage	01/02/2017	31/12/2016	Annually	1000	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	1	1	1
Groundwater Boreholes	NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation; Commonwealth of Australia (Bureau of Meteorology) 2015	21/03/2016	01/12/2015	Annually	2000	0	0	3

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Geological Units 1:250,000	NSW Department of Industry, Resources & Energy	20/08/2014		None planned	1000	2	-	2
Geological Structures 1:250,000	NSW Department of Industry, Resources & Energy	20/08/2014		None planned	1000	0	-	0
Naturally Occurring Asbestos Potential	NSW Department of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000	0	0	1
Standard Local Environmental Plan Acid Sulfate Soils	NSW Planning and Environment	07/10/2016	07/10/2016	As required	500	0	-	-
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000	0	0	0
Dryland Salinity Potential of Western Sydney	NSW Office of Environment and Heritage	12/05/2017	01/01/2002	None planned	1000	-	-	-
Mining Subsidence Districts	Department Finance, Services & Innovation	13/07/2017	01/07/2017	As required	1000	0	0	0
SEPP 14 - Coastal Wetlands	NSW Planning and Environment	17/12/2015	24/10/2008	Annually	1000	0	0	0
SEPP 26 - Littoral Rainforest	NSW Planning and Environment	17/12/2015	05/02/1988	Annually	1000	0	0	0
SEPP 71 - Coastal Protection	NSW Planning and Environment	17/12/2015	01/08/2003	Annually	1000	0	0	0
SEPP Major Developments 2005	NSW Planning and Environment	09/03/2013	25/05/2005	Under Review	1000	0	0	0
SEPP Strategic Land Use Areas	NSW Planning and Environment	01/08/2017	28/01/2014	Annually	1000	0	0	0
LEP - Land Zoning	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	1000	1	1	1
LEP - Minimum Subdivision Lot Size	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	0	1	-	-
LEP - Height of Building	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	0	0	-	-
LEP - Floor Space Ratio	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	0	0	-	-
LEP - Land Application	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	0	1	-	-
LEP - Land Reservation Acquisition	NSW Planning and Environment	23/09/2017	23/09/2017	Quarterly	0	0	-	-
State Heritage Items	NSW Office of Environment and Heritage	01/08/2017	27/05/2016	Quarterly	1000	0	0	0
Local Heritage Items	NSW Planning and Environment	23/09/2017	23/09/2017	Monthly	1000	0	0	0
Bush Fire Prone Land	NSW Rural Fire Service	24/09/2017	06/09/2017	Quarterly	1000	2	2	2
RAMSAR Wetlands	Commonwealth of Australia Department of the Environment	08/10/2014	24/06/2011	As required	1000	0	0	0
ATLAS of NSW Wildlife	NSW Office of Environment and Heritage	25/10/2017	25/10/2017	Daily	10000	-	-	-



# Aerial Imagery 2015

Sunrise Lane, Fifield, NSW 2875



# Contaminated Land & Waste Management Facilities

Sunrise Lane, Fifield, NSW 2875

## List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist (m)	Direction
N/A	No records in buffer								

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority  
 © State of New South Wales through the Environment Protection Authority



# Contaminated Land & Waste Management Facilities

Sunrise Lane, Fifield, NSW 2875

## Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
N/A	No records in buffer							

Contaminated Land Records of Notice Data Source: Environment Protection Authority  
© State of New South Wales through the Environment Protection Authority  
Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit  
<http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm>

## Former Gasworks

Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority  
© State of New South Wales through the Environment Protection Authority

## National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist (m)	Direction
N/A	No records in buffer											

Waste Management Facilities Data Source: Australian Government Geoscience Australia  
Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>

## EPA PFAS Investigation Program

Sunrise Lane, Fifield, NSW 2875

## EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

<b>Id</b>	<b>Site</b>	<b>Address</b>	<b>Location Confidence</b>	<b>Distance</b>	<b>Direction</b>
N/A	No records in buffer				

EPA PFAS Investigation Program: Environment Protection Authority  
© State of New South Wales through the Environment Protection Authority

# EPA Other Sites with Contamination Issues

Sunrise Lane, Fifield, NSW 2875

## EPA Other Sltes with Contamination Issues

This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill

Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

EPA Other Sites with Contamination Issues: Environment Protection Authority  
© State of New South Wales through the Environment Protection Authority

## EPA Activities

**Sunrise Lane, Fifield, NSW 2875**

## Licensed Activities under the POEO Act 1997

Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

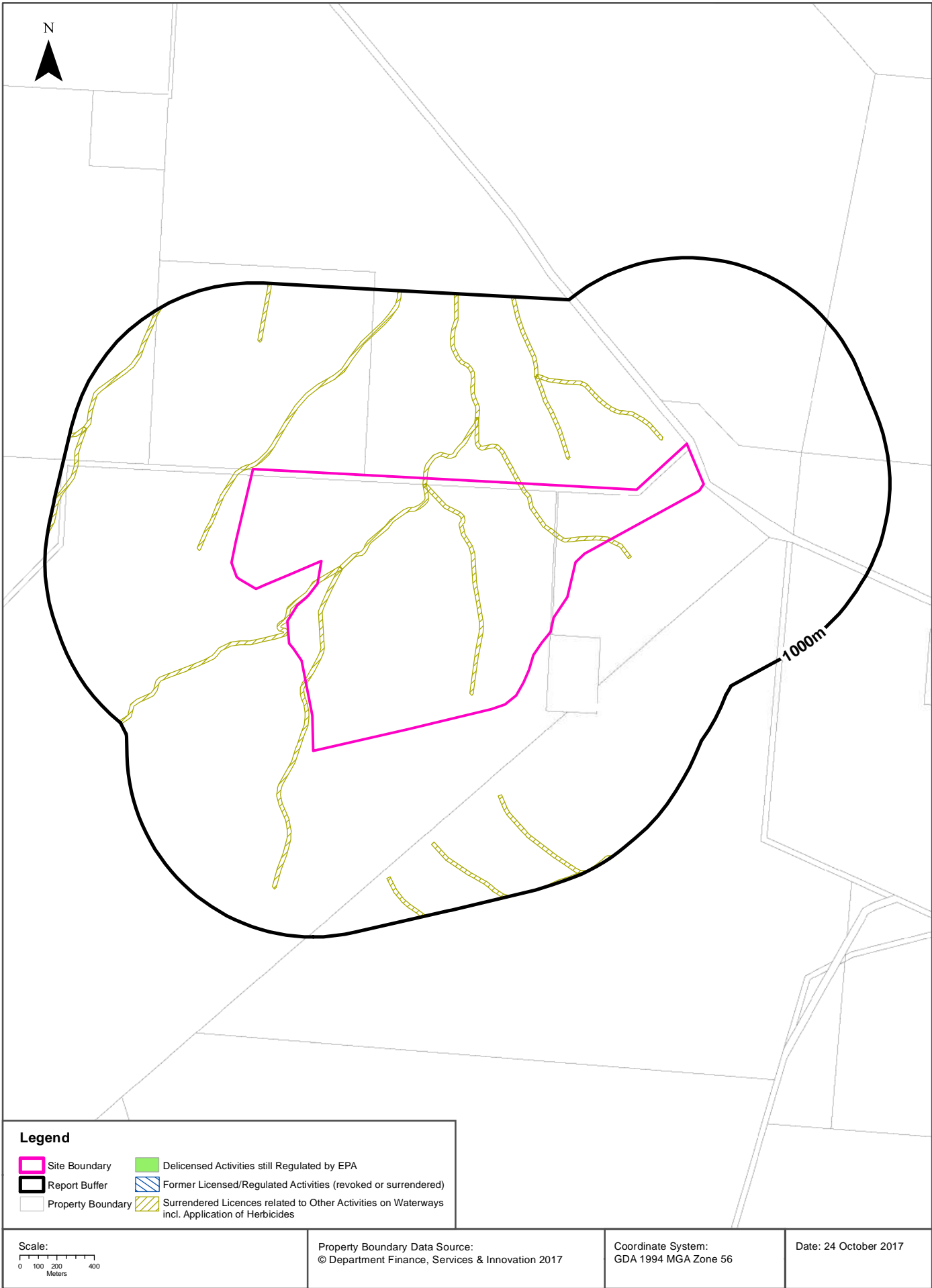
EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

POEO Licence Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

# Delicensed & Former Licensed EPA Activities

Sunrise Lane, Fifield, NSW 2875





## EPA Activities

Sunrise Lane, Fifield, NSW 2875

### Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

Delicensed Activities Data Source: Environment Protection Authority  
© State of New South Wales through the Environment Protection Authority

### Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	7	0m	Onsite
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	7	0m	Onsite
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	7	0m	Onsite

Former Licensed Activities Data Source: Environment Protection Authority  
© State of New South Wales through the Environment Protection Authority



## Historical Business Directories

Sunrise Lane, Fifield, NSW 2875

### 1982 Business Directory Records Premise or Road Intersection Matches

Records from the 1982 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

### 1982 Business Directory Records Road or Area Matches

Records from the 1982 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

## Historical Business Directories

**Sunrise Lane, Fifield, NSW 2875**

### 1970 Business Directory Records Premise or Road Intersection Matches

Records from the 1970 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

### 1970 Business Directory Records Road or Area Matches

Records from the 1970 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

## Historical Business Directories

**Sunrise Lane, Fifield, NSW 2875**

### 1961 Business Directory Records Premise or Road Intersection Matches

Records from the 1961 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

### 1961 Business Directory Records Road or Area Matches

Records from the 1961 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

## Historical Business Directories

**Sunrise Lane, Fifield, NSW 2875**

### 1950 Business Directory Records Premise or Road Intersection Matches

Records from the 1950 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

### 1950 Business Directory Records Road or Area Matches

Records from the 1950 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

## Historical Business Directories

**Sunrise Lane, Fifield, NSW 2875**

### Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant



## Historical Business Directories

**Sunrise Lane, Fifield, NSW 2875**

### Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer				

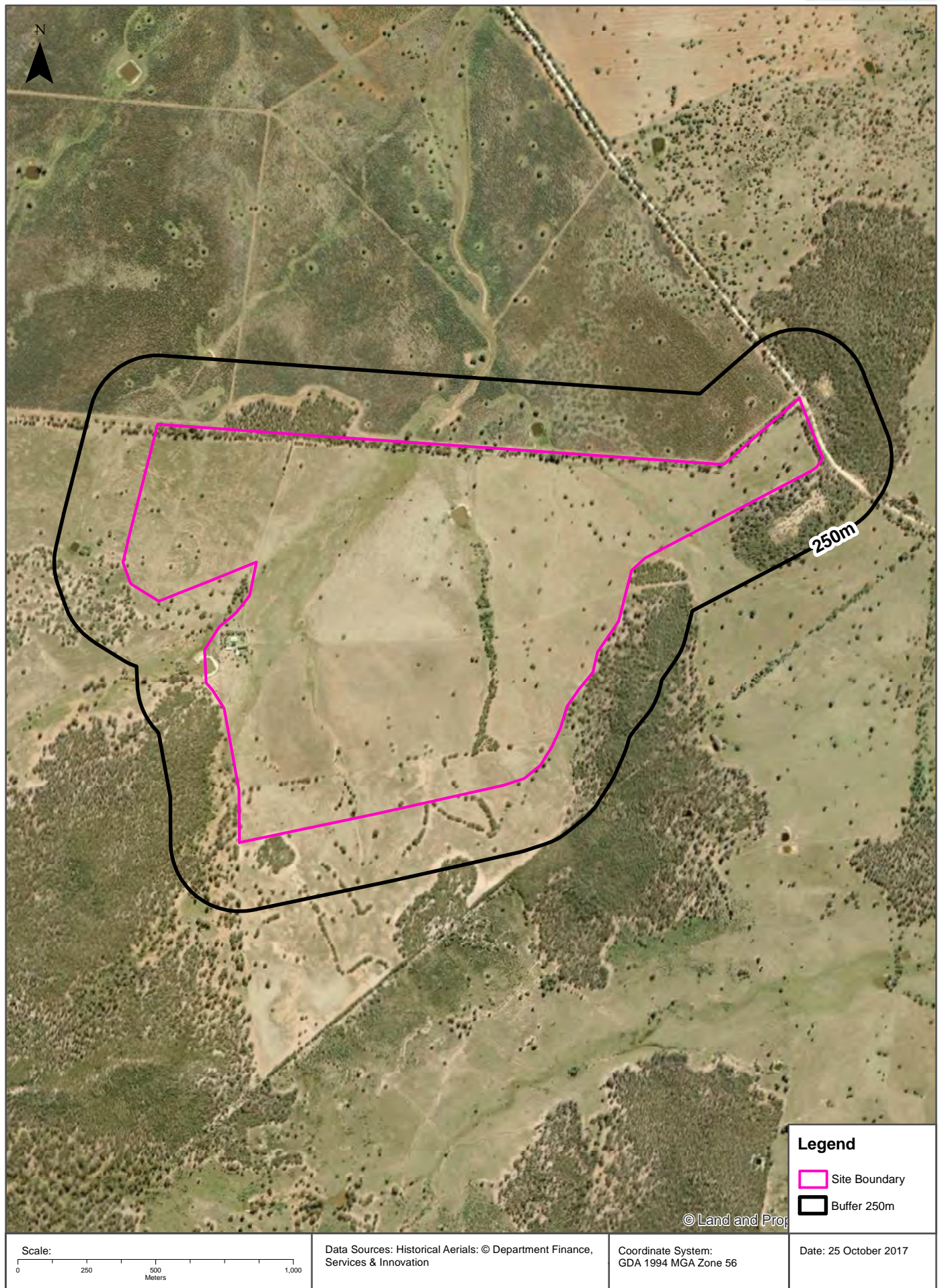
Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant





## Aerial Imagery 2012

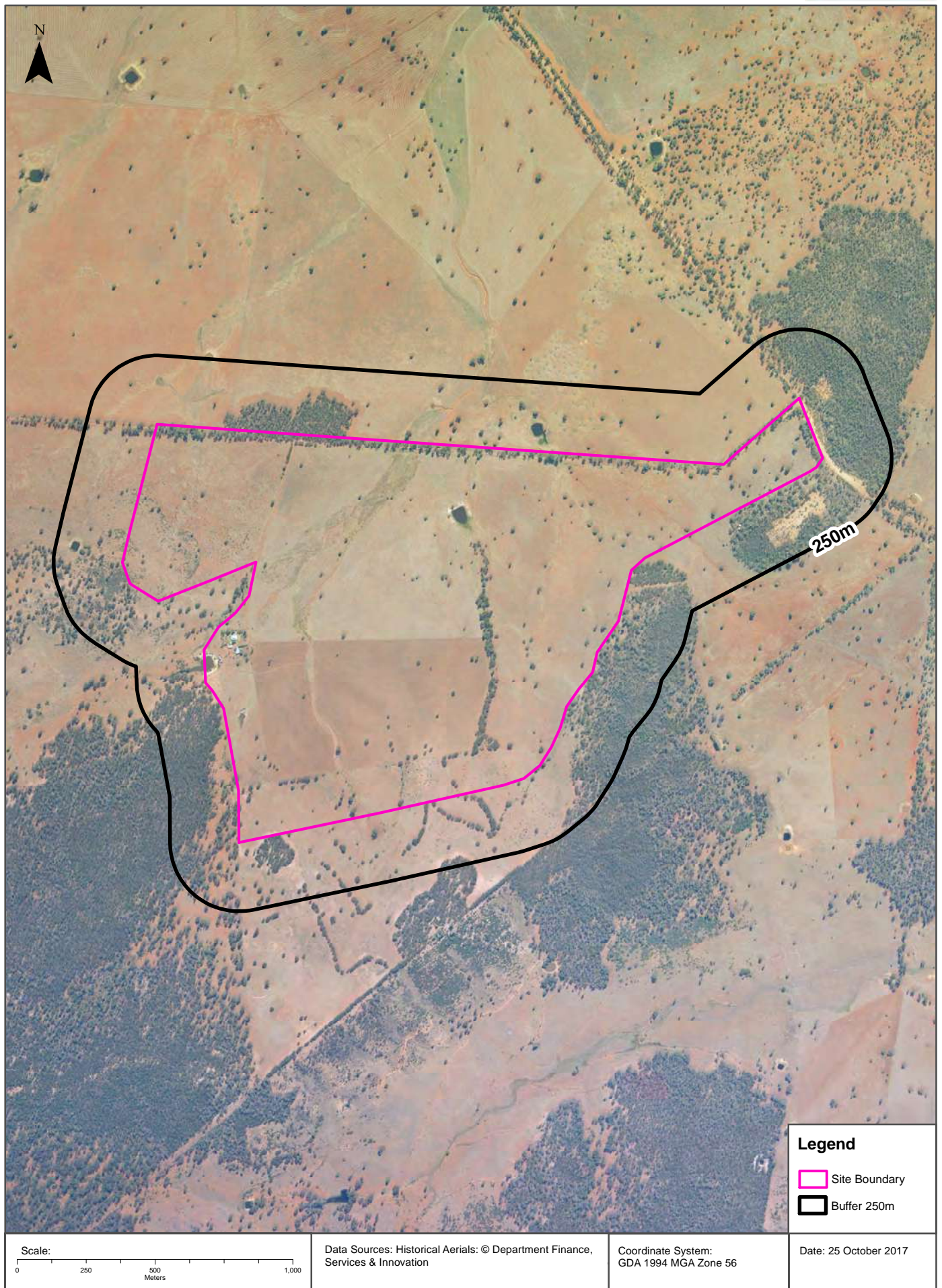
Sunrise Lane, Fifield, NSW 2875



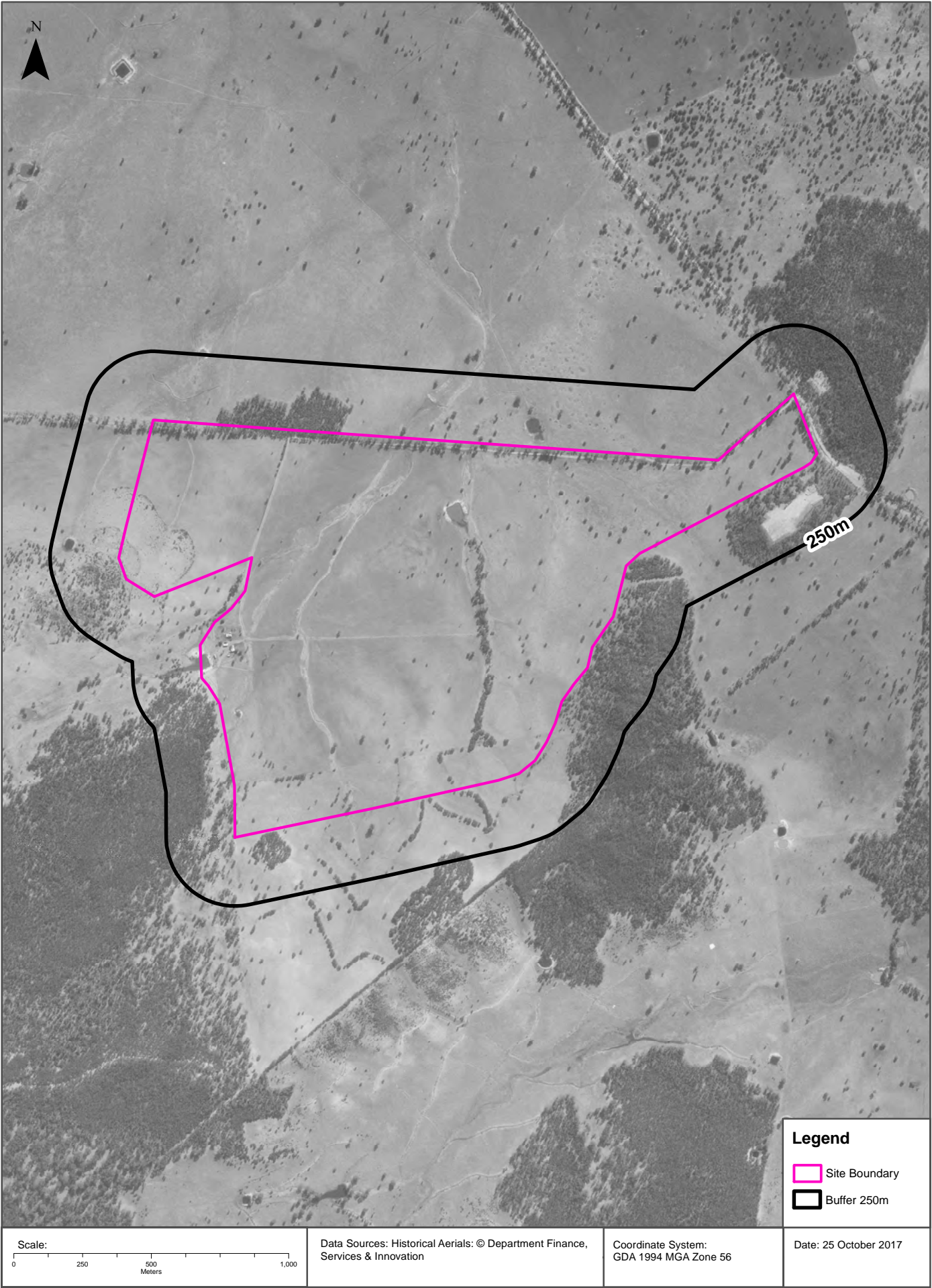


# Aerial Imagery 2004

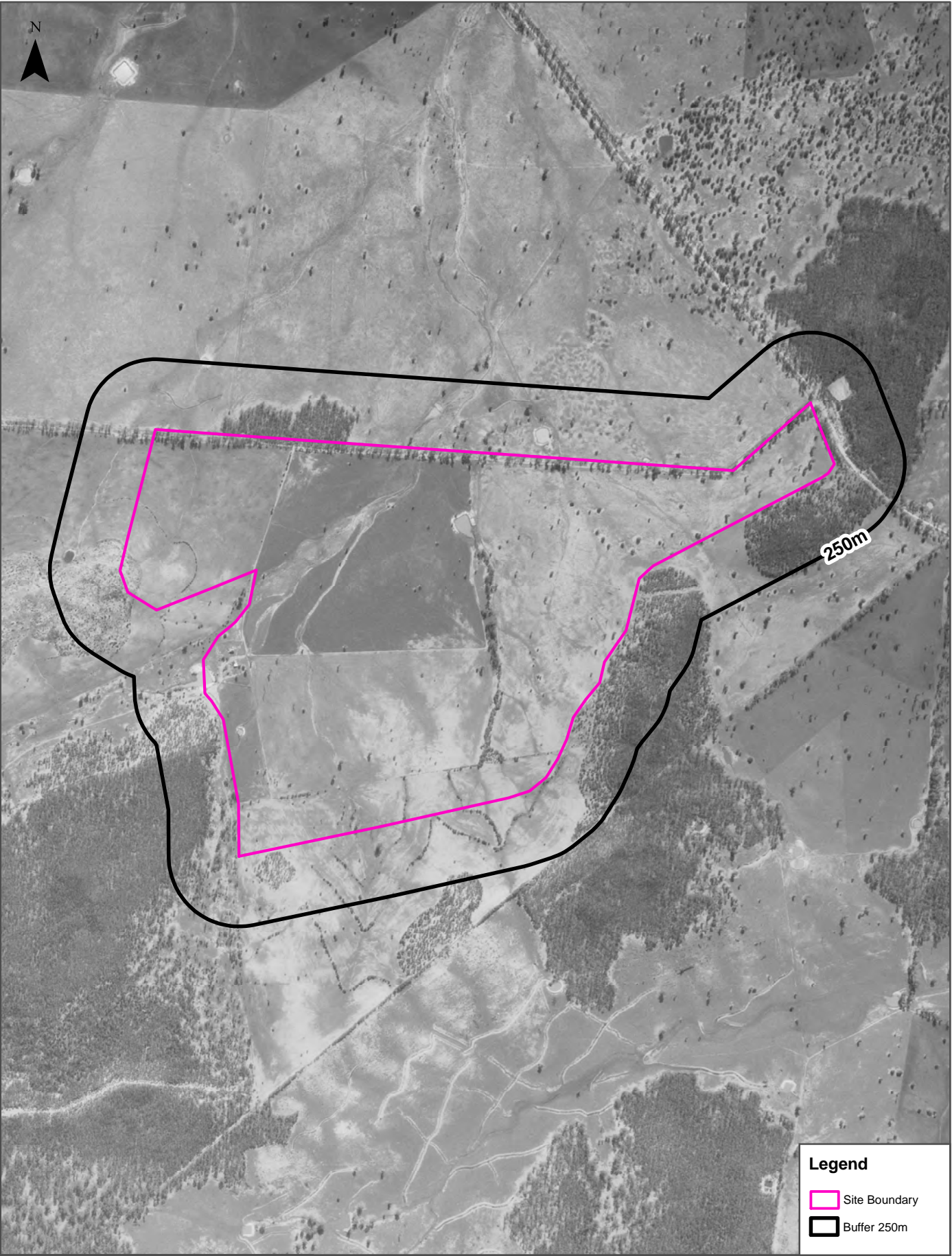
Sunrise Lane, Fifield, NSW 2875





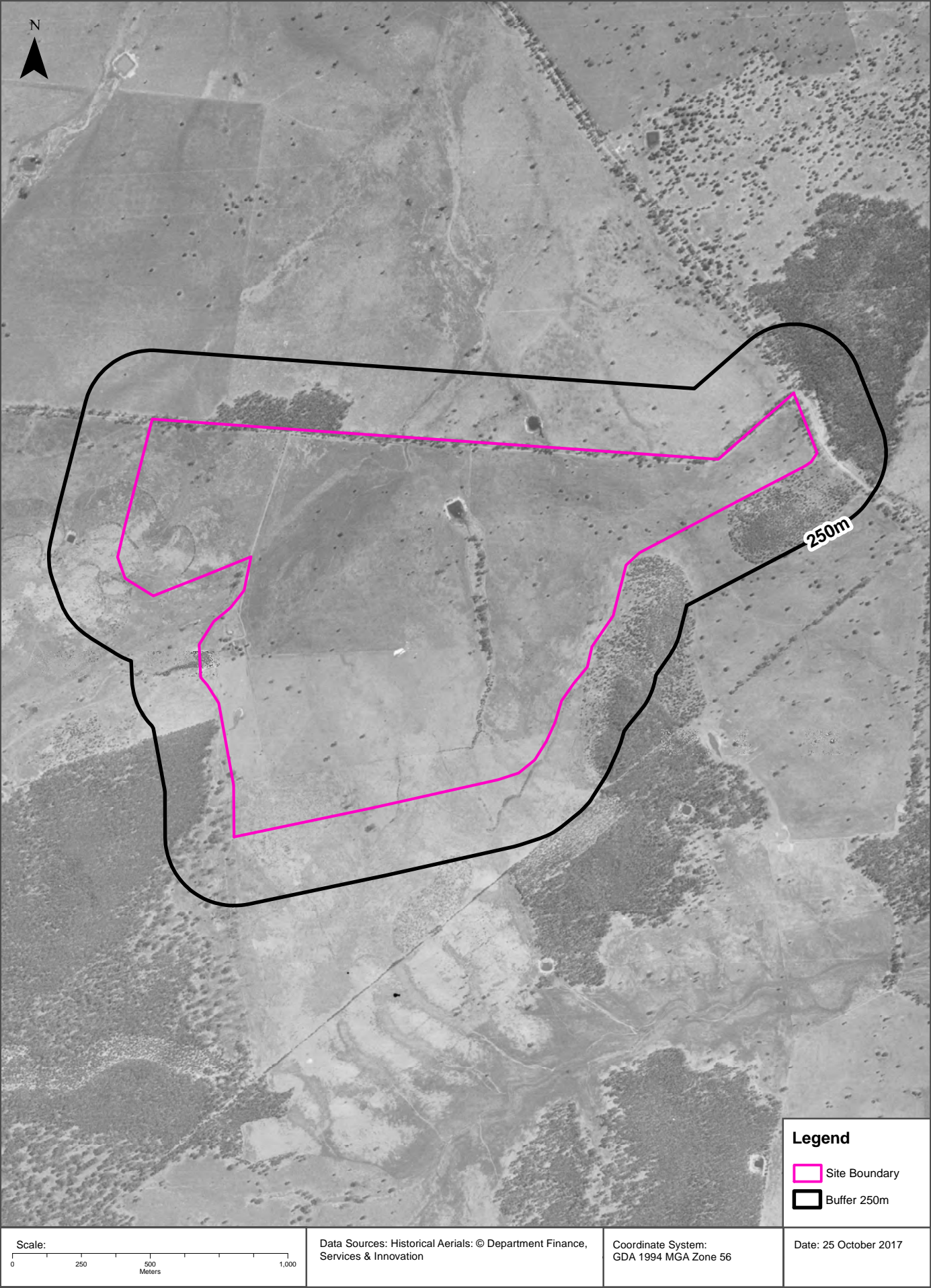




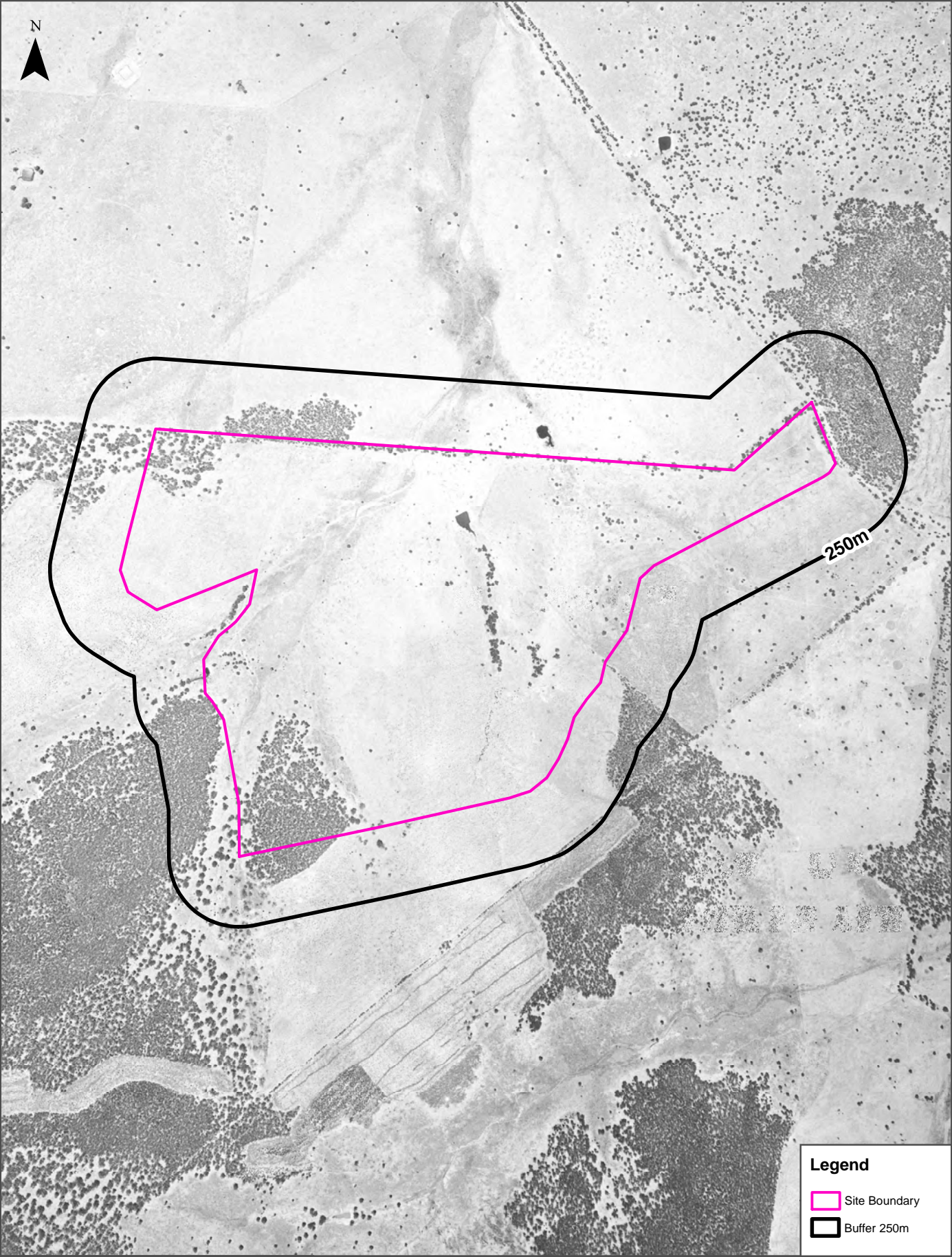


Scale: 0 250 500 1,000 Meters	Data Sources: Historical Aerials: © Department Finance, Services & Innovation	Coordinate System: GDA 1994 MGA Zone 56	Date: 25 October 2017
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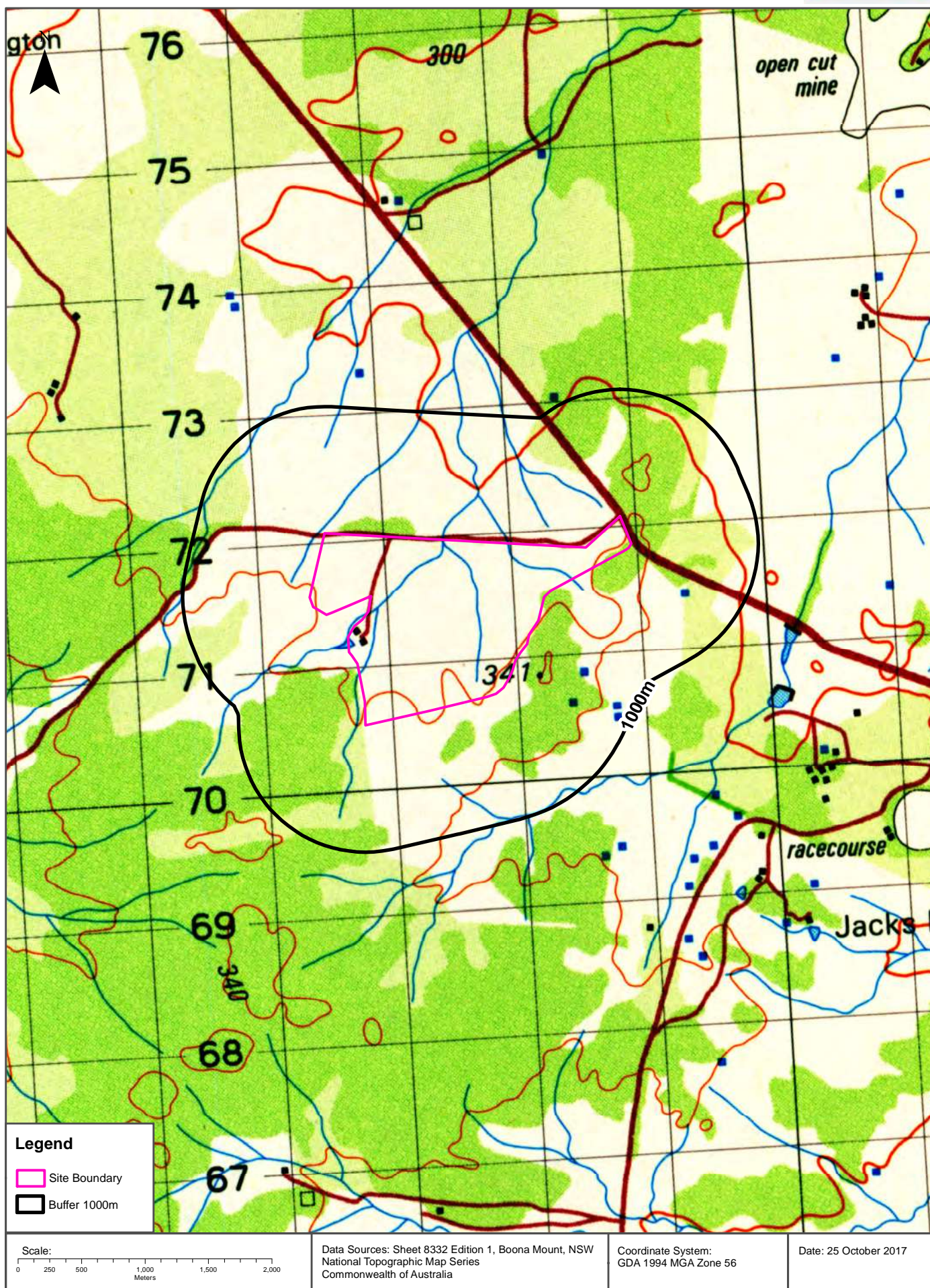


<p>Scale:</p> <p>0 250 500 1,000</p> <p>Meters</p>	<p>Data Sources: Historical Aerials: © Department Finance, Services &amp; Innovation</p>	<p>Coordinate System: GDA 1994 MGA Zone 56</p>	<p>Date: 26 October 2017</p>
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# Historical Map 1976

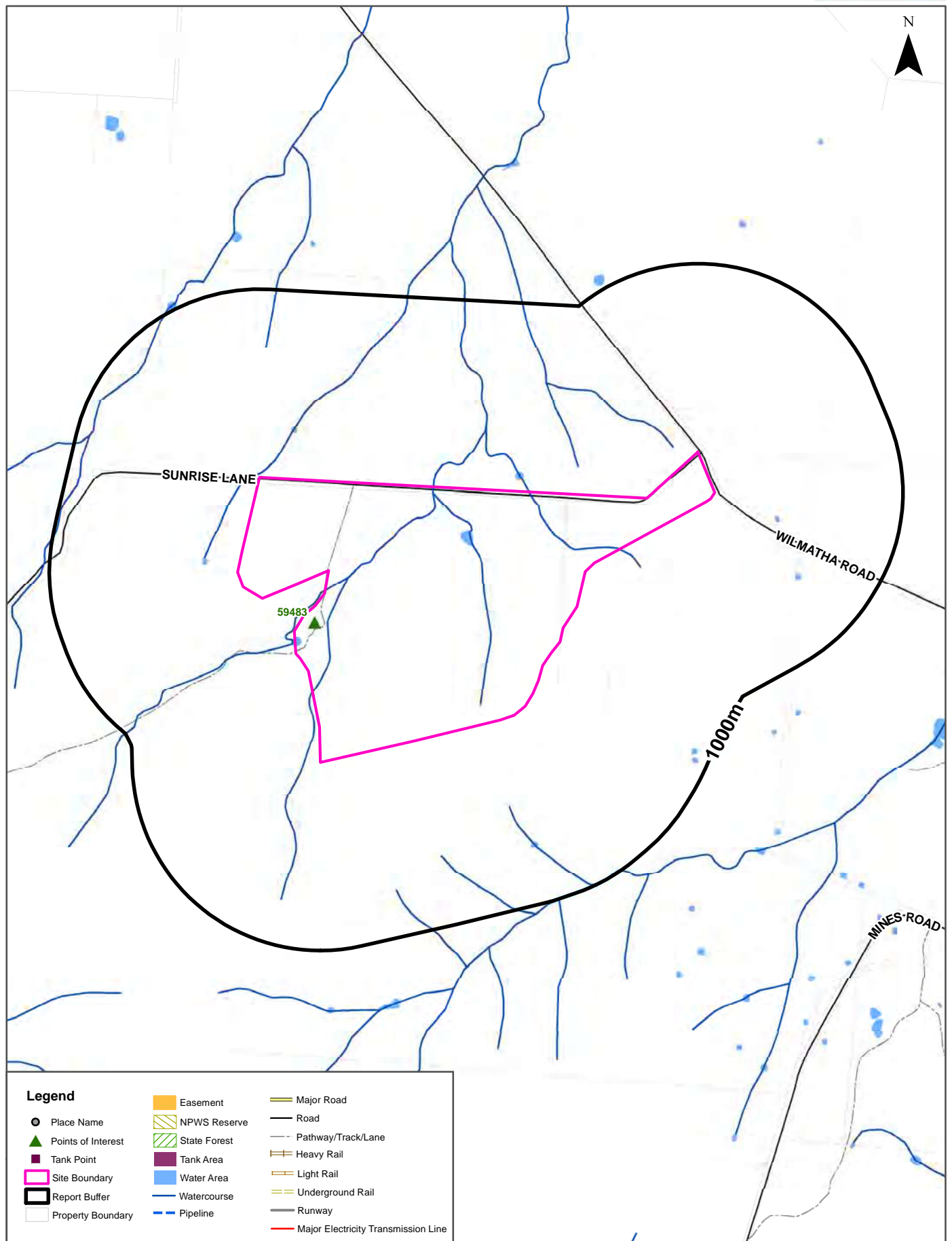
Sunrise Lane, Fifield, NSW 2875





# Topographic Features

Sunrise Lane, Fifield, NSW 2875



## Legend

- |                      |                |                                       |
|----------------------|----------------|---------------------------------------|
| ● Place Name         | ■ Easement     | — Major Road                          |
| ▲ Points of Interest | ▨ NPWS Reserve | — Road                                |
| ■ Tank Point         | ▨ State Forest | — Pathway/Track/Lane                  |
| ▭ Site Boundary      | ■ Tank Area    | — Heavy Rail                          |
| ▭ Report Buffer      | ■ Water Area   | — Light Rail                          |
| ▭ Property Boundary  | — Watercourse  | — Underground Rail                    |
|                      | — Pipeline     | — Runway                              |
|                      |                | — Major Electricity Transmission Line |

Scale:

0 100 200 400  
Meters

Data Sources: Property Boundaries & Topographic Data:  
© Department Finance, Services & Innovation 2017

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 24 October 2017

## Topographic Features

**Sunrise Lane, Fifield, NSW 2875**

### Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
59483	Homestead	SUNRISE	0m	Onsite

Topographic Data Source: © Land and Property Information (2015)

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## Topographic Features

Sunrise Lane, Fifield, NSW 2875

### Tanks (Areas)

What are the Tank Areas located within the dataset buffer?

Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
	No records in buffer					

### Tanks (Points)

What are the Tank Points located within the dataset buffer?

Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
	No records in buffer					

Tanks Data Source: © Land and Property Information (2015)

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### Major Easements

What Major Easements exist within the dataset buffer?

Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
N/A	No records in buffer				

Easements Data Source: © Land and Property Information (2015)

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## Topographic Features

Sunrise Lane, Fifield, NSW 2875

### State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

State Forest Data Source: © Land and Property Information (2015)

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### National Parks and Wildlife Service Reserves

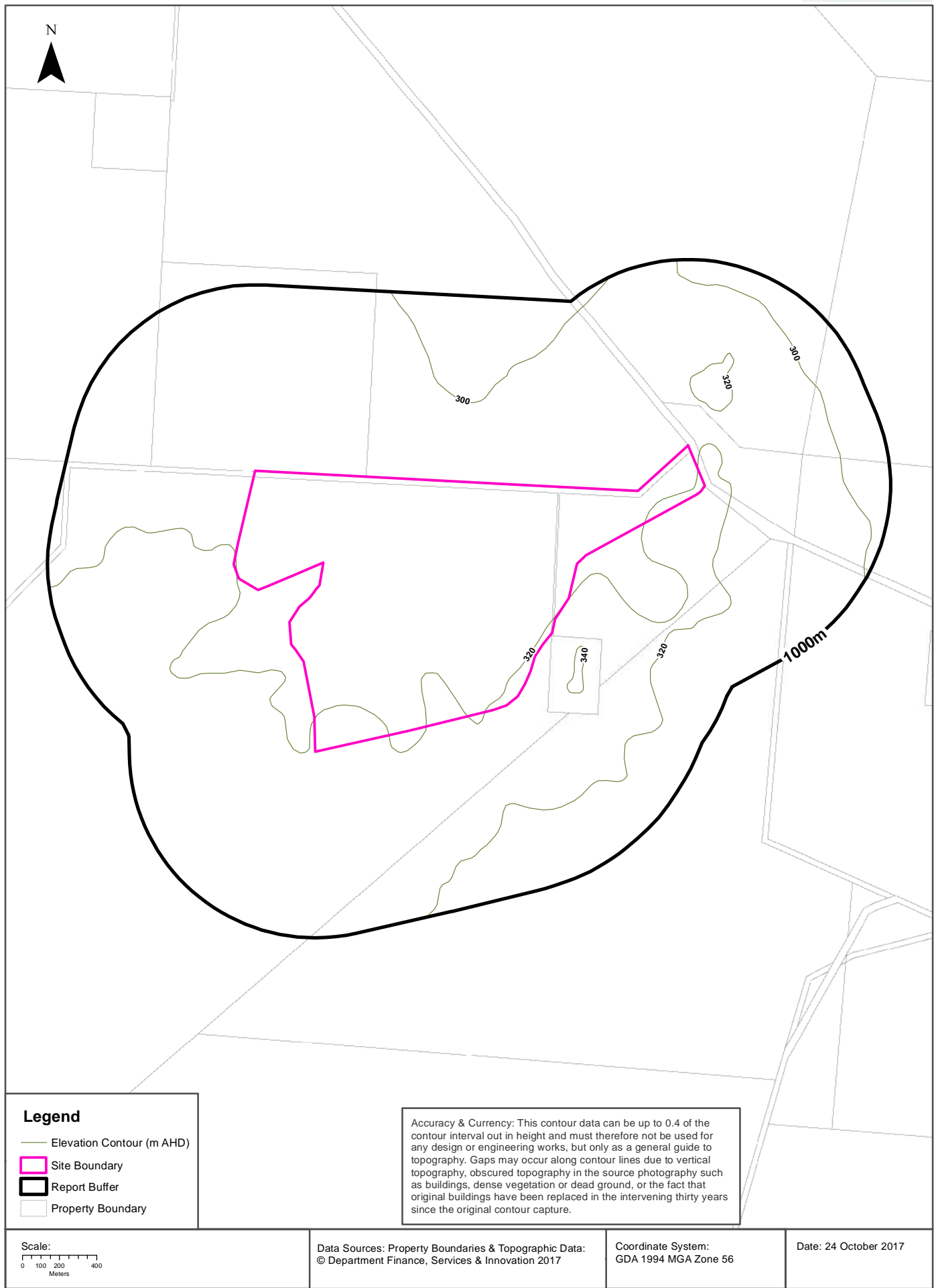
What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

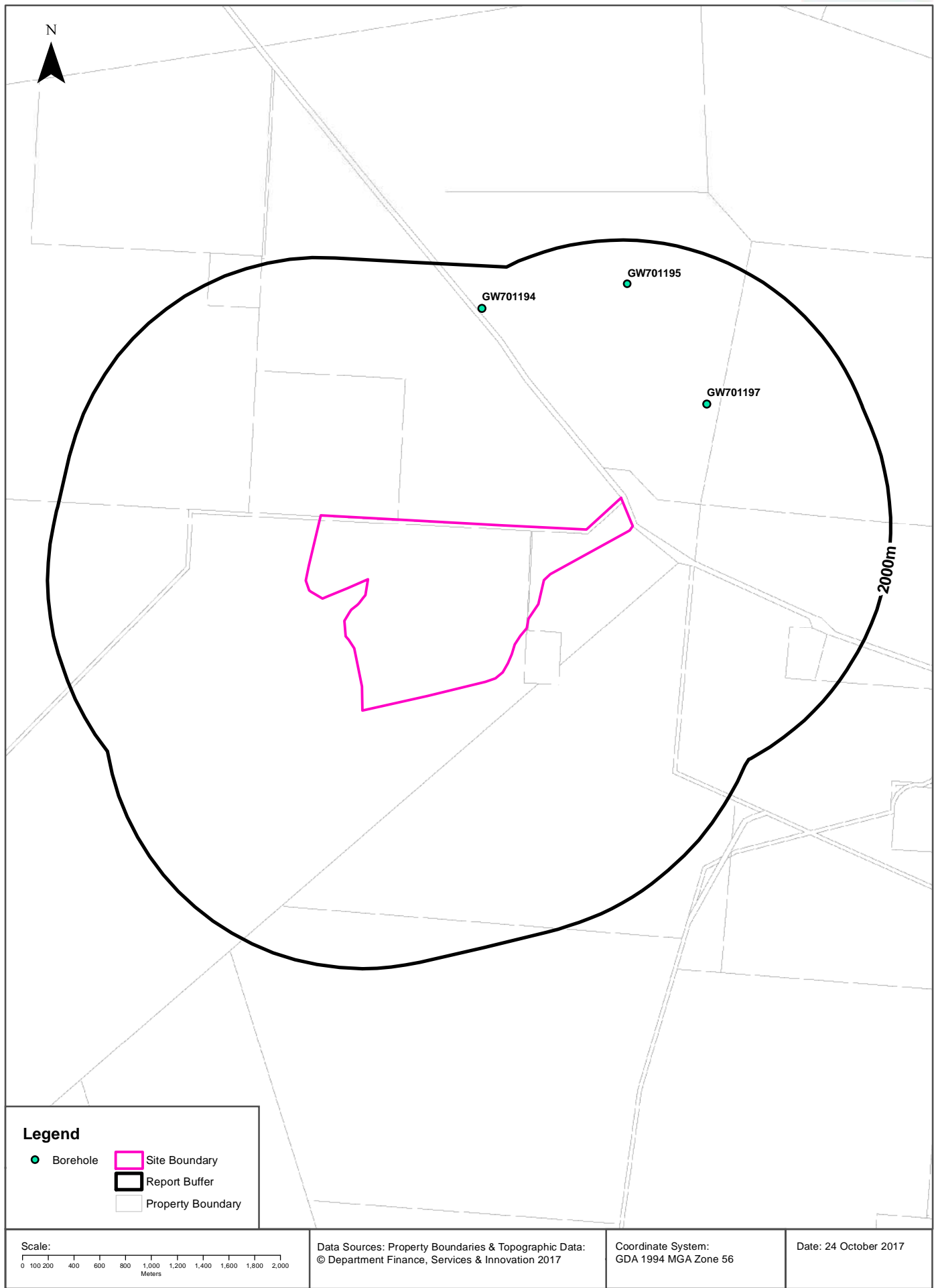
NPWS Data Source: © Land and Property Information (2015)

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Elevation Contours (m AHD)  
Sunrise Lane, Fifield, NSW 2875







# Hydrogeology & Groundwater

Sunrise Lane, Fifield, NSW 2875

## Hydrogeology

Description of aquifers on-site:

Description
Fractured or fissured, extensive aquifers of low to moderate productivity

Description of aquifers within the dataset buffer:

Description
Fractured or fissured, extensive aquifers of low to moderate productivity

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)

Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>

## Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Purpose	Contractor	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW701197	70BL227842	Bore	Mines	Monitoring	McDermott Drilling Pty Ltd	26/08/1999	57.40	57.40		48.21			986m	North East
GW701195	70BL227842	Bore	Mines	Monitoring	McDermott Drilling Pty Ltd	25/08/1999	57.40	57.40		45.21			1657 m	North East
GW701194	70BL227842	Bore	Mines	Monitoring	McDermott Drilling Pty Ltd	04/09/1999	48.20	48.20		27.48			1669 m	North

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW. All other bores © Commonwealth of Australia (Bureau of Meteorology) 2015. Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>

## Hydrogeology & Groundwater

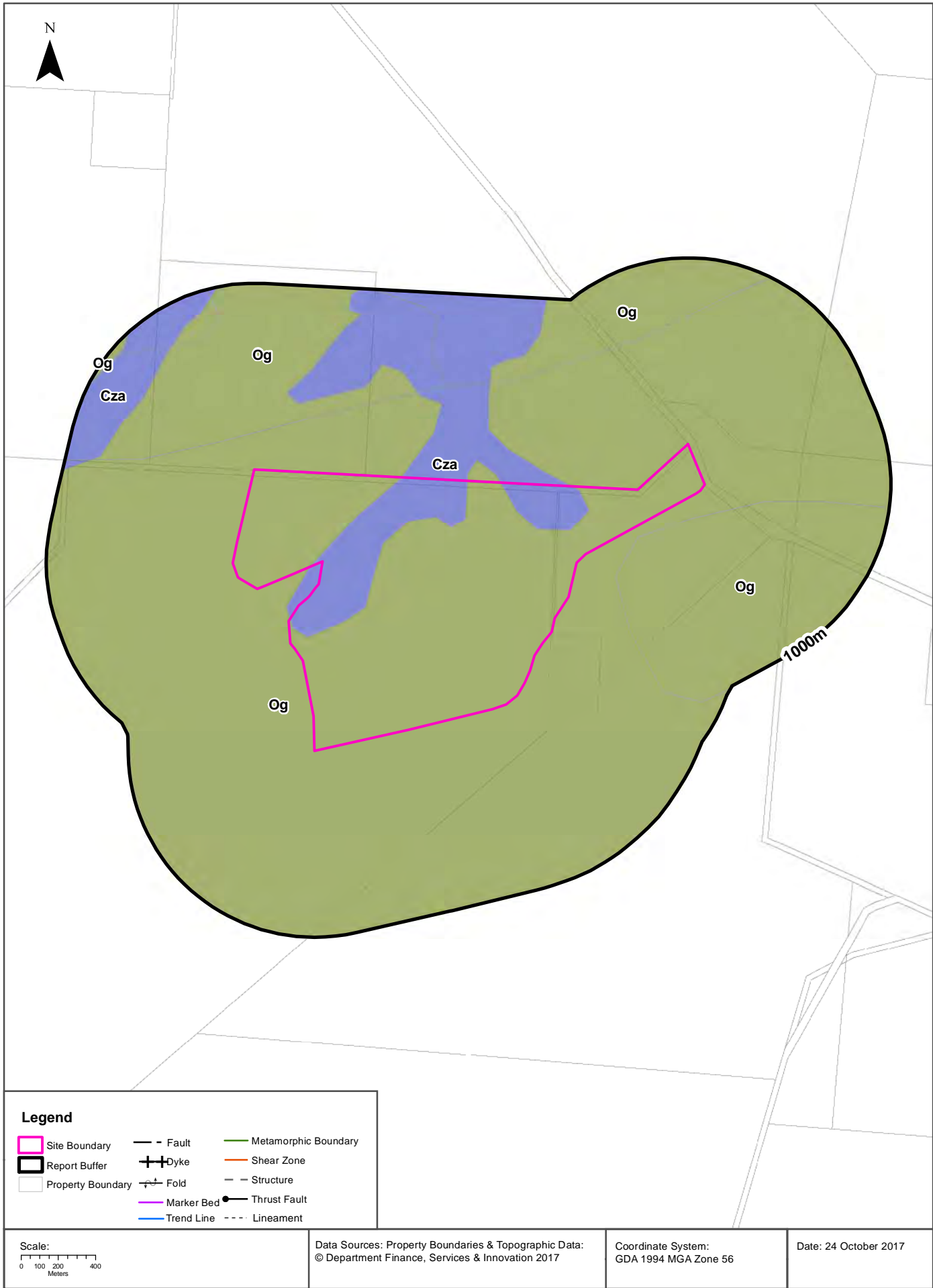
Sunrise Lane, Fifield, NSW 2875

### Driller's Logs

Drill log data relevant to the boreholes within the dataset buffer:

Groundwater No	Drillers Log	Distance	Direction
GW701197	0.00m-8.50m Silty Clay 8.50m-20.30m Metasediments 20.30m-57.40m Gabbro / diorite	986m	North East
GW701195	0.00m-3.00m Silty Clay 3.00m-14.00m Laterite 14.00m-21.00m Ironstone 21.00m-57.40m Pyroxenite	1657m	North East
GW701194	0.00m-19.00m Silty Clay 19.00m-48.20m Pyroxenite	1669m	North

Drill Log Data Source: NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corp  
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## Geology

Sunrise Lane, Fifield, NSW 2875

### Geological Units

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Cza	Alluvium, dominantly red silt with some pebble bands and quartz grit; includes relict meanders but currently is being eroded				Cainozoic			1:250,000
Og	Undifferentiated multiply deformed quartzite and phyllite with numerous quartz veins		Girilambone Group		Palaeozoic			1:250,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Cza	Alluvium, dominantly red silt with some pebble bands and quartz grit; includes relict meanders but currently is being eroded				Cainozoic			1:250,000
Og	Undifferentiated multiply deformed quartzite and phyllite with numerous quartz veins		Girilambone Group		Palaeozoic			1:250,000

### Geological Structures

What are the Geological Structures onsite?

Feature	Name	Description	Map Sheet	Dataset
No features				1:250,000

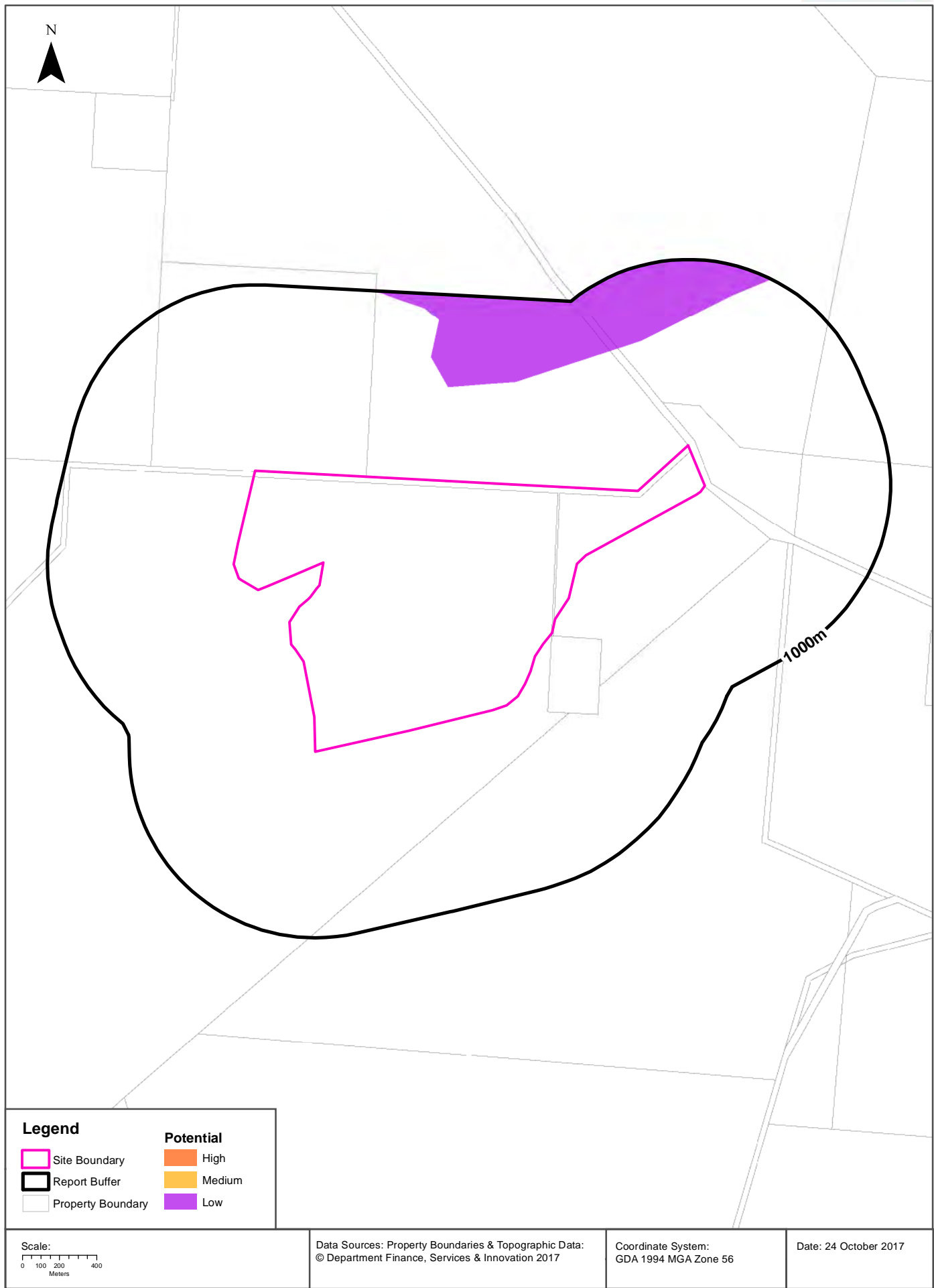
What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Dataset
No features				1:250,000

Geological Data Source : NSW Department of Industry, Resources & Energy

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Naturally Occurring Asbestos Potential  
Sunrise Lane, Fifield, NSW 2875



## Naturally Occurring Asbestos Potential

Sunrise Lane, Fifield, NSW 2875

## Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
Low	Ofii5a	Tout Intrusive Complex	Fifield Igneous Complex	Tout Intrusive Complex	250000	Late Ordovician	Late Ordovician	Gabbro	ULTRAMAFIC	Gabbro	505 m	North

Mining Subsidence District Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy



## Standard Local Environmental Plan Acid Sulfate Soils

Sunrise Lane, Fifield, NSW 2875

### Standard Local Environmental Plan Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

Soil Class	Description	LEP
N/A		

If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	LEP	Distance	Direction
N/A				

Acid Sulfate Data Source Accessed 07/10/2016: NSW Crown Copyright - Planning and Environment  
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## Dryland Salinity

Sunrise Lane, Fifield, NSW 2875

### Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

**No**

Is there Dryland Salinity - National Assessment data within the dataset buffer?

**No**

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A	N/A	N/A

Dryland Salinity Data Source : National Land and Water Resources Audit

The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.

In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

### Dryland Salinity Potential of Western Sydney

Dryland Salinity Potential of Western Sydney within the dataset buffer?

Feature Id	Classification	Description	Distance	Direction
N/A	Outside Data Coverage			

Dryland Salinity Potential of Western Sydney Data Source : NSW Office of Environment and Heritage

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## Mining Subsidence Districts

**Sunrise Lane, Fifield, NSW 2875**

## Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining Subsidence District Data Source: © Land and Property Information (2016)  
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## Environmental Zoning

Sunrise Lane, Fifield, NSW 2875

### State Environmental Planning Policy Protected Areas

Are there any State Environmental Planning Policy Protected Areas onsite or within the dataset buffer?

Dataset	Onsite	Within Site Buffer	Distance
SEPP14 - Coastal Wetlands	No	No	N/A
SEPP26 - Littoral Rainforests	No	No	N/A
SEPP71 - Coastal Protection Zone	No	No	N/A

SEPP Protected Areas Data Source: NSW Department of Planning & Environment  
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### State Environmental Planning Policy Major Developments (2005)

State Environmental Planning Policy Major Developments within the dataset buffer:

Map Id	Feature	Effective Date	Distance	Direction
N/A	No records within buffer			

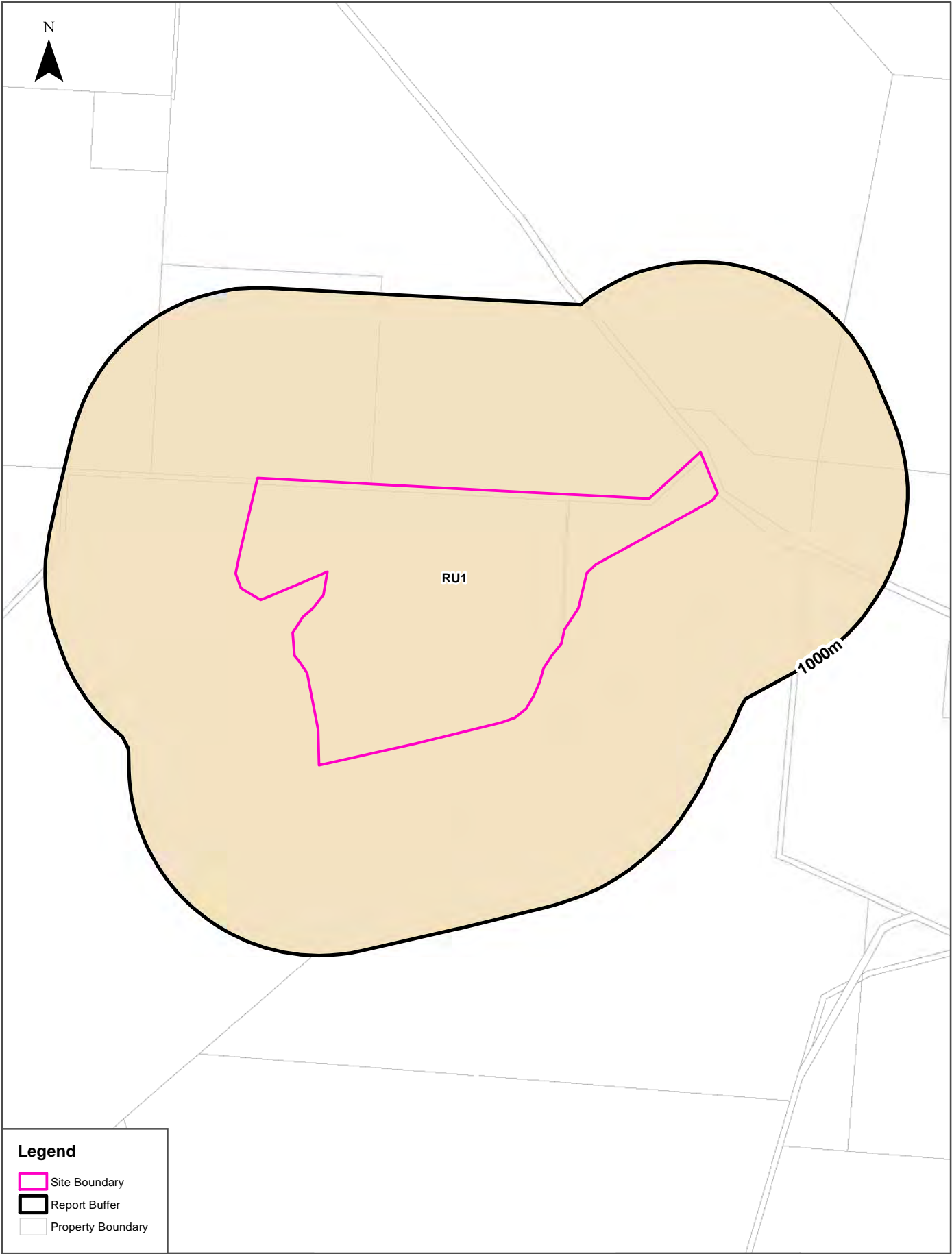
SEPP Major Development Data Source: NSW Department of Planning & Environment  
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### State Environmental Planning Policy Strategic Land Use Areas

State Environmental Planning Policy Strategic Land Use Areas onsite or within the dataset buffer:

Strategic Land Use	SEPPNo	Effective Date	Amendment	Amendment Year	Distance	Direction
No records within buffer						

SEPP Strategic Land Use Data Source: NSW Department of Planning & Environment  
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**Legend**

- Site Boundary
- Report Buffer
- Property Boundary

<p>Scale:</p>	<p>Data Sources: Property Boundaries &amp; Topographic Data: © Department Finance, Services &amp; Innovation 2017 Planning: NSW Crown Copyright - Planning &amp; Environment</p>	<p>Coordinate System: GDA 1994 MGA Zone 56</p>	<p>Date: 24 October 2017</p>
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## Local Environmental Plan

Sunrise Lane, Fifield, NSW 2875

## Land Zoning

What Local Environmental Plan Land Zones exist within the dataset buffer?

Zone	Description	Purpose	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RU1	Primary Production		Lachlan Local Environmental Plan 2013	09/08/2013	09/08/2013	09/08/2013		0m	Onsite

Local Environment Plan Data Source: NSW Crown Copyright - Planning & Environment  
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## Local Environmental Plan

Sunrise Lane, Fifield, NSW 2875

### Minimum Subdivision Lot Size

What are the onsite Local Environmental Plan Minimum Subdivision Lot Sizes?

Symbol	Minimum Lot Size	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
AF	400 ha	Lachlan Local Environmental Plan 2013	09/08/2013	09/08/2013	09/08/2013		100

### Maximum Height of Building

What are the onsite Local Environmental Plan Maximum Height of Buildings?

Symbol	Maximum Height of Building	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
No Data							

### Floor Space Ratio

What are the onsite Local Environmental Plan Floor Space Ratios?

Symbol	Floor Space Ratio	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
No Data							

### Land Application

What are the onsite Local Environmental Plan Land Applications?

Application Type	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
Included	Lachlan Local Environmental Plan 2013	09/08/2013	09/08/2013	09/08/2013		100

### Land Reservation Acquisition

What are the onsite Local Environmental Plan Land Reservation Acquisitions?

Reservation	LEP	Published Date	Commenced Date	Currency Date	Amendment	Comments	Percentage of Site Area
No Data							

Local Environment Plan Data Source: NSW Crown Copyright - Planning & Environment  
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## Heritage

Sunrise Lane, Fifield, NSW 2875

### State Heritage Items

What are the State Heritage Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: NSW Crown Copyright - Planning & Environment

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### Local Heritage Items

What are the Local Heritage Items located within the dataset buffer?

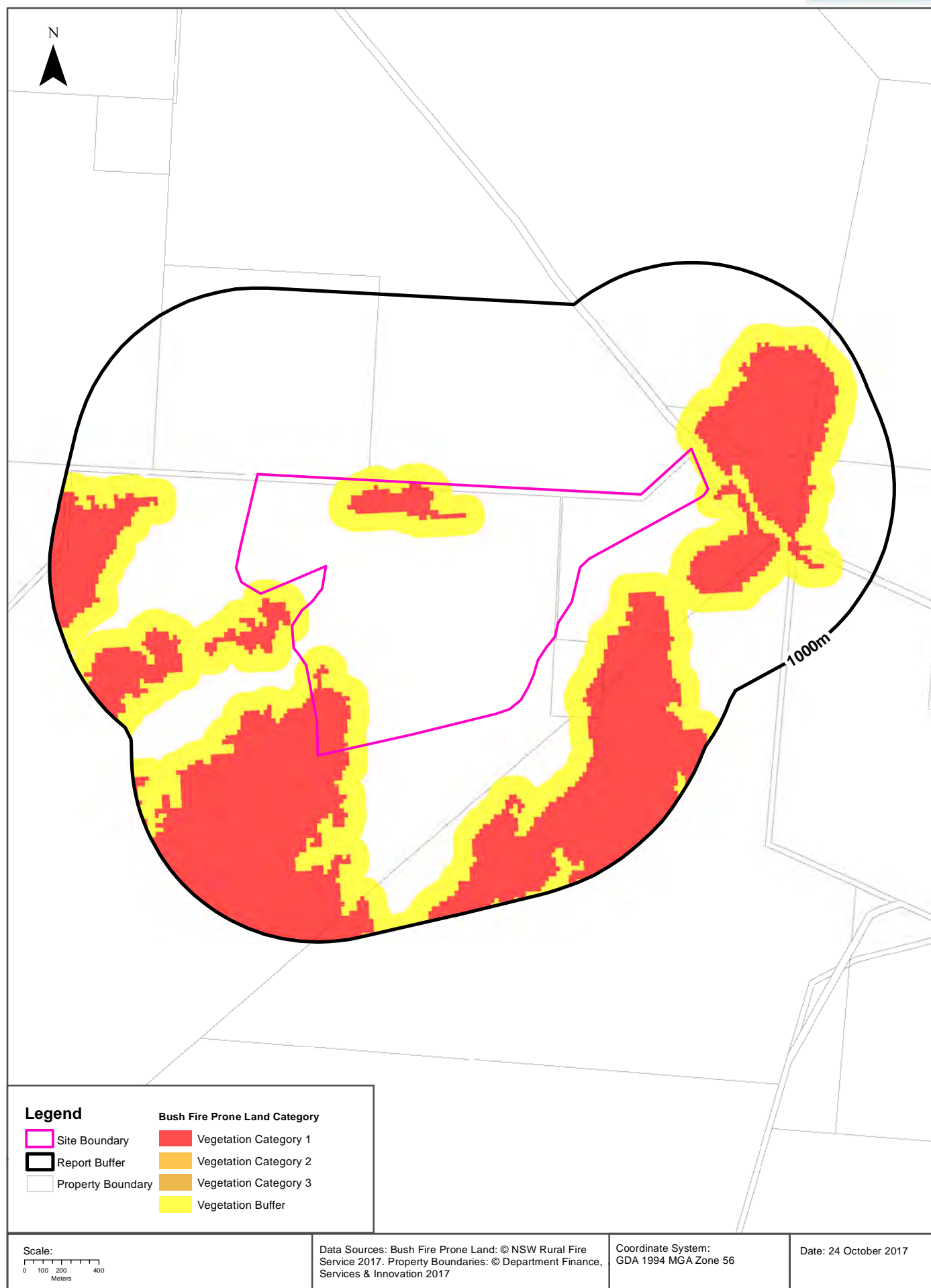
Map Id	Name	Classification	Significance	LEP or Act	Published Date	Commenced Date	Currency Date	Distance	Direction
N/A	No records in buffer								

Heritage Data Source: NSW Crown Copyright - Planning & Environment

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# Natural Hazards - Bush Fire Prone Land

Sunrise Lane, Fifield, NSW 2875



## Natural Hazards

Sunrise Lane, Fifield, NSW 2875

### Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	0m	Onsite
Vegetation Category 1	0m	Onsite

NSW Bush Fire Prone Land - © NSW Rural Fire Service under Creative Commons 4.0 International Licence

## Ecological Constraints

**Sunrise Lane, Fifield, NSW 2875**

### RAMSAR Wetlands

What RAMSAR Wetland areas exist within the dataset buffer?

Map Id	RAMSAR Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

RAMSAR Wetlands Data Source: © Commonwealth of Australia - Department of Environment

## Ecological Constraints

Sunrise Lane, Fifield, NSW 2875

### ATLAS of NSW Wildlife

Endangered & Vulnerable Species on the ATLAS of NSW Wildlife database, within 10km of the site?

Class	Family	Scientific	Common	Exotic	NSW Status	Commonwealth Status
Aves	Cacatuidae	Lophochroa leadbeateri	Major Mitchell's Cockatoo	No	Vulnerable, Protected, Category 2 Sensitive Species	
Aves	Climacteridae	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	No	Vulnerable, Protected	
Aves	Estrildidae	Stagonopleura guttata	Diamond Firetail	No	Vulnerable, Protected	
Aves	Pomatostomidae	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	No	Vulnerable, Protected	
Aves	Psittacidae	Polytelis swainsonii	Superb Parrot	No	Vulnerable, Protected, Category 3 Sensitive Species	Vulnerable
Flora	Poaceae	Austrostipa wakoolica	A spear-grass	No	Endangered, Protected	Endangered

Data does not include records not defined as either endangered or vulnerable, and category 1 sensitive species are also excluded. NSW Office of Environment and Heritage's Atlas of NSW Wildlife, which holds data from a number of custodians. Data obtained 24/10/2017

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# Annexure F

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## **NSW SafeWork Dangerous Goods Search Results**





**SafeWork NSW**

Locked Bag 2906, Lisarow NSW 2252

Customer Experience 13 10 50

ABN 81 913 830 179 | [www.safework.nsw.gov.au](http://www.safework.nsw.gov.au)

Our Ref: D17/232537  
Your Ref: James Morrow

26 October 2017

Attention: James Morrow  
Ground Doctor Pty Ltd  
PO BOX 6278  
Dubbo NSW 2830

Dear Mr Morrow

**RE SITE: Lot 17 DP 752086 Sunrise Lane Fifield NSW**

I refer to your site search request received by SafeWork NSW on 20 October 2017 requesting information on Storage of Hazardous Chemicals for the above site.

A search of the records held by SafeWork NSW has not located any records pertaining to the above mentioned premises.

For further information or if you have any questions, please call us on 13 10 50 or email [licensing@safework.nsw.gov.au](mailto:licensing@safework.nsw.gov.au)

Yours sincerely

A handwritten signature in black ink, appearing to be a stylized 'J' or 'M'.

Customer Service Officer  
Customer Experience - Operations  
SafeWork NSW