

# CHAPTER 12

## Heritage

NORTH STAR TO NSW/QUEENSLAND BORDER ENVIRONMENTAL IMPACT STATEMENT

 ARTC

The Australian Government is delivering  
Inland Rail through the Australian  
Rail Track Corporation (ARTC), in  
partnership with the private sector.

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## 12. Heritage

### 12.1 Scope of chapter

The overarching objectives of the heritage assessment for the Inland Rail North Star to NSW/Queensland Border project (the proposal) are as follows:

- ▶ To identify the cultural heritage values of the study area by way of background research, archaeological survey and consultation with Registered Aboriginal Parties (RAPs)
- ▶ To assess the potential impact of the proposal on the identified cultural heritage values of the study area
- ▶ To provide an appropriate management strategy for avoiding or minimising potential harm to the identified cultural heritage values of the study area

To compile an *Aboriginal Cultural Heritage Assessment Report* and a *Historical Heritage Assessment Report* that will assist the Secretary of the Department of Planning, Industry and Environment (DPIE) in their assessment of the EIS.

### 12.2 Secretary's Environmental Assessment Requirements

This chapter has been prepared to address the SEARs as shown in Table 12.1.

TABLE 12.1 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS COMPLIANCE

	Item 13: Heritage	
Desired performance outcome	<p>The design, construction and operation of the project facilitates, to the greatest extent possible, for the long-term protection, conservation and management of the heritage significance of items of environmental heritage and Aboriginal objects and places.</p> <p>The design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage and Aboriginal objects and places.</p>	
Current guidelines	<p><i>Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW</i> (OEH, 2011)</p> <p><i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (DECCW, 2010a)</p> <p><i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW, 2010b)</p> <p><i>NSW Skeletal Remains: Guidelines for Management of Human Remains</i> (Heritage Office, 1998)</p> <p>Aboriginal site impact recording form (OEH, 2012)</p> <p><i>Aboriginal Heritage Information Management System Site Recording Form</i> (OEH, 2018)</p> <p><i>Application for the Transfer of Aboriginal Objects for Safekeeping Form</i> (OEH, 2014)</p> <p><i>Criteria for the Assessment of Excavation Directors</i> (NSW Heritage Council, 2011)</p> <p><i>NSW Heritage Manual</i> (Heritage Office and DUAP, 1996)</p> <p><i>Assessing Heritage Significance</i> (NSW Heritage Office, 2001)</p> <p><i>The Australia International Council on Monuments and Sites (ICOMOS) Burra Charter</i> (ICOMOS (Australia) 2013).</p>	
SEARs requirement	EIS section	
Item 13.1	The Proponent must identify and assess any direct and/or indirect impacts (including cumulative impacts) to the heritage significance of:	
a) Aboriginal places and objects, as defined under the National Parks and Wildlife Act 1974 and in accordance with the principles and methods of assessment identified in the current guidelines	Section 12.5 Section 12.8	
b) Aboriginal places of heritage significance, as defined in the Standard Instrument—Principal Local Environmental Plan	Section 12.5 Section 12.8	
c) Environmental heritage, as defined under the <i>Heritage Act 1977</i>	Section 12.5 Section 12.8	
d) Items listed on the National and World Heritage lists.	Section 12.4.5 Section 12.5 Section 12.8	



SEARs requirement	EIS section
<p>Item 13.2</p> <p>Where archaeological investigations of Aboriginal objects are proposed, these must be conducted by a suitably qualified archaeologist, in accordance with section 1.6 of the <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW, 2010).</p>	Section 12.4.3
<p>Item 13.3</p> <p>Impacts to Aboriginal objects and/or places must be assessed and documented in an <i>Aboriginal Cultural Heritage Assessment Report</i> (ACHAR). Consultation must be undertaken with Aboriginal people in accordance with the <i>Aboriginal Cultural Heritage Consultation requirements for proponents</i> (DECCW, 2010). The ACHAR must document the outcomes of consultation with Aboriginal people and outline measures proposed to mitigate impacts. The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the ACHAR.</p>	<p>Section 12.4.6</p> <p>Appendix E: Aboriginal Cultural Heritage and Archaeological Assessment</p>
<p>Item 13.4</p> <p>Where impacts to state or locally significant heritage items are identified, the assessment must:</p>	
a) Include a statement of heritage impact for all heritage items (including significance assessment)	<p>Section 12.5.4</p> <p>Figure 12.6</p> <p>Appendix E: Aboriginal Cultural Heritage and Archaeological Assessment</p>
b) Consider impacts to the item of significance caused by, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, visual amenity, landscape and vistas, curtilage, subsidence and architectural noise treatment (as relevant)	<p>Section 12.8</p> <p>Table 12.20</p>
c) Outline measures to avoid and minimise those impacts in accordance with the current guidelines	<p>Section 12.7</p> <p>Table 12.17</p>
d) Be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria).	<p>Section 12.4.3</p> <p>NSW Heritage Council's Excavation Director criteria will be complied with if excavation is required.</p>

### 12.3 Legislation, policies, standards and guidelines

This section describes the legislative, policy and management framework for the proposal, including:

- ▶ Legislative framework that applies to the assessment of heritage applicable to the proposal at the Commonwealth, state and local levels, and provides the statutory context for which the heritage assessment has been undertaken
- ▶ Discussion on statutory approvals that may be required as a result of potential impacts to heritage, based on consideration of the overall approvals pathway for the proposal and the scope of applicable exemptions under NSW legislation.

An overview of the Commonwealth, state and local legislation and guidelines that are relevant to the proposal, outlining the intent of the legislation and applicability to the proposal is presented in Table 12.2.

TABLE 12.2 SUMMARY OF LEGISLATION, POLICIES AND GUIDELINES

Legislation, policies, standards and guidelines	Relevance to the proposal
<b>Commonwealth</b>	
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBC Act)	<p>This Act is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places—defined as matters of national environmental significance (MNES). There are nine MNES to which the <i>EPBC Act</i> applies:</p> <ul style="list-style-type: none"> <li>▶ World heritage properties</li> <li>▶ National heritage places</li> <li>▶ Wetlands of international importance</li> <li>▶ Listed threatened species and ecological communities</li> <li>▶ Migratory species</li> <li>▶ Commonwealth marine areas</li> <li>▶ Great Barrier Reef Marine Park</li> <li>▶ Nuclear actions</li> <li>▶ A water resource, in relation to coal seam gas.</li> </ul> <p>The proposal was considered a controlled action and must therefore assess the significance of any potential impacts on MNES. However, the controlled action decision did not include heritage matters or impacts on the environment on Commonwealth land and, as a result, these matters are not required to be assessed for the purposes of the EPBC Act.</p>
<i>Native Title Act 1993</i>	<p>This Act provides for the recognition and protection of native title for Aboriginal people and Torres Strait Islander people. It also makes provision for Indigenous Land Use Agreements to be formed as well as providing a framework for notification of native title stakeholders for certain future acts on land where native title has not been extinguished.</p> <p>Searches of the Schedule of Applications (unregistered claimant applications), Register of Native Title Claims, National Native Title Register, Register of Indigenous Land Use Agreements and Notified Indigenous Land Use Agreements were undertaken in May 2018 for the proposal. The Gomeroi People (NC2011/006) are the Aboriginal Party accepted for registration on 20 January 2012, which covers the NSW component of the proposal.</p>
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	<p>The Act provides for the preservation and protection of places, areas and objects of significance to Indigenous Australians. The stated purpose of the Act is the 'preservation and protection from injury or desecration of areas and objects in Australia and in Australian waters, being areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition' (Part I, Section 4).</p> <p>For the purposes of the Act, an area or object is considered to have been injured or desecrated if:</p> <ol style="list-style-type: none"> <li>a) In the case of an area: <ol style="list-style-type: none"> <li>i) it is used or treated in a manner inconsistent with Aboriginal tradition</li> <li>ii) the use or significance of the area in accordance with Aboriginal tradition is adversely affected</li> <li>iii) passage through, or over, or entry on, the area by any person occurs in a manner inconsistent with Aboriginal tradition</li> </ol> </li> <li>b) In the case of an object: <ol style="list-style-type: none"> <li>iv) it is used or treated in a manner inconsistent with Aboriginal tradition.</li> </ol> </li> </ol> <p>This Act can override state and territory laws in situations where a state or territory has approved an activity, but the Australian Government Minister prevents the activity from occurring by making a declaration to protect an area or object. However, the Minister can only make a decision after receiving a legally valid application under the Act and, in the case of long-term protection, after considering a report on the matter. Before making a declaration to protect an area or object in a state or territory, the Australian Government Minister must consult the appropriate minister of that state or territory.</p> <p>No declarations relevant to the study area have been made under the <i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>.</p>

State (NSW)

*Environmental Planning  
and Assessment Act 1979*

This Act, administered by the DPIE, requires that consideration be given to environmental impacts as part of the land-use planning process in NSW. In NSW, environmental impacts are interpreted as including impacts to Aboriginal and historical cultural heritage.

Pursuant to Division 5.2, Subdivision 4, Section 5.23(1)(d) of the EP&A Act, Aboriginal Heritage Impact Permits are not required for state significant infrastructure (SSI) authorised by a development consent. Likewise, under Section 5.23(1)(c) an approval under Part 4 or an excavation permit under Section 139 of the *Heritage Act 1977* are not required. Section 5.23(2) also states that Division 8 of Part 6 of the *Heritage Act* cannot be invoked to prevent or interfere with an authorised SSI.

Impacts to Aboriginal and historical heritage values associated with approved SSI projects are typically managed under Aboriginal cultural heritage management plans and historical heritage management plans respectively. Such management plans are statutorily binding once approved by the DPIE.

*National Parks and  
Wildlife Act 1974*

The Act, administered by the Department of Premier and Cabinet (DPC), is the primary legislation for the protection of Aboriginal cultural heritage in NSW. The Act gives the Secretary of the DPC responsibility for the proper care, preservation and protection of 'Aboriginal objects' and 'Aboriginal places', defined under the Act as follows:

- ▶ An Aboriginal object is any deposit, object or material evidence (that is not a handicraft made for sale) relating to Aboriginal habitation of NSW, before or during the occupation of that area by persons of non-Aboriginal extraction (and includes Aboriginal remains).
- ▶ An Aboriginal place is a place declared so by the minister administering the Act because the place is or was of special significance to Aboriginal culture. It may or may not contain Aboriginal objects.

It is recognised that as of July 2019 the NSW DPC administers the *National Parks and Wildlife Act 1974* (NPW Act). The former functions of the Office of Environment and Heritage (OEH) are now administered by the DPC. References to OEH have been maintained in instances where they were the author of a guideline or database searches which were undertaken before the change.

Section 5.23(d) of the *EP&A Act* provides that Section 90 of the *NPW Act* does not apply to SSI.

*Heritage Act 1977*

The Act was enacted to conserve the environmental heritage of NSW. Under Section 32, places, buildings, works, relics, moveable objects or precincts of heritage significance are protected by means of either Interim Heritage Orders or by listing on the *State Heritage Register*. Sites that are assessed as having state heritage significance can be listed on the *State Heritage Register* by the minister on the recommendation of the NSW Heritage Council.

Archaeological relics (any relics that are buried) are protected by the provisions of Section 139. Under this section it is illegal to disturb or excavate any land knowing or suspecting that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed. In such cases an excavation permit under Section 140 is required. Note that no formal listing is required for archaeological relics; they are automatically protected if they are of local significance or higher.

Section 5.23(c) of the *EP&A Act* provides that Section 139 does not apply to SSI.

Searches of the *State Heritage Register* were undertaken in October 2019, with no relevant listings identified for the study area

*Aboriginal Land Rights  
Act 1983*

The Act was established to return land in NSW to Aboriginal peoples through a process of lodging claims for certain Crown lands. The Act, administered by the NSW Department of Aboriginal Affairs, is a compensatory regime which recognises that land is of spiritual, social, cultural and economic importance to Aboriginal people. The Act establishes the NSW Aboriginal Land Council and a network of over 120 autonomous Local Aboriginal Land Councils (LALCs). It requires these bodies to take action to protect the culture and heritage of Aboriginal persons in the LALC's area, subject to any other law. It also requires them to promote awareness in the community of the culture and heritage of Aboriginal persons in the LALC's area.

Consultation with the Office of the Registrar of the Act in September 2018 has indicated study area does not have any Registered Aboriginal Owners.

## Legislation, policies, standards and guidelines

### Relevance to the proposal

<i>Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW</i> (OEH, 2011)	The guide is the key framework for undertaking Aboriginal heritage assessments (tangible and intangible heritage) in NSW and a required component of complying with the SEARs. The guide outlines the format and standards associated with reporting on Aboriginal heritage. This assessment has been undertaken in accordance with this guideline.
<i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (NSW Department of Environment Climate Change & Water, 2010a)	The requirements are the key framework for undertaking Aboriginal stakeholder consultation as part of heritage assessments in NSW and a required component of complying with the SEARs. The guidelines outline a prescriptive program of notification and continued consultation with Aboriginal Parties who nominate an interest in the study area. This assessment has been undertaken in accordance with this guideline.
<i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales</i> (NSW Department of Environment Climate Change & Water, 2010b)	The <i>Code of Practice</i> is a standard framework developed specifically for undertaking Aboriginal archaeological investigation as opposed to general Aboriginal heritage assessments in NSW. This code outlines steps and considerations that must be factored in when proposing to undertake field survey and open area excavation. This assessment has been undertaken in accordance with this guideline.
<i>NSW Heritage Manual</i> (NSW Heritage Office and NSW Department of Urban Affairs and Planning, 1996)	The manual is a collection of procedures and policies developed over the years by the NSW Heritage Division. It deals exclusively with historical heritage and each section is designed to be implemented independently.
<i>Assessing Heritage Significance</i> (NSW Heritage Office, 2001)	The framework is the key document for applying criteria for assessing items of state heritage value. This can include items of Aboriginal heritage significance.
<i>NSW Skeletal Remains: Guidelines for Management of Human Remains</i> (NSW Heritage Office, 1998)	This guideline deals exclusively with the matter of management of human remains. Although unlikely to occur on this proposal, consultation with Aboriginal stakeholders in Toomelah have identified the existence of burials on the northern bank of the Macintyre River in Queensland.

## Local government

<i>Moree Plains Local Environmental Plan</i> (MPSC, 2011)	Although this plan does not apply to the proposal as it is SSI, this plan provides guidance on the management of local heritage in addition to maintaining a register of heritage items. No local heritage items were noted in the plan that intersect with the study area.
<i>Gwydir Local Environmental Plan</i> (GSC, 2013)	Although this plan does not apply to the proposal as it is SSI, this plan provides guidance on the management of local heritage in addition to maintaining a register of heritage items. No local heritage items were noted in the plan that intersect with the study area.

## Non-statutory guidelines

<i>The Burra Charter: The Australian ICOMOS charter for places of cultural significance</i> (ICOMOS, 2013)	The charter sets a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance, including owners, managers and custodians. The charter provides specific guidance for physical and procedural actions that should occur in relation to significant places.
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## 12.4 Methodology

### 12.4.1 Study area

The study area for this assessment generally extends two kilometres either side of the alignment, from North Star in the south to the NSW/QLD border and Macintyre River in the north (refer Figure 12.1). It generally follows the easement of the old Cumurra–Boggabilla Railway line (Warialda Standard and Northern Districts' Advertiser 1932:2) before deviating in a north-easterly direction, south of where Whelan Creek crosses the Bruxner Highway, towards the Macintyre River and joins up at Kurumbal Siding on the Goondiwindi railway line on the Queensland side of the border. Only works on the NSW side of the border are considered as part of this assessment.



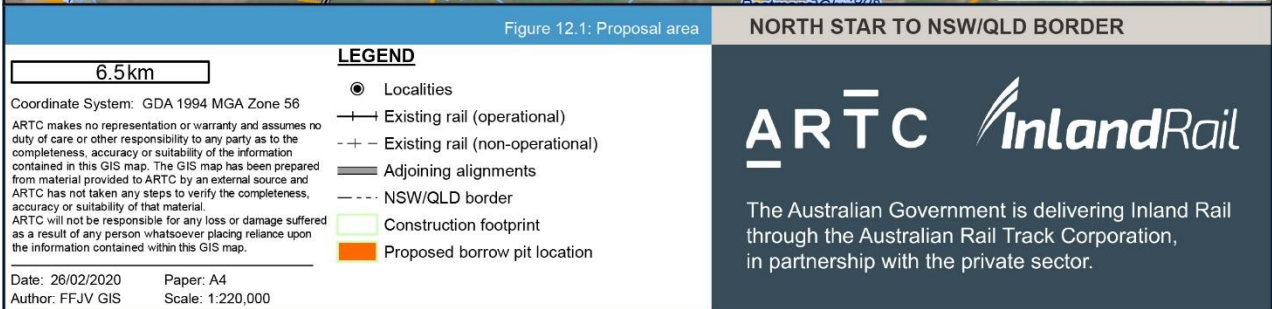
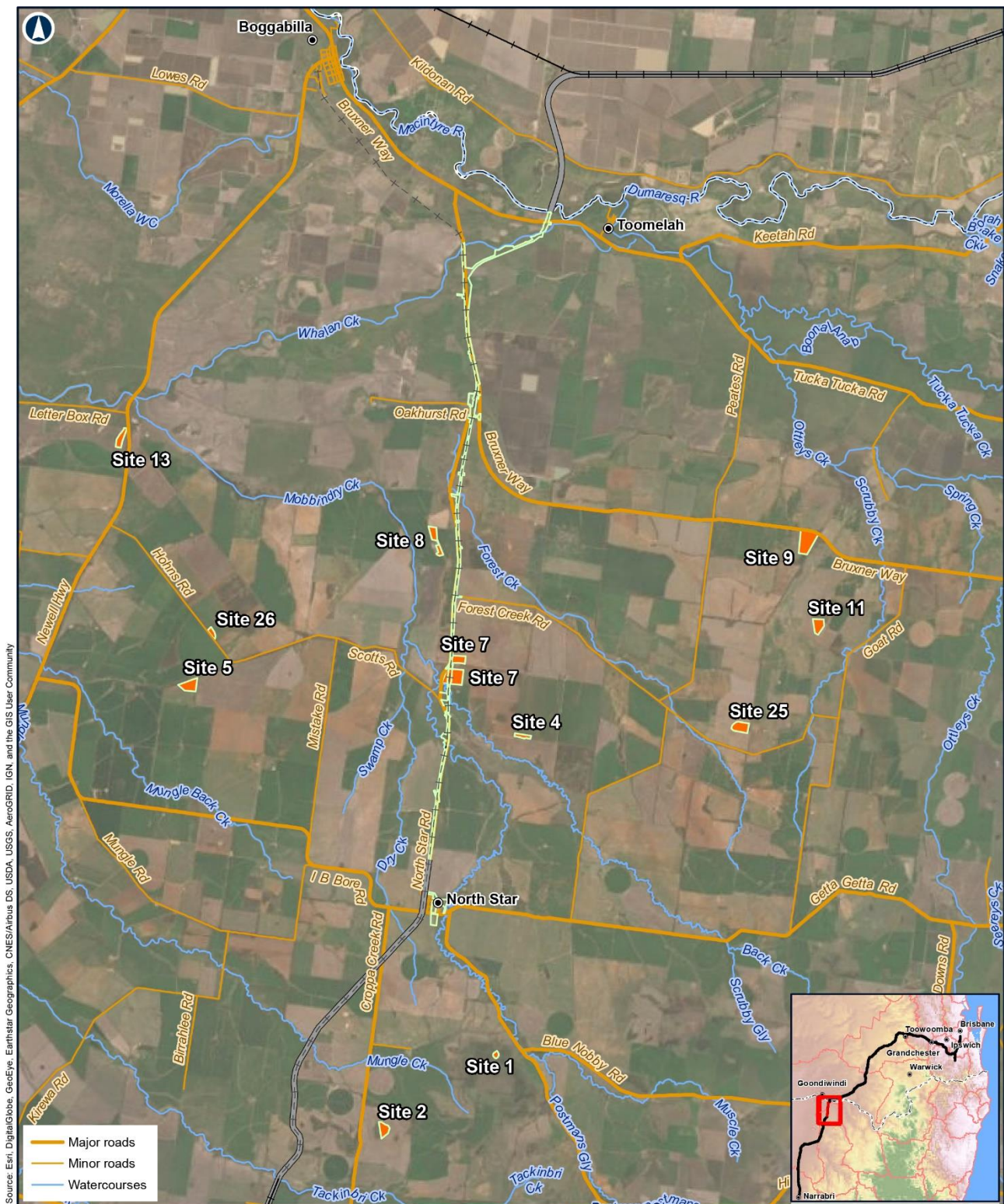


FIGURE 12.1 PROPOSAL AREA

#### 12.4.2 Desktop assessment

A heritage desktop assessment of the study area was undertaken and included:

- ▶ Review of the relevant Commonwealth, state and local heritage registers to identify previously registered heritage and archaeological sites. Registers subject to searches included:
  - ▶ *World Heritage List; National Heritage List; Commonwealth Heritage List; Register of the National Estate* (non-statutory)
  - ▶ *NSW Aboriginal Heritage Information Management System (AHIMS)*
  - ▶ *NSW State Heritage Register*
  - ▶ Heritage schedules of relevant local environmental plans (Moree Plains and the Gwydir)
  - ▶ *National Trust of Australia* (non-statutory)
- ▶ Collation and review of other relevant previous heritage assessments, stakeholder information collated by ARTC and relevant documents held by state organisations (such as the NSW State Library, State Archives, National Archives etc.) relevant to the proposed study area
- ▶ Examination and review of current and historical mapping and aerials relevant to the study area
- ▶ Review of environmental context and past land use highlighting areas of significant ground disturbance
- ▶ Documentation of current known status of individual heritage sites (intact, salvaged, destroyed etc.)
- ▶ Consultation with relevant key stakeholders as required (RAPs, DPC, local historical societies etc.). Note that consultation is discussed in detailed in Section 12.4.6.

#### 12.4.3 Targeted survey

A three-week targeted survey program was undertaken based on the desktop assessment. The onsite survey program aimed to:

- ▶ Confirm areas of significant ground disturbance within the study area identified as part of the background assessment
- ▶ Identify potential for Aboriginal and historical cultural heritage to be present within significantly disturbed areas
- ▶ Identify landforms with Aboriginal cultural heritage potential beyond those areas previously mapped as having Aboriginal cultural heritage sensitivity
- ▶ Identify areas with potential historical archaeological deposits
- ▶ Identify and assess built heritage structures within the study area.

All findings were recorded using iPad Mini 4 running the ESRI Collector for ArcGIS and ESRI Survey123 for ArcGIS platform.

This assessment has been undertaken by the following qualified cultural heritage professionals:

- ▶ Luke Kirkwood (Principal Heritage Specialist)
- ▶ Dr Kate Quirk (Senior Heritage Specialist)
- ▶ Dr Susan Lampard (Principal Heritage Specialist)
- ▶ Perri Braithwaite (Professional Heritage Specialist)
- ▶ Clair Davey (Senior Heritage Specialist)
- ▶ Laura Cross (Professional Heritage Specialist).

While all of the proposed alignment was able to be surveyed, the following issues limited the survey at some of the borrow pits:

- ▶ Lack of access: Borrow Pits (Site 1, Site 11, Site 25) and additional paddock for laydown south of North Star
- ▶ Safety: Borrow Pits (Site 5 (Part), Site 9 (Part)).

#### 12.4.4 Aboriginal cultural heritage assessment report

On completion of the Aboriginal cultural heritage survey, an Aboriginal cultural heritage assessment report (refer Appendix E: Aboriginal Cultural Heritage and Archaeological Assessment) was prepared detailing:

- ▶ The findings of the desktop assessment including the typical Aboriginal cultural heritage values as identified from past reports/sites for the immediate region relevant to the study area
- ▶ Location of Aboriginal cultural heritage items and areas of cultural heritage sensitivity within the study area
- ▶ Results of the survey, including nature and extent, condition assessment and photographic evidence
- ▶ Assessment of potential impacts to identified sites
- ▶ Clear recommendations on the requirement for further investigations or permitting as required by NSW and Commonwealth law
- ▶ Production of mapping identifying heritage constraints and opportunities, including listed heritage sites, culturally sensitive landforms and disturbed land.

#### 12.4.5 Historical heritage assessment report

Separate to the Aboriginal cultural heritage assessment report, a historical heritage report (refer Appendix F: Historical Heritage Technical Report) was prepared for the study area that detailed:

- ▶ Desktop and survey methodology detailing how the sampling strategy was developed with respect to the targeted approach (size and distribution of sample units, ground surface visibility, previously identified heritage potential areas)
- ▶ No listings were identified from the World Heritage List; National Heritage List; Commonwealth Heritage List; Register of the National Estate (non-statutory)
- ▶ Nature and significance of identified historical archaeological deposits
- ▶ The location, nature and significance of built heritage structures
- ▶ Recommendations for the management and/or further investigation of archaeological sites identified (in consultation with ARTC) and justification for heritage listing of identified sites if required
- ▶ Recommendations for the management of built heritage structures as well as a statement as to whether further investigations are required
- ▶ Identification of relevant permitting requirements with respect to recommendation outcomes
- ▶ Production of mapping identifying heritage constraints and opportunities including listed heritage sites and disturbed land.

#### 12.4.6 Consultation

Aboriginal community consultation acknowledges the right of Aboriginal people to be involved, through direct participation, on matters that directly affect their heritage. Involving Aboriginal people in all facets of the assessment process ensures that they are given adequate opportunity to share information about cultural values, and to actively participate in the development of appropriate management and/or mitigation measures. The successful identification, assessment and management of Aboriginal cultural heritage values are dependent on an inclusive and transparent consultation process.

Aboriginal community consultation for the current assessment was undertaken in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (NSW Department of Environment Climate Change & Water [DECCW, 2010a]). The results of the consultation process undertaken are summarised below and detailed in Appendix E: Aboriginal Cultural Heritage and Archaeological Assessment.



The following are the key stages of the consultation process:

#### 12.4.6.1 Stage 1—Notification and registration

The aim of Stage 1 of the consultation requirements is to identify, notify and register Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places in the study area.

Various government departments were contacted via letter or email on 3 August 2018 requesting information on relevant Aboriginal persons and organisations. The following responses were received:

- ▶ The Office of Environment and Heritage (OEH) i.e. Dubbo (since superseded by DPC) responded on 30 August 2018 providing the contact details for 33 groups that may have an interest in the development.
- ▶ Office of Registrar responded on 25 September 2018 stating the study area does not have registered Aboriginal owners pursuant to Division 3 of the *Aboriginal Land Rights Act 1983* and suggesting that contact be made with Toomelah LALC.
- ▶ Native Title Services Corporation Limited responded on 24 September 2018 providing the names of 19 applicants from the Gomeroi People native title claim (NSD 2308/2011) who may have an interest in the development. Native Title Services Corporation Limited advised during phone correspondence that they would contact applicants separately about their interest in being involved in this proposal.
- ▶ A public notice that outlines the proposal and identifies its location was placed in the *Goondiwindi Argus* on 7 November 2018 and the *Moree Champion* on 8 November 2018. The closing date for registration via this notice was 21 November for the *Goondiwindi Argus* and 22 November 2018 for the *Moree Champion*, which provided the necessary minimum one-day period for expressions of interest. No registrations were received in response to the newspaper advertisements.
- ▶ On 25 October 2018, a letter inviting expressions of interest and containing summary information on the proposal was sent to all Aboriginal persons and organisations identified by the regulatory agencies. A total of 32 Aboriginal stakeholders were invited to register an interest in being consulted. No closing date for expressions of interest was issued and all stakeholders interested in being consulted were included from this date onwards. A total of six organisations and individuals confirmed their interest in the assessment and were registered as RAPs, with nearly all having been previously registered following the initial call-out to government departments and Toomelah LALC.

#### 12.4.6.2 Stage 2—Presentation of information about the proposal

Part of consultation requirements is to provide RAPs with information about the scope of the proposal and the proposed cultural heritage assessment process. Presentation of information about the study area and proposed development was provided to RAPs as part of the registration of interest process detailed in Section 12.4.6.1. Basic information on the proponent and the proposal was included in the expression of interest letter mailed on 25 October 2018.

#### 12.4.6.3 Stage 3—Gathering of information about cultural significance

As part of the consultation, the proponent is required to present and/or provide the proposed methodology for the cultural heritage assessment to RAPs and that RAPs be given a minimum of 28 days to review and provide feedback on this methodology. All RAPs for the current assessment were provided with a draft of proposed assessment methodology as part of the expression of interest package. RAPs were given a minimum of 28 days to review and provide feedback on this methodology. No responses were received from RAPs relating to the draft methodology. No specific cultural heritage values relating to the study area were identified and received from RAP respondents.

RAP field representatives were involved in the fieldwork component of the assessment (refer Section 12.4.6.4). They were involved in the visual inspection and identification of social and cultural heritage values for the study area in conversation with Future Freight Joint Venture (FFJV) heritage specialists.



TABLE 12.3 REGISTERED ABORIGINAL PARTIES FIELD REPRESENTATIVES BY ORGANISATION

Registered Aboriginal Party	Field representative(s)	Survey 1	Survey 2	Survey 3
Toomelah Local Aboriginal Land Council (TLALC)	Judith Duncan	✓		
	Will McIntosh	✓	✓	✓
	Malcolm Peckham		✓	
	Reg Haines		✓	✓
	Lesley Williams		✓	✓
	Judy Dennison		✓	✓
	Rick McGrady		✓	✓
	Ronald Duncan		✓	✓
	Rhodney McGrady		✓	✓
	Damien McIntosh			✓
	Steve Edwards		✓	✓
	Alec Haines			✓
Gomerioi People	Maria Cutmore	✓	✓	✓
	Steven Talbott		✓	✓
Raymond Weatherall	Raymond Weatherall		✓	
	Nathan Leslie	✓		
Natasha Long	Natasha Long	✓		✓
Yvonne Long	Loretta Long	✓		
Aliera French Trading	Wayne French	✓		

#### 12.4.6.4 Stage 4—Review of draft assessment report

The aim of Stage 4 of the Consultation Requirements is to prepare and finalise an ACHAR with input from RAPs. Where requested, post-survey meetings have been held with Aboriginal Parties to discuss the findings of the survey and this included a meeting with the Toomelah Local Aboriginal Land Council on 4 November 2019.

Gomerioi People requested a post-survey meeting but because of circumstances beyond ARTC control, a post-survey meeting did not occur. ARTC will continue to liaise with Gomerioi People where possible to inform ongoing cultural heritage management associated with the proposal.

Comments and queries arising from this engagement are summarised in Table 12.4.

Likewise, in accordance with Section 4.4.2 of the Consultation Requirements, on 4 December 2019 all RAPs were sent a draft of this ACHAR for review and comment. The specified closing date for comments was 15 January 2020, which extended the necessary minimum 28-day review period to 42 days, acknowledging the public holiday period **over Christmas and New Year's Day**. Requests were made by individual Aboriginal Parties to extend this deadline which ARTC granted until the 14 February 2020 (72 days) (refer Table 12.5).

TABLE 12.4 POST-SURVEY MEETING FEEDBACK

Registered Aboriginal Party	Post-survey meeting	Comments/issues raised	FFJV response
Toomelah LALC	4/11/2019	Cultural Heritage Assessment and Management Recommendations—Overall support with the survey undertaken and management recommendations.	Acknowledged
		Consultation: Concern raised around the RAP process and who has right to speak for Country. Request that all future work within the Toomelah LALC boundary is undertaken by Toomelah LALC members.	FFJV and ARTC to investigate further and seek advice from OEH on this matter with respect to development of an Aboriginal heritage management plan.
		Flooding concerns	ARTC advised that flooding would be detailed in the EIS and would be open to public comment, noting that numerous non-cultural heritage stakeholder engagement sessions had been about flooding at Toomelah and Boggabilla.
		Recommendation that the Borrow Pits that were not able to be inspected be surveyed pre-construction.	Agreed
		Proximity of Massacre Site to Toomelah—Cromptons' Corner and Boonal Homestead.	ARTC and FFJV have undertaken review of these massacre locations and determined that they are not within the Project boundary. Cromptons Corner is west of Goondiwindi and the OEH Brigalow Belt Report identified that a massacre may have occurred near Kildonan Station in Queensland. Neither of these locations are near the Project area. ARTC has been working closely with Bigambal people on the Queensland side of the border to investigate potential areas for burials.

TABLE 12.5 REGISTERED ABORIGINAL PARTY RESPONSES TO REPORT

Registered Aboriginal Party	Date received	Comment	ARTC response
Toomelah LALC	23/2/2020	<ul style="list-style-type: none"> <li>Happy with the report.</li> <li>Toomelah LALC are to have active involvement in all stages of mitigation of cultural heritage places which has been identified from recent clearance surveys of the NS2B rail corridor.</li> <li>Artefacts are to be kept on country, either in storage for education purposes or returned to country.</li> <li>Supports TLALC fieldworker's idea that AHIMS# 2-4-0046 be used as a relocation area that is publicly accessible to local community.</li> </ul>	ARTC acknowledges and supports all these comments
Gomerioi People	22/1/2020	Requested extension to comment period and a meeting to discuss recommendations.	ARTC to meet with Gomerioi People and NTSCORP (Native Title Service Provider for Aboriginal Traditional Owners) to discuss the report

Registered Aboriginal Party	Date received	Comment	ARTC response
Natasha Long	19/12/19	<ul style="list-style-type: none"> <li>▶ Happy with what I have seen in the report regarding the areas that have been looked at.</li> <li>▶ The artefacts scatters should be surface-collected and then test-pitted.</li> <li>▶ I would recommend wet-sieving if possible.</li> <li>▶ With the isolated artefacts, some test-pitting around the area. Just small ones around to just check if previous floods didn't wash away any artefacts.</li> <li>▶ Any and all artefacts as mentioned in the report about being collected and shown to educate everyone about our people, I agreed.</li> <li>▶ Area where the Bora rings should be fenced off and kept safe, from any impact or dumping of excess dirt.</li> <li>▶ Same goes with any sacred sites that were found.</li> <li>▶ If any bush tucker or medicines are in the impact area and are going to be destroyed, I would recommend that seeds or the plants or trees be collected and replanted in the safe area if possible.</li> <li>▶ Scarred trees that are extremely damaged; I would go back to everyone and ask what would they like to do regarding the scar trees, if possible removal and placed in a safe area. If area is a high possible for impact.</li> <li>▶ Where the construction campsites are going to be, I would recommend test-pitting for any other artefacts that could be found in the area.</li> <li>▶ Regarding the work with the up and coming area...it would be great to get all the people who worked [there] previously (we worked as a great easy team). I would recommend all of them be placed back on to do the test areas for the test-pitting and the areas for the collection as well.</li> </ul>	ARTC acknowledges and supports all these comments except for the test pitting at the construction camp. This area has been significantly disturbed through land clearance and levelling for playing fields and paddocks. The likelihood of finding appreciable tangible heritage at this location is low.

## 12.5 Existing environment

### 12.5.1 Heritage conditions and environmental context

Consideration of the landscape context of the study area is predicated on the now well-established proposition that the nature and distribution of Aboriginal archaeological materials are closely connected to the environments in which they occur (DECCW, 2010c). Environmental variables such as topography, geology, hydrology and the composition of local floral and faunal communities will have played an important role in influencing how Aboriginal people moved within and used their respective Country. Among other things, these variables will have affected the availability of suitable campsites, drinking water, economic plant and animal resources, and raw materials to produce stone and organic implements. At the same time, an assessment of historical and contemporary land-use activities, as well as geomorphic processes such as soil erosion and aggradation, is critical to understanding the formation and integrity of archaeological deposits, as well as any assessments of Aboriginal archaeological sensitivity. The environmental factors relevant to the proposal are summarised in Table 12.6.

TABLE 12.6 ENVIRONMENTAL CONTEXT

Environmental context	Description
Physiography	<p>The study area lies within two physiographic regions: the Cunningham Slopes (North Star to Mungle) and the Upper Darling Plains (Mungle to the Border).</p> <p>The Cunningham Slopes, part of the New England–Moreton Uplands Province, are characterised by geomorphology typically associated with metamorphic activity. The regolith across this region varies from outcrops composed of highly weathered bedrock (20 to 50%) to soil on bedrock (20 to 50%).</p> <p>The Upper Darling Plains are characterised by multi-channel rivers on floodplains (including the Macintyre River) incised into a regolith of predominantly alluvial sediments (&gt;50 per cent) with in-situ weathered rock (&lt;20%) (Pain et al., 2011).</p>
Topography	<p>The topography of the study area is typified by flat plains interspersed with the occasional gently undulating hill. The corridor reaches its highest elevation in the south of the proposal site at North Star, at 260 m, and gradually descends to the banks of the Macintyre River with the point of lowest elevation occurring as the corridor passes over Whalan Creek at 223 m. The Macintyre River is a deeply incised channel with stable river terraces on both sides. The borrow pits to the south of North Star are located on a series of minor cinder cone volcanoes.</p>
Geology	<p>The geology of the study area can be classified into three main precincts. Starting in the south at North Star, the surface geology is characterised by the Keelindi beds, a Cretaceous unit consisting of polymictic gravel, sand, silt and clay overlying quartzose, pebbly sandstone and conglomerate interbedded with minor shale.</p> <p>Moving north to Mungle, the geology transitions to the similarly aged Dridool beds, which include fine grained sandstone laminated and intermixed with siltstone and mudstone.</p> <p>The geology in the northern extent of the study area is comprised of Quaternary unnamed alluvial fans. Characteristic landforms within this subregion include channels and floodplains in addition to crevasse splays, levees and through flow swamps caused by avulsion of the Macintyre River during the past.</p> <p>South of North Star, a series of basaltic outcrops (minor cinder cone volcanos) are present. The uplift caused by this event also pushed several silcrete cobbles to the surface in the surrounding fields.</p> <p>No major rock outcrops of materials are known in the general area of the rail alignment that would have been used by Aboriginal people in the past.</p>
Soils	<p>Much like the geology, the soils can be characterised in three major units across the study area. In the south around North Star, the soils are a mix of red and brown chromosols. Chromosols are amongst the most widespread soils used for agriculture in Australia, particularly chromosols with red subsoils. Chromosols are well-drained soils and it is expected that Aboriginal archaeological sites will be concentrated on the chromosols.</p> <p>Areas of alluvial soil, consisting of dermosols, transect layers of vertosols and chromosols along the study area around Mungle. Dermosols are soils with well-structured B2 horizons, containing low levels of free iron, and lacking strong texture contrast between A and B horizons. These two soil types were highly selected by Aboriginal people for extended occupation or temporary camp sites, particularly when found in conjunction with nearby water sources.</p> <p>Vertosols are the dominant soil types within the study area between Mungle and the Macintyre River. Vertosols are clay rich soils with shrink–swell properties that exhibit strong cracking when dry and are commonly associated with the formation of gilgai. They were generally not used for extended habitation by Aboriginal people, instead being areas where resources could be gathered before returning to a primary occupation site.</p>
Hydrology and watercourses	<p>The study area is sited within the Border River Catchment that contains sections of several large watercourses including the Macintyre River. This is a perennial watercourse that forms the NSW/QLD border and the northern limit of the proposal, with a well-vegetated riparian floodplain on either side of the river.</p> <p>The study area crosses several anabranch streams of the Macintyre River, including Whalan Creek. In addition, there are several smaller local creeks that cross the proposed alignment including Forest Creek, Back Creek and Mobbindry Creek.</p>

Environmental context	Description
Hydrology and watercourses (continued)	<p>The key waterways are:</p> <ul style="list-style-type: none"> <li>▶ Whalan Creek, an ephemeral waterway, larger than other creeks in the area and with a well-defined channel that flows seasonally. It is known to support fish populations</li> <li>▶ Mobbindry Creek and Back Creek, ephemeral waterways with well-defined channels edged by fringing rushes and sedges. They are unlikely to support fish habitat but may support freshwater invertebrates and other food/utilitarian resources.</li> <li>▶ Forest Creek, an ephemeral, highly modified waterway with a poorly defined channel and limited or poor riparian vegetation. It is unlikely to be a fish habitat.</li> <li>▶ An unnamed drainage tributary of Mobbindry Creek, which is ephemeral. It is unlikely to be a fish habitat.</li> </ul> <p>The crossings for Mobbindry Creek, Back Creek, Forest Creek and the unnamed drainage line occur within the previously disturbed Boggabilla railway corridor. New impacts are proposed around Whalan Creek. The proposed rail alignment also avoids impact to Malgarai Lagoon, a nearby billabong to the east of the alignment in the northern part of the study area associated with the Macintyre River system. Malgarai Lagoon was likely a focus area of occupation by local Aboriginal peoples.</p>
Flora and fauna	<p>Key floral species known to occur near the study area that were exploited by Aboriginal people include:</p> <ul style="list-style-type: none"> <li>▶ Poplar box (<i>Eucalyptus populnea</i>)</li> <li>▶ River red gum (<i>Eucalyptus camaldulensis</i>),</li> <li>▶ Brigalow (<i>Acacia harpophylla</i>)</li> <li>▶ Belah (<i>Casuarina cristata</i>)</li> <li>▶ False sandalwood (<i>Eremophila mitchellii</i>).</li> </ul> <p>Key fauna species known to historically occur near the study area that were used by Aboriginal people include:</p> <ul style="list-style-type: none"> <li>▶ Eastern grey kangaroo (<i>Macropus giganteus</i>)</li> <li>▶ Swamp wallaby (<i>Wallabia bicolor</i>)</li> <li>▶ Australian brushtail possum (<i>Trichosurus vulpecula</i>)</li> <li>▶ Short-beaked echidna (<i>Tachyglossus aculeatus</i>)</li> <li>▶ Snake-necked turtle (<i>Chelodina longicollis</i>)</li> <li>▶ Broad-shelled river turtle (<i>Chelodina expansa</i>)</li> <li>▶ Carpet python (<i>Morelia spilota</i>)</li> <li>▶ Red-bellied black snake (<i>Pseudechis porphyriacus</i>)</li> <li>▶ Wedge-tailed eagle (<i>Aquila audax</i>)</li> <li>▶ Sulphur-crested cockatoo (<i>Cacatua galerita</i>)</li> <li>▶ Pacific black duck (<i>Anas superciliosa</i>)</li> <li>▶ Grey teal (<i>Anas gracilis</i>)</li> <li>▶ Murray cod (<i>Maccullochella peelii</i>)</li> <li>▶ Golden perch/yellowbelly (<i>Macquaria ambigua</i>)</li> <li>▶ Freshwater catfish (<i>Tandanus tandanus</i>)</li> <li>▶ Balonne freshwater mussel (<i>Velesunio ambiguus</i>)</li> <li>▶ Yabbie (<i>Cherax destructor</i>).</li> </ul> <p>Native vegetation within the study area has been extensively modified and today consists predominantly of exotic grassland with scattered paddock trees.</p> <p>Historical clearance activities notwithstanding, it can be confidently asserted that the original vegetation communities of the study area and its environs will have supplied Aboriginal people camping within or travelling through the area with an extensive array of edible and otherwise useful plant species. Recorded native vegetation communities and locally occurring watercourses would likewise have supported a large and diverse range of economic terrestrial, aquatic and avian fauna.</p>
Past disturbance	<p>The study area is dominated by extensive agriculture including grazing, dryland cropping and irrigation for cotton farming. Other land disturbance includes construction of roads and the old Boggabilla railway branch line.</p> <p>Native vegetation within the study area has been extensively modified as a result of agricultural and pastoral land-use activities, with the overwhelming majority cleared historically for grazing and/or cropping. Vegetation today consists predominantly of exotic grassland with scattered paddock trees.</p>

## 12.5.2 Aboriginal heritage

### 12.5.2.1 Tangible Heritage—Archaeological sites

The desktop assessment and field survey identified a total of 54 Aboriginal archaeological heritage sites near the proposed rail corridor, including three previously registered sites in AHIMS (refer Table 12.7 and Table 12.2). One of these sites, AHIMS 2-4-0003 (three carved trees), has since been removed to the Australian Museum. The remaining sites were either inspected or identified during the current assessment. Several areas with a range of bush foods and bush medicines were identified. These were typically growing in disturbed contexts associated with the existing rail easement, including in some instance where some plants were growing within the existing rail lines. No other culturally sensitive features were reported during the survey.

A full description of each site is provided in Appendix E: Aboriginal Cultural Heritage and Archaeological Assessment.

TABLE 12.7 ABORIGINAL HERITAGE SITES

AHIMS ID <sup>1</sup>	Site name	Site type	Site description	Impact	Previous disturbance
2-4-0003	Boggabilla Mungle	Carved tree	Three carved trees. Only known details were that they were identified at Mungle Scrub.	No	Not inspected. Carved tree since relocated to the Australian Museum, Sydney (acquisition no. E.34341-34343).
2-4-0046	BBS Toomelah LALC Mobbindry Ck1	Artefact Scatter	High-density artefact scatter located on the aggrading banks of Mobbindry Creek and Back Creek. Site was originally recorded as part of the Brigalow Belt South Regional Study.	Yes	Land clearance evident across site. Significant erosion along Back Creek adjacent to existing rail line.
2-4-0047	BBS Toomelah LALC Mobbindry Ck ST2	Culturally modified tree	Located on northern bank of Mobbindry Creek. Scar tree with two scars and a modern carving of a lizard on one of the scars.	Yes	Ground surface around tree has been severely degraded, likely as a result of upgrade of adjacent road bridge. Tree appears to have been fenced off during previous works.
2-4-0103	NS2B-19-AS1	Artefact Scatter	Low-density artefact scatter of at least 11 artefacts located on an old river terrace of the Macintyre River.	Yes	Ploughed paddock
2-4-0120	NS2B-19-AS2	Artefact Scatter	Low-density artefact scatter of three artefacts located on the north bank of Whalan Creek.	No	Land clearance
2-4-0119	NS2B-19-AS3	Artefact Scatter	Low-density artefact scatter of at least five artefacts on southern bank of Whalan Creek including sandstone muller.	Yes	Land clearance
2-4-0118	NS2B-19-AS4	Artefact Scatter	Low-density artefact scatter of two artefacts east of Bruxner Way.	Yes	Ploughed paddock
2-4-0117	NS2B-19-AS5	Artefact Scatter	High-density artefact scatter of at least 568 artefacts located in travelling stock reserve associated with Wearne Siding.	Yes	Land clearance, railway infrastructure and contour banks

AHIMS ID <sup>1</sup>	Site name	Site type	Site description	Impact	Previous disturbance
2-4-0116	NS2B-19-AS6	Artefact Scatter	Low-density artefact scatter of 13 artefacts immediately south of NS2B-19-AS5 and east of North Star Road.	Yes	Land clearance and railway infrastructure
2-5-0088	NS2B-19-AS7	Artefact Scatter	Moderate-density artefact scatter of 165 artefacts immediately south of NS2B-19-AS6 and east of North Star Road.	Yes	Land clearance and railway infrastructure
2-4-0115	NS2B-19-AS8	Artefact Scatter	Low-density artefact scatter of 22 artefacts immediately south of NS2B-19-AS7 and east of North Star Road.	Yes	Land clearance and railway infrastructure
2-4-0139	NS2B-19-AS9	Artefact Scatter	High-density artefact scatter of 168 artefacts located between two ploughed fields west of North Star Road.	Yes	Very limited land clearance, borrow pits excavated on western periphery.
2-4-0102	NS2B-19-AS10	Artefact Scatter	Low-density artefact scatter of at least 13 artefacts immediately south and likely an extension of NS2B-19-AS9.	Yes	Very limited land clearance, borrow pits excavated on western periphery.
2-4-0101	NS2B-19-AS11	Artefact Scatter	Low-density artefact scatter of at least 15 artefacts located within the existing railway corridor.	Yes	Land clearance and railway infrastructure
2-4-0100	NS2B-19-AS12	Artefact Scatter	Low-density artefact scatter of at least three artefacts immediately east of the existing railway corridor.	Yes	Ploughed paddock
2-4-0099	NS2B-19-AS13	Artefact Scatter	Low-density artefact scatter of at least 10 artefacts immediately south of 2-4-0046 and within existing railway corridor.	Yes	Land clearance and railway infrastructure
2-4-0098	NS2B-19-AS14	Artefact Scatter	Low-density artefact scatter of at least six artefacts immediately south of NS2B-19-AS13 and within existing railway corridor.	Yes	Land clearance and railway infrastructure
2-4-0097	NS2B-19-AS15	Artefact Scatter	Low-density artefact scatter of 17 artefacts including a hammerstone.	Yes	Ploughed paddock and borrow pit
2-4-0096	NS2B-19-AS16	Artefact Scatter	Low-density artefact scatter of at least 17 artefacts.	Yes	Land clearance
2-4-0095	NS2B-19-AS17	Artefact Scatter	Low-density artefact scatter of at least two lithic artefacts within North Star Showgrounds.	Yes	Land clearance
2-4-0122	NS2B-19-AS18	Artefact Scatter	Low-density artefact scatter of at least eight artefacts.	Yes	Land clearance, ploughed paddock and borrow pit
2-4-0121	NS2B-19-AS19	Artefact Scatter	Low-density artefact scatter of at least two artefacts.	Yes	Land clearance
11-1-0056	NS2B-19-AS20	Artefact Scatter	Low-density artefact scatter of at least 14 artefacts identified in a clearing on top of an extinct volcano.	Yes	Land clearance

AHIMS ID <sup>1</sup>	Site name	Site type	Site description	Impact	Previous disturbance
11-1-0055	NS2B-19-AS21	Artefact Scatter	Low-density artefact scatter of at least 28 lithics at the base of an extinct volcano and adjacent to natural silcrete cobble deposit.	Yes	Land clearance
2-5-0089	NS2B-19-AS22	Artefact Scatter	Low-density artefact scatter of at least two artefacts.	Yes	Some land clearance
2-4-0114	NS2B-19-IA1	Isolated Artefact	Complete silcrete flake located on southern bank of Macintyre River.	No	Land clearance
2-4-0109	NS2B-19-IA2	Isolated Artefact	Distal silcrete flake located on southern bank of Whalan Creek.	Yes	Land clearance
2-4-0108	NS2B-19-IA3	Isolated Artefact	Complete silcrete backed flake located immediately east of Whalan Creek Rail Bridge.	Yes	Land clearance and erosion
2-4-0107	NS2B-19-IA4	Isolated Artefact	Complete silcrete flake located in ploughed paddocked immediately east of Bruxner Way.	Yes	Ploughed paddock
2-4-0141	NS2B-19-IA5	Isolated Artefact	Complete quartzite flake located within existing rail corridor.	Yes	Land clearance and erosion
2-4-0140	NS2B-19-IA6	Isolated Artefact	Proximal silcrete flake located within existing rail corridor.	Yes	Land clearance and erosion
2-4-0138	NS2B-19-IA7	Isolated Artefact	Silcrete multidirectional core located within drain immediately west of existing railway corridor.	Yes	Land clearance and erosion
2-4-0137	NS2B-19-IA8	Isolated Artefact	Complete silcrete flake located within existing rail corridor.	Yes	Land clearance and railway infrastructure
2-4-0136	NS2B-19-IA9	Isolated Artefact	Complete silcrete flake located within existing rail corridor.	Yes	Land clearance and railway infrastructure
2-4-0113	NS2B-19-IA10	Isolated Artefact	Complete silcrete flake located within existing rail corridor.	Yes	Land clearance and railway infrastructure
2-4-0112	NS2B-19-IA11	Isolated Artefact	Complete chert flake located within existing rail corridor.	Yes	Land clearance and railway infrastructure
2-4-0111	NS2B-19-IA12	Isolated Artefact	Silcrete multidirectional core located within ploughed paddock east of existing rail corridor.	Yes	Ploughed paddock
2-4-0110	NS2B-19-IA13	Isolated Artefact	Distal silcrete flake.	Yes	Land clearance and borrow pit
2-4-0104	NS2B-19-ST1	Culturally modified tree	Single-scarred bumble box tree on fenceline.	Yes	Rail corridor
2-4-0105	NS2B-19-ST2	Culturally modified tree	Dual-scarred bumble box tree.	Yes	Limited land clearance
2-4-0106	NS2B-19-ST3	Culturally modified tree	Single-scarred bumble box tree.	Yes	Limited land clearance
2-4-0129	NS2B-19-ST4	Culturally modified tree	Single-scarred bumble box tree.	Yes	Limited land clearance



AHIMS ID <sup>1</sup>	Site name	Site type	Site description	Impact	Previous disturbance
2-4-0128	NS2B-19-ST5	Culturally modified tree	Single-scarred bumble box tree.	Yes	Limited land clearance
2-4-0127	NS2B-19-ST6	Culturally modified tree	Single-scarred bumble box tree. Possible 'possum tree'.	Yes	Limited land clearance
2-4-0126	NS2B-19-ST7	Culturally modified tree	Single-scarred bumble box tree.	Yes	Limited land clearance
2-4-0125	NS2B-19-ST8	Culturally modified tree	Single-scarred bumble box tree.	Yes	Limited land clearance
2-4-0124	NS2B-19-ST9	Culturally modified tree	Single-scarred bumble box tree.	Yes	Limited land clearance
2-4-0135	NS2B-19-ST10	Culturally modified tree	Single-scarred bumble box tree.	Yes	Limited land clearance
2-4-0134	NS2B-19-ST11	Culturally modified tree	Single-scarred bumble box tree.	Yes	Limited land clearance
2-4-0131	NS2B-19-ST12	Culturally modified tree	Single-scarred bumble box tree.	Yes	Land clearance
2-4-0132	NS2B-19-ST13	Culturally modified tree	Single scarred bumble box tree.	No	Land clearance
2-4-0133	NS2B-19-ST14	Culturally modified tree	Single-scarred bumble box tree.	Yes	Dead and fallen over
2-4-0130	NS2B-19-ST15	Culturally modified tree	Single-scarred bumble box tree.	Yes	Limited land clearance
2-4-0123	NS2B-19-ST16	Culturally modified tree	Single-scarred bumble box tree located near BBS Toomelah LALC Mobbindry Ck1 but apparently was not recorded.	No	Land clearance

Table note:

1. AHIMS ID may not yet have been assigned for all sites by the DPC.

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community  
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**Aboriginal Heritage**  
 ● Artefact Scatter

Figure 12.2a: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER

0.75km

Coordinate System: GDA 1994 MGA Zone 56  
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Date: 26/02/2020      Paper: A4  
 Author: FJVJ GIS      Scale: 1:25,000

**LEGEND**

- Localities
- - - Existing rail (non-operational)
- Adjoining alignments
- Major roads
- Minor roads
- Watercourses
- Construction footprint



The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector.

Map by: MEF/IGN/RB Z:\GIS\GIS\_270\_NS2B\Tasks\270-ECH-201910221331\_Heritage\270-ECH-201910221331\_ARTC\_EIS\_Fig12.2\_Aboriginal\_ArchSites\_ddp\_v2.mxd Date: 26/02/2020 12:02

FIGURE 12.2A-P ABORIGINAL ARCHAEOLOGICAL SITES



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community  
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

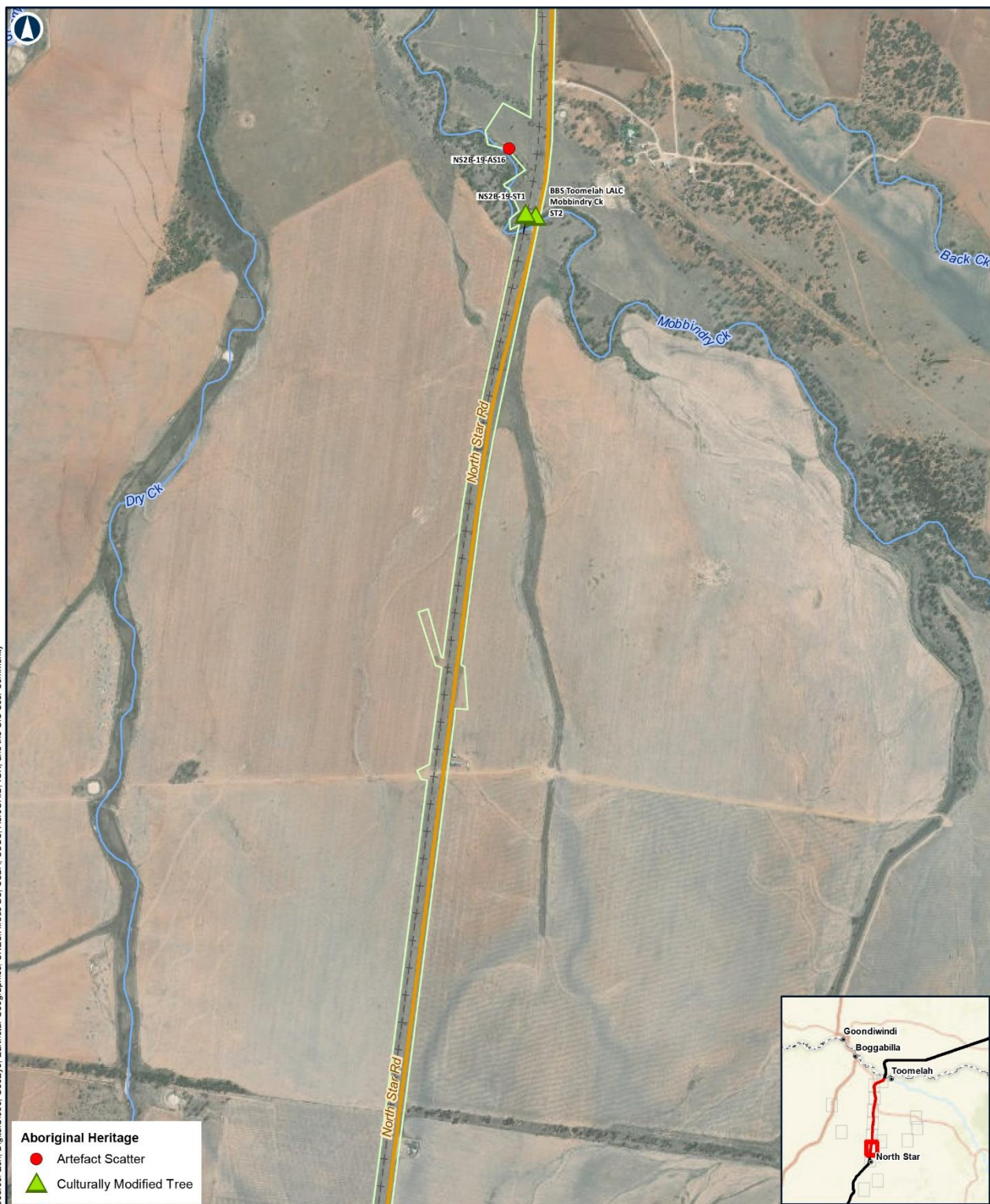


Figure 12.2b: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER

0.75km

Coordinate System: GDA 1994 MGA Zone 56  
 ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.  
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Date: 26/02/2020 Paper: A4  
 Author: FFFJV GIS Scale: 1:25,000

LEGEND

- +— Existing rail (operational)
- - - Existing rail (non-operational)
- Major roads
- Watercourses
- Construction footprint

ARTC InlandRail

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation, in partnership with the private sector.

Map by: MEF/IGN/RB Z:\GIS\GIS\_270\_NS2B\Tasks\270-ECH-201910221331\_Heritage\270-ECH-201910221331\_ARTC\_EIS\_Fig12.2\_Aboriginal\_ArchSites\_ddp\_v2.mxd Date: 26/02/2020 12:02

FIGURE 12.2B ABORIGINAL ARCHAEOLOGICAL SITES



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community  
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Figure 12.2c: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER

0.75km

Coordinate System: GDA 1994 MGA Zone 56

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**LEGEND**

- +— Existing rail (operational)
- - - Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses
- Construction footprint

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FIGURE 12.2C ABORIGINAL ARCHAEOLOGICAL SITES



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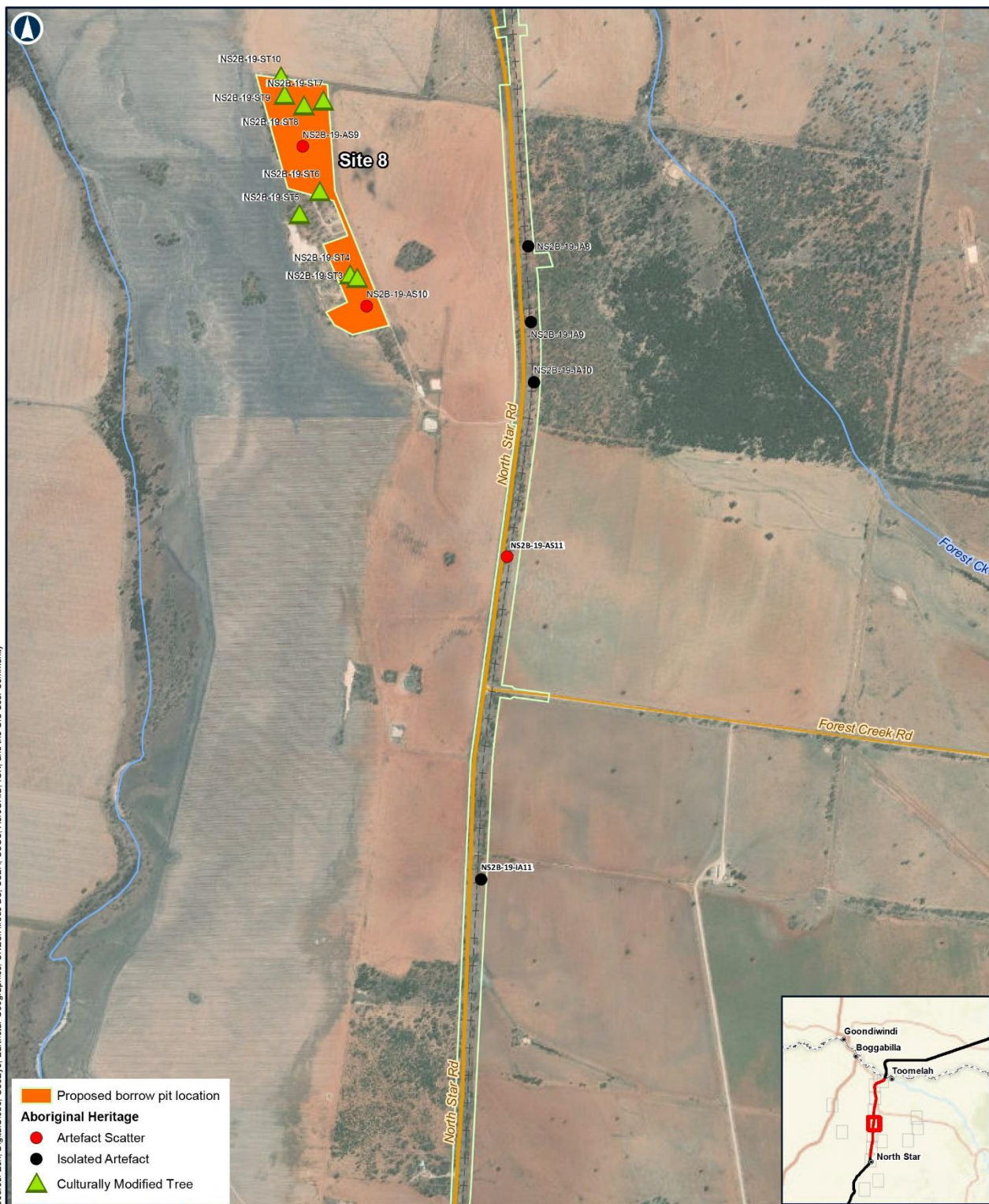


Figure 12.2d: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER

**LEGEND**

--+-- Existing rail (non-operational)

Major roads

Minor roads

Watercourses

Construction footprint

0.75km

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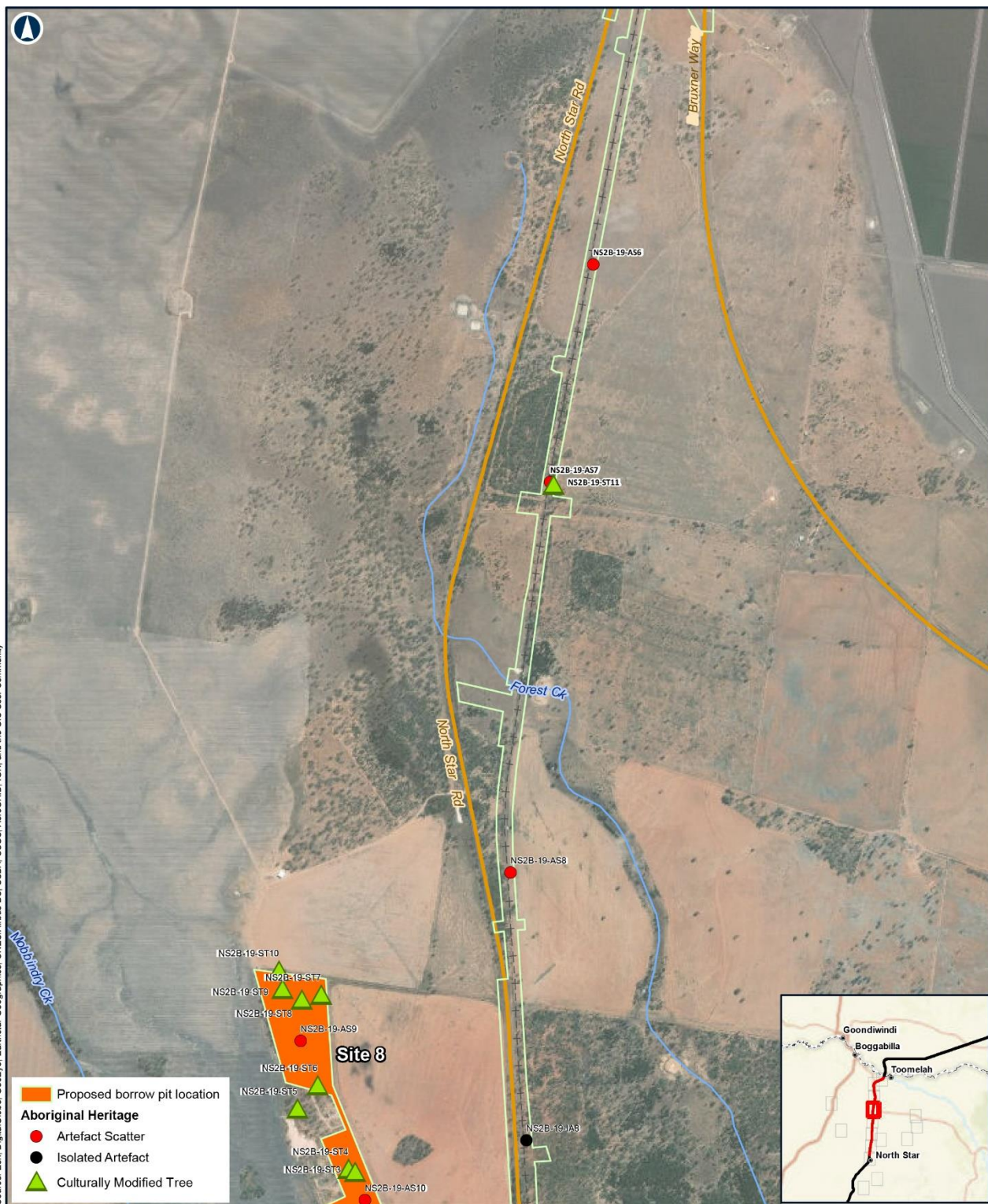
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FIGURE 12.2D ABORIGINAL ARCHAEOLOGICAL SITES



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0.75km

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**LEGEND**

- - - Existing rail (non-operational)
- Major roads
- Watercourses
- Construction footprint

**NORTH STAR TO NSW/QLD BORDER**



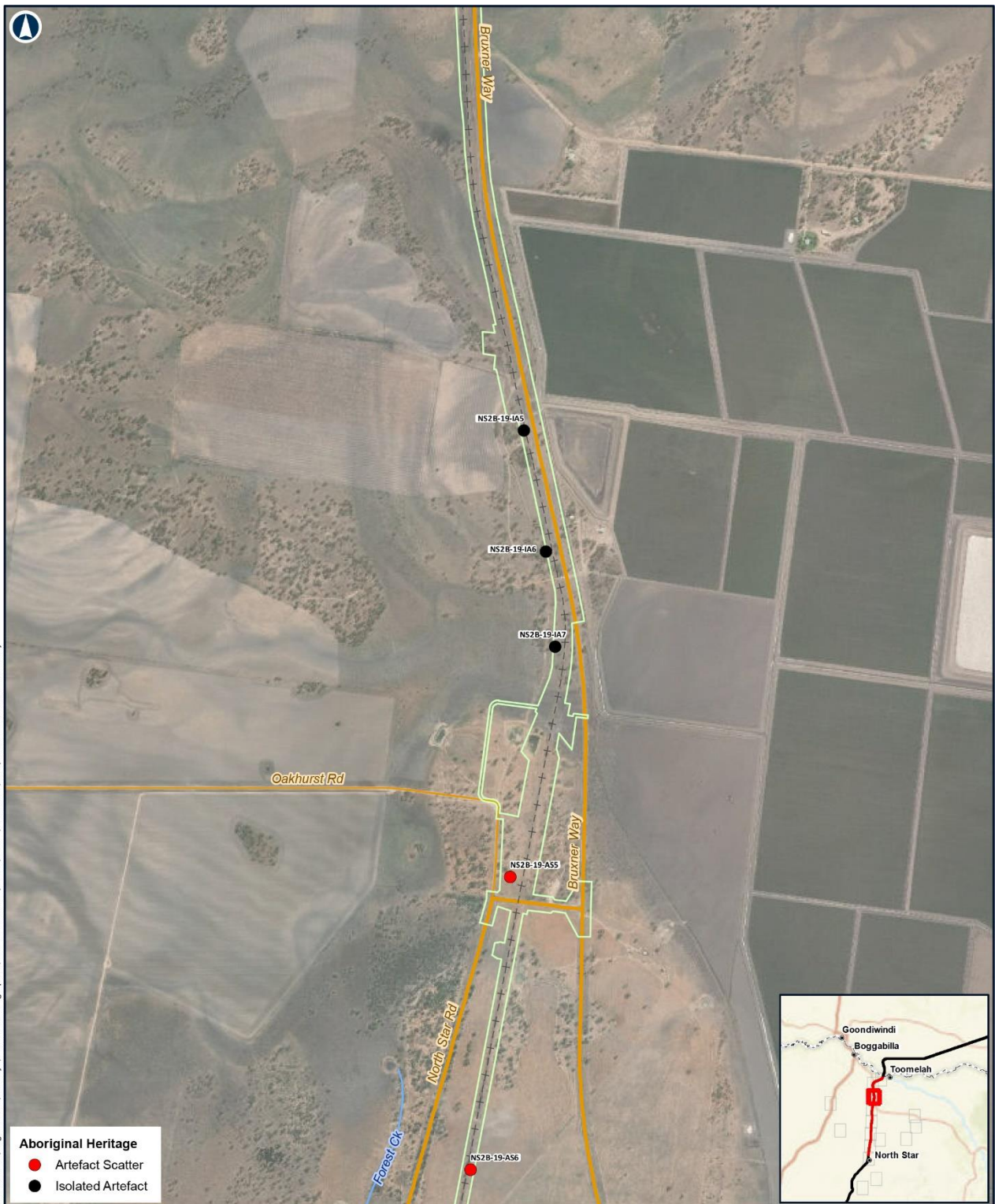
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FIGURE 12.2E ABORIGINAL ARCHAEOLOGICAL SITES



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**Aboriginal Heritage**

- Artefact Scatter
- Isolated Artefact

Figure 12.2f: Aboriginal archaeological sites

**NORTH STAR TO NSW/QLD BORDER**

0.75km

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**LEGEND**

- +-- Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses
- Construction footprint

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FIGURE 12.2F ABORIGINAL ARCHAEOLOGICAL SITES



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Figure 12.2g: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER

**LEGEND**

- +-- Existing rail (non-operational)
- Major roads
- Watercourses
- Construction footprint

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FIGURE 12.2G ABORIGINAL ARCHAEOLOGICAL SITES



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- Aboriginal**
- Artefact Scatter
  - Isolated Artefact
  - ▲ Culturally Modified

0.75km

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- LEGEND**
- Major roads
  - Watercourses
  - - - NSW/QLD border
  - Construction footprint

Figure 12.2h: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER



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FIGURE 12.2H ABORIGINAL ARCHAEOLOGICAL SITES



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**Figure 12.2i: Aboriginal archaeological sites**

**LEGEND**

0.75km

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**NORTH STAR TO NSW/QLD BORDER**

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FIGURE 12.2i ABORIGINAL ARCHAEOLOGICAL SITES



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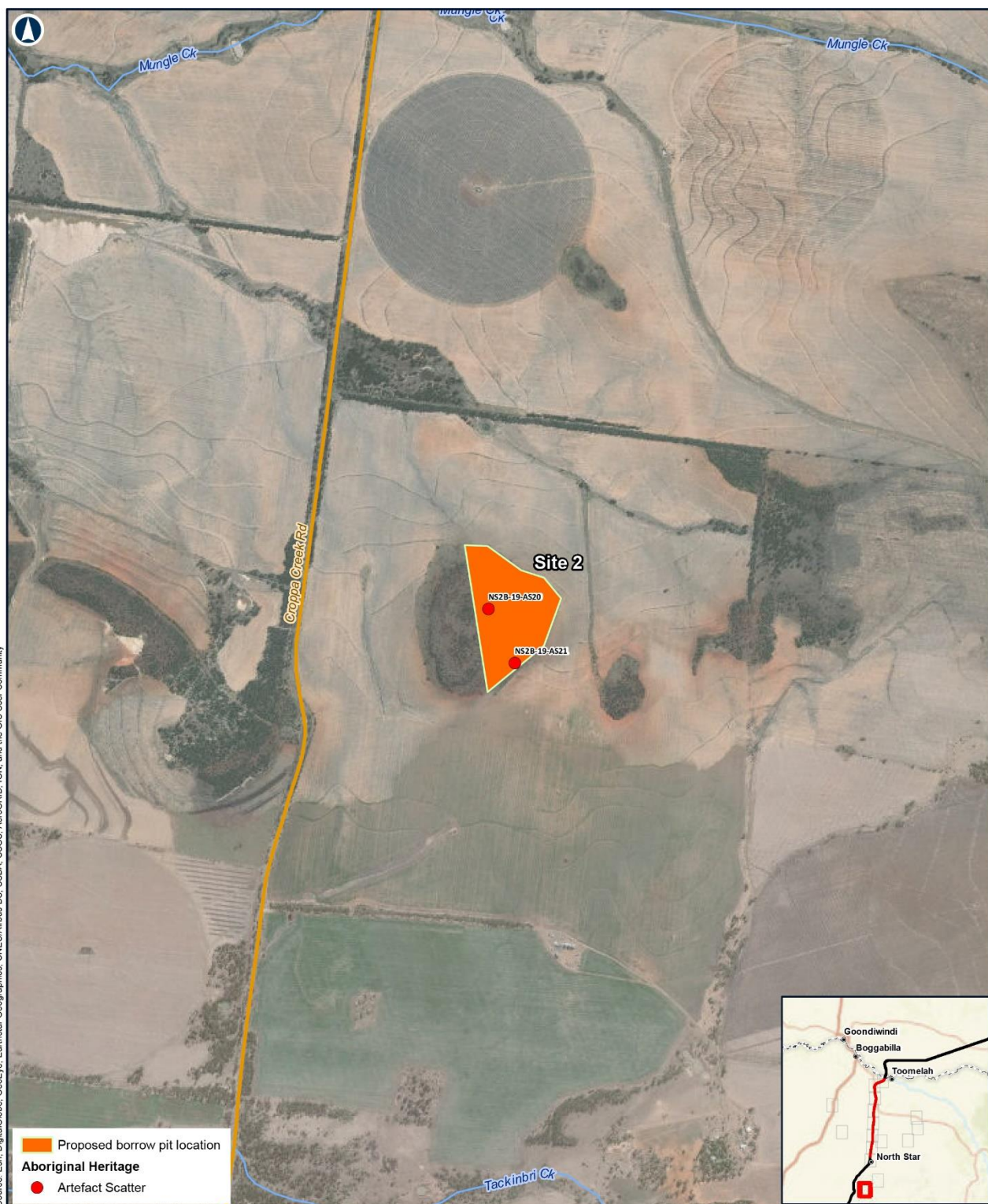


Figure 12.2j: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER

**LEGEND**

Major roads  
Watercourses

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FIGURE 12.2J ABORIGINAL ARCHAEOLOGICAL SITES



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Figure 12.2k: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER

0.75km

**LEGEND**

Watercourses

Coordinate System: GDA 1994 MGA Zone 56

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FIGURE 12.2K ABORIGINAL ARCHAEOLOGICAL SITES



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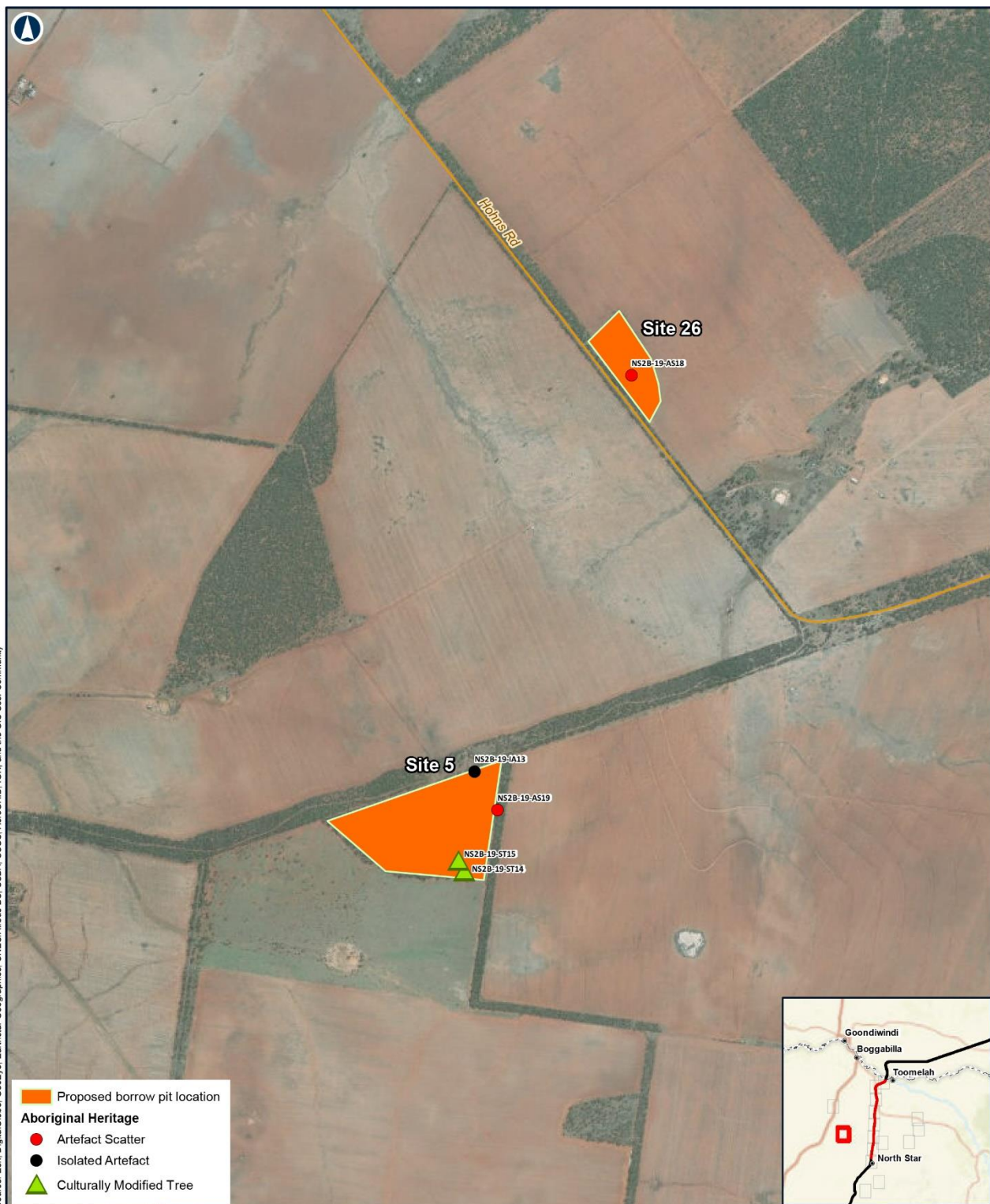


Figure 12.2l: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER

0.75km

**LEGEND**

- Proposed borrow pit location
- Aboriginal Heritage
  - Artefact Scatter
  - Isolated Artefact
  - Culturally Modified Tree
- Minor roads

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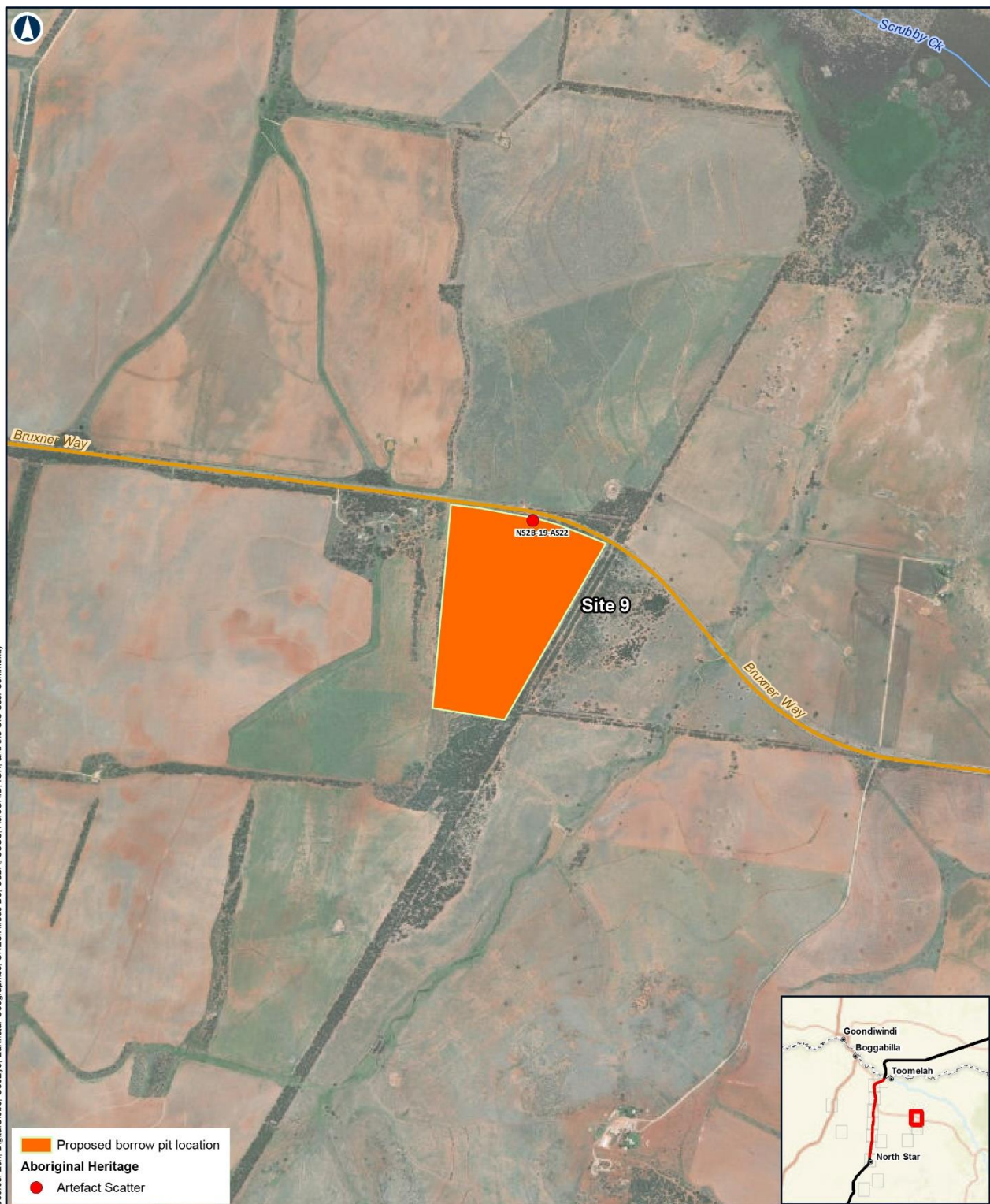
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FIGURE 12.2L ABORIGINAL ARCHAEOLOGICAL SITES



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0.75km

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#### NORTH STAR TO NSW/QLD BORDER



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FIGURE 12.2M ABORIGINAL ARCHAEOLOGICAL SITES



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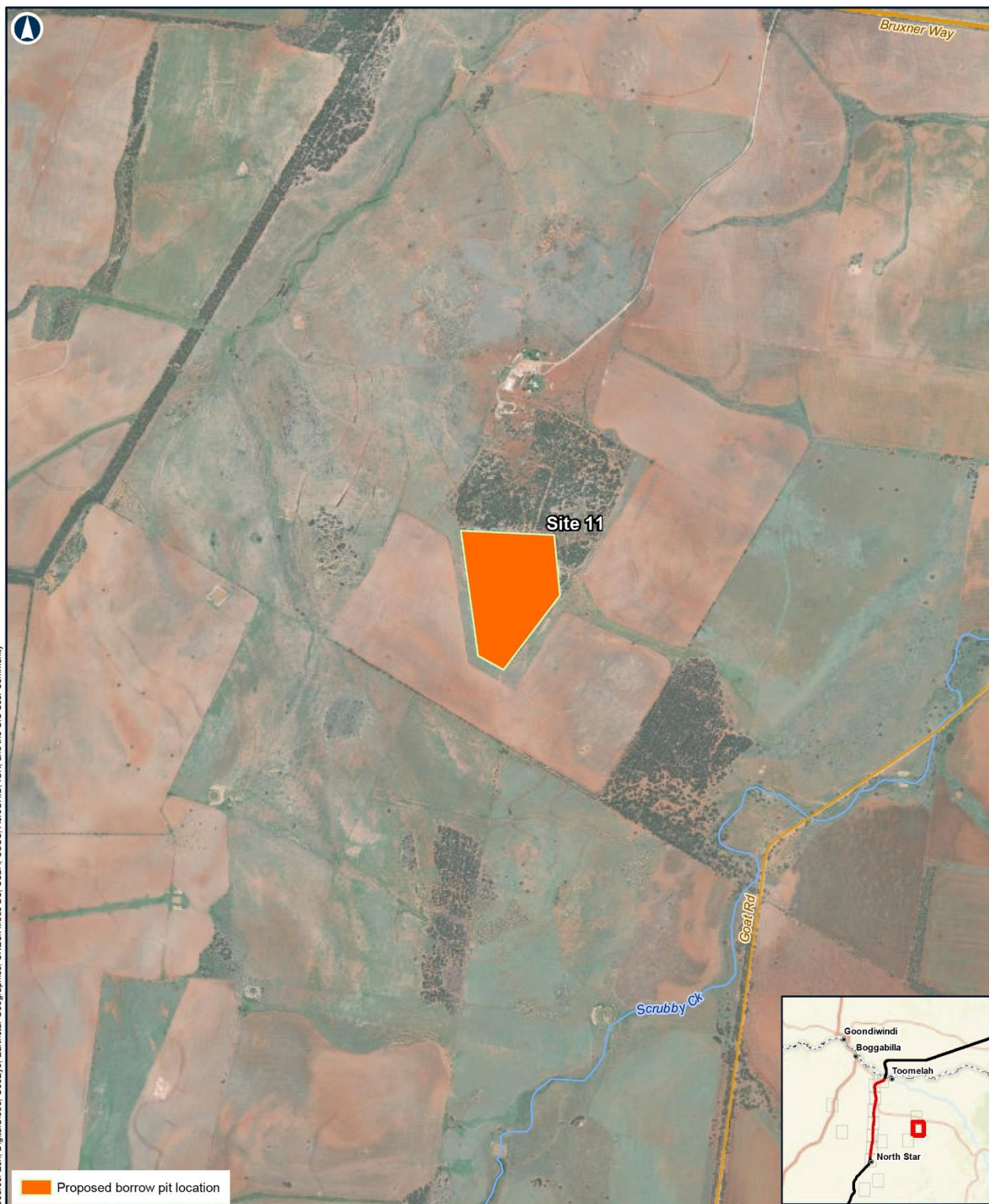


Figure 12.2n: Aboriginal archaeological sites

0.75km

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**LEGEND**

- Major roads
- Minor roads
- Watercourses

**NORTH STAR TO NSW/QLD BORDER**

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FIGURE 12.2NABORIGINAL ARCHAEOLOGICAL SITES



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Figure 12.20: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER

0.75km

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**LEGEND**

- Major roads
- Minor roads
- Watercourses



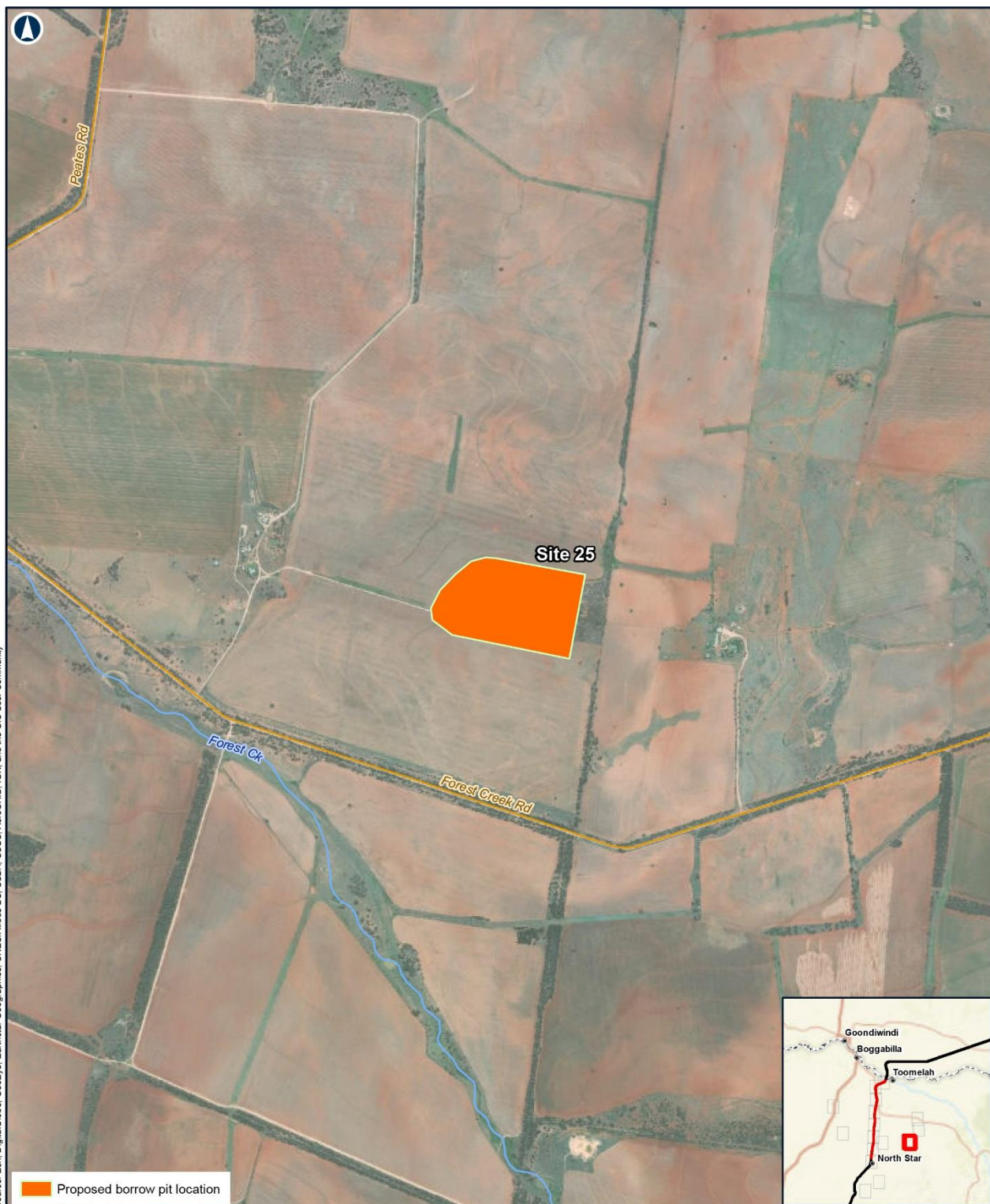
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FIGURE 12.20 ABORIGINAL ARCHAEOLOGICAL SITES



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Proposed borrow pit location

Figure 12.2p: Aboriginal archaeological sites

NORTH STAR TO NSW/QLD BORDER

**LEGEND**

- Minor roads
- Watercourses

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FIGURE 12.2P ABORIGINAL ARCHAEOLOGICAL SITES



### 12.5.2.2 Tangible Heritage—Ring Tree (NS2B-19-RT1)

A 'ring tree' was located on the southern banks of the Macintyre River approximately where the proposed viaduct crosses the river. Ring trees (sometimes called hoop trees) are trees where branches have grown together, fusing and forming a ring. Ring trees can occur through both natural (inosculation) and cultural (grafting) means. Field representatives on the survey, identified this tree as being a marker tree either symbolising a border or point of interest (camp site). Despite this tree's proximity to Toomelah, it was not previously known to the local field representatives.



PHOTOGRAPH 12.1 THE 'RING' OF THE RING TREE SHOWN BENT OVER AND GROWING AROUND THE BRANCH BELOW



PHOTOGRAPH 12.2 CONTEXT SHOT OF RING TREE ON VEHICLE TRACK LEADING DOWN TO MACINTYRE RIVER. NOTE THAT A SEPARATE TREE IS GROWING IN FRONT

### 12.5.2.3 Intangible Heritage—Plant resources (NS2B-19-IH1)

In addition to archaeological resources, RAP field representatives identified at least 16 commonly found plant resources that are traditionally used by past and current Aboriginal people as bush foods and medicines. The 16 plant species were identified within the disturbed railway easement corridor, and in some cases were growing in the remaining rail line itself, suggesting that these plants are tolerant of significant impact. Field representatives expressed a strong desire that their traditional knowledge be documented as part of this report and be incorporated into an interpretation strategy for the Inland Rail Program.

Intangible heritage features are shown Figure 12.3. These plant resources are detailed in Appendix E: Aboriginal Cultural Heritage and Archaeological Assessment.







#### 12.5.2.4 Intangible Heritage—Watercourses (NS2B-19-IH2)

The rail alignment crosses several watercourses. All watercourses were highlighted as being important cultural features to the local Aboriginal community. No specific information relating to oral tradition was provided for each crossing.

TABLE 12.8 WATER CROSSINGS WITHIN THE RAIL ALIGNMENT

Water crossing	Location/Chainage
Mobbindry Creek	5,800
Back Creek	8,400
Forest Creek	16,500
Whalan Creek	29,600
Macintyre River	30,600

#### 12.5.2.5 Other considerations

##### Indeterminate trees

In addition to the 16 culturally modified trees which were identified and confirmed during the survey, an additional 26 modified trees were identified by survey participants. However, these additional trees could not be convincingly demonstrated to be cultural or natural scars. The scars on these trees were typically either diseased or damaged, or the tree in question was assessed as being young and therefore not likely to have been culturally scarred. Rather than dismiss these trees immediately recommendations are made regarding their reappraisal by an arborist before determining as to whether they should be salvaged.



PHOTOGRAPH 12.3 EXAMPLE OF INDETERMINATE SCAR



PHOTOGRAPH 12.4 EXAMPLE OF INDETERMINATE SCAR

## Circular feature

During the survey, a circular feature was identified in the southern half of Site 8, a proposed borrow pit for the proposal. The feature is an almost circular patch of barren ground with nearly no grass, measuring approximately 8 m across. A linear, cleared line connects the circle and extends north east to a nearby access track.

Several hypotheses were put forward to explain this feature, and further detail is provided in Appendix E: Aboriginal Cultural Heritage and Archaeological Assessment. The nature of this feature remains unresolved but at present a decision has been made to avoid it. To clarify its status, further investigations are recommended in Appendix E: Aboriginal Cultural Heritage and Archaeological Assessment.



PHOTOGRAPH 12.5 CIRCULAR FEATURE LOOKING WEST



PHOTOGRAPH 12.6 CIRCULAR FEATURE LOOKING EAST

### 12.5.3 Historical heritage

The desktop and field survey identified a total of 15 historical heritage sites in proximity to the proposed rail corridor (refer Table 12.9 and Figure 12.4). Sites within the rail corridor include historic sidings, bridges and fettlers (construction) camps.

A full description of each site is provided in Appendix F: Historical Heritage Technical Report.

TABLE 12.9 HISTORICAL HERITAGE SITES

Site ID	Site name	Site description	Impact potential	Previous disturbance
NS2B-19-H2	Loggers' Camp	Low-density historical artefact scatter of mid-20th century broken glass, ceramics and metal in cleared land south of Tucka Tucka Road.	Yes	Land clearance
NS2B-19-H3	Survey Mark	Blaze on a tree used as a survey marker south of Whalan Creek.	Yes	Land clearance
NS2B-19-H4	Whalan Creek Rail Bridge	Rail bridge constructed of 20 concrete pylons with steel I-beam frame on top of pylons across Whalan Creek and west of the Bruxner Highway.	Yes	Rail corridor
NS2B-19-H5	Shearing Shed Archaeological Site	Shearing shed was reportedly used for local balls in the mid-to-late 20th century before being burnt down.	No	Land clearance
NS2B-19-H6	Shearer's Accommodation	Tin shed thought to be shearer's accommodation located west of rail corridor and Bruxner Way.	No	Land clearance
NS2B-19-H7	Modern Roadside Memorial	Simple roadside memorial of a white metal cross with black writing 'RIP HENRY', plastic flowers, beer bottles and cans.	Yes	Land clearance
NS2B-19-H8	Old Boggabilla/ North Star Road	Original alignment of the Boggabilla/North Star Road.	Yes	Land clearance and rail corridor
NS2B-19-H9	Wearne Siding	Site of former Wearne Siding. Currently consists of main rail line, a siding and an earthen embankment supported by a series of 10 concrete panels and braced with offcuts of rail track.	Yes	Land clearance and rail corridor
NS2B-19-H10	Wearne Siding Sign	The sign for Wearne Siding was relocated to the front gate at Wearne Pastoral Station on the eastern side of the Bruxner Highway.	Yes	Sign has been relocated from previous location
NS2B-19-H11	Fettlers Camp 1	Artefacts were largely industrial in nature and extending approximately 400 m north and south from a central loading embankment. Artefacts include bricks, concrete and metal.	Yes	Land clearance and rail corridor
NS2B-19-H12	Fettlers Camp 2	Artefacts were largely industrial in nature, consisting of brick, concrete, and sandstone.	Yes	Land clearance and rail corridor
NS2B-19-H13	Fettlers Camp 3	Approximately 300 m long, continuous low-density linear artefact scatter adjacent to the railway line.	Yes	Land clearance and rail corridor
NS2B-19-H14	Fettlers Camp 4	Approximately 50 m long, continuous medium-density linear artefact scatter located to the west of the railway line.	Yes	Land clearance and rail corridor
NS2B-19-H15	Mungle Siding	Site of former Mungle Siding. Currently consists of main rail line, a siding and an earthen embankment supported by a series of 10 concrete panels and braced with offcuts of rail track.	Yes	Land clearance and rail corridor
NS2B-19-H16	Back Creek Rail Bridge	Rail bridge constructed of concrete pylons with steel I-beam frame on top of pylons across Back Creek.	Yes	Land clearance and rail corridor



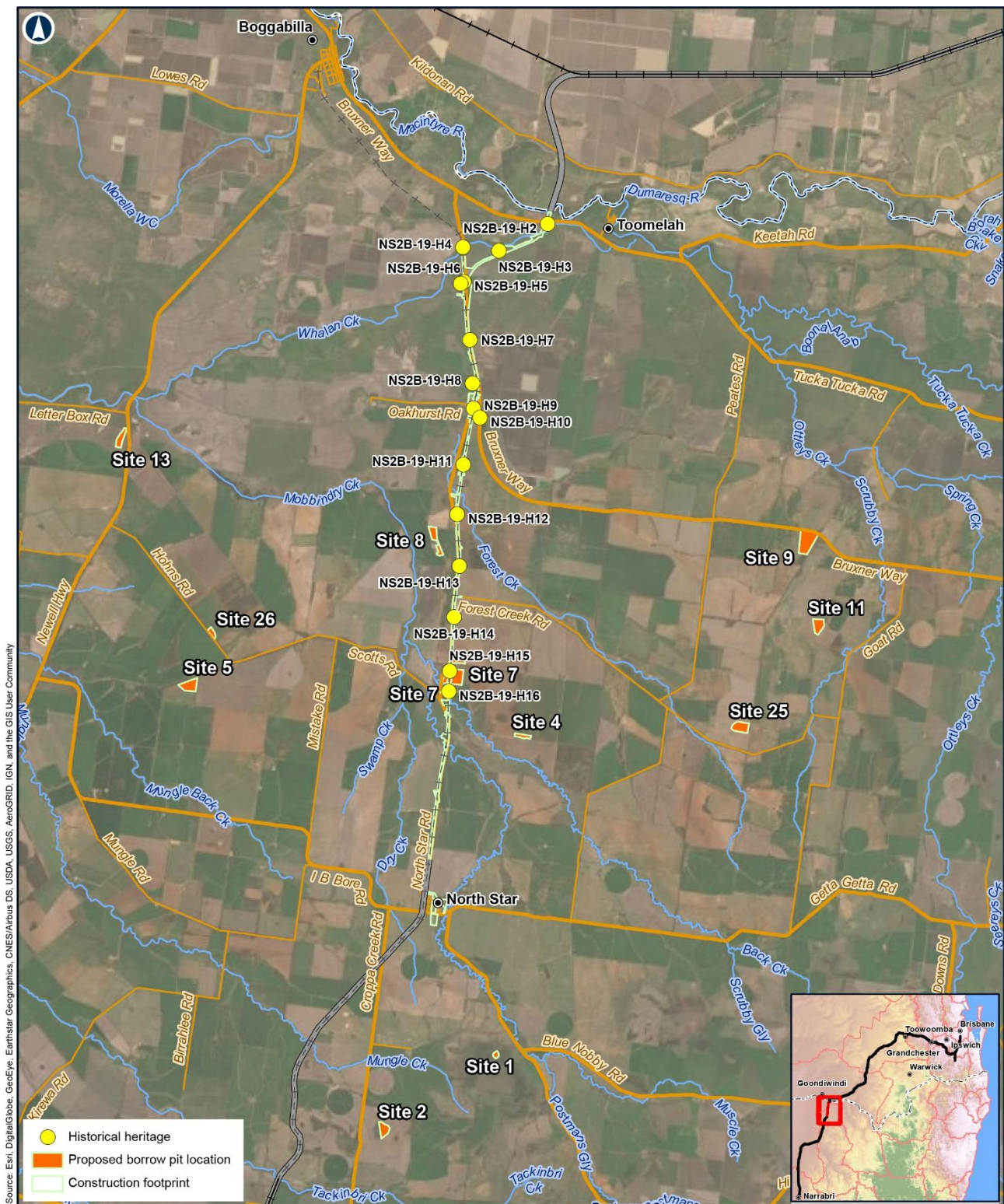


FIGURE 12.4 HISTORICAL HERITAGE SITES

#### 12.5.4 Significance assessment

An assessment of significance is undertaken to explain why a particular site is important and to enable the appropriate site management and curtilage to be determined. Cultural significance is defined in the Burra Charter (ICOMOS [Australia], 2013) as meaning 'aesthetic, historic, scientific or social value for past, present or future generations' (Article 1.1). Cultural significance may be derived from a place's fabric, association with a person or event, or for its research potential. The significance of a place is not fixed for all time, and what is of significance to us now may change as similar items are located, more historical research is undertaken and community tastes change. A geographical overview of the significance assessment on Aboriginal and historical heritage is shown in Figure 12.5 and Figure 12.6. Refer to Appendix E: Aboriginal Cultural Heritage and Archaeological Assessment, and Appendix F: Historical Heritage Technical Report for a discussion of significance assessment for each site.

##### 12.5.4.1 Aboriginal heritage

###### Social (cultural) value

Social or cultural heritage value for Aboriginal heritage refers to the spiritual, traditional, historic and contemporary associations and attachments a place or area has for Aboriginal people. It can only be identified through consultation with Aboriginal people (OEH, 2011). Throughout the survey, all RAP representatives identified Aboriginal cultural heritage as being of high social value. A summary of values is provided below, with further information detailed in Appendix E: Aboriginal Cultural Heritage and Archaeological Assessment.

###### Cultural landscape

RAPs indicated that the study area sits within a broader cultural landscape that has cultural significance for Aboriginal people. Forming part of this cultural landscape are important landscape features. These include the Macintyre and Dumaresq Rivers, Boobera Lagoon and all minor watercourses/lagoons which surround and in some cases are found within the study area. In addition to landforms, all Aboriginal objects (i.e. stone artefacts) identified during the archaeological survey for the proposal, represent links to the cultural landscape that local Aboriginal people would have inhabited in the past.

###### Aboriginal dispossession and resistance

RAPs indicated that conflict, including massacres of Aboriginal people, between Aboriginal people, local settlers and Mounted Police occurred in the region surrounding the proposal area. **Crampton's** Corner (25 kilometres to the north west of the proposal) was noted as a massacre location. While no massacres have been noted near the proposal area, a review of oral histories recorded by the National Parks and Wildlife Service's (NPWS) Brigalow Belt studies identified a possible massacre on the Queensland border. This may have occurred at Kildonan Station; however, the location of this event is not accurately known.

###### Vegetation

RAPs identified that prior to European settlement, the native vegetation communities of the study area would have contained a variety of edible and otherwise useful plant species. Cross-referencing the results of the heritage surveys where RAPs identified numerous plant foods and medicines within the rail corridor suggest several useful plant species used by Aboriginal people are located within the study area.



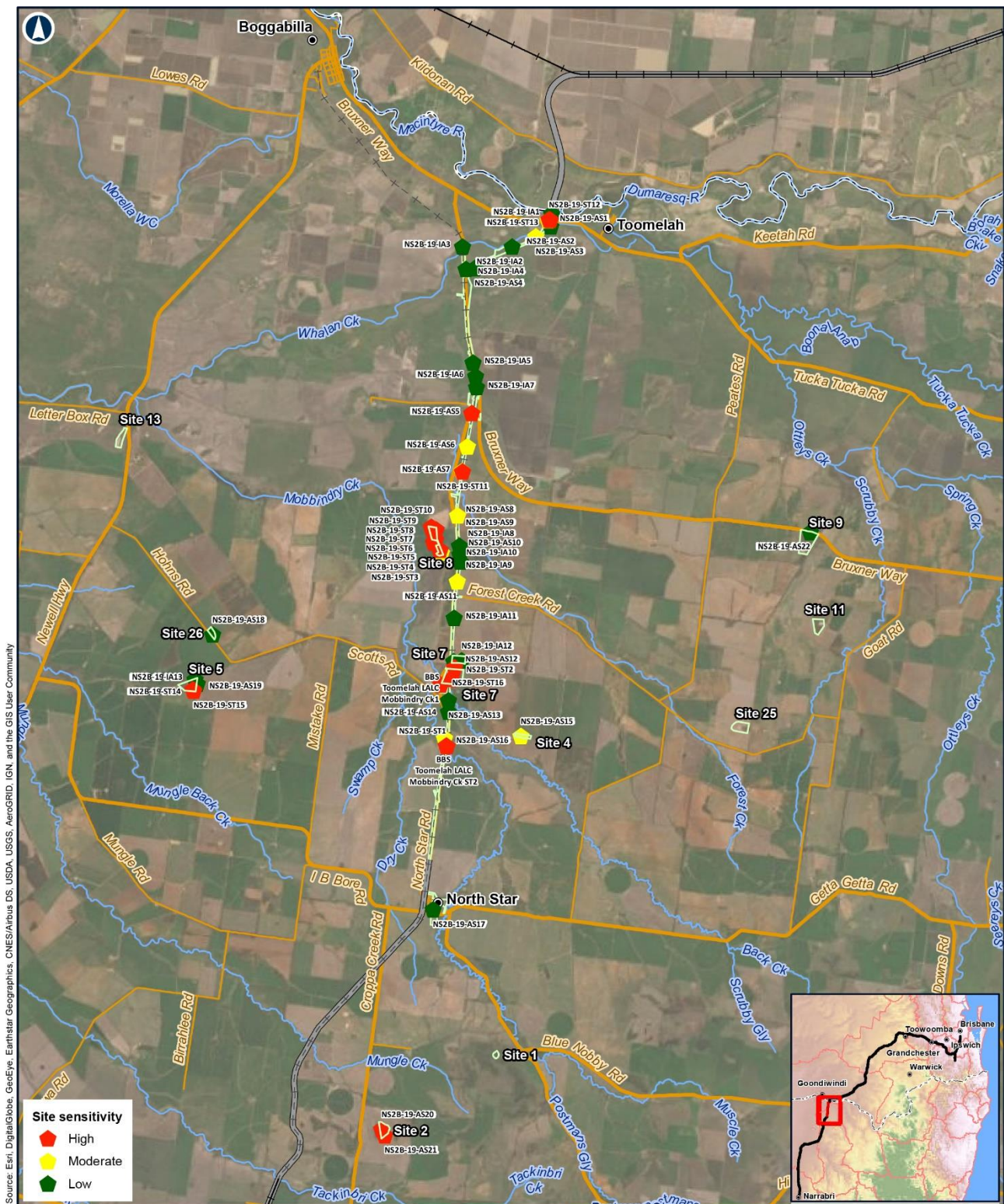


FIGURE 12.5 ABORIGINAL ARCHAEOLOGICAL SITES—SIGNIFICANCE ASSESSMENT



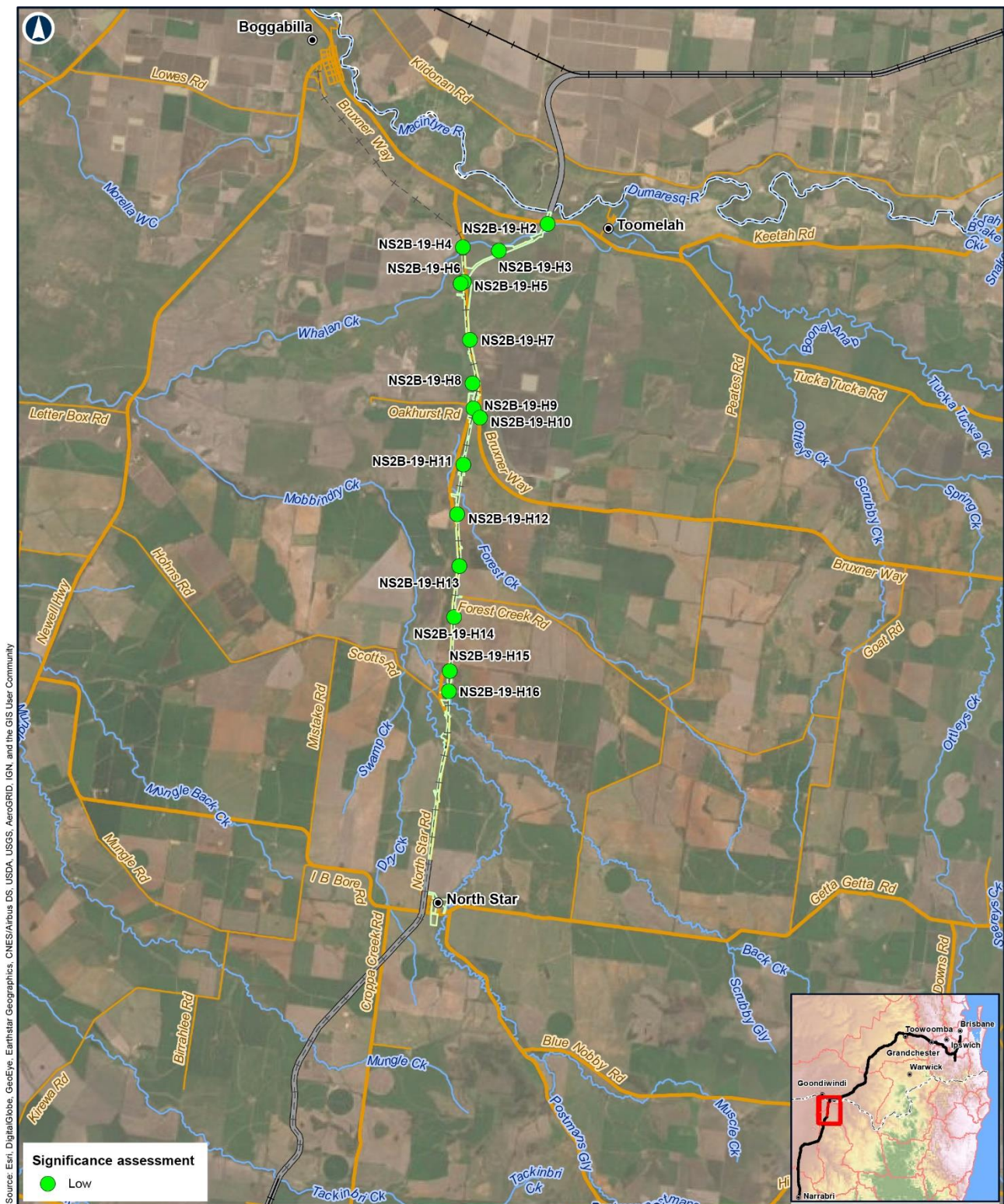


FIGURE 12.6 HISTORICAL HERITAGE SITES—SIGNIFICANCE ASSESSMENT

## Burials

RAPs noted that a burial site was located 1.5 km east of the proposal area on the Queensland side of the Macintyre River. The burials were uncovered at a sand quarry in 1992 and reburied adjacent to the quarry. Limited information was able to be provided on the nature and location of the remains; however, all RAPs identified the burial as being of exceptional heritage value to the local community.

### Historic value

‘Historic value’ refers to the associations that a place has with a historically important person, event, phase or activity in an Aboriginal community (OEH, 2011). Historic values can but will not necessarily be represented by physical evidence.

Although situated within a broader landscape of high historical significance for contemporary Aboriginal people, the study area itself is assessed as having low historical significance. Representatives from RAPs did identify relatives who had worked on the Boggabilla railway line, but these associations were either generalised to the rail industry or relate to Boggabilla and other key stations/rail yards. No specific oral history was provided for the study area.

### Scientific (archaeological) value

Scientific value refers to the importance of a place in terms of its rarity, representativeness and the extent to which it may contribute further information (i.e. its research potential) (OEH, 2011). It is typically assessed through characterisation against four key criteria.

## Research potential

Research potential can be defined as the potential of an archaeological site to address what Bowdler (1981) has referred to as ‘timely and specific research questions’. These questions may relate to any number of issues concerning past human lifeways and environments and, as suggested by Bowdler’s quote, will inevitably reflect current trends or problems in academic research (Burke & Smith, 2004). For their part, Bickford and Sullivan (1984) suggest that the research potential of an archaeological site can be determined by answering the following series of questions:

1. Can the site contribute knowledge which no other resource can?
2. Can the site contribute knowledge which no other such site can?
3. Is this knowledge relevant to general questions about human history or other substantive subjects?

Several criteria can be used to assess the research potential of an archaeological site. Particularly important in the context of Aboriginal archaeology are the intactness or integrity of the site in question, its complexity (place contents) and its representativeness.

### Complexity (place contents)

The complexity of a site refers primarily to the nature or character of the artefactual materials or features that constitute it but also includes site structure (e.g. the physical size of the site, spatial patterning in observed cultural materials). In the case of open artefact sites, for example, the principal criteria used to assess complexity are the site’s size (i.e. number of artefacts and/or spatial extent), the presence, range and frequency of artefact and raw material types, and the presence of features such as hearths. Table 12.10 provides the assessment criteria for the complexity of the site.

TABLE 12.10 COMPLEXITY (PLACE CONTENTS) CRITERIA

Criteria	Value
No cultural heritage material	0
Place contains 1–25 artefacts	1
Place contains large number of artefacts but limited range of cultural heritage materials	2
Place contains large number of artefacts and diverse range of cultural heritage material and/or complexity of a site/site structure	3

## Integrity/place condition

Integrity refers to the extent to which a site has been disturbed by natural and/or anthropogenic phenomena and includes both the state of preservation of particular remains (e.g. animal bones, plant remains) and, where applicable, stratigraphic integrity. Assessments of archaeological integrity are predicated on the notion that undisturbed or minimally disturbed sites are likely to yield higher quality archaeological and/or environmental data than those whose integrity has been significantly compromised by natural and/or anthropogenic phenomena. Establishing levels of preservation or integrity in the context of a surface survey is difficult. Nonetheless, useful rating schemes are available for 'open' sites (Coutts & Witter, 1977) and culturally modified trees (Long, 2003). Table 12.11 provides the assessment criteria for the place's integrity.

TABLE 12.11 INTEGRITY CRITERIA FOR PLACE'S INTEGRITY

Criteria	Value
Place destroyed	0
Place demonstrates high degree of disturbance (mechanical disturbance) with some cultural materials remaining or has limited opportunity for deposit	1
Place in good condition with little disturbance	2
Place in excellent condition with minimum or no disturbance	3

## Rarity and representativeness

Rarity and representativeness are related concepts. Rarity refers to the relative uniqueness of a site within its local and regional context. The scientific significance of a site is assessed as higher if it is unique or rare within either context. Conversely, it is considered to be of lower significance if it is common in one or both. The concept of representativeness, meanwhile, refers to the question of whether or not a site is 'a good example of its type, illustrating clearly the attributes of its significance' (Burke & Smith, 2004: 247).

Representativeness is an important criterion as one of the primary goals of cultural heritage management is to preserve for future generations a representative sample of all archaeological site types in their full range of environmental contexts.

In common with rarity, assessments of representativeness within a region are dependent on the state of current knowledge concerning the number and type of archaeological sites present within that region. This is a critical point, for as suggested by Kuskie (2000) and others (e.g. Bowdler, 1981; Godwin, 2011; Pearson & Sullivan, 1995), the absence across most of Australia of regional-scale quantitative data for Aboriginal sites and places represents a major constraint in assessments of representativeness and rarity. As stressed by Bowdler (1981) some 30 years ago, detailed regional-scale assessments of the Aboriginal archaeological record of Australia are required to address this issue. Table 12.12 provides the assessment criteria for the place's rarity.

TABLE 12.12 RARITY CRITERIA

CRITERIA	VALUE
Very common occurrence within the geographical region	0
Common occurrence within the geographical region	1
Uncommon occurrence within the geographical region	2
Rare occurrence within the geographical region	3

Each cultural heritage site is assessed against the above criteria and given a value. This value is then tallied, and sites are ranked accordingly (see Table 12.13). It should be noted that this methodology applies only to scientific significance assessments and cannot be readily applied to cultural significance assessments.

TABLE 12.13 SCIENTIFIC SIGNIFICANCE RANKING

Scientific Significance Value	Value
No scientific significance	0
Low scientific significance	1–3
Moderate scientific significance	4–6
High scientific significance	7–9



An assessment of the scientific significance of all archaeological sites within the study area is presented in Table 12.14. The significance rating is offered on the basis of the assessed research potential, rarity and representativeness on a local and regional scale.

#### Aesthetic value

Aesthetic value refers to the sensory, scenic, architectural and creative aspects of a place and is manifested through a range of physical and non-physical attributes (OEH, 2011). The study area is assessed as having low aesthetic significance for Aboriginal cultural heritage as the natural landscape of the subject properties has been extensively altered by historical and contemporary land-use practices. Individual artefacts may hold aesthetic value, and this would be clarified after detailed analysis following salvage.

A summary assessment of each identified Aboriginal cultural heritage sites is provided in Table 12.14.

#### 12.5.4.2 Historical heritage

Historical heritage is assessed in NSW against the seven NSW State Heritage Significance criteria (NSW Heritage Office, 2001). In general, a place may be of heritage significance if it meets one or more of the following criteria:

- ▶ Criterion A—An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).
- ▶ Criterion B—An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).
- ▶ Criterion C—An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).
- ▶ Criterion D—An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.
- ▶ Criterion E—An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).
- ▶ Criterion F—An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).
- ▶ Criterion G—An item is important in demonstrating the principal characteristics of a class of NSW's:
  - ▶ Cultural or natural places, or
  - ▶ Cultural or natural environments.

A summary assessment of each identified historical heritage sites is provided in Table 12.15.

TABLE 12.14 SUMMARY OF SCIENTIFIC SIGNIFICANCE—ABORIGINAL HERITAGE

AHIMS ID <sup>1</sup>	Site name	Complexity	Complexity value	Integrity	Integrity value	Rarity and representativeness	Rarity value	Scientific significance ranking
2-4-0003	Boggabilla Mungle	Three carved trees.	3	Trees have been relocated to Australian Museum. Actual removal location not known.	1	Carved trees are typically exceedingly rare throughout Australia.	3	High (n=7)
2-4-0046	BBS Toomelah LALC Mobbindry Ck1	Artefact scatter of 500+ artefacts with range of raw materials, manufacture and evidence of retouch.	3	While artefacts are eroding out of the bank of Mobbindry Creek, the overall site appears intact. There is evidence of surface disturbance through recent vegetation clearance. Archaeological deposit expected.	2	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies. However, larger artefact scatters (n=100+) are typically uncommon.	2	High (n=7)
2-4-0047	BBS Toomelah LALC Mobbindry Ck ST2	Culturally modified tree is a dual scar box gum with recently carved lizard motif.	3	Tree is in good condition. Limited potential for deposit as nearby construction for rail and road bridge have caused significant disturbance.	1	Culturally modified trees are an uncommon site. Dual culturally modified trees are considered rare.	2	High (n=7)
2-4-0103	NS2B-19-AS1	Artefact scatter of 11 artefacts including nine flakes, one bifacial artefact and one multidirectional core.	1	Artefact scatter is located within land that has been disturbed by ploughing. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0120	NS2B-19-AS2	Artefact scatter of two artefacts.	1	Artefact scatter is located within land that has been cleared. Some erosion noted. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0119	NS2B-19-AS3	Artefact scatter of five artefacts. One of these artefacts is a rare muller/ grindstone which has potential for further research.	1	Artefact scatter is located within land that has been cleared. Limited potential for deposit.	1	While artefact scatters are a common occurrence across Australia, grindstones are relatively rare implements.	2	Moderate (n=4)
2-4-0118	NS2B-19-AS4	Artefact scatter of two artefacts.	1	Artefact scatter is located within land that has been disturbed by ploughing. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)

AHIMS ID <sup>1</sup>	Site name	Complexity	Complexity value	Integrity	Integrity value	Rarity and representativeness	Rarity value	Scientific significance ranking
2-4-0117	NS2B-19-AS5	Artefact scatter of 500+ artefacts with range of raw materials, manufacture and evidence of retouch. One of these artefacts is a rare muller/grindstone which has potential for further research.	3	While most artefacts were recorded from contour banks, the overall site appears intact. There is some evidence of surface disturbance through recent vegetation clearance. Archaeological deposit expected.	2	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies. However, larger artefact scatters (n=100+) are typically uncommon. Likewise, the presence of a muller suggests that this is an important camp site.	2	High (n=7)
2-4-0116	NS2B-19-AS6	Artefact scatter of 13 artefacts including 10 flakes and three cores.	1	Artefact scatter is located within land that has been disturbed by the rail corridor. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-5-0088	NS2B-19-AS7	Artefact scatter of 65 artefacts including 43 flakes and 19 cores.	2	Artefact scatter is located within land that has been disturbed by the rail corridor. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Moderate (n=4)
2-4-0115	NS2B-19-AS8	Artefact scatter of 22 artefacts including 17 flakes and five cores.	1	Artefact scatter is located within land that has been disturbed by the rail corridor. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0139	NS2B-19-AS9	Artefact scatter of 168 artefacts including 127 flakes, 21 cores and 20 flake tools with range of raw materials, manufacture and evidence of retouch. Associated with a number of culturally modified trees. Broken emu shell was also present. The presence of emus was also confirmed during ecological assessments (refer Biodiversity Technical Report produced for the North Star to NSW/Queensland Border project EIS).	3	Artefact scatter is located within land that is relatively intact and does not appear to have been historically extensively cleared. Archaeological deposit expected.	3	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies. However, larger artefact scatters (n=100+) are typically uncommon, as are large artefact scatters in association with a high number of culturally modified trees. Likewise, the presence of potential datable material (emu eggshell) suggests potential for further research.	2	High (n=8)



AHIMS ID <sup>1</sup>	Site name	Complexity	Complexity value	Integrity	Integrity value	Rarity and representativeness	Rarity value	Scientific significance ranking
2-4-0102	NS2B-19-AS10	Artefact scatter of 13 artefacts including 11 flakes, one cores and one flake tools. Site is likely an extension of NS2B-19-AS9 which test excavation will likely demonstrate.	3	Artefact scatter is located within land that is relatively intact and does not appear to have been historically extensively cleared. Archaeological deposit expected.	3	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies. However, this site is considered an extension of NS2B-19-AS9.	2	High (n=8)
2-4-0101	NS2B-19-AS11	Artefact scatter of 18 artefacts including 17 flakes and one core.	1	Artefact scatter is located within land that has been disturbed by the rail corridor. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0100	NS2B-19-AS12	Artefact scatter of three artefacts including two flakes and one core.	1	Artefact scatter is located within land that has been disturbed by ploughing. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0099	NS2B-19-AS13	Artefact scatter of 10 artefacts including seven flakes, one flake tool and two cores.	1	Artefact scatter is located within land that has been disturbed by the rail corridor. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0098	NS2B-19-AS14	Artefact scatter of six artefacts including five flakes and one core.	1	Artefact scatter is located within land that has been disturbed by the rail corridor. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0097	NS2B-19-AS15	Artefact scatter of 17 artefacts including nine flakes, one flake tool and one hammerstone.	1	Artefact scatter is located within land that has been disturbed by ploughing. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0096	NS2B-19-AS16	Artefact scatter of 17 artefacts including 14 flakes and three cores.	1	Artefact scatter is located within land that has been cleared of vegetation. Artefacts were mostly noted in erosion areas. Archaeological deposit may be present closer to the creek.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0095	NS2B-19-AS17	Artefact scatter of two flakes.	1	Artefact scatter is located within land that has been cleared of vegetation. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)

AHIMS ID <sup>1</sup>	Site name	Complexity	Complexity value	Integrity	Integrity value	Rarity and representativeness	Rarity value	Scientific significance ranking
2-4-0122	NS2B-19-AS18	Artefact scatter of eight flakes.	1	Artefact scatter is located within land that has been disturbed by ploughing. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0121	NS2B-19-AS19	Artefact scatter of two flakes.	1	Artefact scatter is located within land that has been cleared of vegetation. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
11-1-0056	NS2B-19-AS20	Artefact scatter of 14 artefacts including nine flakes, three flake tools and two cores. Raw materials are all silcrete. A natural silcrete deposit exists at the base of the volcano.	1	Artefact scatter is located on top of an extinct cinder cone. While some clearing appears to have occurred, comments by a farmworker indicated that clearance was limited because of the volcanic geology. Archaeological deposit may be present but will be shallow.	2	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies. However, artefact scatters associated with volcanoes are rare.	1	Moderate (n=4)
11-1-0055	NS2B-19-AS21	Artefact scatter of 28 artefacts including 14 flakes, three flake tools and 11 cores. Raw materials are all silcrete. A natural silcrete deposit exists at the base of the volcano.	2	Artefact scatter is located on top of an extinct cinder cone. While some clearing appears to have occurred, comments by a farmworker indicated that clearance was limited because of the volcanic geology. Archaeological deposit may be present but will be shallow.	2	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies. However, artefact scatters associated with volcanoes are rare.	1	Moderate (n=5)
2-5-0089	NS2B-19-AS22	Artefact scatter of two artefacts including one flakes and one multidirectional core.	1	Artefact scatter is located within land that has not been subject to significant clearance. Limited potential for deposit.	1	Artefact scatters are a common occurrence across Australia, particularly in association with waterbodies.	1	Low (n=3)
2-4-0114	NS2B-19-IA1	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by ploughing. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0109	NS2B-19-IA2	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by vegetation clearance. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)



AHIMS ID <sup>1</sup>	Site name	Complexity	Complexity value	Integrity	Integrity value	Rarity and representativeness	Rarity value	Scientific significance ranking
2-4-0108	NS2B-19-IA3	Isolated artefact—backed artefact.	1	Isolated artefact is located within land that has been disturbed by grader action associated with the rail corridor. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0107	NS2B-19-IA4	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by ploughing. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0141	NS2B-19-IA5	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by grader action associated with the rail corridor and old North Star Road. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0140	NS2B-19-IA6	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by grader action associated with the rail corridor and old North Star Road. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0138	NS2B-19-IA7	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by vegetation clearance. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0137	NS2B-19-IA8	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by grader action associated with the rail corridor. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0136	NS2B-19-IA9	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by grader action associated with the rail corridor. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0113	NS2B-19-IA10	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by grader action associated with the rail corridor. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)

AHIMS ID <sup>1</sup>	Site name	Complexity	Complexity value	Integrity	Integrity value	Rarity and representativeness	Rarity value	Scientific significance ranking
2-4-0112	NS2B-19-IA11	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by grader action associated with the rail corridor. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0111	NS2B-19-IA12	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by ploughing. Limited potential for deposit.	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0110	NS2B-19-IA13	Isolated artefact.	1	Isolated artefact is located within land that has been disturbed by vegetation clearance. Limited potential for deposit	1	Isolated artefacts are a common archaeological find in Australia.	1	Low (n=3)
2-4-0104	NS2B-19-ST1	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is in poor condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0105	NS2B-19-ST2	Tree is a dual culturally modified poplar box gum.	3	Tree is in good condition; scars are in poor condition or nearly healed over. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site. Dual culturally modified trees are considered rare.	3	High (n=8)
2-4-0106	NS2B-19-ST3	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is in poor condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0129	NS2B-19-ST4	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is in good condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0128	NS2B-19-ST5	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is in poor condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0127	NS2B-19-ST6	Tree is a multiple culturally modified poplar box gum, likely a 'possum tree'.	3	Tree is in good condition; scars are in poor condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0126	NS2B-19-ST7	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is in good condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)

AHIMS ID <sup>1</sup>	Site name	Complexity	Complexity value	Integrity	Integrity value	Rarity and representativeness	Rarity value	Scientific significance ranking
2-4-0125	NS2B-19-ST8	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is in good condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0124	NS2B-19-ST9	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is in good condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0135	NS2B-19-ST10	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is in good condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0134	NS2B-19-ST11	Tree is a single, culturally modified poplar box gum, shows evidence of stone axe marks.	3	Tree is in good condition; scar is in good condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0131	NS2B-19-ST12	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is in poor condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0132	NS2B-19-ST13	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is almost healed over. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0133	NS2B-19-ST14	Tree is a single culturally modified poplar box gum.	3	Tree is dead and fallen over, scar is in poor condition. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0130	NS2B-19-ST15	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is almost healed over. Limited potential for deposit.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)
2-4-0123	NS2B-19-ST16	Tree is a single culturally modified poplar box gum.	3	Tree is in good condition; scar is almost healed over. Potential for deposit associated with BBS Toomelah LALC Mobbindry Ck1 artefact scatter.	2	Culturally modified trees are generally an uncommon Aboriginal cultural heritage site.	2	High (n=7)

Table note:

1. AHIMS ID may not yet have been assigned for all sites by the DPC.



TABLE 12.15 SUMMARY OF SIGNIFICANCE—HISTORICAL HERITAGE

Site ID	Site name	State heritage criterion						
		Criterion A—Historical	Criterion B—Association	Criterion C—Aesthetic	Criterion D—Social	Criterion E—Research	Criterion F—Rarity	Criterion G—Representativeness
NS2B-19-H2	Loggers' Camp	Not met	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H3	Survey mark	Not met	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H4	Whalan Creek rail bridge	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H5	Shearing shed archaeological site	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met
NS2B-19-H6	Shearer's accommodation	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met
NS2B-19-H7	Modern roadside memorial	Not met	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H8	Old Boggabilla/ North Star Road	Not met	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H9	Wearne siding	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H10	Wearne siding sign	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H11	Fettlers Camp 1	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met	Not met	Not met	Not met

Site ID	Site name	State heritage criterion						
		Criterion A—Historical	Criterion B—Association	Criterion C—Aesthetic	Criterion D—Social	Criterion E—Research	Criterion F—Rarity	Criterion G—Representativeness
NS2B-19-H12	Fettlers Camp 2	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H13	Fettlers Camp 3	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H14	Fettlers Camp 4	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H15	Mungle siding	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met	Not met	Not met	Not met
NS2B-19-H16	Back Creek rail bridge	While the item does not meet the threshold for state significance, it is considered to have local historical significance.	Not met	Not met	Not met	Not met	Not met	Not met

## 12.6 Potential impacts

A description of the proposal is available in Chapter 6: The Proposal and Chapter 7: Construction of the Proposal.

Infrastructure activities proposed as part of the proposal have been categorised into two phases, including construction and operation. Direct impacts occur if a heritage place or site is located directly in a development area and/or would be physically impacted by development. Such impacts include the disturbance of a site. Alternatively, indirect impacts are those that alter the surrounding physical environment in such a way that a cultural heritage place or site is affected. Indirect impacts might include extra vibration from construction activities or subsequent traffic load, as well as additional water runoff or sediment deposition due to changing hydrology that can affect culturally modified trees. A description of proposal related activities and the extent of their disturbance is provided in Table 12.16.

TABLE 12.16 DESCRIPTION OF PROPOSAL RELATED ACTIVITIES ASSOCIATED WITH CONSTRUCTION AND OPERATIONAL PHASES

Potential impact	Construction	Operation
Impact to surface and subsurface archaeological sites	Potential impact during clearance works for all archaeological sites	Low risk of impact to archaeological sites during operation
Impact to culturally modified trees	Ground clearance works have potential to damage tree including roots	Low risk of impact to archaeological sites during operation
Impact to structures	Potential impact during clearance works for all historical heritage structures in the proposal site Low risk of vibrational impact during construction.	Low risk of vibrational impact during operation

## 12.7 Mitigation measures

ARTC has committed to applying impact mitigation measures to minimise proposal related impacts on Aboriginal and historical cultural heritage values. These potential mitigation measures are presented in Table 12.17. Site-specific mitigation measures are presented in Table 12.18 and Figure 12.7 for Aboriginal Heritage and Table 12.19 and Figure 12.9 for historical heritage.

TABLE 12.17 IMPACT MITIGATION MEASURES

Aspect	Management measure
Heritage (General)	<ul style="list-style-type: none"><li>▶ Clearing extents/site boundary/limit of works are consistent with proposal extents defined in a condition of approval.</li><li>▶ Clearing extents are limited to that required to undertake the works.</li><li>▶ The clearing extents/site boundary/limit of works is clearly defined with flagging or marking tape, signage or other suitable means to delineate no-go areas. This delineation and marking process will be incorporated and align with the flagging/marketing tape process and specifications for the proposal, to ensure that it aligns with the greater Inland Rail program processes and does not conflict or contradict any of their demarcation.</li><li>▶ Disturbance is minimised to avoid impacts to identified heritage as far as practicable.</li></ul>



Aspect	Management measure
	<ul style="list-style-type: none"> <li>▶ A heritage management sub-plan will be developed as part of the construction environmental management plan, which complies with the proposal conditions of approval, relevant regulatory requirements and state or commonwealth guidelines. This plan should include appropriate criteria, directives and processes on: <ul style="list-style-type: none"> <li>▶ Site registry with approved management requirements</li> <li>▶ Requirements and protocols for heritage clearances including engagement of RAPs for areas of Aboriginal heritage sensitivity</li> <li>▶ Unexpected finds procedure and process for update of heritage management sub-plan procedures including the following steps: <ol style="list-style-type: none"> <li>1. All activity to cease within a 10 m buffer of the suspected find, and the area to be cordoned off using temporary fencing.</li> <li>2. Site supervisor is to be immediately notified who will then engage a qualified heritage advisor to assess the find.</li> <li>3. If the find is determined to be Aboriginal cultural heritage, the DPC and the RAPs are to be notified immediately of the find. The heritage advisor is to consult with the RAPs on the management of the object and prepare a site card for submission to the AHIMS register.</li> </ol> </li> <li>▶ Consultation engagement protocols and dispute resolution process for Aboriginal heritage</li> <li>▶ Relocation methodology of salvaged material (where applicable)</li> <li>▶ Requirements for inspections and corrective actions during construction and other activities in vicinity of heritage items</li> <li>▶ Heritage management actions to be undertaken by suitably qualified persons</li> <li>▶ Requirements for training, inspections, corrective actions, notification and classification of incidents, record keeping, monitoring and performance objectives for handover on completion of construction</li> </ul> </li> <li>▶ Any other requirements necessary to comply with conditions of approval, subsequent approvals or regulatory requirements.</li> </ul>
Isolated artefacts and low-density artefact scatters (<100 artefacts)	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Historical artefacts determined to be of high significance are to be surface-collected as per the <i>Historical Archaeology Code of Practice</i> (NSW Heritage Office, 2006a).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential Global Positioning System (GPS).</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ All historical heritage items are to be analysed by a historical heritage professional.</li> </ul>
Artefact scatters (>100 artefacts)	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Historical artefacts determined to be of high significance are to be surface-collected as per the <i>Historical Archaeology Code of Practice</i> (NSW Heritage Office, 2006a).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant <i>Code and approved Heritage Management Plan</i> (HMP).</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ All historical heritage items are to be analysed by a historical heritage professional.</li> </ul>
Aboriginal culturally modified trees	<ul style="list-style-type: none"> <li>▶ All culturally modified trees are to be avoided as far as practicable.</li> <li>▶ Where avoidance is not achievable and salvage is appropriate, a program of consultation must be undertaken with the relevant Aboriginal Parties to identify a suitable salvage methodology and agreement on keeping place.</li> </ul>
Historic heritage	<ul style="list-style-type: none"> <li>▶ A program of archival recording is to be undertaken prior to construction. This program will seek to map the full extent of each site through surface finds and documented with photographs as per the NSW guidelines (NSW Heritage Office, 2006b).</li> </ul>

TABLE 12.18 PROPOSED MITIGATION MEASURES FOR ABORIGINAL HERITAGE PLACES

AHIMS ID <sup>1</sup>	Site name	Mitigation
2-4-0003	Boggabilla Mungle	<ul style="list-style-type: none"> <li>▶ <i>Aboriginal Site Impact Recording Form</i> to be appended to existing site card in AHIMS to state that site has been salvaged.</li> <li>▶ No further mitigation required, other than unexpected finds.</li> </ul>
2-4-0046	BBS Toomelah LALC Mobbindry Ck1	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether or not additional investigations are warranted and what methodologies are appropriate.</li> <li>▶ Radiometric dating to be undertaken if following conditions met: <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> <li>▶ Use of part of site not impacted as an 'on Country' keeping place.</li> </ul>
2-4-0047	BBS Toomelah LALC Mobbindry Ck ST2	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly basis; Site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>
2-4-0103	NS2B-19-AS1	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0120	NS2B-19-AS2	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be monitored for changes in condition.</li> </ul>
2-4-0119	NS2B-19-AS3	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Sandstone muller to be investigated for residue analysis.</li> </ul>

AHIMS ID <sup>1</sup>	Site name	Mitigation
2-4-0118	NS2B-19-AS4	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0117	NS2B-19-AS5	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts, mullers etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether additional investigations are warranted and what methodologies are appropriate.</li> <li>▶ Radiometric dating to be undertaken if the following conditions are met: <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> </ul>
2-4-0116	NS2B-19-AS6	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-5-0088	NS2B-19-AS7	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ A program of test excavation is to be considered as per the requirements of the relevant Code and approved HMPs in areas where surface artefact densities are 10 per 10 m<sup>2</sup> and ground surface integrity is established.</li> </ul>
2-4-0115	NS2B-19-AS8	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>



AHIMS ID <sup>1</sup>	Site name	Mitigation
2-4-0139	NS2B-19-AS9	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether additional investigations are warranted and what methodologies are appropriate.</li> <li>▶ Radiometric dating to be undertaken if following conditions met: <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> </ul>
2-4-0102	NS2B-19-AS10	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether additional investigations are warranted and what methodologies are appropriate.</li> <li>▶ Radiometric dating to be undertaken if following conditions met: <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> </ul>
2-4-0101	NS2B-19-AS11	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0100	NS2B-19-AS12	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0099	NS2B-19-AS13	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>

AHIMS ID <sup>1</sup>	Site name	Mitigation
2-4-0098	NS2B-19-AS14	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0097	NS2B-19-AS15	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0096	NS2B-19-AS16	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ A program of test excavation is to be considered as per the requirements of the relevant Code and approved HMPs in areas where surface artefact densities are 10 per 10 m<sup>2</sup> ground surface integrity is established, and the area of site will be impacted.</li> </ul>
2-4-0095	NS2B-19-AS17	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0122	NS2B-19-AS18	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0121	NS2B-19-AS19	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
11-1-0056	NS2B-19-AS20	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>

AHIMS ID <sup>1</sup>	Site name	Mitigation
11-1-0055	NS2B-19-AS21	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of artefacts to be analysed for residue analysis (preferably tools and muller).</li> <li>▶ Radiometric dating to be undertaken if following conditions met: <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> </ul>
2-5-0089	NS2B-19-AS22	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts, muller etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether additional investigations are warranted and what methodologies are appropriate.</li> <li>▶ Radiometric dating to be undertaken if following conditions met: <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> </ul>
2-4-0114	NS2B-19-IA1	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0109	NS2B-19-IA2	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0108	NS2B-19-IA3	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>



AHIMS ID <sup>1</sup>	Site name	Mitigation
2-4-0107	NS2B-19-IA4	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0141	NS2B-19-IA5	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0140	NS2B-19-IA6	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0138	NS2B-19-IA7	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0137	NS2B-19-IA8	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0136	NS2B-19-IA9	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0113	NS2B-19-IA10	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0112	NS2B-19-IA11	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>

AHIMS ID <sup>1</sup>	Site name	Mitigation
2-4-0111	NS2B-19-IA12	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0110	NS2B-19-IA13	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>
2-4-0104	NS2B-19-ST1	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly bas; site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>
2-4-0105	NS2B-19-ST2	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly bas; site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>
2-4-0106	NS2B-19-ST3	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>
2-4-0129	NS2B-19-ST4	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>
2-4-0128	NS2B-19-ST5	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly base; site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>
2-4-0127	NS2B-19-ST6	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>
2-4-0126	NS2B-19-ST7	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>

AHIMS ID <sup>1</sup>	Site name	Mitigation
2-4-0125	NS2B-19-ST8	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>
2-4-0124	NS2B-19-ST9	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>
2-4-0135	NS2B-19-ST10	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly bas; site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>
2-4-0134	NS2B-19-ST11	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>
2-4-0131	NS2B-19-ST12	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>
2-4-0132	NS2B-19-ST13	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly base; site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>
2-4-0133	NS2B-19-ST14	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>
2-4-0130	NS2B-19-ST15	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>
2-4-0123	NS2B-19-ST16	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly bas; site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>
N/A	NS2B-19-RT1	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be monitored every six months and at the end of construction for changes in condition.</li> </ul>



AHIMS ID <sup>1</sup>	Site name	Mitigation
N/A	NS2B-19-IH1	<ul style="list-style-type: none"> <li>▶ Species of value to local Aboriginal community to be considered for rehabilitation.</li> <li>▶ Consideration of publicly accessible rehabilitation.</li> <li>▶ Consideration of avoidance of impact to two mature bumble tree specimens.</li> </ul>
N/A	NS2B-19-IH2	<ul style="list-style-type: none"> <li>▶ Impacts will be managed under the <i>Construction Environment Management Plan</i> for the proposal.</li> </ul>

Table note:

1. AHIMS ID may not yet been assigned for all sites by the DPC.

TABLE 12.19 PROPOSED MITIGATION MEASURES FOR HISTORICAL HERITAGE PLACES

Site ID	Description	Mitigation
NS2B-19-H2	Loggers' camp	<ul style="list-style-type: none"> <li>▶ Clearance of site through collection and documentation of historical artefacts within construction disturbance footprint.</li> <li>▶ Unexpected finds procedure to be implemented.</li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>
NS2B-19-H3	Survey mark	<ul style="list-style-type: none"> <li>▶ The tree should be accurately surveyed, and consultation undertaken with NSW Government Spatial Services to determine if they have a record of this tree.</li> <li>▶ Should NS2B-19-H3 be impacted, ARTC will engage with the NSW Government Spatial Services to discuss requirements for destruction of this survey mark (pre-construction).</li> <li>▶ Photographic archival recording of the tree should be undertaken prior to impact (pre-construction).</li> </ul>
NS2B-19-H4	Whalan Creek rail bridge	<ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site should be undertaken prior to impact. This will involve: <ul style="list-style-type: none"> <li>▶ Archaeological survey and collection of Aboriginal and historical heritage items prior to disturbance</li> <li>▶ Clearance of vegetation around structure prior to recording</li> <li>▶ Detailed plans are to be prepared and photographic archival recording undertaken according to NSW Standards prior to demolition</li> </ul> </li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>
NS2B-19-H5	Shearing shed archaeological site	<ul style="list-style-type: none"> <li>▶ Avoidance of site. Site is outside of the proposal disturbance footprint but may be impacted through unintentional interaction.</li> <li>▶ Works within 200 m should note presence of heritage site as part of daily toolboxes.</li> </ul> <p>If avoidance is identified as not being possible for whatever reason:</p> <ul style="list-style-type: none"> <li>▶ Archaeological survey of the site is to be undertaken.</li> <li>▶ Archaeological excavation is to be undertaken in areas identified during the survey as having potential for subsurface deposits.</li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>
NS2B-19-H6	Shearer accommodation	<ul style="list-style-type: none"> <li>▶ Avoidance of site. The site is outside of the proposal disturbance footprint but may be impacted through unintentional interaction.</li> <li>▶ Works within 200 m should note presence of heritage site as part of daily toolboxes.</li> </ul> <p>If avoidance is identified as not being possible for whatever reason:</p> <ul style="list-style-type: none"> <li>▶ Archaeological survey of the site is to be undertaken.</li> <li>▶ Archaeological excavation is to be undertaken in areas identified during the survey as having potential for subsurface deposits.</li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>

Site ID	Description	Mitigation
NS2B-19-H7	Modern roadside memorial	<ul style="list-style-type: none"> <li>▶ Avoidance of site.</li> </ul> <p>If avoidance is identified as not being possible for whatever reason:</p> <ul style="list-style-type: none"> <li>▶ Immediate family of Mr Orchard are to be consulted regarding appropriate measures during construction which may include: <ul style="list-style-type: none"> <li>▶ Access requirements to memorial</li> <li>▶ Temporary relocation, and later reinstatement post-construction.</li> </ul> </li> </ul>
NS2B-19-H8	Old Boggabilla/ North Star Road alignment	<ul style="list-style-type: none"> <li>▶ Clearance of site through collection and documentation of historical artefacts within construction disturbance footprint.</li> <li>▶ Unexpected finds procedure to be implemented.</li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>
NS2B-19-H9	Wearne siding	<ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site should be undertaken prior to impact. This will involve: <ul style="list-style-type: none"> <li>▶ Archaeological survey and collection of Aboriginal and historical heritage items prior to disturbance</li> <li>▶ Clearance of vegetation around structure prior to recording</li> <li>▶ Detailed plans are to be prepared and photographic archival recording undertaken according to NSW Standards prior to demolition</li> </ul> </li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>
NS2B-19-H10	Wearne siding sign	<ul style="list-style-type: none"> <li>▶ Avoidance of site</li> </ul> <p>If avoidance is identified as not being possible for whatever reason:</p> <ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site.</li> <li>▶ Consultation with landowner on proposed mitigation measures.</li> <li>▶ Temporarily remove structure and reinstate post-construction.</li> </ul>
NS2B-19-H11	Fettlers Camp 1	<ul style="list-style-type: none"> <li>▶ Documentation and salvage of unique non-kiln related historical artefacts (i.e. not slag or non-descript kiln bricks) within construction disturbance footprint.</li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>
NS2B-19-H12	Fettlers Camp 2	<ul style="list-style-type: none"> <li>▶ Documentation and salvage of unique non-kiln related historical artefacts (i.e. not slag or non-descript kiln bricks) within construction disturbance footprint.</li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>
NS2B-19-H13	Fettlers Camp 3	<ul style="list-style-type: none"> <li>▶ Documentation and salvage of unique non-kiln related historical artefacts (i.e. not slag or non-descript kiln bricks) within construction disturbance footprint.</li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>
NS2B-19-H14	Fettlers Camp 4	<ul style="list-style-type: none"> <li>▶ Documentation and salvage of unique non-kiln related historical artefacts (i.e. not slag or non-descript kiln bricks) within construction disturbance footprint.</li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>
NS2B-19-H15	Mungle siding	<ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site should be undertaken prior to impact. This will involve: <ul style="list-style-type: none"> <li>▶ Archaeological survey and collection of Aboriginal and historical heritage items prior to disturbance</li> <li>▶ Clearance of vegetation around structure prior to recording</li> <li>▶ Detailed plans are to be prepared and photographic archival recording undertaken according to NSW Standards prior to demolition</li> </ul> </li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>
NS2B-19-H16	Back Creek rail bridge	<ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site should be undertaken prior to impact. This will involve: <ul style="list-style-type: none"> <li>▶ Archaeological survey and collection of Aboriginal and historical heritage items prior to disturbance</li> <li>▶ Clearance of vegetation around structure prior to recording</li> <li>▶ Detailed plans are to be prepared and photographic archival recording undertaken according to NSW Standards prior to demolition</li> </ul> </li> <li>▶ Salvaged artefacts to be offered to local heritage society/museum.</li> </ul>

## 12.8 Impact assessment

### 12.8.1 Aboriginal heritage

Consideration of the location of sites related directly to the proposed North Star to Border easement impacts identified that 22 artefact scatters, 12 isolated artefacts and nine culturally modified trees will be directly impacted by the proposal. Seven culturally modified trees will be indirectly impacted and one artefact scatter, one isolated artefact, one culturally modified tree and one carved tree site will not be impacted by the proposal.

Table 12.20, Figure 12.7 and Figure 12.8 present a summary of significance of impacts to impacted sites.

### 12.8.2 Historical heritage

Of the 15 identified historical heritage sites, 11 will be directly impacted by the proposal. These include two railway sidings, two bridges and four fettler camps.

Table 12.21 and Figure 12.9 presents a summary of impacted sites and an assessment of the significance of impacts.



TABLE 12.20 ASSESSMENT OF IMPACTS TO ABORIGINAL HERITAGE SITES

Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
Boggabilla Mungle	<ul style="list-style-type: none"> <li>▶ No impact</li> <li>▶ Trees have been salvaged</li> </ul>	Very high	No change	Neutral	<ul style="list-style-type: none"> <li>▶ <i>Aboriginal Site Impact Recording Form</i> to be appended to existing site card in AHIMS to state that site has been salvaged.</li> <li>▶ No further mitigation required, other than unexpected finds.</li> </ul>	No change	Neutral
BBS Toomelah LALC Mobbindry Ck1	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> <li>▶ Part of the site can be avoided, outside the construction disturbance footprint</li> </ul>	High	Major	Large/very large	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether additional investigations are warranted and what methodologies are appropriate.</li> <li>▶ Radiometric dating to be undertaken if following conditions met: <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon</li> </ul> </li> <li>▶ Use of part of site not impacted as 'on Country' keeping place.</li> </ul>	Major	Large/very large

Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
BBS Toomelah LALC Mobbindry Ck ST2	<ul style="list-style-type: none"> <li>▶ Indirect impact</li> <li>▶ Tree is located immediately outside disturbance corridor</li> <li>▶ Risk of vibration impact, dust, and potential impact</li> <li>▶ Change in access to water for the tree</li> </ul>	High	Medium	Moderate/ large	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during construction works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly basis; site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>	Medium	Moderate/ large
NS2B-19-AS1	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/ moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/ moderate
NS2B-19-AS2	<ul style="list-style-type: none"> <li>▶ No impact</li> <li>▶ Site is located immediately outside disturbance footprint.</li> </ul>	Low	No change	Neutral	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be monitored for changes in condition.</li> </ul>	No Change	Neutral
NS2B-19-AS3	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint</li> </ul>	Moderate	Major	Moderate/ large	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Sandstone muller to be investigated for residue analysis.</li> </ul>	Major	Moderate/ large

Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-AS4	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-AS5	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> <li>▶ Part of the site can be avoided, outside the construction disturbance footprint</li> </ul>	High	Major	Large/very large	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts, muller etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether additional investigations are warranted and what methodologies are appropriate.</li> <li>▶ Radiometric dating to be undertaken if following conditions met: <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> </ul>	Major	Large/very large
NS2B-19-AS6	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate



Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-AS7	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Moderate	Major	Moderate/large	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ A program of test excavation is to be considered as per the requirements of the relevant Code and approved HMPs in areas where surface artefact densities are 10 per 10 m<sup>2</sup> and ground surface integrity is established.</li> </ul>	Major	Moderate/large
NS2B-19-AS8	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b),</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS,</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required,</li> </ul>	Major	Slight/moderate
NS2B-19-AS9	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	High	Major	Large/very large	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether or not additional investigations are warranted and what methodologies are appropriate.</li> <li>▶ Radiometric dating to be undertaken if following conditions met: <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> </ul>	Major	Large/very large

Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-AS10	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	High	Major	Large/very large	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether additional investigations are warranted and what methodologies are appropriate.</li> <li>▶ Radiometric dating to be undertaken if following conditions met: <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> </ul>	Major	Large/very large
NS2B-19-AS11	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-AS12	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate

Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-AS13	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-AS14	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-AS15	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-AS16	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Part of site is located with the construction disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ A program of test excavation is to be considered as per the requirements of the relevant Code and approved HMPs in areas where surface artefact densities are 10 per 10 m<sup>2</sup>, ground surface integrity is established, and the area of site will be impacted</li> </ul>	Major	Slight/moderate
NS2B-19-AS17	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate



Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-AS18	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-AS19	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-AS20	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	Moderate	Major	Moderate/large	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Moderate/large
NS2B-19-AS21	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	Moderate	Major	Moderate/large	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts, muller etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether or not additional investigations are warranted and what methodologies are appropriate.</li> </ul>	Major	Moderate/large

Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
					<ul style="list-style-type: none"> <li>▶ Radiometric dating to be undertaken if following conditions met:               <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> </ul>		
NS2B-19-AS22	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ A program of test excavation is to be undertaken as per the requirements of the relevant Code and approved HMPs.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> <li>▶ Selection of an initial maximum of 50 lithic tools (backed artefacts, muller etc.) to be analysed for microscopic residue analysis pre-screening (presence or absence of residues). Should the pre-screening identify potential residues, discussions should be held between ARTC and Aboriginal Parties as to whether or not additional investigations are warranted and what methodologies are appropriate.</li> <li>▶ Radiometric dating to be undertaken if following conditions met:               <ul style="list-style-type: none"> <li>▶ Sample is from subsurface stratified hearth, archaeologically associated bone or eggshell hand-excavated via controlled methods</li> <li>▶ Taphonomic conditions are suitable for the preservation of datable carbon.</li> </ul> </li> </ul>	Major	Slight/moderate
NS2B-19-IA1	<ul style="list-style-type: none"> <li>▶ No Impact</li> <li>▶ Site is located immediately outside disturbance footprint</li> </ul>	Low	No Change	Neutral	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	No change	Neutral

Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-IA2	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-IA3	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-IA4	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-IA5	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-IA6	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located just within the construction disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate



Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-IA7	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-IA8	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-IA9	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-IA10	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-IA11	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate

Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-IA12	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-IA13	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Aboriginal artefacts are to be surface-collected as per the <i>Aboriginal Heritage Code of Practice</i> (DECCW, 2010b).</li> <li>▶ Individual artefacts are mapped using tablet devices and/or handheld differential GPS.</li> <li>▶ An Aboriginal site impact recording form will be completed for Aboriginal stone artefacts, where required.</li> </ul>	Major	Slight/moderate
NS2B-19-ST1	<ul style="list-style-type: none"> <li>▶ Indirect Impact</li> <li>▶ Tree is located immediately outside disturbance corridor</li> <li>▶ Risk of vibration impact, dust, and potential impact</li> <li>▶ Change in access to water for the tree</li> </ul>	High	Medium	Moderate/large	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly basis; Site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>	Medium	Moderate/large
NS2B-19-ST2	<ul style="list-style-type: none"> <li>▶ Indirect Impact</li> <li>▶ Tree is located immediately outside disturbance corridor</li> <li>▶ Risk of vibration impact, dust, and potential impact</li> <li>▶ Change in access to water for the tree</li> </ul>	High	Medium	Moderate/large	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly basis; Site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>	Medium	Moderate/large
NS2B-19-ST3	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	High	Major	Large/very large	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>	Major	Large/very large

Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-ST4	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	High	Major	Large/ very large	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>	Major	Large/ very large
NS2B-19-ST5	<ul style="list-style-type: none"> <li>▶ Indirect impact</li> <li>▶ Tree is located immediately outside disturbance corridor</li> <li>▶ Risk of vibration impact, dust, and potential impact</li> <li>▶ Change in access to water for the tree</li> </ul>	High	Medium	Moderate/ large	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly basis; Site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>	Medium	Moderate/ large
NS2B-19-ST6	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	High	Major	Large/ very large	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>	Major	Large/ very large
NS2B-19-ST7	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	High	Major	Large/ very large	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>	Major	Large/ very large
NS2B-19-ST8	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	High	Major	Large/ very large	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>	Major	Large/ very large
NS2B-19-ST9	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	High	Major	Large/ very large	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>	Major	Large/ very large



Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-ST10	<ul style="list-style-type: none"> <li>▶ Indirect impact</li> <li>▶ Tree is located immediately outside disturbance corridor</li> <li>▶ Risk of vibration impact, dust, and potential impact</li> <li>▶ Change in access to water for the tree</li> </ul>	High	Medium	Moderate/ large	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly bas; Site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>	Medium	Moderate/ large
NS2B-19-ST11	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the permanent disturbance footprint</li> </ul>	High	Major	Large/ very large	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>	Major	Large/ very large
NS2B-19-ST12	<ul style="list-style-type: none"> <li>▶ Potential for direct impact</li> <li>▶ Site is located with the construction disturbance footprint</li> </ul>	High	Major	Large/ very large	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>	Major	Large/ very large
NS2B-19-ST13	<ul style="list-style-type: none"> <li>▶ Indirect impact</li> <li>▶ Tree is located immediately outside disturbance corridor</li> <li>▶ Risk of vibration impact, dust, and potential impact</li> <li>▶ Change in access to water for the tree</li> </ul>	High	Medium	Moderate/ large	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly bas; Site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>	Medium	Moderate/ large
NS2B-19-ST14	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	High	Major	Large/ very large	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>	Major	Large/ very large

Site	Potential impact	Pre-mitigated impact assessment			Mitigation and management measures	Residual impact assessment	
		Sensitivity	Magnitude	Impact		Magnitude	Impact
NS2B-19-ST15	<ul style="list-style-type: none"> <li>▶ Direct impact</li> <li>▶ Site is located with the construction disturbance footprint (borrow pit)</li> </ul>	High	Major	Large/very large	<ul style="list-style-type: none"> <li>▶ If site is to be impacted, site to be salvaged in accordance with industry standards (Long, 2005; Rio Tinto Coal Australia, 2009).</li> <li>▶ Salvaged tree to be conserved as per best practice.</li> <li>▶ Consultation with RAPs on suitable keeping place.</li> </ul>	Major	Large/very large
NS2B-19-ST16	<ul style="list-style-type: none"> <li>▶ No impact</li> <li>▶ No disturbance is planned in the vicinity of this site.</li> </ul>	High	No change	Neutral	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be regularly monitored for changes in condition during construction on a monthly basis; Site to be assessed for condition six months post-construction as part of management plan conditions.</li> </ul>	No change	Neutral
NS2B-19-RT1		High	Medium	Moderate/large	<ul style="list-style-type: none"> <li>▶ Site location to be clearly identified during construction to avoid impact.</li> <li>▶ Site is to be temporarily fenced during constructions works.</li> <li>▶ Site location is to be noted and discussed in toolbox for all works occurring in vicinity.</li> <li>▶ Site to be monitored every six months and at the end of construction for changes in condition.</li> </ul>	Negligible	Slight
NS2B-19-IH1		High	Major	Large/very large	<ul style="list-style-type: none"> <li>▶ Species of value to local Aboriginal community to be considered for rehabilitation.</li> <li>▶ Consideration of publicly accessible rehabilitation.</li> <li>▶ Consideration of avoidance of impact to two mature bumble tree specimens.</li> </ul>	Low	Slight/moderate
NS2B-19-IH2		High	Medium	Moderate/large	<ul style="list-style-type: none"> <li>▶ Impacts will be managed under the Construction Environment Management Plan for the proposal.</li> </ul>	Low	Slight/moderate

TABLE 12.21 SIGNIFICANCE ASSESSMENT OF IMPACTS TO HISTORICAL HERITAGE SITES

Site	Potential Impact	Pre-mitigated significance			Mitigation and management measures	Residual significance	
		Sensitivity	Magnitude	Significance		Magnitude	Significance
NS2B-19-H2 Loggers' camp	Disturbance of entire site	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site.</li> <li>▶ Consider offer to local historical society to collect a sample of artefacts.</li> </ul>	Medium	Slight
NS2B-19-H3 Surveying Mark	Disturbance of entire site	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Archival Recording.</li> <li>▶ Consult with NSW Government Spatial Services if required to relocate site.</li> </ul>	Medium	Slight
NS2B-19-H4 Whalan Creek Rail Bridge	Disturbance of entire site	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site.</li> <li>▶ Consider offer to local historical society to collect a sample of artefacts.</li> </ul>	Medium	Slight
NS2B-19-H5 Shearing Shed Archaeological Site	Vibration from construction and operation	Low	Low	Neutral/slight	<ul style="list-style-type: none"> <li>▶ Avoid site</li> <li>▶ Manage indirect impacts</li> <li>▶ If avoidance is not possible: <ul style="list-style-type: none"> <li>▶ Archaeological survey</li> <li>▶ Archaeological excavation</li> </ul> </li> </ul>	Negligible	Neutral/slight
NS2B-19-H6 Shearer Accommodation	Vibration from construction and operation	Low	Low	Neutral/slight	<ul style="list-style-type: none"> <li>▶ Avoid site</li> <li>▶ Manage indirect impacts</li> <li>▶ If avoidance is not possible: <ul style="list-style-type: none"> <li>▶ Archaeological survey</li> <li>▶ Archaeological excavation</li> </ul> </li> </ul>	Negligible	Neutral/slight
NS2B-19-H7 Modern Roadside Memorial	Potential for impact during construction	Low	Low	Neutral/slight	<ul style="list-style-type: none"> <li>▶ Avoid site</li> <li>▶ If avoidance is not possible: <ul style="list-style-type: none"> <li>▶ Contact family on temporary measures which may include temporary relocation/replacement.</li> </ul> </li> </ul>	Negligible	Neutral/slight
NS2B-19-H8 Old Boggabilla/North Star Road Alignment	Disturbance of entire site	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Archival recording of location and elevations</li> </ul>	Medium	Slight
NS2B-19-H9 Wearne Siding	Disturbance of entire site	Low	Major	Slight/moderate	<ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site</li> <li>▶ Consider offer to local historical society to collect a sample of artefacts.</li> </ul>	Medium	Slight

Site	Potential Impact	Pre-mitigated significance			Mitigation and management measures	Residual significance	
		Sensitivity	Magnitude	Significance		Magnitude	Significance
NS2B-19-H10 Wearne Siding Sign	Sign is located on private land but within construction disturbance footprint	Low	Low	Neutral/ slight	<ul style="list-style-type: none"> <li>▶ Avoid site</li> <li>▶ If avoidance is not possible: <ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site</li> <li>▶ Temporarily remove structure and reinstate post-construction.</li> </ul> </li> </ul>	Negligible	Neutral/ slight
NS2B-19-H11 Fettlers Camp 1	Disturbance of entire site	Low	Major	Slight/ moderate	<ul style="list-style-type: none"> <li>▶ Consider offer to local historical society to collect a sample of artefacts.</li> </ul>	Medium	Slight
NS2B-19-H12 Fettlers Camp 2	Disturbance of entire site	Low	Major	Slight/ moderate	<ul style="list-style-type: none"> <li>▶ Consider offer to local historical society to collect a sample of artefacts.</li> </ul>	Medium	Slight
NS2B-19-H13 Fettlers Camp 3	Disturbance of entire site	Low	Major	Slight/ moderate	<ul style="list-style-type: none"> <li>▶ Consider offer to local historical society to collect a sample of artefacts.</li> </ul>	Medium	Slight
NS2B-19-H14 Fettlers Camp 4	Disturbance of entire site	Low	Major	Slight/ moderate	<ul style="list-style-type: none"> <li>▶ Consider offer to local historical society to collect a sample of artefacts.</li> </ul>	Medium	Slight
NS2B-19-H15 Mungle Siding	Disturbance of entire site	Low	Major	Slight/ moderate	<ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site</li> <li>▶ Consider offer to local historical society to collect a sample of artefacts.</li> </ul>	Medium	Slight
NS2B-19-H16 Back Creek Rail Bridge	Disturbance of entire site	Low	Major	Slight/ moderate	<ul style="list-style-type: none"> <li>▶ Archival recording/mapping of site</li> <li>▶ Consider offer to local historical society to collect a sample of artefacts.</li> </ul>	Medium	Slight



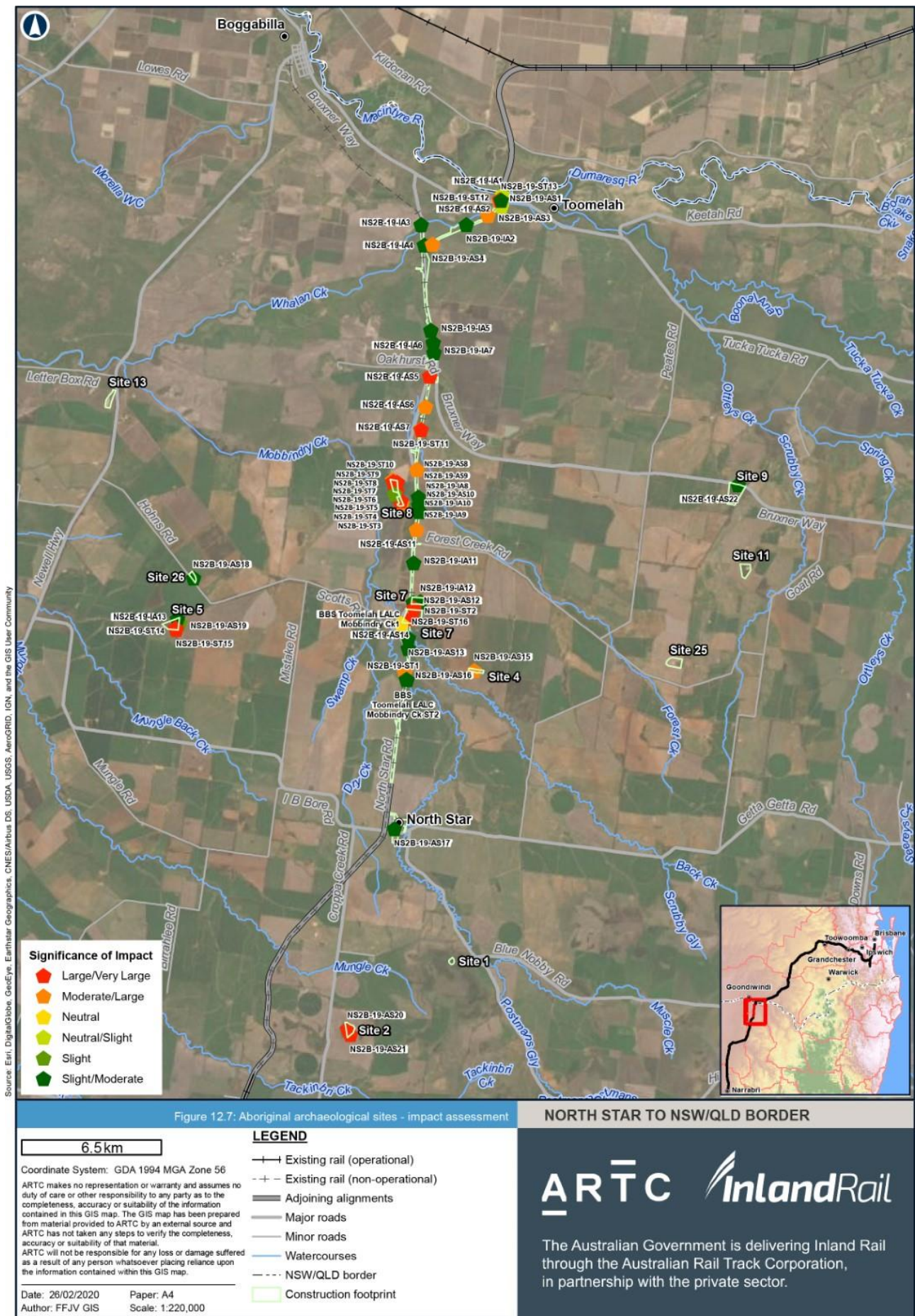


FIGURE 12.7 ABORIGINAL ARCHAEOLOGICAL SITES—IMPACT ASSESSMENT



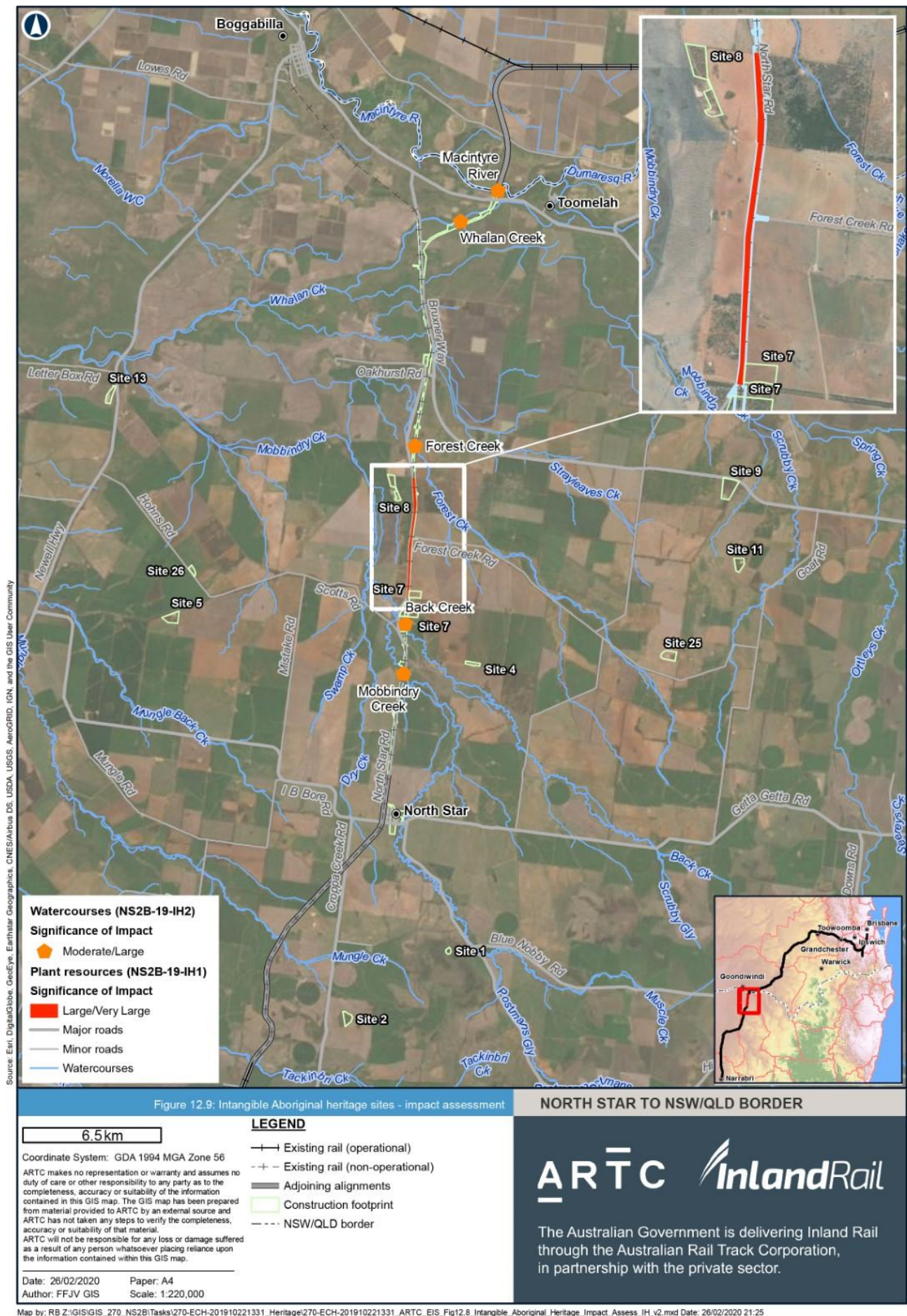


FIGURE 12.8 INTANGIBLE ABORIGINAL HERITAGE SITES—IMPACT ASSESSMENT



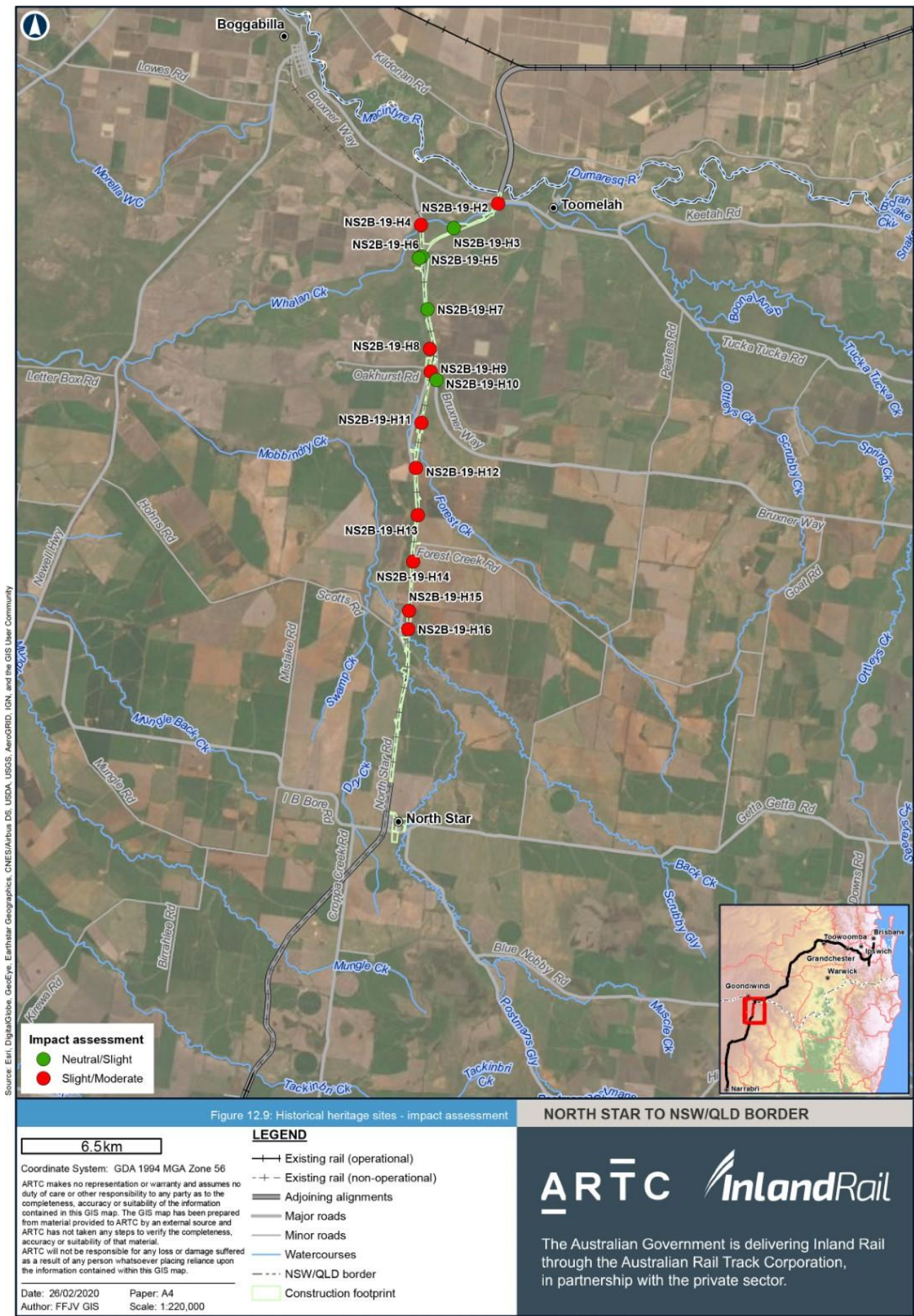


FIGURE 12.9 HISTORICAL HERITAGE SITES—IMPACT ASSESSMENT

## 12.9 Conclusions

This chapter has identified the heritage aspects relevant to the proposal. This chapter has addressed the SEARs requirements through the identification of previously known heritage, areas of heritage potential and identification of the potential impacts of the proposal on heritage values both tangible and intangible. Where possible, these potential impacts have been avoided. Where impacts cannot be avoided, mitigation measures have been proposed to reduce and manage the potential impacts of the proposal.

Following is a summary of heritage values identified and their proposed management:

- ▶ Aboriginal heritage
  - ▶ 55 Aboriginal heritage sites were identified during the assessment
    - 53 tangible heritage sites (lithic artefact distributions, scarred trees and a ring tree)
    - 2 intangible heritage sites (watercourses and plant resource areas)
    - Direct impacts—22 artefact scatters, 12 isolated artefacts, 9 culturally modified trees and 2 intangible sites (watercourses and plant resource areas) will be directly impacted by the proposal
    - Indirect impacts—7 culturally modified trees will be indirectly impacted
    - No impact—1 artefact scatter, 1 isolated artefact, 1 culturally modified tree and 1 carved tree site will not be impacted by the proposal.
  - ▶ All Aboriginal heritage sites will be managed under an Aboriginal Heritage Management Plan (AHMP) framework to be developed in consultation with registered Aboriginal Parties
  - ▶ All directly impacted tangible sites will be salvaged in partnership with registered Aboriginal parties
  - ▶ All indirectly impacted intangible sites will be managed under the AHMP framework
  - ▶ All indirectly impacted tangible sites will be managed under the AHMP framework with clear guidance on monitoring for impacts and avoidance protocols.
- ▶ Historical heritage
  - ▶ 15 historical heritage sites were identified during the assessment
    - Direct impacts—11 sites including 2 railway sidings, 2 bridges and 4 fettler camps
    - No impacts—4 sites located adjacent to project works and are unlikely to be impacted by the proposal (shearing shed complex, roadside memorial and railway siding sign)
  - ▶ All historical heritage sites will be managed under an historical heritage management plan framework, which will include protocols for archival recording and archaeological salvage.