Tooleybuc Bridge Replacement Project

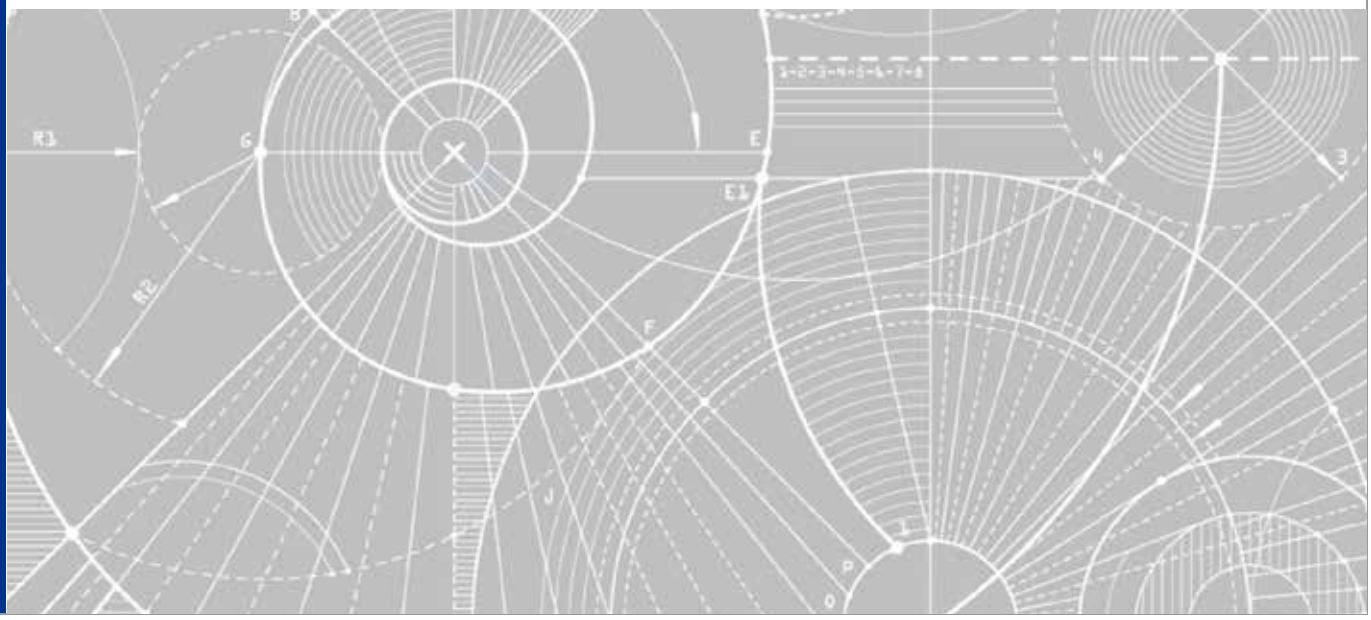
ROADS AND MARITIME SERVICES PTY LTD

Aboriginal Cultural Heritage Assessment Report

IS085600 | D

Contract No 14.2571.1914

30 September 2015



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Tooleybuc Bridge Replacement Project

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Document history and status

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D	30 September 2015	CHAR updated with bathymetry results	J Hill	Roads & Maritime	30 September 2015

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Executive Summary

Background

Roads and Maritime Services (Roads and Maritime), in partnership with VicRoads, plans to replace the existing bridge over the Murray River at Tooleybuc. The Tooleybuc Bridge Replacement Project (the project) is a high priority project for south-western NSW. Replacing the existing bridge is important to help keep Tooleybuc's social connections and grow its economy. It will also keep the Mallee Highway as a transport route into and out of south-western NSW.

Roads and Maritime has developed three strategic route options for further investigation (Figure 1.1). All options connect to Murray Street, the main shopping strip in Tooleybuc. These options are:

- Yellow Option: A high level bridge downstream of the existing bridge
- Blue Option: A low level bridge with lift span next to and upstream of the existing bridge
- Purple Option: A low level bridge with lift span upstream of the existing bridge

Jacobs Group Australia Pty Ltd (Jacobs) was commissioned by Roads and Maritime to assess current and potential impacts on Aboriginal cultural heritage caused by building a new bridge at Tooleybuc.

This Aboriginal cultural heritage assessment report (ACHAR) document Aboriginal heritage values for each option and describe how these values could be impacted. This assessment and report have been carried out in line with the following guidelines and procedures:

- Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (Roads and Maritime 2011)
- Aboriginal Cultural Heritage Consultation Requirements for Proponents (ACHCRP) (Department of Environment, Climate Change and Water (DECCW) 2010)
- Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (Code of Practice) (Office of Environment and Heritage (OEH) 2010a)
- Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011)

Project location

Tooleybuc is found on the New South Wales (NSW)/Victorian border in south-western NSW and across from Piangil in Victoria. The town is on the Mallee Highway within Wakool Shire.

Tooleybuc is centrally located between larger regional towns of Balranald in NSW (53 kilometres (km) north-east) and Swan Hill in Victoria (46 km south-west). The town is located 919 km south-west of Sydney and 381 km north-west of Melbourne.

The project area for the purposes of this assessment includes all three option routes, areas that may require ground clearance and site facilities establishment.

Desktop assessment

The desktop assessment has established that:

- There are no known Aboriginal sites located within the project area
- Of the 46 Aboriginal sites located within five kilometres of Tooleybuc, 33 of these are oven mounds. Other site types include shell middens, scarred trees and a burial site
- No previous archaeological investigation has been completed within the project area except for the Aboriginal cultural heritage constraints report for the project

- Very little previous archaeological research has focussed on the Murray River area in or around Tooleybuc, with almost no sub-surface investigation in the region, consequently, predictions are difficult to make and preliminary in nature
- Fishing activities were a primary Aboriginal economy focus for the majority of the calendar year. If stone structures are thought to exist on the Murray River bed they may still be intact due to controlled water-levels concealing these structures
- The project area is a mixture of riparian and sandhill landforms:
  - The riparian landform (channels and banks) is of moderate archaeological sensitivity. The most likely Aborignal site types to be found within this landform include: shell middens on high banks of the river, scarred trees (River Red Gum along the waters edge and Black Box upon the open floodplain), isolated stone artefacts (silcrete, chert and quartz) and hearths (fire places)
  - The sandhill landform has low sensitivity due to the limited number of site types predicted to occur within this landform. Burials are the most likely site type to be present within the sandhills landform, but due to the rarity of this site type the sandhills are predicted to be of low archaeological sensitivity.

Consultation

Consultation to date has followed relevant government and Roads and Maritime consultation guidelines. The relevant guidelines are:

- ACHCRP (DECCW 2010)
- PACHCI (Roads and Maritime 2011).

Table 3.1 summarises consultation carried out for the project and how it complies with each step of the ACHCRP. A log of consultation completed for the project to date is included in Appendix C and where letters have been the method of correspondence, copies of these are included in Appendix D.

Field survey

A field survey was completed on Thursday 18 December 2014 by a fully qualified and experienced archaeologist and heritage consultant, Jeff Hill and registered Aboriginal party (RAP) site officers. No Aboriginal sites were discovered during the field survey.

A sandhill landform comes within 10 m of the riverbank. The sandhill landform has been recorded as a potential archaeological deposit (PAD) area for the project as Aboriginal sites or objects may be concealed by the sands.

Consultation with RAP site officers indicated that fish traps may be present where the yellow option crosses the Murray River. The current height of the river doesn't allow this claim to be visibly confirmed by archaeological assessment.

Of the three options, the yellow option has the greatest potential to harm unidentified Aboriginal cultural heritage values, due to the impact area relating to this option. The preference at this stage would be to minimise the amount of impact to potential unidentified sub-surface Aboriginal cultural material by minimising the construction footprint. If fish traps are positively identified within the yellow option then impact to the fish traps would only be allowed through the granting of an Aboriginal Heritage Impact Permit (AHIP) by OEH. If impact could be avoided then an AHIP would not be required.

Aboriginal Knowledge Holders meeting

A meeting with the Nominated Aboriginal Knowledge Holders was held in Tooleybuc on 27 May 2015 in order to obtain cultural information from Aboriginal Knowledge Holders about traditional ties to the area and to discuss the potential of fish traps to be within the Murray River within the yellow option area. The Aboriginal Knowledge Holders agreed that fish traps were present; however they could not accurately map the location of the fish traps, nor their extent. The Aboriginal Knowledge Holders requested further investigation in order to establish

location and extent of the fish traps, but did not see the fish traps as a problem that could not be solved through further consultation. The Aboriginal Knowledge Holders also requested to be consulted during later stages of the project.

Recommendations

Test excavation

Currently no registered or known Aboriginal cultural heritage will be impacted by the project so an AHIP is not needed. An identified PAD is the sandhill landform that covers the majority of the project area. This PAD is to be tested with sub-surface test excavations for the selected option in accordance with Requirement 16 of the Code of Practice.

A draft test excavation methodology has been provided in Section 8.2.2. This methodology will be finalised once an option has been selected for the project. The results of the test excavation are to be reported in an updated version of this ACHAR.

Fish trap assessment

The Aboriginal Knowledge Holders believe that fish traps are located in the Murray River at Tooleybuc. Whether the fish traps are located within the yellow option requires further confirmation.

A bathymetric survey failed to detect any underwater features that could be positively interpreted as fish traps. However, a constricted channel (approximately 100 x 15 m in extent), close to the west bank of the Murray River was identified and interpreted as the most likely location where fish traps would occur. It is recommended that this area should be considered for avoidance during the detailed design stage of the project.

The alternative option to substantiate the presence, location and extent of fish traps within the yellow option alignment would be an archaeological assessment of the river bed during a period of low water-levels, such as a drought. As this option may take years, possibly decades to occur, avoidance of the area predicted to be the most likely location of the fish traps, is the most practicable recommendation in avoiding harm to any fish traps.

Abbreviations

ACHAR	Aboriginal cultural heritage assessment report
ACHCRP	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010
AFG	Aboriginal focus group
AHIMS	Aboriginal heritage information management system
AHIP	Aboriginal heritage impact permit
ASIRF	Aboriginal Site Impact Recording form
BP	Before Present
CHMP	Cultural Heritage Management Plan
Code of Practice	Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010
DEC	NSW Department of Environment and Conservation (now the Office of Environment and Heritage)
DECCW	Department of Environment, Climate Change and Water
DP&I	Department of Planning and Infrastructure
EA	Environmental assessment
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GIS	Geographic Information Systems
Jacobs	Jacobs Group Australia Pty Ltd
km	kilometres
LALC	Local Aboriginal Land Council
LEP	Local environment plan
LGA	Local government area
NSW	New South Wales
NWP Act	*National Parks and Wildlife Act 1974*
OEH	Office of Environment and Heritage
PACHCI	Procedure for Aboriginal Cultural Heritage Consultation and Investigation
PAD	Potential archaeological deposit

PAS	Potential archaeological sensitivity
the project	Tooleybuc Bridge Replacement project
RAP	Registered Aboriginal Party
Roads and Maritime	Roads and Maritime Services
VAHR	Victorian Aboriginal Heritage Register
VAS	Victorian Archaeological Survey

1. Introduction

1.1 Background to project

Roads and Maritime Services (Roads and Maritime), in partnership with VicRoads, plans to replace the existing bridge over the Murray River at Tooleybuc on the New South Wales (NSW)/Victorian border in south-western NSW. The Tooleybuc Bridge Replacement project (the project) is a high priority project for south-western NSW. Replacing the existing bridge is important to help keep Tooleybuc's social connections and grow its economy. It will ensure also keep the Mallee Highway as a transport route into and out of south-western NSW.

Built in 1925, the Tooleybuc Bridge is a timber truss and steel lift-span bridge over the Murray River at Tooleybuc in New South Wales, near Piangil in Victoria. The bridge comprises of a timber bridge deck supported by two 21.8 metre (m) long Allan truss spans each side of a 17.8 m steel lift-span bridge. The main section of the bridge is approached from the Victorian bank by three approach spans built of round timber girders supported by round timber trestles. There are five girders to each span supported on timber corbels.

Easy communication across the Murray River for access to Victorian markets was fundamental to the viability of the grazing and agricultural concerns in the southern NSW Riverina. A privately-owned punt was in operation by the 1870s, near the riverside hotel, the Tooley Buc, but it was not until 1925 that the present lift-span bridge was erected by the Department of Public Works in response to pressure from fruit-growers on the NSW side of the river. The bridge was located just upstream from the old punt and was the last lift span bridge designed by Percy Allan.

The primary goals for Roads and Maritime under the guidance of these NSW legislation and policy are to:

- Identify and take appropriate action in relation to all heritage items which Roads and Maritime projects affect
- Identify and manage all heritage items which Roads and Maritime own or for which it has care and control
- Ensure that Roads and Maritime projects which have the potential to affect Aboriginal cultural heritage receive the appropriate level of assessment and community involvement
- Establish and maintain the heritage significance of Roads and Maritime's assets in accordance with the requirements of relevant NSW and Commonwealth legislation.

Cultural heritage is a priority for Roads and Maritime. In the south western region of NSW and particularly riverine environments such as those along the Murray River at Tooleybuc, Roads and Maritime has recognised the critical importance of incorporating cultural heritage assessments and Aboriginal community consultation in all stages of planning and options assessment.

1.2 The proposed activity

The Tooleybuc Bridge has been identified for replacement under the Timber Truss Bridge Strategy, which was endorsed by the Heritage Council of NSW in August 2012. Replacing the Tooleybuc Bridge with a bridge will meet the current and future traffic demands in the area, including semi-trailer and B-double vehicles being able to carry heavier loads.

A new bridge will benefit the community by:

- Improving travel efficiency and freight vehicle capacity by providing a two lane bridge
- Improving road safety for pedestrians and cyclists by providing a footway across the bridge
- Reducing disruptions to road users by eliminating long term maintenance works on the old timber bridge
- Reducing disruptions to road users and boaters by either improving the efficiency of the lift span or removing the need for it.

Based on the feedback received from the community, Roads and Maritime has developed three strategic route options for further investigation (Figure 1.1). All options connect to Murray Street, the main shopping strip in Tooleybuc. These options are:

- Yellow Option: A high level bridge downstream of the existing bridge
- Blue Option: A low level bridge with lift span next to and upstream of the existing bridge
- Purple Option: A low level bridge with lift span upstream of the existing bridge (based on the previous high level orange option).

1.3 Project location

Tooleybuc is located on the Mallee Highway in south-western NSW within the Wakool Shire. Tooleybuc is centrally located between larger regional towns of Balranald in NSW (53 kilometres (km) north-east) and Swan Hill in Victoria (46 km south-west). The town is located 919 km south-west of Sydney and 381 km north-west of Melbourne. Tooleybuc is situated on the banks of the Murray River across from Piangil in Victoria.

The project area for the purposes of this assessment includes all three option routes, areas that may require ground clearance and the establishment of site facilities (see Figure 1.1).

1.4 Authorship and acknowledgements

This Aboriginal cultural heritage assessment report (ACHAR) was prepared by Jeff Hill[1] (Senior Archaeologist, Jacobs Group Australia Pty Ltd (Jacobs)). Jeff is a qualified archaeologist having experience on projects of similar scope and size. The report was reviewed by Vanessa Edmonds (Practice Leader - Cultural Heritage Assessments, Jacobs).

The author would like to acknowledge the participation of members of the Registered Aboriginal Parties (RAPs) and other Aboriginal stakeholders, particularly the RAP nominated site officers who participated in consultation and survey, including:

- Mr Gary Pappin (Wakool Indigenous Corporation)
- Mr Ray Kennedy (Dadi Dadi Weki Weki Aboriginal Corporation)
- Mr Greg Kennedy (Dadi Dadi Weki Weki Aboriginal Corporation)
- Mr Ken Knight (Wamba Wamba Local Aboriginal Land Council)
- Mr Steven Morrison Firebrace (Wadi Wadi Native Title Group)
- Irene Wellington (nee Moore) (Wamba Wamba Elder)
- Ray Murray (Wiradjeri / Wamba Wamba Elder)
- Mary Pappin (Muthi Muthi Elder
- Lena Sweeney (Wamba Wamba LALC)
- Neville Whyman (Wadi Wadi Elder)
- John Jackson (Wadi Wadi Elder)
- Mr Ronald Jackson
- Mr Stephen Kirby.

[1] Bachelor of Archaeology (Honours), eight years of experience in archaeology and cultural heritage management.

1.5 Statutory controls

The following legislation is relevant to this investigation:

New South Wales legislation

- *Environmental Planning and Assessment Act* 1979
- *National Parks and Wildlife Act* 1974
- *National Parks and Wildlife Amendment Act* 2010
- *Native Title Act (NSW)* 1994

Commonwealth legislation

- *Aboriginal and Torres Strait Islander Heritage Protection Act* 1984
- *Environment Protection and Biodiversity Conservation Act* 1999
- *Native Title Act* 1993

These Acts and how their relevant sections and associated regulatory documents (eg codes of practice, guidelines, etc) govern the project are described in Table 1.1.

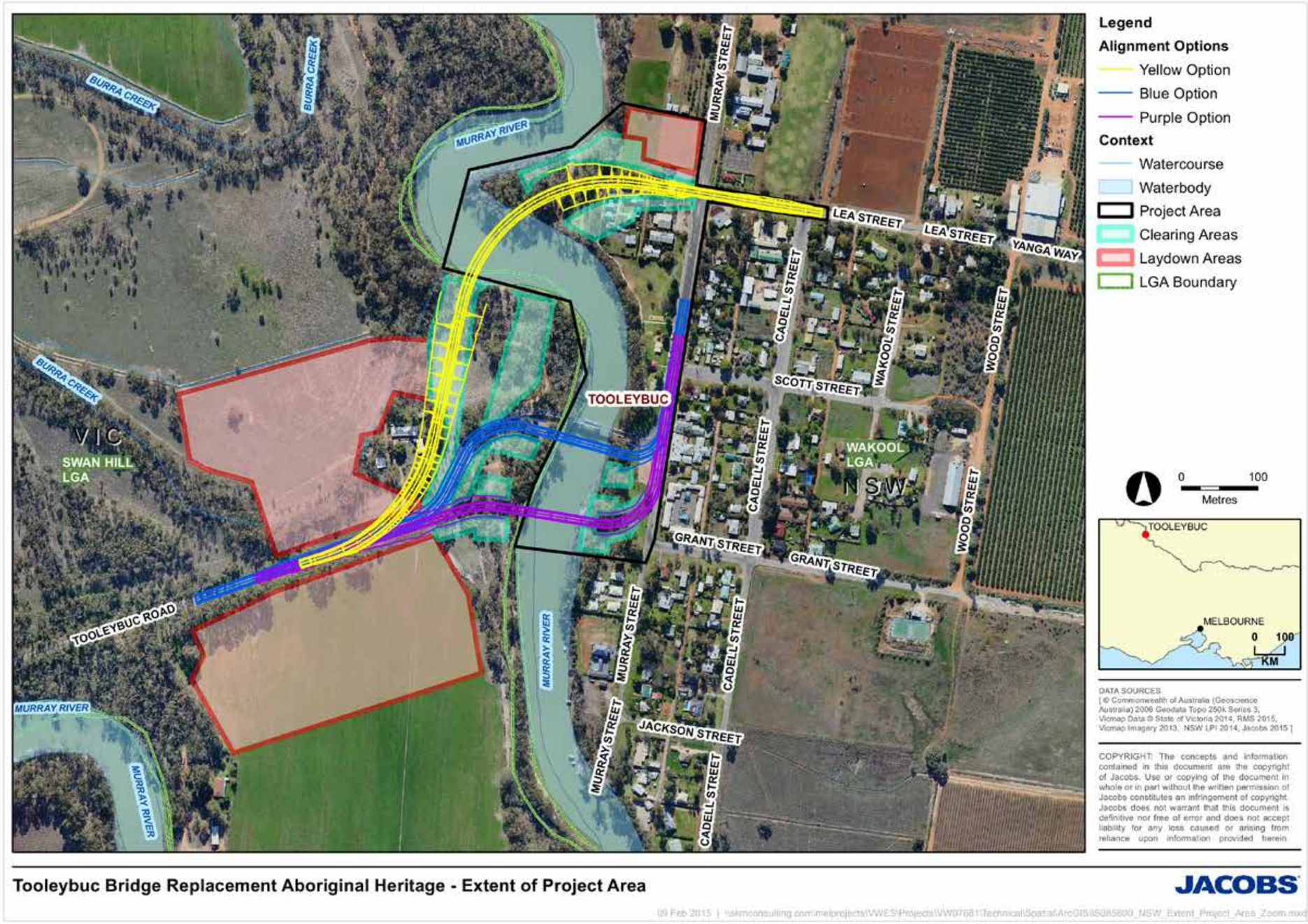

Figure 1.1 : Project options and location of the project area in NSW

Table 1.1 : Legislative framework for Aboriginal cultural heritage

Reference	Requirements
Environmental Planning and Assessment Act 1979 (EP&A Act)	· Framework for environmental planning and assessment in NSW. Including the requirement for environmental impacts to be considered prior to development approval. The *EP&A Act* t requires Roads and Maritime to examine and take into account the impact or likely impact of its projects on the environment. · This includes requirements for Aboriginal cultural heritage items and places. · Part 4 of the *EP&A Act* applies to the undertaking of development that is not State significant development or infrastructure. This type of development requires the consent of a consent authority. Usually, Roads and Maritime projects requiring Part 4 consent will fall within the "crown development" provisions of Division 4 of Part 4. · Part 5 of the *EP&A Act* defines activities for which an Environmental Impact Statement should be undertaken and defines what is considered state significant infrastructure.
National Parks and Wildlife Act 1974 (NPW Act)	The NPW Act provides for the protection of Aboriginal objects and Aboriginal places. Under the NPW Act (s5), an Aboriginal object is defined as: 'any deposit, object or material evidence (not being a handicraft for sale) relating to indigenous and non-European habitation of the area that comprises New South Wales, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction, and includes Aboriginal remains'. An Aboriginal place is defined under this Act as an area that has been declared by the Minister administering the NPW Act as a place of special significance for Aboriginal culture. It may or may not contain physical Aboriginal objects. Under Section 90 (s90) of the NPW Act it is an offence to knowingly destroy, deface, damage or desecrate, or cause or permit the destruction, defacement, damage or desecration of an Aboriginal object or Aboriginal place, without the prior written consent from the Director General of the Office of Environment and Heritage (OEH). Penalties apply to the offence of knowingly impacting on an Aboriginal object or Aboriginal place. The largest penalties apply when a person has an object that they know to be an Aboriginal object (called a 'knowing offence'). However, a 'strict liability' offence still applies whether or not a person knows it is an Aboriginal object or place. In order to obtain written consent, known as an Aboriginal heritage impact permit (AHIP), an AHIP application must be submitted and approved by the OEH Director-General. In considering whether to issue an s90 AHIP, OEH will take into account: · The significance of the Aboriginal object(s) or place(s) subject to the proposed impacts · The effect of the proposed impacts and the mitigation measures proposed · The alternatives to the proposed impacts · The conservation outcomes that will be achieved if impact is permitted, and · The outcomes of the Aboriginal community consultation regarding the proposed impact and conservation outcomes Under s89A of the NPW Act it is a requirement to notify the OEH Director-General of the location of an Aboriginal object. Identified Aboriginal items and sites are registered with NSW on the Aboriginal Heritage Information Management System (AHIMS). New procedures that accompany the National Parks and Wildlife Amendment Act 2010 include the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales 2010* (OEH, 2010b), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010), and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW 2010* (OEH, 2010a).
Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales 2010	This code of practice is to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for consent in the form of an AHIP. A *Due Diligence Code of Practice* has been developed to guide proponents on how to ensure a defence to the 'strict liability' offence of harm to an Aboriginal object or place. A proponent would be found not guilty of the offence if it can be proved that the proponent demonstrated due diligence in investigating the likelihood of impact to Aboriginal heritage by the proposed activity. This code sets out the reasonable and practicable steps which individuals and organisations need to take in order to:

Reference	Requirements
	· Identify whether or not Aboriginal objects are, or are likely to be, present in an area · Determine whether or not their activities are likely to harm Aboriginal objects (if present), and · Determine whether an AHIP application is required Consultation with the Aboriginal community is not a formal requirement of the due diligence process. However, proponents may wish to consider undertaking consultation if it will assist in informing decision-making. If at any point an application is made for an AHIP then the consultation must be undertaken in accordance with the requirements in clause l80C of the National Parks and Wildlife Regulation 2009 (NPW Regulation). Due diligence amounts to taking reasonable and practicable steps to protect Aboriginal objects. The *Due Diligence Code of Practice* provides one process for satisfying the due diligence requirements of the NPW Act. It is not mandatory to follow this code. An individual or corporation can take other measures, provided that such measures are objectively reasonable and practicable and meet the ordinary meaning of exercising due diligence. Provisions relating to the due diligence system were effective from 1 October 2010.
Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (ACHCRP)	This document establishes the requirements for consultation (under part 6 of the *National Parks and Wildlife Act* 1974) with Aboriginal stakeholders as part of the heritage assessment process to determine potential impacts of proposed activities on Aboriginal objects and places and to inform decision making for any application for an AHIP. The ACHCRP comprises four stages with associated timeframes which must be adhered to: **Stage 1** — Notification of project proposal and registration of interest (14 days from date letter sent to register as a registered Aboriginal stakeholders) **Stage 2** — Presentation of information about the proposed project (set up Aboriginal Focus Group meetings, prepare info etc) **Stage 3** — Gathering information about cultural significance (28 days for registered Aboriginal stakeholders to provide a review and feedback to consultants methodology), and **Stage 4** — Review of draft cultural heritage assessment report (registered Aboriginal stakeholders have 28 days from sending of the report to make a submissions)
Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010 (Code of Practice)	The Code of Practice sets out the detailed requirements for archaeological investigations of Aboriginal objects in NSW for activities that require assessment under Part 4 or Part 5 of the *Environmental Planning and Assessment Act* 1979 (EP&A Act). An AHIP to undertake test excavation is not required if complying with this Code, as test excavations complying with this Code are excluded from the definition of harm to an Aboriginal object. The Code sets out in detail: · Minimum qualifications for anyone undertaking archaeological investigation under the Code in NSW · Assessment steps required to be undertaken for all archaeological investigation, and · Assessment steps that may be required to be undertaken to adequately characterise the Aboriginal objects being investigated The Code must be used for investigation that is likely to result in an AHIP application.
Procedure for Aboriginal Cultural Heritage Consultation and Investigation 2011 (PACHCI)	· This procedure applies to all development and activities concerning roads, road infrastructure and road related assets undertaken by Roads and Maritime. · It outlines the four stages of consultation and investigation that assess known or potential impacts to Aboriginal cultural heritage. projects that can avoid impacts to Aboriginal cultural heritage may only be required to complete some stages of the procedure. However, projects that would harm Aboriginal objects or places are required to complete all stages. It is anticipated that this project will require as a minimum the completion of Stage 3 of the PACHCI procedure.
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	· Protects Aboriginal cultural property in a wider sense and includes any places, objects and folklore that "are of particular significance to Aboriginals in accordance with Aboriginal tradition". · The Act may apply to contemporary Aboriginal cultural property as well as ancient sites. · The responsible Minister may make a declaration under Section 10 of the Act in situations where state or territory laws do not provide adequate protection of heritage places.
Environment Protection and Biodiversity Conservation Act	· The EPBC Act includes provisions to protect matters of national environmental significance and Commonwealth land. Lists and registers made under the Act include: – A National Heritage List of places of national heritage significance.

Reference	Requirements
1999 (EPBC Act)	– A Commonwealth Heritage List of heritage places owned or managed by the Commonwealth. – Management of the Register of the National Estate. An independent expert body, the Australian Heritage Council, advises the Minister on the listing and protection of heritage places.
Native Title Act 1993	· Recognises and protects native title, and provides that native title cannot be extinguished contrary to the Act. · National Native Title Tribunal is a Commonwealth Government agency set up under this Act and mediates native title claims under the direction of the Federal Court of Australia. · The National Native Title Tribunal maintains the following registers: – National Native Title Register. – Register of Native Title Claim. – Unregistered claimant applications. – Register of Aboriginal land use agreements.
Native Title Act (NSW) 1994	· The NSW Native Title Act 1994 was introduced to ensure that the laws of NSW are consistent with the Commonwealth Native Title Act 1993. It validates past and intermediate acts which may have been invalidated because of the existence of native title.

1.6 Objectives of the Aboriginal cultural heritage assessment

Jacobs Group Australia Pty Ltd (Jacobs) was commissioned by Roads and Maritime to undertake an Aboriginal archaeological assessment of current and potential impacts on Aboriginal cultural heritage caused by building a new bridge at Tooleybuc.

The objective of this Aboriginal cultural heritage assessment report (ACHAR) is to document Aboriginal heritage values for each option and describe how these values could be impacted. This assessment and report has been carried out in line with the following guidelines and procedures:

- Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (Roads and Maritime 2011)
- Aboriginal Cultural Heritage Consultation Requirements for Proponents (ACHCRP) (DECCW 2010)
- Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (Code of Practice) (OEH 2010a)
- Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011)

2. Environmental and historical background

2.1 Environmental context

It should be noted that all interpretation relating to landforms, geology and soils, climate and vegetation are made from an archaeological perspective and may not necessarily correspond to scientific reports on these subjects.

The project area includes a riparian fringe (the present Murray River bank) in the south-western third of the project area, and a source bordering dune

2.1.1 Geology, landforms and soils

The project area is part of the Murray Fans province of the southern Murray *Riverine Plains* land system (Morgan and Terrey 1992, p 30). The Murray Fans or Basin developed in the Cainozoic era, following the break up between Antarctica and the southern margin of Australia. The Cainozoic history indicates slow rates of subsidence coupled with low rates of sediment supply. There were three major depositional sequences in the Tertiary correlating with periods of sea level rise and fall (Kingham 1998).

The Murray *Riverine Plains* land system is dominated by a high level alluvial plain landform containing river channels and banks and major tributaries comprising grey cracking clays (Morgan and Terrey 1992, p 35). Sub-dominant landforms include a gently sloping and undulating plain which is covered by extensive aeolian red-brown sand deposits with occasional sandy rises (Morgan and Terrey 1992, p 35). These geological processes have led to the formation of elevated, well-drained landforms in the region which are archaeologically sensitive and include elevated sandy lunettes, sandy rises on the floodplain, point bar deposits, and elevated plains and channel margins.

The Murray *Riverine Plains* land system is the active floodplain of the Murray River with associated billabongs, swamps, channels, levees and lunettes (Soil Conservation Service (SCS) 1991). Vegetation comprises dense black box, lignum and old man saltbush on the terraces with clumped mallee, pine, prickly wattle and shrubs on the rises, lunettes and back plains. This low alluvial plain comprises grey clays with alluvial loams and sands.

Of the six landforms in the Murray *Riverine Plains* land system two occur in the project area: the channels and banks landform and the riverside lunettes and ridges landform (SCS 1991, pp 480-2). Soils on the channels and banks are silty clays and grey deeply cracking clays. On the riverside lunettes and ridges landform soils are deep brownish sands and calcareous sands that are subject to moderate to severe drift and blowouts (SCS 191, p 481-2).

2.1.2 Vegetation

Vegetation in the region has generally been altered, primarily for agricultural purposes. Surviving vegetation in the Southern Murray Basin primarily consists of dry shrubs such as saltbush. Current and ancestral rivers are dominated by River Red Gums (*Eucalyptus camaldulensis*) and Black Box (*E. largiflorens*), while swamps and lagoons support species of rush and sedge. Lignum (*Muehlenbeckia florulenta*) is a common understorey plant. Many noxious weeds, originally introduced to benefit agriculture or agroforestry, to assist in the prevention of soil erosion, to provide wind breaks or for commercial or economic reasons, exist in the region (Murrumbidgee Landcare Inc. 2013d, 2013e). Prior to settlement, the Murray River area would have provided local Aboriginal people with a variety of plant resources including large old trees, shrubs, herbs and grasses which would have been utilised for a variety of purposes including the creation of coolamons, spears, baskets and as a food resource.

2.1.3 Climate

Tooleybuc has a Mediterranean-like climate, with hot dry summers and cool winters. Maximum temperatures in nearby Balranald average 33°C in summer and 15.7°C in winter while minimum temperatures average 16.4°C in

summer and 3.5°C in winter. Average annual rainfall in Balranald is 324.2 mm. Rainfall is lower over the summer months (Bureau of Meteorology 2014 and Murrumbidgee Landcare Inc. 2013b).

2.1.4 Waterways

The project area is rich with natural water sources which would have provided both drinking water and riverine/lake resource foods for Aboriginal people. The Murray River is the major source of permanent water and faunal resources such as fish, shell fish and water birds. Lake Coomaroop is located to the east of the project area. The lake is not connected to a water discharge system and is reliant on rainfall and flooding of the nearby Murray River for its water.

2.1.5 Historical land use, disturbance and current site condition

The project area comprises riverbank adjacent to the Murray River in Tooleybuc. The land has experienced disturbance as a result of the construction of the current Tooleybuc Bridge and the Tooleybuc Road that crosses it. As a part of town improvement activities the landscape along the river's edge has been modified into parkland. The project area is currently in poor condition due to these disturbances and it is unlikely that *in situ* Aboriginal cultural deposits still exist within the project area.

2.2 Aboriginal cultural heritage context

The Murray River from Echuca to the Murray-Darling junction was occupied by numerous Aboriginal clans. Clan territories were defined by ritual and economic responsibilities and formed the basic unit of Aboriginal society. Clusters of neighbouring clans which shared a common dialect and political and economic interests defined themselves from other clusters by a language name (Barwick 1984). The territories of these clans were often small, consisting of several kilometres of river frontage and some back country (Edmonds 1997).

Language groups along the Murray River often identified themselves with a name which consisted of their word for 'no' repeated for example, Wemba Wemba, Latji Latji and Wadi Wadi. The project area appears to be located within the traditional boundaries of the Wadi Wadi language group whose territory stretched between Piangil and Swan Hill extending northward to Moolpa and including territory in both western NSW and Victoria (Clark 1990, p 404; Tindale 1974, p 208).

The Murray River and its associated floodplains provided abundant and reliable food and water resources and supported some of the densest Aboriginal populations in Australia (Angus 1847, Butlin 1983). The importance of the river to Aboriginal subsistence was substantial with fish, crayfish and shellfish providing reliable sources of protein (Beveridge 1883, p 36; Hawdon 1952, p 41, Morey 1921, p 1). Aboriginal people dived for these resources while fish were caught by a number of methods including the construction of weirs and dams and the use of nets and spears. Other sources of protein available included possums, kangaroos, emus, reptiles, and waterfowl and their eggs (Edmonds 1999).

Pigface (*Carpobrotus sp*) and nardoo (*Marsilea sp*) were considered to be important food sources. Pigface was eaten with fish and the seeds of the nardoo plant, which grows on the floodplain, were ground up with water to form a paste (Morey 1921, p 6). This dough was then cooked in special unexcavated ovens (Edmonds 1998).

Cooking methods were simple. All animal foods, including shellfish, were roasted in shallow dug open ovens lined with stone, or more often clay, heat retainers.

In spring and summer, when water was scarce, Aborigines occupied semi-permanent settlements focussed near rivers and creeks, and the abundant food resources located in and around these. During late autumn and winter when food resources were less reliable and rainfall was more frequent, it is likely that Aborigines ranged further inland to hunt on the plains (Edmonds 1997).

2.2.1 Subsistence and occupation patterns

Tyntynder Station, located 16 km north of Swan Hill was first settled by the Beveridge brothers (Peter and Andrew) in 1846. Upon their arrival the Beveridge brothers obtained right of station over three properties: 'Swan

Hill', 'Tyntynder', and 'Piangil'. Together these properties had a combined water frontage of 66 km, extending roughly 17 km inland and including the activity area. The Beveridge brothers employed local Aboriginal groups, learnt their language and Peter Beveridge recorded his observations of their culture.

Ethnographic observations of the *Targundidj* clan indicate that they relied heavily on riverine and lacustrine food resources, with fish forming the principal component of their diet for about eight months of the year (eg Beveridge 1865; 1884; Beveridge 1889; Curr 1883; Howitt 1904; Quinn et al. 1999, p 50). Fish would have been caught using a number of methods including the construction of weirs and dams and the use of nets, lines, diving and spears. Fishing spear points were made from hardwood and hafted into wooden shafts 2-3 metres long (Baxter et al 1990, p 7). Interestingly 'Piangil' is a Wadi Wadi word (*Bandjel*) translated as meaning 'fish' by (Baxter et al 1990, p 5) and 'Murray Cod' (very large) by Clark and Heydon (2002, p 66). Tooleybuc (*Toolibook*) is translated from the Wad Wadi language as meaning yolk of an egg (Clark and Heydon 2002, p 80), which may be in reference to the colour of the sand dunes.

Fishing was carried out by a number of methods. Fishing from canoes was carried out by removing a single curved piece of bark from a Red Gum tree. Clay would be used to seal and render the canoe. Some canoes could carry up to eight people; however the majority could carry three or four people. Fishing lines were made from Kampung (*typha muellara*) which grew along the margins of lagoons and swamps. The root of the plant was lightly cooked, the outer skin removed and then the women chewed part of the inner root to make it pliable and soft. This was then made into hanks with the aid of a mussel shell scraper. Fish hooks made out of bone and baited with freshwater mussel. Beveridge (1889, p 102) reported catches of 93 fish from two days fishing using this equipment.

Nets were also manufactured by the women using the Kampung fibres. Large nets up to 30 m long with a 7 cm mesh were used in lagoons or lakes. A communal effort was required to haul in up to 500 kg of fish at one time. Smaller nets were fixed in a zig zag pattern across a lake or still water. These nets would yield up to 24 fish a day, each weigh 0.5-1 kg.

Fish weirs were constructed on the edges of the river plain. Earthen banks three to foot feet high were constructed with channels cut through at intervals. When the river flooded, the water came through the channels to the reed beds. Wooden stakes set close tighter, trapped the fish in the receding water. For weeks at a time the natives were provided with a surplus that tons and tons of fish were left to decay (Beveridge 1889, p 90). Similar structures were seen by Major Mitchell on the Darling River and George Robinson on the Moyne river in the Grampians.

Fish were also caught through the construction of stone fish traps. Aboriginal stone fish traps have been recorded throughout the broader Murray Riverine Plains land system suggesting the potential for their presence in the activity area. These traps were designed to capture fish through an often elaborate labyrinth of stone traps, the opening of which were closed up by means of large stones once a sufficient number of fish had entered the trap itself (Dargin 1976, p 41).

The Brewarrina Aboriginal fish traps within the Murray-Darling Basin are a well-known example of this resource procurement technology, included on Australia's National Heritage List in 2005. The Brewarrina Aboriginal fish traps are a complex arrangement of stone pens, channels and rock walls covering 400 m of the Barwon River bed. The site demonstrates advanced knowledge of engineering, physics, water ecology and animal migration to catch large numbers of fish in traps and is also steeped in legend. These specific fish traps were also an important historical inter-tribal meeting place for indigenous groups (Bark R. H. 2015, p 3). Lake Condah in south-west Victoria also has a well-known example of an extensive fish trap suggesting the technology was not regionally specific (Richards 2011).

The Murray River and its associated tributaries provided ample food resources for Aboriginal people, mainly in the form of mussels and fishes, but also waterfowl and turtles. It is possible to assume a correlation between the occurrence of shallow, fordable sections of the Murray and stone weirs and fish traps (Spennemann 2015, p 19). Such sections of the Murray have been previously recorded at Balranald in close proximity to the activity area (reference Balranald site card). A possible fish trap has also been recorded at Wallanthery on the Lachlan River (Edmonds 1996).

Other foods accessed from the river included eels, crustacae and shellfish and different species of waterfowl which were netted and snared; eggs were collected during springtime. The concentration of kangaroos, wallabies, bandicoots, native cats, possums, other small mammals, emus, reptiles and amphibians would also have been high in the river corridor, given the year round availability of water. Long-shafted spears were made from box species and mallee gum saplings. Small game was hunted with spears made from reeds used in combination with a throwing stick for additional thrust. A lighter spear made of mallee gum, and the same size as the reed spear was also used Beveridge (1889, p 64). In the sixth Central Board for the Protection of Aborigines (Central BPA) Report (1869, p 17), it was noted that the Aboriginal people at Swan Hill 'hunt native game extensively, and fish likewise, of which there is an abundance continually' lamenting that he had 'frequently offered, and been refused, to purchase ducks at one shilling each'.

Plant food sources also formed an important component of the diet and included Water Ribbons (*Triglochin procera*), Common Reed (*Phragmites australis*) and Nardoo (*Marsilea drummondii*) in areas closer to water and Pigface (eg *Carpobrotus modestus*) and Murnong-Yam Daisy (*Microseris lanceolata*) in areas further from water. Common Reed was also used in the manufacture of spear shafts, necklaces and baskets and, according to Stone (1911, p 460), they traded water reeds which were plentiful for raw materials such as stone, which were less readily available in the local area. Extensive travel was required in order to trade with other groups for raw material such as stone (used to make axes) or for ceremonies and marriage opportunities (Mackay *et al.* nd). Kangaroo grass (*Themeda australis*) was used to make string, which was ultimately made into nets (Quinn *et al.* 1999, p 50). The bark from mature River Red Gum (*Eucalyptus camaldulensis*) and Black Box (*E largiflorens*) trees was used to create shelters and shields, with a single piece of bark taken from a River Red Gum also being used in the manufacture of canoes. Beveridge (1889, p 59-64) noted that bark from other trees was also used, but only for temporary use.

Earth mounds are a common feature of the Murray Valley region. Ethnographic evidence is contradictory regarding the function of these mounds with observations suggesting that they were related to burials, cooking plant foods, or cooking meats (Coutts et al 1979, p 3). Mitchell (1839 Vol11, p 80-81, 134) suggests that mounds were related to the cooking of the bullrush, or *balyan* and that this root was an important dietary component of the Murray Valley Aboriginals.

> '…the natives live for several months of the year on typha roots'. At a certain time, I believe January or February to be the months, the women enter the swamps and take up the roots of these reeds…The roots are roasted in a hollow made in the ground and either consumed hot or taken as a sort of provision upon hunting expeditions…' (Krefft 1866, p 361)

Beveridge (1889, p 32-33) claims that mounds were used to cook other foods such as possum and makes no comment about cooking bullrush roots. He also notes that these were not occupation sites, but were an accumulation of burnt earth and clay used specifically as ovens. Some of the larger mounds were used as 'bases' during floods from which to mount hunting expeditions. Beveridge also notes that mounds were not consciously raised for the purpose of burying the dead, however once high enough they were used in this manner, and then abandoned immediately (Beveridge 1889, p 37, 39).

2.2.2 Contact and post-contact era

The decimation of Aboriginal populations from areas along the Murray after the arrival of Europeans was a result of exclusion from traditional foraging areas, disease, starvation and massacre.

By the mid-1800s, a number of stations and evangelical missions had been set up throughout Victoria, where the remaining Aboriginal populations were relocated (Edmonds 2002, p 15). One of these sites was Lake Boga Mission, which was established in 1851 by the Moravian Church (Kenny 2003). The Lake Boga Mission, located on the south side of Lake Boga, was operational for only five years and closed down in 1856. The Moravian missionaries noted that there was significant incidence of disease in adults and children in the Aboriginal population, and was the result of contact with European settlers. The road past the Lake Boga Mission became one of the main routes for traffic between Adelaide and the Victorian goldfields, increasing contact between the *Wadiwadi* people and settlers. Conflict between missionaries and the settlers over road access was one of the main reasons for the mission's closure in 1856 (Kenny 2003).

Early relations between Europeans at Tyntynder and the local Aboriginal clans were tentative and friendly, but became violent in 1846, after disputes arose between Andrew Beveridge and the local Aboriginal people after a series of events led to Aboriginal people raiding cattle herds for food. Andrew Beveridge was eventually killed and two of his killers were subsequently hanged, provoking further violence from local Aboriginal people. The later establishment of a police depot at Swan Hill served to pacify this situation and by the late 1840s, Aboriginal people were employed as labourers by several stations. During the 1850s, the tribal structure of the *Wadiwadi* people was largely intact and individuals separated their 'working life' from their 'tribal life', which took precedence. In 1863, the Tyntynder Station depot was established and the single honorary correspondent was Peter Beveridge. When the station closed in 1866, 'surplus' Aboriginal people were moved to the Swan Hill depot (Long and Clark 1999). In September 1867, Dr B W Grummow, Honorary Correspondent for the Swan Hill depot, reported to the Central BPA that 'every able-bodied blackfellow… [was]… engaged [in] either washing sheep or shearing, for which they get the wages of a white man' (Central BPA 1869, p 17).

In 1858, an inquiry into Aboriginal welfare led to the establishment of the Central Board for the Protection of Aborigines (Central BPA), appointed to watch over the Interests of Aborigines, whose primary functions were to protect and provide for Aboriginal people. The Central BPA was later given statutory authority under the *Aborigines Protection Act* 1869 and became known as the Central BPA. The Central BPA ran missions and reserve stations in Victoria and had significant statutory power over the lives and affairs of Aboriginal people. The Central BPA was abolished by the *Aborigines Act* 1957.

2.2.3 Aboriginal heritage information management system search

Aboriginal heritage data used to determine the archaeological sensitivity of the study area was obtained from the OEH Aboriginal Heritage Information Management System (AHIMS) search results and from relevant reports and published works about Aboriginal cultural heritage in the region.

An extensive AHIMS search was conducted by Rani Attwood (project Archaeologist, Jacobs) for the project and the results reported on the 7 October 2014. Seventy-three Aboriginal sites were located in the general region of Tooleybuc (50 km search) within a 10 km width stretch along the Murray River. Within a five kilometre radius of the project area, 46 Aboriginal sites have been recorded (Figure 2.1). The majority of these are earth mounds (n= 33) located on the source bordering dune and lunette landform of Lake Coomaroop east of Tooleybuc. Scarred trees (n=6), shell middens (n=6) and one burial site are the other site types represented in this search area. No Aboriginal sites have been recorded within the project area, however as noted in AECOM (2014, p 19) the AHIMS data is not entirely accurate as several sites are shown in Victoria when mapped. Centroids are also used to record these sites, so it is possible that sites with extensive extents could continue further than shown on the mapping. The AECOM report (2014, pp 19-25) goes into great detail regarding the likely location of the majority of these sites. Most of these sites were recorded in the 1970s using AGD map co-ordinates to record location and hence are inaccurately show in the mapping as to their likely location. A search of OEH's Places of Significance register identified one declared Aboriginal place in the region, the 'Dippo Ceremonial Ground' at Balranald. Appendix B for AHIMS provides details of the AHIMS extensive search results, including maps.

A search of the Victorian Aboriginal Heritage Register (VAHR) and AHIMS failed to locate any recordings of fish traps along the entirety of the Murray River along the NSW/Victorian border. However, this may be due to a fish traps structural impermanence as opposed to them not having existed in the area at all. The recorded rarity and significance of such Aboriginal sites provides further justification for detailed investigation at a location where fish traps could have been likely.

Table 2.1 : List of Aboriginal sites associated within five kilometres of the project area

Aboriginal Place name	AHIMS number	GDA 94 Easting (Zone 54)	GDA 94 Northing (Zone 54)	Aboriginal Place type
Piangil Tooleybuc Tooleybuc 10	53-2-0006	715702	6120833	Midden open camp site
Lake Coomaroop Lake Coomaroop 3	53-2-0007	715428	6118822	Mound (Oven)
Tooleybuc Tooleybuc 1	53-2-0008	714788	6121747	Mound (Oven)

Aboriginal Place name	AHIMS number	GDA 94 Easting (Zone 54)	GDA 94 Northing (Zone 54)	Aboriginal Place type
Lake Coomaroop Lake Coomaroop 15	53-2-0009	714788	6121747	Mound (Oven)
Tooleybuc Tooleybuc 8	53-2-0010	714331	6120376	Mound (Oven)
Tooleybuc Tooleybuc 7	53-2-0011	714331	6120376	Scarred Tree
Tooleybuc	53-2-0012	714331	6120376	Midden
Lake Coomaroop	53-2-0013	714331	6119919	Mound (Oven)
Lake Coomaroop Lake Coomaroop 14	53-2-0014	714331	6119919	Mound (Oven)
Lake Coomeroop	53-2-0016	714971	6119005	Scarred Tree
Lake Coomaroop Lake Coomaroop 8	53-2-0017	714788	6119005	Mound (Oven)
Lake Coomaroop Lake Coomaroop 5	53-2-0018	714788	6119005	Mound (Oven)
Lake Coomaroop	53-2-0019	714788	6119005	Mound (Oven)
Lake Coomaroop Lake Coomaroop 4	53-2-0020	714788	6119005	Mound (Oven)
Lake Coomeroop 2	53-2-0021	714788	6119005	Mound (Oven)
Lake Coomeroop 1	53-2-0022	714788	6119005	Mound (Oven)
Lake Coomaroop;Lake Coomaroop 16;	53-2-0023	714057	6120833	Mound (Oven)
Tooleybuc 2	53-2-0024	713874	6122661	Mound (Oven)
Lake Coomaroop.	53-2-0025	714331	6119919	Mound (Oven)
Tooleybuc 9	53-2-0026	714331	6120833	Mound (Oven)
Tooleybuc 5	53-2-0027	714331	6121290	Mound (Oven)
Lake Coomaroop Lake Coomaroop 20	53-2-0028	713874	6119919	Mound (Oven)
Lake Coomaroop.	53-2-0029	713874	6119919	Mound (Oven)
Lake Coomaroop Lake Coomaroop 25	53-2-0030	713874	6119919	Mound (Oven)
d	53-2-0031	714250	6117250	Mound (Oven)
Murray River.	53-2-0032	713874	6117999	Mound (Oven)
Tooleybuc.	53-2-0033	712960	6120833	Scarred Tree
Lake Coomaroop Lake Coomaroop 13	53-2-0034	712960	6120833	Mound (Oven)
Lake Coomaroop 23	53-2-0035	713417	6119919	Mound (Oven)
Tooleybuc	53-2-0036	712960	6122661	Mound (Oven)
Tooleybuc	53-2-0037	715702	6121747	Scarred Tree
Tooleybuc	53-2-0038	715702	6119005	Midden
Tooleybuc 11	53-2-0039	715702	6119005	Midden
Tooleybuc (Lake Coomaroop)	53-2-0040	715702	6119005	Midden
Tooley Landing.	53-2-0041	715702	6114434	Scarred Tree
Lake Coomaroop 27	53-2-0042	716616	6120833	Midden
Tooleybuc Minnie Bend	53-2-0043	712046	6119919	Mound (Oven)
Murray River Tooleybuc	53-2-0044	713874	6119919	Mound (Oven)
Lake Coomaroop 20	53-2-0045	713874	6120833	Mound (Oven)
Lake Coomaroop 21	53-2-0046	713874	6120833	Mound (Oven)
Lake Coomaroop 13	53-2-0047	714331	6120833	Mound (Oven)
Tooleybuc 4	53-2-0048	714331	6121290	Mound (Oven)

Aboriginal Place name	AHIMS number	GDA 94 Easting (Zone 54)	GDA 94 Northing (Zone 54)	Aboriginal Place type
Lake Coomaroop-	53-2-0049	713874	6119005	Mound (Oven)
Lake Coomaroop:	53-2-0050	714331	6119919	Mound (Oven)
Tooleybuc Burial No.1	53-2-0153	715315	6118828	Human Burial
Lake Coomeroop Ring Tree 1	53-2-0166	714912	6121458	Modified Tree carved or scarred 1

2.2.4 Previous heritage data

A review of previous archaeological studies conducted in the Tooleybuc region has been conducted as part of this desktop assessment. The majority of these reports are Victorian based as the bulk of archaeological assessments along Murray River in this area have been produced for Victoria.

AECOM 2014

AECOM (2014) completed an Aboriginal cultural heritage constraints report for Roads and Maritime as a preliminary exercise for the project. The report aimed to determine if additional cultural heritage assessment was required for the project. The desktop assessment indicated that there were potentially three Aboriginal sites located within the project area, however it should be noted that the project area for the cultural heritage constraints report was much larger and extended into the Lake Coomaroop lunette. A site inspection was completed by a combination of vehicle and pedestrian survey. One new site (Coomaroop Lake Ring Tree 1; AHIMS 52-2-0153) was recorded on the northern side of Lake Coomaroop. Three previously registered sites (AHIMS 52-2-0008, 53-2-0012 and 53-2-0033) that were located within or had the potential to extend into the study area were also re-inspected. None of these sites are located within the project area.

The Murray River (and the land within 200 m of), Lake Coomaroop and an associated lunette were identified as areas of potential archaeological sensitivity (PAS). Avoidance of these areas of PAS was recommended, and where avoidance could not occur, sub-surface testing was recommended to determine the presence or absence of Aboriginal archaeological material and the nature and extent of any sub-surface deposits.

Hill 2013

An archaeological assessment was undertaken by Hill (2013) for the replacement of Approach Bridge No 3 at Euston, downstream of the project area in NSW. The study area for this project was located within the *Murray Riverine Plains* land system. The landform associated with the study area was open floodplain. The archaeological sensitivity of the floodplain was predicted to be low due to previous disturbances. Based on the AHIMS search and the review of previous reports the most likely Aboriginal sites predicted to occur within the study area were scarred trees, hearths and isolated stone artefacts. During the field survey of two Aboriginal sites were recorded – Euston Floodplain 1 (AHIMS 47-4-0324; isolated stone artefact) and Euston Floodplain 2 (AHIMS 47-4-0323; isolated stone artefact and deflated hearths). Hill concluded that even though the area had undergone significant disturbance this did not necessarily imply that Aboriginal sites will not exist, even in a disturbed form.

Hope 2008

Hope (2008) completed a standard Cultural Heritage Management Plan (CHMP) for a 25 m pipeline and a pump shed located in Piangil. The activity area was approximately 3.5 km south of the project area, along the Murray Valley Highway. Hope (2008) noted that the focus of previous archaeological work within the region had been on mounds. Hope (2008, p 4) predicted that shell middens, artefact scatters or clay hearthstones would be the most likely Aboriginal site type within the activity area.

Hope's (2008) survey found there was significant ground disturbance within the activity area due to the construction of the highway and the existing water infrastructure. No Aboriginal sites were located during the survey.

Sub-surface testing in the form of three auger holes on the bank of the Murray River was undertaken due to the lack of ground surface visibility. The maximum depth reached by any auger hole was 0.75 m. Clay was encountered early in the testing (as a sandy clay) with a white sand layer devoid of clay occurring at a depth of around 50- 250 mm. No Aboriginal cultural material was located during the sub-surface testing.

Long and Chandler 2006

Long and Chandler (2006) undertook a desktop study of the Swan Hill area for the proposed Swan Hill Bridge Planning Study. The following predictive statements were made regarding the areas:

- The banks of the Murray and Little Murray Rivers, floodplain forest, sand rises and other upstanding landforms in the adjacent floodplain are of high archaeological sensitivity
- Other landforms in the area are considered to be of low-moderate archaeological sensitivity
- It is likely that archaeological deposits area preserved in localised pockets due to past ground disturbance
- Scarred trees are common in the region and may survive in areas of remnant vegetation or on dead trees

Cupper 2006

Cupper (2006) undertook an archaeological assessment of the Murray River at Wood Wood in Victoria (downstream of the project area) for the construction of a pump station. Cupper identified the following Aboriginal Place types as the most likely to occur in the area:

- Stone artefact scatters (predominantly open sites occasionally associated with hearths and only rarely stratified)
- Scarred trees
- Earthen mounds
- Shell middens (freshwater mussel *Alathyria jacksoni* and lacustrine mussel *Velesunio ambiguus*)
- Burials (typically located in sandy source bordering dunes).

No Aboriginal sites were identified during the field survey, with previous ground disturbance considered to have been a major factor in removing traces of past occupation.

Edmonds 2003

Edmonds (2003) undertook an archaeological survey of the Balranald levee (west of the project area along the Murrumbidgee River in NSW). Background research indicated that the high bank of the Murrumbidgee River had the highest Aboriginal archaeological potential in the study area with the remainder being of low to moderate archaeological sensitivity. The most common Aboriginal sites expected in the study area were scarred trees followed by middens and/or campsites along the riverbank although a high level of disturbance resulting from urban development was expected. Twelve new Aboriginal sites, including twelve scarred trees and two shell middens, were recorded during the survey. The scarred trees were distributed across the floodplain while the shell middens were located on the high bank of the river.

Edmonds 2000

As part of the route selection study for the Robinvale Bridge replacement over the Murray River (downstream from the project area), Edmonds (2000) conducted an archaeological assessment of six proposed options for the new crossing. Six new Aboriginal sites were recorded within the route selection study area, and two previously recorded sites were re-inspected. The sites comprise five scarred trees and three shell middens. The

shell middens were recorded along the modern and ancestral banks of the Murray River, with the scarred trees distributed randomly across the floodplain.

In addition four areas of potential archaeological deposit (PAD) were identified. The PADs consisted of sandy landforms (PAD 2) and ancestral terraces of the Murray River along the floodplain (PADs 3-5). The terraces comprised sandy clays deposited by the retreating Murray River. All four PADs had the potential to contain burials and other types of occupational evidence (stone artefacts, shell middens and hearths). PADs 3-5 were tested through sub-surface excavations by Edmonds (2003b) and no Aboriginal cultural material was found.

Gunn 1998

Gunn (1998) undertook a site survey for a proposed 1.5 km pipeline in Piangil (opposite the project area in Victoria) for Lower Murray Water. The pipeline was proposed to be run alongside the Murray Valley Highway (western side). Gunn (1998) identified three Aboriginal site types as most likely to occur along the route:

- Scarred trees
- Stone artefact scatters
- Isolated stone artefacts.

Mounds and burials could also be expected given the appropriate geographic conditions. Scarred trees and mounds were expected to occur around major creek lines and swamps, burials within sand dunes or mounds. Stone artefact scatters were expected to occur on rises with isolated stone artefacts occurring anywhere across the landscape. Gunn (1998) also noted the stone tools relating to the Australian Small Tool Tradition (ASTT) are very rare along the Murray River suggesting that the ASTT was not relevant to the activities undertaken by Aboriginal people along the Murray River (Gunn 1998, p 6).

During the field assessment no Aboriginal sites were identified. A sand dune landform was identified and Gunn (1998) recommended monitoring of works during installation of the pipeline in this section due to the association of sand dunes with burials.

Luebbers and Ellender 1991

Luebbers and Ellender (1991) undertook an assessment of Aboriginal sites in north-west Victoria for VAS, which included the geographic region of the project area. The study noted that mounds were the most common site type in the riverine area and that a high incidence of burials occurs in the Murray Valley. Other recorded Aboriginal Places in north-west Victoria included scarred trees, shell middens, hearths, wells, quarries and artefact scatters.

Coutts et al 1979

Coutts et al (1979) undertook a preliminary investigation of Aboriginal mounds in north-west Victoria as part of the Victoria Archaeological Survey (VAS). The study which included excavations of mounds in the Nyah and Vinifera State Forests upstream from the project area, made a number of conclusions regarding mounds in the region:

- Mounds were typically located near anabranches or ponds left behind after floods
- Two types of mounds existed in this area, comprising smaller cooking pits and larger raised mounds, constructed so that the resources of the area could be better exploited during times of flood

2.3 Predictive statements

Very little archaeological research has been conducted at Tooleybuc however assessments have been undertaken in the surrounding area and region, which can be used to make assumptions regarding the expected range of site types and where these site types are predicted to occur, based on the relevance of this data to the *Riverland* land system.

Based on the known background archaeology for the entire western region of NSW, Witter (2004) has detailed the archaeological landscapes of western NSW. The document is based on those land systems defined in Section 2.1.1. The following table (Table 2.2) summarises the archaeological sensitivity of these land systems and their landforms. This summary is based on Witter (2004, pp 140-141) and is useful when designing a survey strategy and/or formulating recommendations. Table 2.2 indicates that the *Riverland* land system has high archaeological sensitivity where sand deposits exist on, or adjacent to, the floodplain.

Table 2.2 : Archaeological sensitivity of the *Riverland* land system in the project area

Land system	Expected site types	Archaeologically sensitive landforms	Archaeological sensitivity of land system
Riverland	Scarred Trees, Earth Mounds, Shell Middens, Open Campsites /Surface Scatters, Burials	Elevated sandy lunettes/ sandy rises on the floodplain/ point bar deposits/ elevated plains and channel margins	High (common)

Craib (1992) and other archaeological consultants working in the Mallee Zone of the Murray River (for example Edmonds 2000) have identified five general micro-environments within the *Riverland Plains* land system. These are:

- Riparian
- Lagoon/Swamp
- Open (floodplain)
- Box Plain (alluvial terrace)
- Sandhill.

These micro-environments represent exclusive, homogeneous categories, which serve as a basis for identifying survey sampling strata (Craib 1992, p 32). The project area consists of riparian and sandhill micro-environments. Table 2.3 provides a predictive model of site type, location and archaeological sensitivity for those micro-environments (landforms) occurring within the *Riverland Plains* land system in the project area. Table 2.3 indicates that the riparian landform is of moderate archaeological sensitivity, while the sandhills have low sensitivity in regards to the type of sites that may be present. Burials are the most likely site type to be present within the sandhills landform. Burials are acknowledged as being of high cultural significance, but due to the rarity of this site type the sandhills are predicted to be of low archaeological sensitivity.

Table 2.3 : Predictive model of archaeological sensitivity by micro-environmental context for the *Riverland* land system and landforms in the project area

Micro-environment (landform)	Expected site types	Archaeological sensitivity
Riparian (channels & banks)	Shell middens on high banks/ scarred trees/isolated artefacts/hearths	Moderate
Sandhill	Isolated artefacts/ burials	Low

The following paragraphs provide a summary description of the expected site types for the project area landscape:

- *Scarred trees* generally consist of River Red Gums or Black Box trees and are usually found on low lying floodplain less than 500 m from a water source. The minimum age range for scarred red gums will vary between 100 and around 300 years Before Present (BP). Culturally derived scars are distinguished from

naturally occurring scars by their oval or symmetrical shape and occasional presence of stone or steel axe marks on the scar's surface. Size and shape of the scar will depend on the use for which the bark was intended. Bark was used for a variety of purposes, including the manufacture of dishes, containers, canoes and the construction of huts. Other types of scarring include toeholds cut in the trunks or branches of trees for climbing purposes and removal of bark to indicate the presence of burials in the area. River Red Gums are confined to wetlands of the present floodplain while Black Box are distributed across the low lying floodplain and higher box plains

- *Hearths* are also known as oven mounds or fireplaces and are roughly circular features mainly comprising of lumps of burnt/baked clay, calcrete or termite nest, sometimes in an ash and charcoal matrix. Occasionally food remains, such as burnt and unburnt fish, mammal and bird bone and shell can be found associated with the hearths indicating that these features were used as ovens for cooking food. Often isolated or small numbers of stone artefacts can be found associated with hearths. Hearths often form part of a midden or campsite but they are also found as isolated occurrences on the floodplain, or in groups forming hearth complexes
- *Shell middens* dominate the study region and occur in a variety of locations. These include both current and prior watercourse and lagoon channels, high cliffs and escarpments overlooking the Murray floodplain, sand deposits adjacent to the floodplain and in lunettes around swamps or lakes. The composition of the middens can be seen as a reflection of both site location, activities practised and age. River mussel (*Alathyria jacksoni*) is the predominant species in deposits along the Murray River and major creeks, while freshwater mussel (*Velesunio ambiguus*) is common in sites adjacent to lakes, swamps and watercourses with a weaker current. Other species of shell fish include the freshwater snail (*Vivipara notopala hamelyi*). Middens may also contain small amounts of animal and fish bone, stone artefacts, heat retainers, charcoal and sometimes burials. Size can vary from a single layer, or lens, of shell to large, compacted deposits up to a metre thick. The age of a particular deposit can be assessed through C_{14} dating of charcoal or shell, or inferred through geomorphological context and post-depositional changes to the shell. The dating of midden deposits has demonstrated an Aboriginal association with the Murray River wetlands of the region for the previous 22,000 years, and for this reason shell middens are considered a highly significant site type for studying prehistoric Aboriginal culture in the study region. Dates for shell midden excavations in the region have been summarised in Edmonds (1998, Table 4.1). These dates indicate that sites on the present floodplain and riverbank are likely to range from about 13,000 years through to the present. Older middens, that is up to 22,000 years BP will most likely be located along the ancestral riverbank and in lunette sediments around lakes and swamps.
- *Isolated artefacts* comprise isolated occurrences of flaked/ground stone artefacts.

2.4 Summary of background information

The desktop assessment has established that:

- There are no known Aboriginal sites located within the project area
- Of the 46 Aboriginal sites located within five kilometres of Tooleybuc, 33 of these are oven mounds. Other site types include shell middens, scarred trees and a burial site
- No previous archaeological investigations have been completed within the project area, except for the Aboriginal cultural heritage constraints report for the project
- Very little previous archaeological research has focussed on the Murray River area in or around Tooleybuc, with almost no sub-surface investigation in the region – consequently, predictions are difficult to make and preliminary in nature
- Fishing activities were a primary focus of Aboriginal economy for the majority of the calendar year. While obvious archaeological evidence exists in the presence of shell middens, other evidence such as the construction of wooden fish traps and earthen levees on the floodplain will most likely not remain. If stone structures are thought to exist upon the Murray River bed they may still be intact due to the regulation of water-levels concealing these structures. However, determining the presence of fish weirs would either require low water levels or specialist equipment that is able to penetrate the murky waters of the Murray to create a ‘picture’ of the river bed

- The project area is a mixture of two landforms:
  - The riparian landform (channels and banks) is of moderate archaeological sensitivity. The most likely Aborignal site types to be found within this landform include: shell middens on high banks of the river, scarred trees (River Red Gum along the waters edge and Black Box upon the open floodplain), isolated stone artefacts (silcrete, chert and quartz) and hearths (fire places)
  - The sandhill landform has low sensitivity due to the limited number of site types predicted to occur within this landform. Burials are the most likely site type to be present within the sandhills landform, but due to the rarity of this site type the sandhills are predicted to be of low archaeological sensitivity.

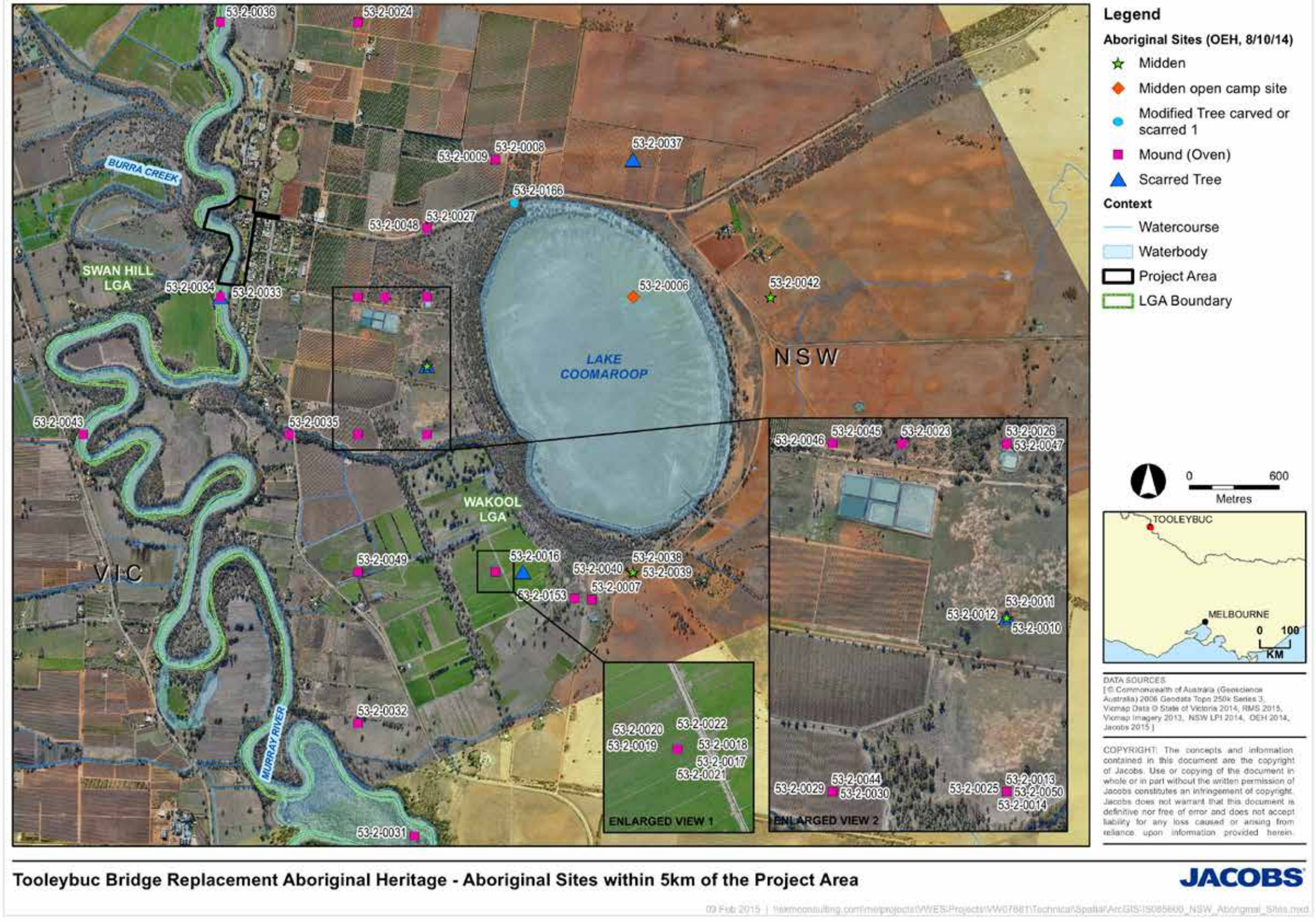

Figure 2.1 : Location of Aboriginal sites within five km of the project area

3. Aboriginal community consultation

3.1 Consultation and assessment process

This chapter details the consultation process used for the project. This includes the identification of registered Aboriginal parties (RAP) and the nature of Aboriginal stakeholder consultation and involvement in the assessment process to date.

3.1.1 Overview of consultation

The consultation undertaken to date has followed relevant government and Roads and Maritime consultation guidelines. The relevant guidelines are:

- ACHCRP (DECCW 2010)
- PACHCI (Roads and Maritime 2011)

3.1.2 Consultation requirements for proponents

The ACHCRP includes a process for the notification and registration of interested stakeholders, preparation for the Aboriginal cultural heritage assessment and the drafting, review and finalisation of an Aboriginal cultural heritage assessment report. Table 3.1 summarises the consultation undertaken for the project and how it complies with each step of the ACHCRP. A log of consultation undertaken for the project to date is included in Appendix C and where letters have been the method of correspondence, copies of these are included in Appendix D.

3.1.3 Roads and Maritime consultation procedure

Consultation with RAPs followed the process described in the Roads and Maritime PACHCI. This process aims to ensure that RAPs have the opportunity to contribute to the assessment through:

- The development and design of the cultural heritage assessment methodologies.
- The identification of Aboriginal heritage constraints to be considered within the design.
- The development of recommendations for the management of archaeological sites within the boundary of the project.

Consultation and investigation for the project so far has been up to and including part of Stage 3 of the 2011 PACHCI. The stages of PACHCI are:

- Stage 1 – Internal Roads and Maritime assessment to identify key environmental issues.
- Stage 2 – Further assessment and site survey, with an archaeologist and specific Aboriginal stakeholders to assess the project's potential cultural heritage impacts.
- Stage 3 – Where Stages 1 and 2 lead to the preliminary view that harm to Aboriginal objects or places is likely to occur, then formal consultation must be undertaken and a cultural heritage assessment report prepared. This may also include sub-surface testing where required.
- Stage 4 – Implement project mitigation measures (eg salvage).

Table 3.1 : Consultation process implemented, based on the stages of the ACHCRP

Stage	Steps undertaken
Stage 1: Notification of project proposal and registration of interest	The following was undertaken: 1. On 16 May 2014, consultation with OEH, Murray Catchment Management Authority, Local Aboriginal Land Councils (LALCs), Native Title Services Corporation Limited, the National Native Title Tribunal, Balranald Shire Council, and the Registrar of Aboriginal Owners to request the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places for the project. 2. On 30 July 2014, public notices were placed in local newspapers (*Swan Hill Guardian*, *Hay Riverine Grazier*, *National Indigenous Times*, and *Koori Times*) for any Aboriginal person who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places for the project to register their interest in participating in each of the four Aboriginal focus groups. A period of 30 days was allowed for a response to register interest. 3. On 17 October 2014, relevant stakeholders identified in step 1 above were written to, inviting any Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places for the project to register their interest in participating in the Aboriginal focus groups (AFG). A period of 30 days was allowed for a response to register interest. The stakeholders who registered were: · Wamba Wamba LALC · Cynthia Pappin, Gary Pappin, Daryl Pappin and May Pappin (Wakool Indigenous Corporation) · Ali Maher (National Koori Site Management) · Ray Kennedy (Dadi Dadi Weki Weki Aboriginal Corporation) · Paul Charles (Kullila Site Consultants)
Stage 2: Presentation of information about the proposed project	The proposed archaeological methodology was distributed to stakeholders on 17 October 2014 and also presented at an AFG meeting on 30 October 2014 (see Appendix D for minutes). The methodology was agreed upon by those in attendance at the AFG, and a period of 28 days was allowed for further comment; no further comments were received.
Stage 3: Gathering information about cultural significance	The proposed methodology for the gathering of cultural knowledge was distributed to stakeholders on 27 March 2015 (see Appendix D for the methodology), and a period of 28 days was allowed for further comment; no comments were received. An informal meeting was held on 27 May 2015 at Mensforth Park in order to gather cultural knowledge. The registered Aboriginal Knowledge Holders who attended this event were: · Irene Wellington (nee Moore) (Wamba Wamba Elder) · Ray Murray (Wiradjeri / Wamba Wamba Elder) · Mary Pappin (Muthi Muthi Elder · Lena Sweeney (Wamba Wamba LALC) · Neville Whyman (Wadi Wadi Elder) · John Jackson (Wadi Wadi Elder). The social significance of the Tooleybuc area and the potential for fish traps to be present in the area were discussed at the meeting (see Section 5 for details of the discussions at the meeting and Appendix D for minutes).

Stage	Steps undertaken
Stage 4: Review of draft cultural heritage assessment report	Draft copies of this ACHAR will be provided to RAPs with 30 days within which to provide comment. Comments received will be reviewed and incorporated into this ACHAR.

4. Field survey

4.1 Aims

The aim of the field survey was to undertake an archaeological survey of the three option alignments and consult with the RAP nominated site officers.

4.2 Methodology

A field survey was completed on 18 December 2014 by a fully qualified and experienced archaeologist and heritage consultant, Jeff Hill (Bachelor of Archaeology [Honours], seven years of experience) and Aboriginal site officers – Gary Pappin (Wakool Indigenous Corporation), Ray Kennedy (Dadi Dadi Weki Weki Aboriginal Corporation) and Steven Morrison-Firebrace (Wadi Wadi Native Title Claimant Group) – in conjunction with Andrew Whitton (Aboriginal Cultural Heritage Advisor, South West Region, Roads and Maritime).

All three options were surveyed on foot by the survey team spaced approximately 5 - 10 m apart walking along the proposed option routes; all areas of higher visibility or sub-surface exposure were inspected.

All survey information (including landform, soil type, land surface and survey coverage) was recorded using a Trimble GeoXT (Differential GPS (+/-1 metre accuracy).

4.3 Constraints

Survey conditions were favourable (clear and sunny) and no constraints were met.

4.4 Coverage

The detection of Aboriginal sites and cultural material is dependent upon ground surface visibility. Ground surface visibility is also affected by erosional processes and surface vegetation. Effective survey coverage calculations attempt to quantify the efficacy of the survey. The following formula for quantifying effective survey coverage (Witter 1990) was used to calculate effective coverage for the activity area:

EC = (a) x (e) x (v) x (b), where:

- EC = effective coverage
- a = area surveyed in square metres
- e = erosion
- v = visibility
- b = background effect

Table 4.1 : Effective coverage rating definitions

Erosion rating (the index of sedimentation)	Visibility rating (estimation of the percentage of bare ground)	Background effect (measure of the occurrence of materials that impedes the detection of cultural deposits)
e	**v**	**b**
0.1 = aggrading surface 0.5 = stable surface 1.0 = degrading surface	0.1 = negligible visibility 0.2 = (1-25%) 0.3 = (26-50%) 0.4 = (51-75%) 0.5 = (76-99%) 1.0 = 100%	0.1 = high 0.5 = medium 1.0 = low

Table 4.2 : Survey coverage details

Total area (m²)	Surveyed area m² (%)	Erosion rating (e)	Visibility rating (v)	Background rating (b)	Effective survey coverage (m²)	Effective survey coverage (%)
Yellow (32,000)	13,653 (43)	0.5	0.4	0.5	1,3,65	4
Blue (2,620)	2,620 (100)	0.5	0.3	1.0	2,620	15
Purple (5,757)	4,948 (86)	0.5	0.3	1.0	4,948	13

Photographs of the areas surveyed are shown in Figure 4.1 - Figure 4.12. Mapping of the surveyed areas is shown in Figure 4.13.

4.4.1 Blue option

The majority of the blue option was covered with Kikuyu grass from approximately 10 m from the Murray River bank to Murray Street a distance of approximately 60 m. Visibility was limited to the 10 m margin around the banks of the Murray River for this option. No Aboriginal sites were recorded within this option. The overall effective survey coverage was highest (15 per cent) for the blue option mainly due to the lack of leaf litter along the riparian fringe in comparison to the purple option Two pieces of burnt clay material were observed on the banks of the Murray River where the blue option crosses, however this cannot be definitively identified as Aboriginal cultural material mainly due lack of additional material confirming that this is oven material.

4.4.2 Purple option

As with the blue option, the purple option was covered with Kikuyu grass from approximately 10 m from the Murray River bank to Murray Street, a distance of approximately 60 m. Visibility was limited to the 10 m margin around the banks of the Murray River for this option and this was limited due to leaf litter cover. The overall effective survey coverage was slightly lower than the blue option because of this (13 per cent) No Aboriginal sites were recorded within this option.

4.4.3 Yellow option

Approximately 43 per cent of the total options area was assessed. Sections of the yellow option that cut through a current caravan/ cabin park; this areas was not surveyed as well as where options extend onto sealed roads. Ground surface visibility was variable within the yellow option, with the greatest visibility on a large section of cleared ground that was only lightly grassed. The riverbank also offered good visibility and no shell pieces were observed that may indicate shell middens along the riverbank. A dense riparian fringe along the northern section of the yellow option had low visibility due to leaf litter cover. The overall effective survey coverage was lowest (four per cent) for the yellow option mainly due to the inaccessible/ unnecessary areas not being surveyed. No Aboriginal sites were recorded within this option.

4.5 Results

All three options were subject to archaeological field survey. No Aboriginal sites were recorded during the survey.

As noted by AECOM (2014) the land within 200 m of the Murray River is considered to be an area of PAS. As this includes the total project area, all three options are considered to be within an area of PAS. All three option alignments have been heavily disturbed through clearance and landscaping activities removing most of the

archaeological sensitivity. The remnant natural landscape is limited to 5 – 10 metres of riparian fringe along the Murray River bank. No evidence of shell pieces indicating the potential presence of shell middens was observed along the riparian fringe or in the riverbank cutting.

A sandhill landform comes within 10 m of the riverbank. Although highly disturbed this landform has the greatest potential for sub-surface Aboriginal cultural material to be present within the project area, mainly due to the moving nature of dune sands which has a greater ability to conceal objects and items. The sandhill landform has been recorded as a potential archaeological deposit (PAD) area for the project.

Consultation with the Aboriginal site officers presented an otherwise unknown threat to Aboriginal cultural heritage at the site of the yellow option. Through conversations with site officers present on the day it is believed that where the yellow option crosses the Murray River, fish traps may be present. The current height of the river doesn't allow this claim to be assessed; however investigation of the potential for fish traps to be present in the section downstream from the current bridge requires further investigation through the consultation with nominated Aboriginal knowledge holders (see Figure 4.13 for the location of area where fish traps are thought to exist).

From an archaeological perspective the yellow option has the greatest potential to harm unidentified Aboriginal cultural heritage values, regardless of the validity of the fish traps within this option. This is mainly due to the fact that this option will impact upon a greater area than the blue or purple options. The preference at this stage would be to minimise the amount of impact to potential unidentified sub-surface Aboriginal cultural material by selecting the shortest possible option (blue or purple). If fish traps are positively identified within the yellow option then impact to the fish traps would only be allowed through the granting of an Aboriginal Heritage Impact Permit (AHIP) by OEH. Given the rarity and high cultural significance of fish traps to the local Aboriginal community, approval by OEH to impact upon the fish traps may not be obtained.

Figure 4.1 : Yellow option view west, showing the riparian fringe along the river bend (Photograph taken by J Hill 18 December 2014)

Figure 4.2 : Yellow option where it hooks into an existing road. As stated in the text the field survey did not extend to surveying the roads (Photograph taken by J Hill 18 December 2014; view west)

Figure 4.3 : Yellow option cleared and used for recreation (Photograph taken by J Hill 18 December 2014; view north-west)

Figure 4.4 : Yellow option, paddock in the background will be used for site facilities. Paddock was not surveyed due to high grass cover (Photograph taken by J Hill 18 December 2014; view north-east)

Figure 4.5 : Blue option riparian zone, covered in dense River Red Gums (Photograph taken by J Hill 18 December 2014; view south)

Figure 4.6 : Burnt clay piece located on the bank of the Murray River within the blue option (Photograph taken by J Hill 18 December 2014)

Figure 4.7 : Second piece of burnt clay piece located on the bank of the Murray River within the blue option approximately four metres from the first piece (Photograph taken by J Hill 18 December 2014)

Figure 4.8 : Section of river bank between the blue and purple option showing that fair visibility and ground surface exposure did occur along the riparian fringe (Photograph taken by J Hill 18 December 2014; view south-west)

Figure 4.9 : View east from the purple option looking towards where it will hook into Murray Street. This area has been cleared with the exception of the river frontage for recreational use (Photograph taken by J Hill 18 December 2014)

Figure 4.10 : View north-east across the purple and blue options. Note the dense River Red Gum and lignum vegetation along the riparian zone to left of photograph. The sand hill have been cleared and planted with Kikuyu grass for park use (Photograph taken by J Hill 18 December 2014; view north-east)

Figure 4.11 : Purple option riparian zone (Photograph taken by J Hill 18 December 2014; view south-west)

Figure 4.12 : View of yellow option where it crosses the Murray River from the Victorian bank. This section of the Murray River downstream of the existing bridge is the reported location of fish traps (Photograph taken by J Hill 19 December 2014; view east)

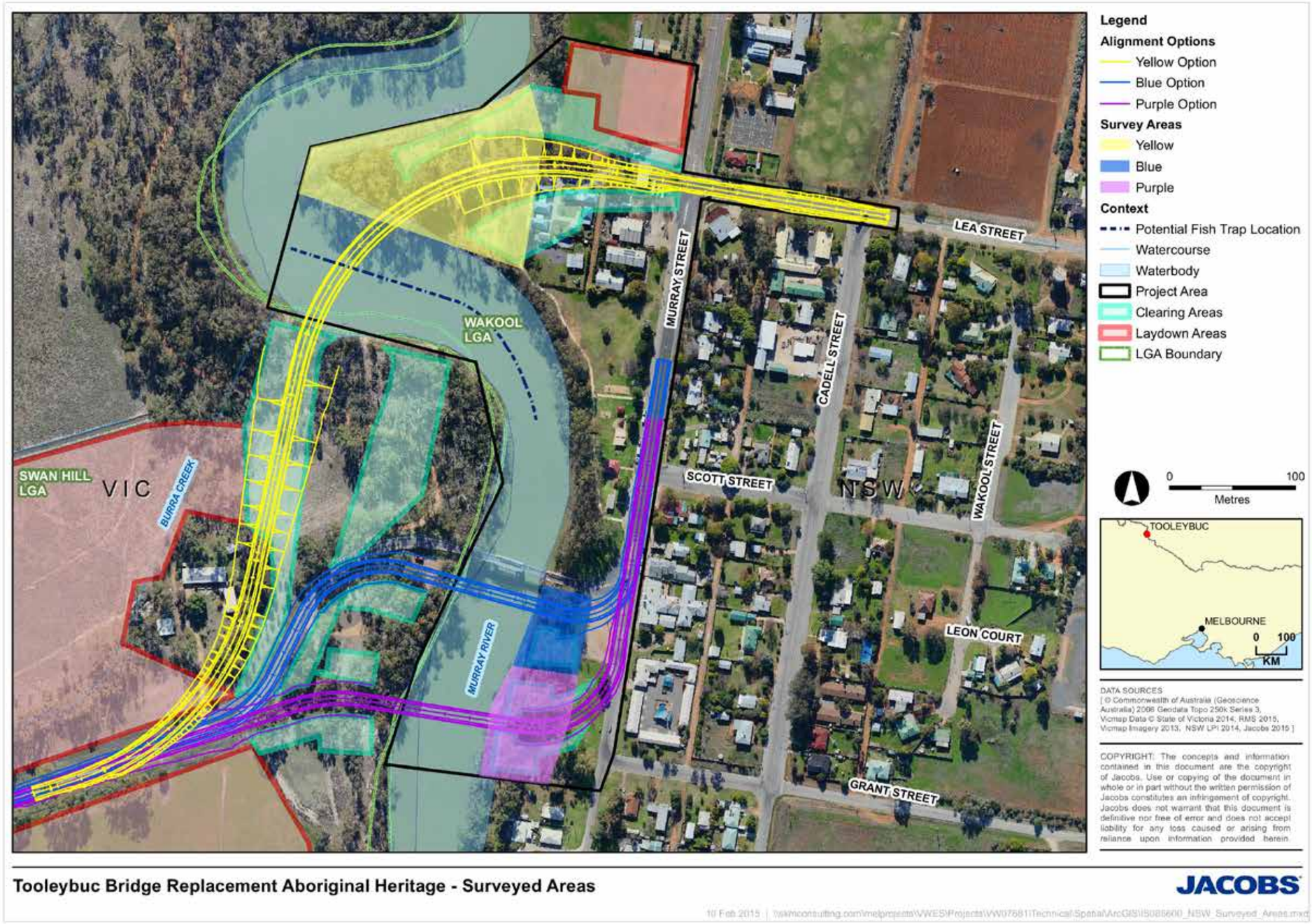

Figure 4.13 : The location of the potential fish traps and areas surveyed during the field assessment

5. Aboriginal Knowledge Holders meeting

5.1 Purpose

The objective of community consultation is to ensure that Aboriginal people have the opportunity to improve assessment outcomes by:

- providing relevant information about the cultural significance and values of the Aboriginal object(s) and/or place(s)
- influencing the design of the method to assess cultural and scientific significance of Aboriginal object(s) and/or place(s)
- actively contributing to the development of cultural heritage management options and recommendations for any Aboriginal object(s) and/or place(s) within the proposed project area.

Consultation with Aboriginal Site Officers during the field survey on 18 December 2014 indicated the potential presence of Aboriginal fish traps in the Murray River where the yellow option is aligned. Only through further consultation with Aboriginal Knowledge Holders for the Tooleybuc area can the presence of cultural significant objects or places be determined.

An in-depth literature review was completed as a background investigation in order to locate references of fish traps in the Murray River at Tooleybuc, and in the Aboriginal economy in general; this information is supplied in the Sections 2.2.1 and 2.2.2 of this report. The background investigation failed to find any literature reference or recording of fish traps at Tooleybuc, however it did reveal the association of Wadi Wadi people with a fishing economy and the construction of structures made of earth, timber and stone for the entrapment of fish. The results of this review indicate that the occurrence of fish traps within the river at Tooleybuc is not out of the question given the historical context.

5.2 Aims

The aims of the consultation strategy were to undertake a detailed consultation process in order to establish the presence of Aboriginal fish traps within the Murray River at Tooleybuc, and to record the cultural significance of the Tooleybuc area to Aboriginal people. The identified Aboriginal Knowledge Holders listed below were to be invited to attend an on-site meeting in order to provide the opportunity for people to associate memories with the physical area surrounding Tooleybuc.

The identified invitees were:

- Irene Moore
- Nelly Moore
- John Ross
- Vincent Ross
- Mary Pappin
- Alf Kelly
- Bev Moore/Whyman
- Ray Murray
- Shirley Davis
- John Jackson.

5.3 Informal meeting / BBQ Tooleybuc

An informal meeting / BBQ was held at Tooleybuc (Mensforth Park) on 27 May 2015 with the Aboriginal Knowledge Holders (and their companions) to discuss the project and traditional links to the area (see Appendix D for meeting minutes). Some of the listed identified Aboriginal Knowledge Holders could not be contacted or

were unavailable for a variety of reasons. The following Aboriginal Knowledge Holders were in attendance at this meeting:

- Irene Wellington (nee Moore) (Wamba Wamba Elder)
- Ray Murray (Wamba Wamba Elder)
- Mary Pappin (Muthi Muthi Elder)
- Lena Sweeney (Wamba Wamba LALC)
- Neville Whyman (Wadi Wadi Elder)
- John Jackson (Wadi Wadi Elder).

A1 mapping of the Tooleybuc area showing the project alignments, recorded Aboriginal sites and potential fish trap area was shown to the Aboriginal Knowledge Holders in order to start discussions. The general consensus at the meeting was that fish traps are present within the stretch of the Murray River closely associated with the yellow option as marked on the map (see Figure 5.5). There was uncertainty regarding the exact location of the fish traps and whether the yellow option would impact upon them. Many of the Aboriginal Knowledge Holders had not seen the fish traps in a long time and were unable to pin-point the exact location and extent. Three big holes in the Murray River were identified as being significant in the confining of fish with fish traps. One of these holes was identified opposite the clay bar on the bend where the yellow option is proposed to cross (see Figure 5.5). Figure 5.1 - Figure 5.3 show the location of the clay bar from historic mapping and recent photographs of the river at low-levels. The Aboriginal Knowledge Holders associated the fish trap location with rocky outcrops. Whether the identified clay bars also have a rock based geology is not known. Constriction of water to a narrow channel within the bed of the Murray River at low-levels was indicated to be the area where fish traps or weirs would have been constructed in order to entrap fish moving from river hole to river hole along this narrow passage. Mary Pappin (Muthi Muthi Elder) also mentioned a survey and subsequent report from the 1980s that her mother and father (Alice and Alf Kelly) were involved with that may have mentioned fish traps at this location. This report is currently being sought.

Avoidance of the fish traps was foremost in the Aboriginal Knowledge Holders considerations. As no one could accurately define the exact location and extent of the fish traps more information was asked for to make an informed decision on whether impact to the fish traps would occur. Given the unlikely chance that low river levels would occur sometime soon, the Aboriginal Knowledge Holders were in agreement that a bathymetric survey should be undertaken in order to provide the detail of information required to make a more informed decision on the likely impacts to the fish traps by bridge pylons. The Aboriginal Knowledge Holders requested that the placement of the bridge crossing, and the pylons within the river particularly, should be been made in consultation with the RAPs in order to ensure that Aboriginal cultural values are not impacted. The Aboriginal Knowledge Holders saw the fish traps as an issue requiring further investigation

Further considerations at the meeting were the extent of construction zones on both sides of the river. The Aboriginal Knowledge holders were concerned about the extent of disturbance and pointed out a number of areas (labelled as ‘non-impact areas’ in Figure 5.5) where they would like to see little to no impact. A particular spot on the Tooleybuc side of the river at the peak of the river bend was singled out by Neville Whyman (Wadi Wadi Elder) as an Aboriginal camping site (Figure 5.5). This was a significant location to Neville and he wanted to ensure the protection of as much of this area as possible. The Aboriginal Knowledge Holders were in agreement that the defined construction zone should be adhered too and all were in agreement that they wanted to see where the construction zones and areas of impact would be at the detailed design stage.

5.4 Summary

The Aboriginal Knowledge Holders identified fish traps as being present in the Murray River at Tooleybuc. The exact location and extent of the fish traps is not known and therefore further investigation is required in order to understand if impact to the fish traps will occur. The presence of the fish traps was not an insurmountable obstacle in the construction of the new Tooleybuc Bridge. The Aboriginal Knowledge Holders also had concerns with the extent of the construction footprint and whether Aboriginal cultural sites would be impacted. Further consultation during the detailed design stage was requested.

Figure 5.1 : Photograph of the Murray River at low water levels with the clay bar exposed (Photograph provenance unknown)

Figure 5.2 : Close-up view of the exposed clay bar, upstream of the corner bend where the yellow option is proposed to cross the Murray River

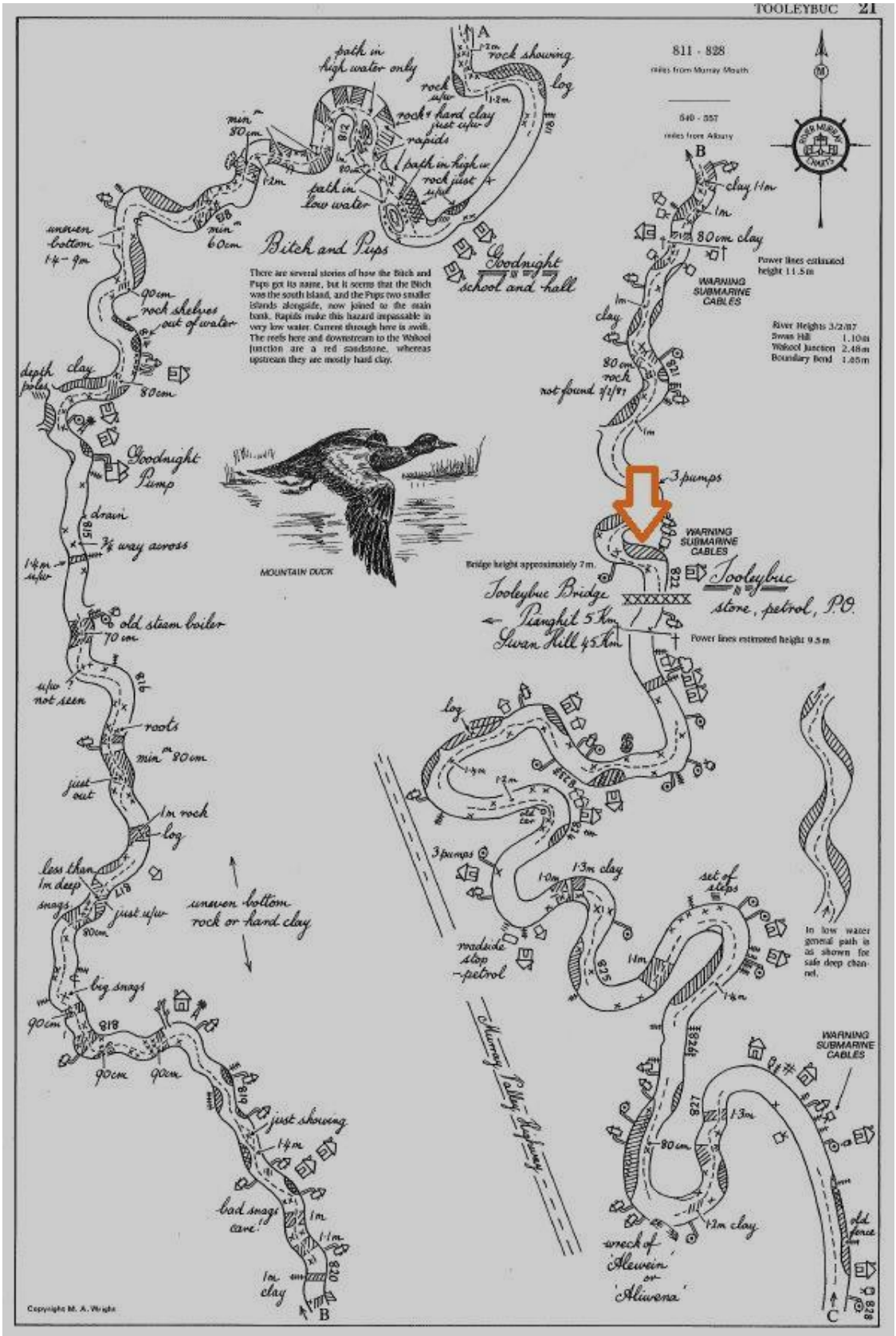

Figure 5.3 : Murray River mapping of the Tooleybuc stretch of the river with the clay bar shown

Figure 5.4 : Aboriginal Knowledge Holder meeting participants from left to right (Ray Murray (Wiradjeri/Wemba Wemba Elder), Andrew Whitton (Roads and Maritime Services), Irene Wellington (Wamba Wamba Elder), John Jackson (Wadi Wadi Elder), Lena Sweeney (Wamba Wamba LALC), Mary Pappin (Muthi Muthi Elder), Mary Pappin (Muthi Muthi) and Kelvin Murray (Wamba Wamba)) (photograph taken on 27 May 2015 by Vanessa Edmonds) Neville Whyman is absent

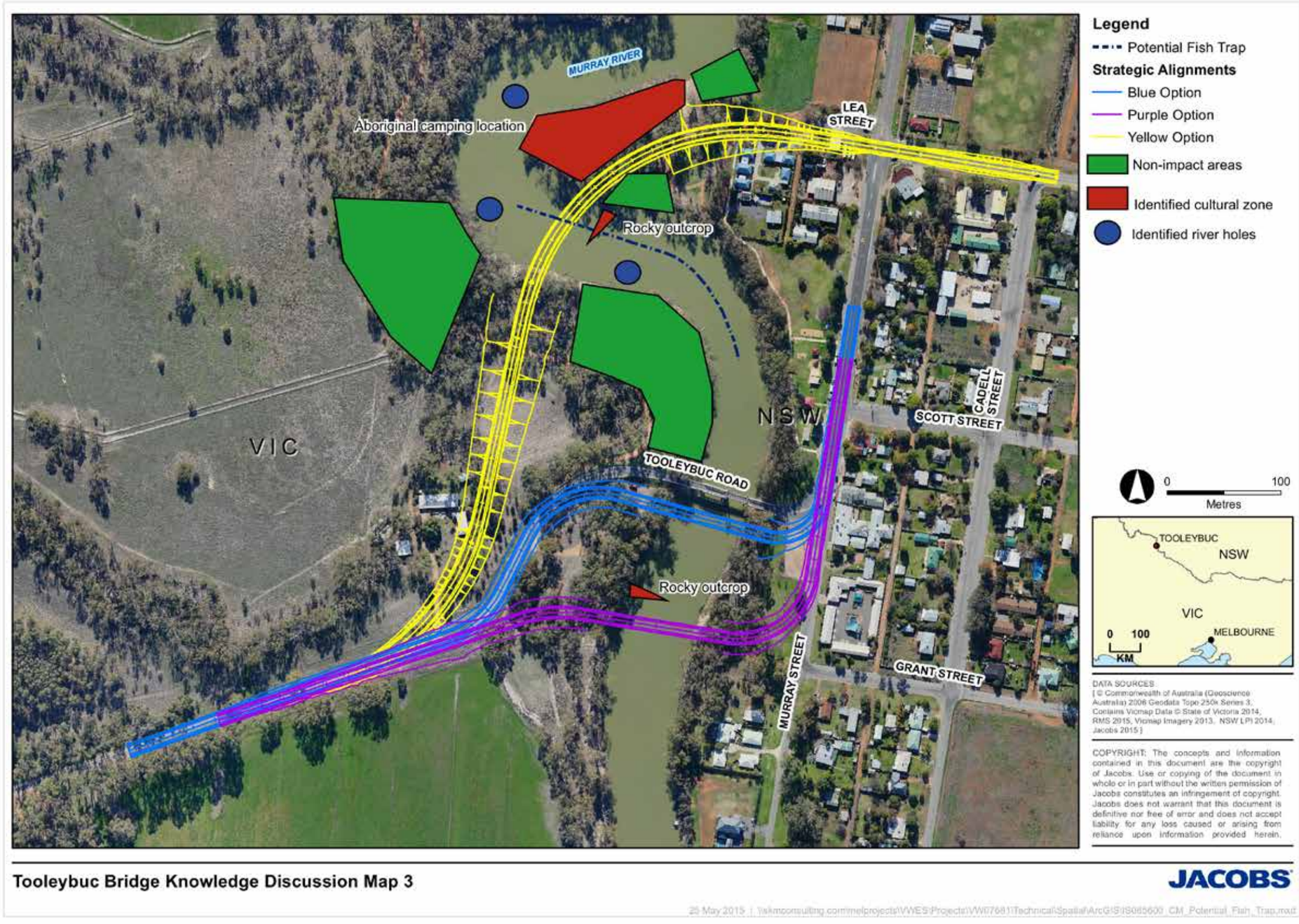

Figure 5.5 : Areas mapped as a part of the Aboriginal Knowledge Holders meeting

6. Bathymetry survey

6.1 Aims

The Bathymetirc survey was undertaken by Austral Research and Consulting (full report provided in Appendix E).

There were two aims of the bathymetric survey:

- The primary aim was to assess the presence of fish traps on the river bed
- The secondary aim was to provide bathymetry data that will assist with the bridge design.

The primary aim of the survey was to investigate the presence of fish traps on the Murray River bed based on anecdotal evidence gathered during the consultation process (see Section 5). The secondary aim of the project was to collect detailed data that will feed into the detailed design of the bridge.

6.2 Methodology

A CEESCOPE dual frequency sonar (33/200 kHz) mounted to a 4.8 m aluminium punt was used to undertake the survey. A Trimble R4 base station was used over a survey marker and linked with the on board GPS to provide improved accuracy (generally ±1 to 0.05 m) to the data collected. A blanking distance of 0.6 m was applied to the sonar collection process which results in any area shallower than the 0.6 m below the sonar head will register as a flat line at RL ~56.00 AHD. Field surveys were completed on 20 - 22 July 2015.

Prior to the detailed sonar survey being conducted a side scan sonar was used to examine the river bed for any obvious features. A shape file was provided by Roads and Maritime Services was used to prepare planned survey lines. The survey lines were planned as long sections and cross sections at 2 m intervals within the specified survey location (100m upstream and downstream of the yellow option alignment).

The data was post processed in HYPACK software package. The data was processed and sorted to reduce the data volume to 10 per cent of the original data volume. The data was then processed to produce a TIN model (similar to a DEM).

6.3 Results

Data was collected on the 21 July 2015. Conditions were fine with sunny patches and no rain at the time of the survey. River levels were low which restricted boat access in some areas. The river bed was found to be heavy clays based on physical observations of the substrate.

Long section and cross section sonar data was collected (Figure 6.1). Good coverage was obtained adjacent to the western side of the river due to deep water. Shallower water was concentrated from the centre of the river continuing to the NSW bank of the river (east bank) and restricted the survey coverage. The collection of cross sectional data was restricted due to shallow water. A deeper hole was present at the downstream extent of the survey area. The cross sections penetrate to the bank as much as possible around snags.

The generated tin model highlights the deeper hole are the end of the survey reach (Figure 6.2). The NSW side of the river (eastern side of the river) is shallow at this point in the river. The deeper channel is located on the Victorian side of the river (west bank) of the river. There are two deeper areas located on the eastern bank and the cable crossing location upstream of the proposed yellow option is clearly visible.

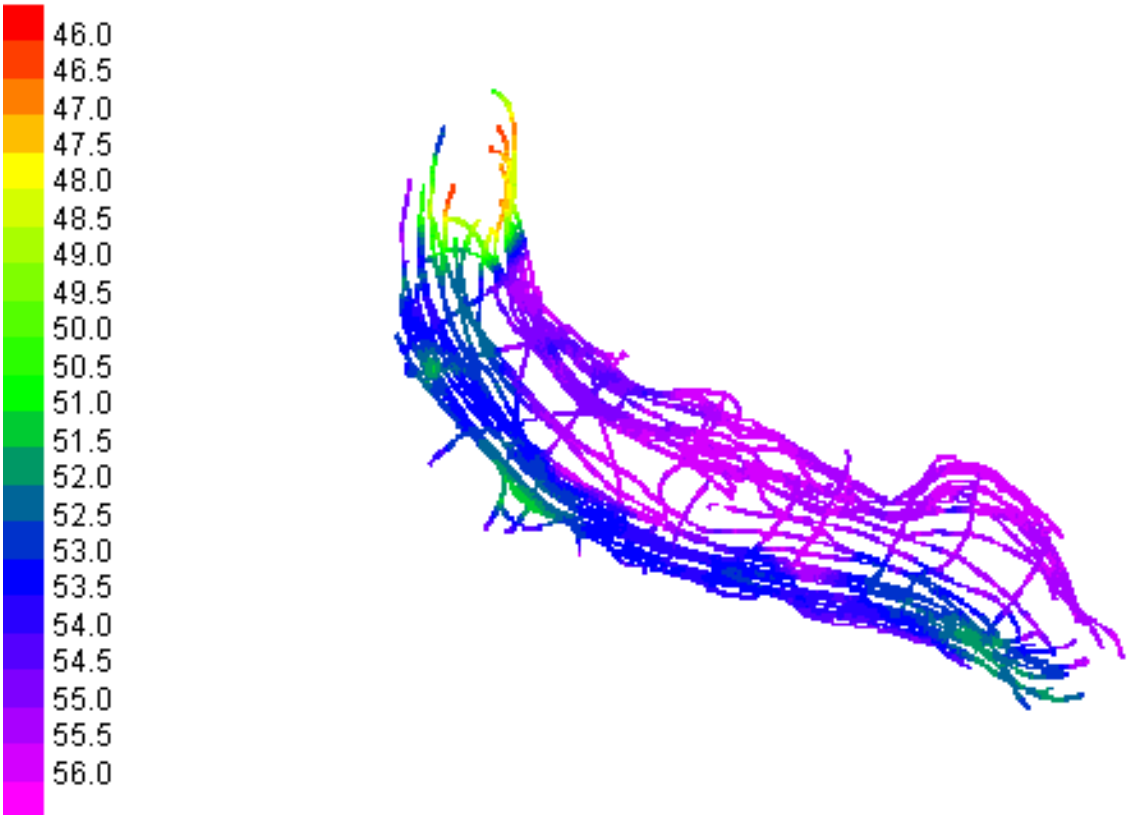

Figure 6.1 : Survey lines collected during the bathymetric survey

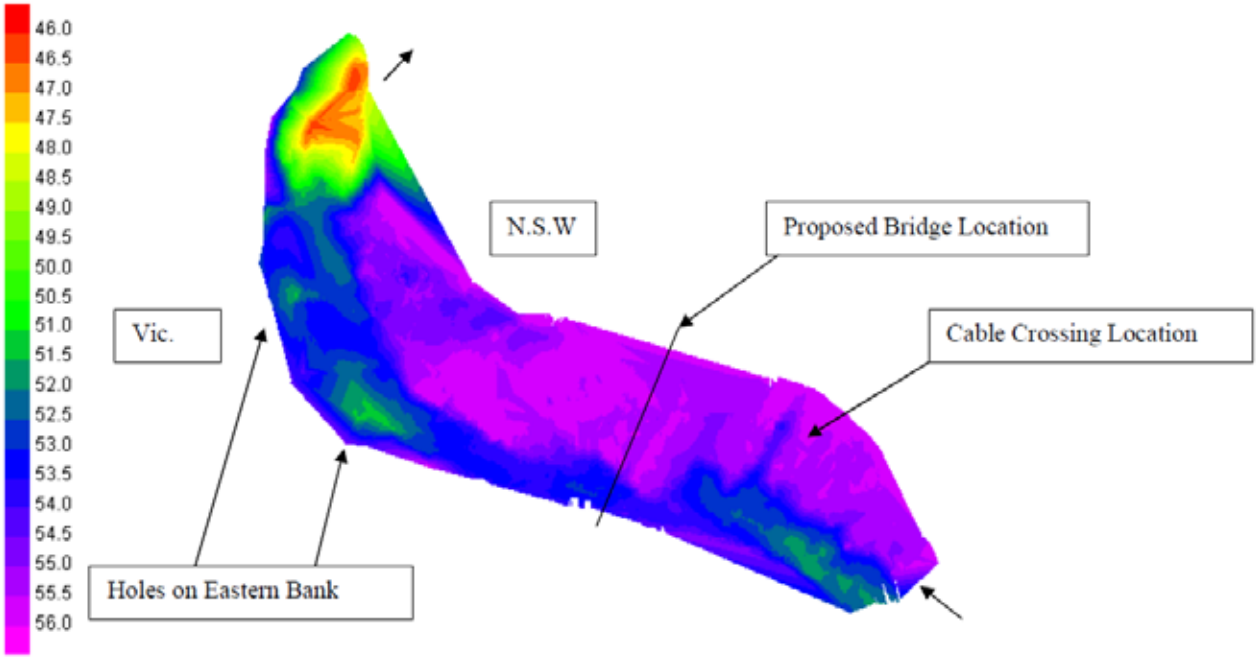

Figure 6.2 : Tin model developed from survey data (arrows indicate direction of flow)

Figure 6.3 highlights the holes located on the Victorian side of the river (west bank). Cross sectional data generated from the Tin model (Figure 6.2) highlight the depth of the cable trench located upstream of the proposed bridge which is approximately one metre deep. The two holes adjacent to the Victorian bank of the river (west bank) are 1-2 m deep.

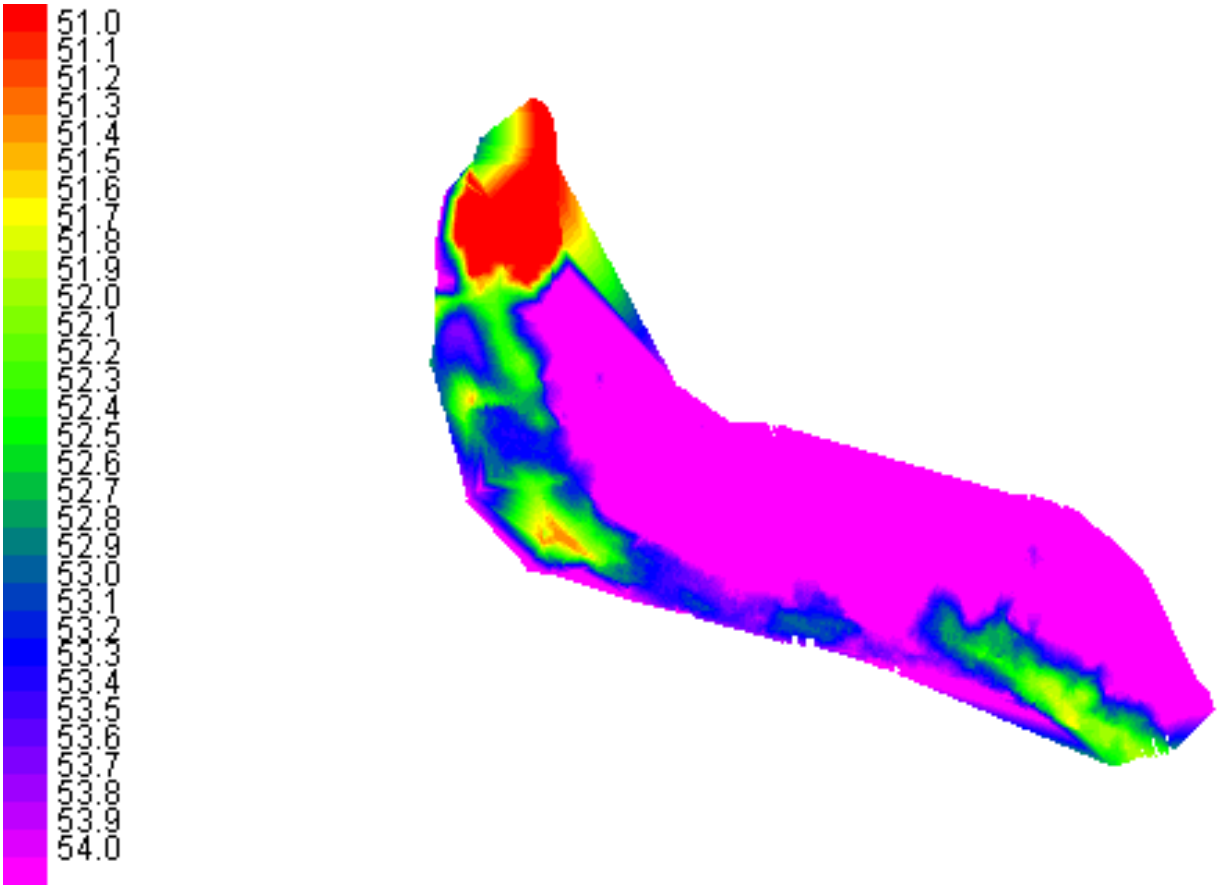

Figure 6.3 : Highlight of deep holes along the west bank

6.3.1 Technical conclusions from the bathymetric survey

No conclusions or interpretations regarding cultural heritage significance has been included. Based on the output from the sonar survey:

- The Murray Rivers substrate is heavy clay around the location of the proposed bridge based on our site visit
- There is a large scour hole downstream of the proposed bridge location
- There are two smaller features (holes) on the Victorian side of the river
- The cabling trench that was created at the crossing location upstream of the proposed bridge location is still visible
- There are minimal bathymetric features on the NSW side of the river.

6.3.2 Archaeological interpretations

The bathymetric survey did not identify features that can be positively determined to be fish traps. This does not infer that there are no fish traps within this section of the Murray River, it does indicate that their presence may be too subtle for the resolution of the equipment to separate from the natural river bed surface. However, we can infer several things rearding the location of any fish traps from these results. They are as follows:

- It is unlikely that the fish traps are present upon the clay bar that stretches across most of the river bed
- It is also unlikely that fish traps are present within the deep holes, however they may be on the edges
- It is most likely that the fish traps will be located where the river channel is a constricted passageway
- This narrows down the most likely area for the fish traps to be present to a 100 m long stretch of river bed close to the eastern bank of the Murray River that is 10-15 m wide (Figure 6.4).

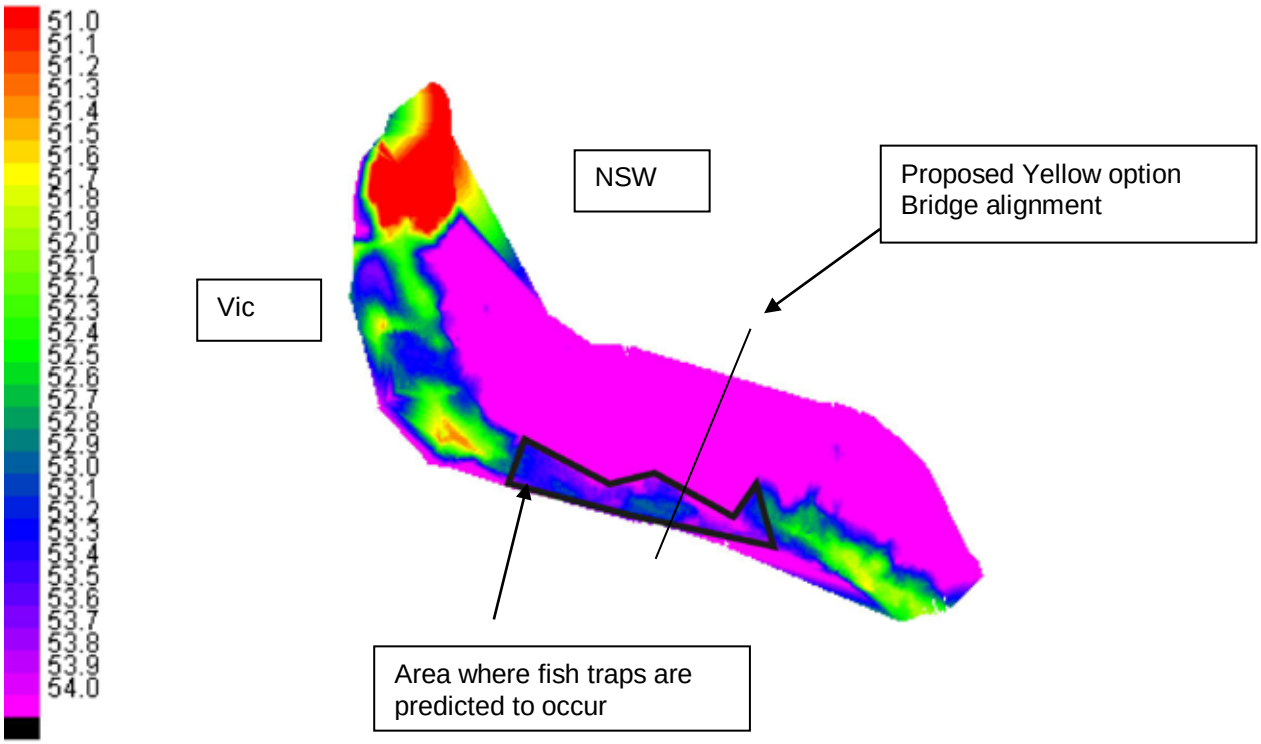

Figure 6.4 : Map showing the area where fish traps are most likely to be located

7. Significance assessment

7.1 Assessment and discussion of significance

All Aboriginal cultural heritage sites identified near or within the project area will be assessed against the significance criteria outlined below.

7.1.1 Basis for assessment

A significance assessment is made up of several significance criteria that attempt to define why a site is important. Such assessment recognises that sites may be important for different reasons to different people, and even at different times. The assessment of Aboriginal cultural heritage in this assessment is based upon the four values of the *Australia ICOMOS Burra Charter* (ICOMOS 1999).

- Social values
- Historical values
- Scientific values
- Aesthetic values

Each of these values is assessed below, and an overall significance is assigned based on an average across the values. This is inherently a reductive process, and oversimplifies what is important for different reasons to a range of different stakeholders, but is a necessary process in being able to create comparative values between sites. The significance of each site ultimately informs Roads and Maritime on the management of sites and places.

7.1.2 Social significance

The significance of a site does not relate only to its scientific or research value. Aboriginal people's views on the significance of archaeological sites are usually related to traditional, cultural and educational values, although some Aboriginal people also value any scientific information a site may be able to provide.

Aboriginal cultural significance was assessed from consultation with the nominated Aboriginal site officers and other members of the RAPs, including Elders, both during and following field assessments. It should be noted that Aboriginal significance assessed in this manner may not reflect the views of all members of the community.

7.1.3 Historic significance

The historic value of a site is determined through its association with historically important people, events or activities.

7.1.4 Scientific significance

Research potential or scientific significance of an Aboriginal archaeological site can be assessed by utilising the criteria set out below. Each criteria is rated as low, moderate or high.

- **Site integrity –** The integrity of a site refers to its state of preservation, or condition. A site can be disturbed through a number of factors including natural erosion processes, destructive land use practices or repeated use of a site in the past by both humans and animals.
- **Site structure –** Structure refers to a site's physical dimensions, that is, size and stratigraphy. A large site or a site with stratified deposits has more research potential than small sites and/or surface scatters. Sometimes however, specific research questions may be aimed at smaller sites in which case they would be rated at a higher significance than normal. Site structure cannot be assessed for scarred trees or isolated artefacts.

- **Site contents –** This category refers to the range and type of occupation debris found in a site. Generally, complex art sites, extensive quarries with associated debris and surface sites that contain a large and varied amount of organic and non-organic materials are considered to have greater research potential than those sites with small, uniform artefacts, single motif art sites and small quarries with little or no debris. For scarred trees, contents may refer to the size and type of scar and/or how many scars there are on the one tree.
- **Representativeness and rarity –** Representativeness refers to how much variability exists between the subject site and others inside or outside the subject area. It also considers the types of sites already conserved in the area and how much connectivity between sites exists. Rarity considers how often a particular site type occurs in an area. Assessment of representativeness and rarity requires some knowledge of the background archaeology of the area or region in which a study is being undertaken. Rarity also relates to whether the subject site or area is important in demonstrating a distinctive way of life, custom, process, land use, function or design which is no longer practiced (OEH 2011:10).

7.1.5 Aesthetic significance

This refers to the 'sensory' value of a place, and can include aspects such as form, texture, and colour, and can also include the smell and sound elements associated with use or experience of a site (ICOMOS 1999). Aesthetic significance can be closely linked to the social value of a site.

7.1.6 Scale of significance

Significance of sites and places is assigned to different geographic scales, such as local, regional, State and National, appropriate to the scale of importance. For example, Uluru is significant at a National (and World) scale, whereas a local historic building may only be significant on a local scale. This is reflected in the variety of heritage lists held by local councils, up to State and Federal government. In scale of significance, the criteria presented above as well as educational or research potential, representativeness and rarity (Australian ICOMOS 1999) have been considered in determinations of significance.

Each site has been assessed and its scale of significance has been identified as being of importance at the State, regional or local level. Each site has also been given a grading of its significance overall based on the grading of each of the individual values. The gradings of low, moderate and high have been assigned comparatively across the sites investigated in the region.

7.2 Statement of significance

There is a strong conviction that fish traps are located within the projects boundary. A statement of significance for the fish traps will be sought for the Aboriignal community.

8. Impact assessment

There are currently no known impacts to Aboriginal cultural heritage. The potential exists for fish traps to be impacted upon by the yellow option. A predicted location of where the fish traps are most likely to be has been determined, assessment of the likeliehood of impact to this area can only be determined at the detailed design stage of the project.

9. Recommendations

9.1 Introduction

To manage impacts to Aboriginal archaeological and cultural heritage the broad objectives for the project are:

- Avoid or minimise impacts on significant cultural heritage
- Preserve as much cultural heritage in its original environment as possible
- Maintain cultural heritage through preservation, salvage and research

The first principle of cultural heritage management is impact avoidance, followed by minimisation before mitigation. If it is not possible to completely avoid a site, then mitigation is required for parts of site that are likely to be impacted.

9.2 Test excavation

Further investigation through sub-surface testing is required in order to assess the potential impacts to Aboriginal cultural heritage values. Currently no registered or known Aboriginal cultural heritage will be impacted by the project, and therefore an AHIP is not a requirement of the project. The identified PAD is a sandhill landform that covers the majority of the project area. This PAD is to be tested within the selected option in accordance with Requirement 16 of the Code of Practice.

9.2.1 Aims

The aims of the sub-surface testing are as follows:

- To undertake sub-surface testing along the selected option within the PAD area in order to determine whether the project will harm Aboriginal cultural heritage material
- To undertake sub-surface testing within the PAD area located within the site facilities area in order to determine whether the project will harm Aboriginal cultural heritage material
- To consult with Aboriginal stakeholders in regards to this work and the area being tested

Preliminary management recommendations and Aboriginal cultural (social) significance may be discussed informally in the field during this time; however recommendations will be discussed more formally at a post-excavation AFG meeting.

9.2.2 Methodology

Sub-surface test excavation is proposed for the preferred option for the Tooleybuc Bridge. The methodology implemented during the test excavations will be in line with Requirement 16 of the Code of Practice (test excavations) and would comprise:

- Two archaeologists, and four Aboriginal site officers undertaking the excavations
- Excavation units will only be placed within the preferred option construction footprint
- Excavation units will generally be placed along transects or grids at approximately 15 metre intervals, depending upon observed disturbance of the area, and the predicted sensitivity of the landform. Excavation units will be placed at closer intervals where required to further investigate the extent of an identified site; however separation of test units must be separated by a minimum of five metres (Requirement 16a (2)). The exact placement and number of excavation units will be determined by the supervising archaeologist in consultation with site officers for the relevant RAPs
- Excavations will include a series of 0.50 m x 0.50 m test-pits by hand tools (eg trowel and shovel) (Requirement 16a (3 and 4))
- Excavation units may be combined in order to expand the understanding of soil characteristics (Requirement 16a (5))

- Excavation will be in a controlled manner, with the first test-pit for each test-area in 50 mm spits (depth units), and subsequent test-pits in that test-area in 50 mm – 100 mm spits (depending on soil layers identified) (Requirement 16a (7))
- All material excavated from the test excavation units will be sieved using approximately 5 mm aperture wire-mesh sieve (Requirement 16a (8))
- Excavation units will be excavated until the culturally sterile layer is reached (generally the clay layer) or until Work Health and Safety (WH&S) restrictions force a cessation of further excavation at that location (Requirement 16a (9))
- Photographic and scale-drawn records of the stratigraphy/soil profile, features and informative Aboriginal objects will be made for a representative sample of excavation points. This includes recording of the stratigraphy/soil profile of each distinct landform sampled and of each test excavation unit in which an archaeological feature or Aboriginal object is identified
- Soil colour and type, texture, acidity and stratification will be recorded to increase understanding of the sub-surface conditions of the preferred option and how they may relate to site formation processes influencing the presence and condition of sub-surface archaeological deposits (Requirement 16a (11))
- Soil colours will be recorded from a representative sample of soil strata, using a Munsell colour chart to ensure consistency (Requirement 16a (11))
- Soil acidity will be measured for a representative sample of soil types using a pH testing kit (Requirement 16a (11))
- The location of each excavation unit will be recorded using a mobile GIS Unit (Trimble® GeoXH™ GeoExplorer® or the Trimble® Nomad). This will allow for the spatial datasets collected in the field to be post-processed to sub-metre level accuracy once the GPS co-ordinates have been differentially corrected
- Excavations units will be backfilled as soon as practicable (Requirement 16a (12))
- An Aboriginal Site Impact Recording form (ASIRF) will be completed and submitted to the AHIMS Registrar if a registered PAD or site is investigated (Requirement 16a (13))
- If suspected human skeletal remains are encountered, works potentially affecting the find would cease immediately and the Roads and Maritime's Standard Management Procedure – Unexpected Heritage Items would be followed
- Any Aboriginal objects that are uncovered during test excavation will be analysed on site and stored within a secure temporary storage location pending determination of the long-term management of the Aboriginal objects. The location of the secure temporary storage location will be submitted to AHIMS with a site update record card for the site(s) in question. The long-term management of these artefacts will be decided upon in consultation with Aboriginal stakeholders and Roads and Maritime and presented in an updated version of this ACHAR
- The results of the test excavation are to be reported in an updated version of this ACHAR
- In the event that non-Aboriginal objects are discovered at any time, protocols according to the *Heritage Act 1977* will be followed.

9.3 Fish trap assessment

Literature reviews have been unable to confirm, nor deny, the presence of fish traps within the Murray River at Tooleybuc. What is known is that high clay-bars exist along this stretch of the Murray. The constriction of the river channel by the clay bar provides opportunities for the entrapment of fish at low water-levels. It is feasible that fish traps are present within the Murray River at Tooleybuc due to this topography of the river. The ethnographic observations made by early local settlers of the local Wadi Wadi people have also shown the importance of the fishing economy to Aboriginal people, and the variety of elaborate and constructive techniques that were used to capture fish. The RAP nominated knowledge holders have also provided information supporting the presence of fish traps within the Murray River at Tooleybuc.

Nominally the presence of fish traps within the Murray River at Tooleybuc has been confirmed at the meeting with the RAP nominated knowledge holders. Whether the extent of the fish traps encroaches upon the

construction footprint for the yellow option requires further confirmation as locational details are hazy. However the importance of big fishing holes and a channel within the river bed was conveyed at this meeting. Fish trap or weir constructions within this channel were considered likely to occur in association with these features.

The bathymetric survey did not detect any underwater features that could be positively interpreted as fish traps. However, the bathymetric survey did map the river bed and from this data a constricted channel (approximately 100 x 15 m in extent), close to the west bank of the Murray River was identified as the most likely location where any fish traps would occur. It is recommended that this area should be avoided during the detailed design stage of the project.

The alternative option to substantiate the presence, location and extent of fish traps within the yellow option alignment would be an archaeological assessment of the river bed during a period of low water-levels, such as a drought. As this option may take years, possibly decades to occur, avoidance of the area predicted to be the most likely location of the fish traps from the interpretation of the bathymetric survey results, is the most practicable recommendation in avoiding harm to any fish traps.

9.4 Procedure for unexpected finds

As for all Roads and Maritime projects, the procedure for unexpected finds must be followed should any unexpected heritage item be made during any works. This procedure applies to the discovery of any unexpected heritage item (usually during construction),where Roads and Maritime does not have approval to disturb the item (eg AHIP, or investigations under the Code of Practice) or where safeguards for managing the disturbance (apart from this procedure) are not contained in the environmental impact assessment.

The below procedure is consistent with Roads and Maritime *Standard Management Procedure: Unexpected Heritage Items*, (Roads and Maritime 2015), but summarises several details – the full document should be consulted in the instance of an unexpected find.

If Aboriginal cultural heritage is found during construction activities, the following steps would be followed:

- Stop work in the immediate area of the find and notify the project manager
- The project manager should arrange for a number of photographs that capture the general context and specific details of the find to be taken, and establish a ‘no-go zone’ to protect the find with appropriate high-visibility fencing – no further interference must occur with the find or within the protected area. Only construction that is required to comply with occupational and environmental health and safety standards and/or to protect the cultural heritage would occur. Inform all site personnel of this protected area
- The project manager should inform the relevant Roads and Maritime regional environment staff, Senior Environmental Specialist (Heritage), and the Aboriginal Cultural Heritage Advisor (South West Region)
- If the find is reasonably suspected to be human remains, proceed directly to notifying local police.
- A suitably qualified and experienced archaeologist should be engaged to inspect the find, conduct a preliminary assessment and prepare an archaeological management plan
- The Aboriginal Cultural Heritage Advisor (South West Region) or the archaeologist will also make contact with the registered Aboriginal parties to notify them of the find and invite them to take part in the site inspection and assessment of the finds, as well as taking part in preparing any management strategies and plans for any objects discovered
- Subject to the archaeologist’s assessment, work can recommence at a set distance from the find, determined by the archaeologist. This is to protect any other archaeological material that may exist in the vicinity, which has not yet been uncovered – existing protective fencing may need to be adjusted to reflect the newly assessed protected area. No works are to take place within this area until further written notice from the archaeologist/project manager
- The archaeologist must prepare an archaeological management plan in accordance with the *Standard Management Procedure: Unexpected Heritage Items* (Roads and Maritime 2015) shortly after the site inspection

- In preparing the management plan, the archaeologist with the assistance of Roads and Maritime regional environment staff must review the Construction Environmental Management Plan, any heritage sub-plans, and any heritage assessment documentation (eg this report). Discussions should occur with design engineers to consider if re-design options exist and are appropriate.
- The management plan must be submitted to the project manager as a letter, brief report, or email within two working days.
- Notify OEH to inform them of any find (eg submit an AHIMS site card), including the archaeological management plan.

· Review the archaeological management plan and clarify regulator expectations around written authorisation to commence project work. This may relate to situations where human remains are found or when they request to review preliminary archaeological excavation reports or heritage assessments prior to the resumption of Roads and Maritime project work. Where this is not explicit in heritage approval conditions, expectations should be clarified directly with the regulator. Update the archaeological management plan, including mapping where necessary

· Implement the archaeological management plan

· Ensure all archaeological work has been completed prior to Roads and Maritime project work resuming – written clearance to resume work from the archaeologist, Roads and Maritime regional environment staff, and if necessary OEH.

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Appendix A. Glossary

Aboriginal cultural heritage: The material (objects) and intangible (mythological places, dreaming stories etc) traditions and practices associated with past and present day Aboriginal communities.

Aboriginal object: Any deposit, object or material evidence (not being a handicraft made for sale), including Aboriginal remains, relating to the Aboriginal habitation of NSW.

Aboriginal place: Any place declared to be an Aboriginal place under s.94 of the *National Parks and Wildlife Act 1974*.

Aboriginal stakeholders: Members of a local Aboriginal land council, Aboriginal groups or other Aboriginal people who have registered their interest with the Roads and Maritime to be consulted about a proposed Roads and Maritime project or activity

Aeolian: Aeolian processes refer to the wind's alteration of the landscape.

AFG: An acronym for 'Aboriginal focus group'. This refers to organised meetings where Aboriginal stakeholders (who have registered their interest) can be consulted on Roads and Maritime projects.

AHIMS: Acronym for **'**Aboriginal heritage information management system'. AHIMS is a register that contains information about NSW Aboriginal heritage, and it is maintained by DECCW.

Alluvium: A deposit left by the flow of water. It can include sediments of gravel, mud or sand.

Archaeological site: A location that has evidence of past Aboriginal activity (both material and mythological/ritual).

Area of archaeological sensitivity: A part of the landscape that contains demonstrated occurrences of cultural material. The precise level of sensitivity will depend on the density and significance of the material.

Artefact: An item of cultural material created by humans.

Artefact scatter: Where two or more stone artefacts are found within an area of potential archaeological deposit or a site.

Bioturbation: Disturbance in soil profiles caused by living organisms, such as ants and roots.

Burials: Burial sites may be composed of a single burial, isolated individual in a general area, or cemeteries containing many individuals.

Carved trees: Carved trees exhibit evidence of purposeful removal of bark, but differ from scarred trees in that geometric patterns and figures are cut into the tree. The motifs of the mid-north coast region are mostly linear geometric patterns (Craib and Bonhomme 1995: 27).

Chert: A fine grained rock composed of cryptocrystalline silica. It exhibits a range of textures and colours including red, green or black. Chert is easy to work and retains a sharp edge for an extensive period of time before resharpening is required. It has a low to medium fracture toughness.

Clay: A type of sediment with particles less than 4 microns in size and that is composed of clay minerals (Keary 2001: 49).

Cultural heritage assessment report: A report combining an Aboriginal archaeological assessment and Aboriginal cultural assessment, required to be submitted to DECCW for any Part 6 *National Parks and Wildlife Act 1974* approval or prepared for projects under Part 3A of the *Environmental Planning and Assessment Act 1979* where Aboriginal cultural heritage is identified as a key issue.

Easting: This is a measurement used to determine location. The easting is the x-coordinate and relates to the vertical lines on a map, which divide east to west. It increases in size when moving further east.

Ecotone: A term used to describe the transition area between two land systems.

Exposure: The level of ground exposure is based on the whether the landform is eroding, aggrading or stable.

Flake: A stone piece removed from a core by percussion (striking it) or by pressure. It is identified by the presence of a striking platform and bulb of percussion, not usually found on a naturally shattered stone.

Floodplain: The area covered by water during a major flood and/or the area of alluvium deposits laid down during past floods.

Fluvial: Pertaining to or produced from a river.

Geomorphic: Relating to the structure, shape and development of landforms.

Hammerstone: A piece of stone used to knock flakes from a core. Evidence of pitting or bashing can usually be seen along some part of the margins of this artefact.

Holocene: The Holocene epoch forms part of the late Quaternary period and extends from about 11,000 years ago to the present day.

***In situ*:** A description of any cultural material that lies undisturbed in its original point of deposition.

Layer: In stratigraphy, it is used to describe a horizon (soil, rock, charcoal) that is distinct from its surrounds.

Land system: Description for an area of land based on an assessment of a series of environmental characteristics including geology, geomorphology, climate, soils and vegetation.

Midden: The term midden is a Danish word meaning a mound of kitchen refuse. In archaeological terms , a midden refers to an accumulation of shell deposited after people had collected and eaten shellfish. These could contain estuarine and fresh water shellfish species in addition to faunal remains, stone artefacts and charcoal from cooking fires. In northern NSW in many areas, burials have been recorded in direct association with midden deposits.

Munsell colour: This is a colour code chart used to standardise colour specifications.

Northing: This is a measurement used to determine location. The northing is the y-coordinate and relates to the horizontal lines on a map, which divide north to south. It increases in size when moving further north.

pH: A measure of the acidity or alkalinity of the soil. Neutral is indicated by a pH of 7, with strongly acidic being 0 and strongly basic (alkaline) being 14. The ‘pH’ is said to stand for ‘potential of hydrogen’.

Pleistocene: The Pleistocene is an epoch within the early Quaternary period, extending from about 1.6 million years ago to about 11,700 years ago. The end of the Pleistocene is marked by the last of the great ice ages.

Quaternary: This is a geological time period spanning approximately 2 million years (to the present). It includes the two epochs, the Pleistocene and the Holocene.

Resource zone: An area of the landscape or part of the environment that provides a resource (be it food or material items such as a source of stone for making artefacts) for Aboriginal people. Swamps are good examples of rich resource zones.

Sand: A material composed of small grains (0.625-2.0 mm) (Keary 2001: 233). Sand is formed from a variety of minerals and rocks, but commonly contains silica, such as quartz.

Scarred trees: Trees that feature Aboriginal derived scars are distinct due to the scar's oval or symmetrical shape and the occasional use of steel, or more rarely, stone axe marks on the scar's surface. Scarred trees are identified by the purposeful removal of bark for use in the manufacture of artefacts such as containers, shields and canoes. The bark was also used for the construction of shelters. Other types of scarring include toeholds cut in the trunks or branches of trees for climbing purposes and the removal of bark to indicate the presence of burials in the area.

Sediment: Is a mineral that has undergone erosion or weathering and that is then deposited via aeolian, glacial or fluvial means.

Silt: A sediment with grains ranging from 4.0-62.5 microns in size (Keary 2001: 245). It can be found as a soil or in water.

Silcrete: Soil, clay or sand sediments that have silicified under basalt through groundwater percolation. It ranges in texture from very fine grained to coarse grained. At one extreme it is cryptocrystalline with very few clasts. It generally has characteristic yellow streaks of titanium oxide that occur within a grey and less commonly reddish background. Used for flaked stone artefacts.

Spit: Refers to an arbitrarily defined strata of soil removed during excavation (often 50 to 100 mm in depth).

STP: Acronym for 'shovel test pit'. Generally, this refers to a 0.5 m x 0.5 m pit dug by shovel, trowel or mattock. STPs are usually laid out on a grid pattern and the soil is excavated from the pit in a controlled manner, using 50-100 mm spits.

Stratification: The way in which soil forms in layers.

Stratigraphy: The study of soil stratification (layers) and deposition.

Sub-surface testing: An archaeological method used to determine the cultural sensitivity of an area by excavating small (0.5 m x 0.5 m) pits and recording the stratigraphy, material remains (such as stone tools) and disturbance.

Survey: In archaeological terms, this refers to walking over a surface while studying the location of artefacts and landmarks. These are then recorded and photographed.

TP: Acronym for 'test pit'. Generally, this refers to a 1 m x 1 m or 2 m x 1 m pit dug by shovel, trowel or mattock. Test pits were used to determine the extent of possible features (such as shell middens) in a controlled excavation of 50 mm spits.

Visibility: Refers to the degree to which the surface of the ground can be observed. This may be influenced by natural processes such as wind erosion or the character of the native vegetation, and by land use practices, such as ploughing or grading. It is generally expressed in terms of the percentage of the ground surface visible for an observer on foot.

Appendix B. AHIMS search results

Office of Environment & Heritage NSW

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : Tooleybuc CHMP
Client Service ID : 150019

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
53-2-0001	Murray River Koraleigh	AGD	54	717530	6109864	Open site	Valid	Burial : -, Earth Mound : -, Hearth : -	Burial/s,Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0002	Lake Jileroo Murray River	AGD	54	717530	6109864	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0003	Koraleigh (Murray River)	AGD	54	716616	6108036	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	B Vale					Permits		
53-2-0004	Koraleigh Murray River	AGD	54	718100	6108600	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0005	Koraleigh	AGD	54	716616	6108036	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0006	Piangil Tooleybuc Tooleybuc 10	AGD	54	715702	6120833	Open site	Valid	Shell : -, Earth Mound : -, Artefact : -	Midden,Open Camp Site	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0007	Lake Coomaroop Lake Coomaroop 3	AGD	54	715428	6118822	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0008	Tooleybuc Tooleybuc 1	AGD	54	714788	6121747	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0009	Lake Coomaroop Lake Coomaroop 15	AGD	54	714788	6121747	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0010	Tooleybuc Tooleybuc 8	AGD	54	714331	6120376	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0011	Tooleybuc Tooleybuc 7	AGD	54	714331	6120376	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0012	Tooleybuc	AGD	54	714331	6120376	Open site	Valid	Earth Mound : -, Shell : -, Artefact : -	Midden	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0014	Lake Coomaroop Lake Coomaroop 14	AGD	54	714331	6119919	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051

Report generated by AHIMS Web Service on 07/10/2014 for Rani Attwood for the following area at Search using shape-file redline_polygon_38.SHP with a buffer of 0 meters. Additional Info : Aboriginal heritage constraints assessment to inform VIC and NSW heritage requirements.. Number of Aboriginal sites and Aboriginal objects found is 73

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Extensive search - Site list report

Your Ref Number : Tooleybuc CHMP
Client Service ID : 150019

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	ASRSYS					Permits		
53-2-0016	Lake Coomeroop	AGD	54	714971	6119005	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0017	Lake Coomaroop Lake Coomaroop 8	AGD	54	714788	6119005	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0018	Lake Coomaroop Lake Coomaroop 5	AGD	54	714788	6119005	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0019	Lake Coomaroop	AGD	54	714788	6119005	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0020	Lake Coomaroop Lake Coomaroop 4	AGD	54	714788	6119005	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0021	Lake Coomeroop 2	AGD	54	714788	6119005	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0022	Lake Coomeroop 1	AGD	54	714788	6119005	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0023	Lake Coomaroop;Lake Coomaroop 16;	AGD	54	714057	6120833	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0024	Tooleybuc 2	AGD	54	713874	6122661	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0025	Lake Coomaroop,	AGD	54	714331	6119919	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0026	Tooleybuc 9	AGD	54	714331	6120833	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0027	Tooleybuc 5	AGD	54	714331	6121290	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0028	Lake Coomaroop Lake Coomaroop 20	AGD	54	713874	6119919	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : Tooleybuc CHMP
Client Service ID : 150019

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	ASRSYS					Permits		
53-2-0029	Lake Coomaroop.	AGD	54	713874	6119919	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0030	Lake Coomaroop Lake Coomaroop 25	AGD	54	713874	6119919	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0031	d	AGD	54	714250	6117250	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0032	Murray River.	AGD	54	713874	6117999	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0033	Tooleybuc.	AGD	54	712960	6120833	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0132	Limburgia 2	AGD	54	716068	6111144	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0133	Limburgia 3	AGD	54	716068	6111144	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0134	Mardale1	AGD	54	715520	6111144	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0135	Mardale2	AGD	54	715245	6111144	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0136	Yworri1	AGD	54	715337	6112424	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0137	Yworri2	AGD	54	715337	6112424	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0138	Yworri3	AGD	54	715337	6112424	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		

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Client Service ID : 150019

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
53-2-0139	Yworri4	AGD	54	715337	6112424	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0140	YworriS	AGD	54	715337	6112424	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0141	Yworri6	AGD	54	715200	6111700	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0142	Kersleigh	AGD	54	716616	6108036	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0121	Redwood Park 1	AGD	54	716799	6110047	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0122	Redwood Park 2	AGD	54	717073	6109773	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0123	Lake Jileroo 1	AGD	54	717622	6111144	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0124	Lake Jileroo 2	AGD	54	716342	6110321	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0125	Lake Jileroo 3	AGD	54	716342	6110138	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0126	Lake Jileroo 4	AGD	54	716342	6110138	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0127	Lake Jileroo 5	AGD	54	716342	6110138	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0128	Lake Jileroo 6	AGD	54	716342	6110138	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		

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Office of Environment & Heritage NSW

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : Tooleybuc CHMP
Client Service ID : 150019

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
53-2-0129	Lake Jilercc 7	AGD	54	716342	6110138	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0130	Lake Jilercc 8	AGD	54	716799	6110778	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0131	Limburgia 1	AGD	54	716068	6111144	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0034	Lake Coomaroop Lake Coomaroop 13	AGD	54	712960	6120833	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0035	Lake Coomaroop 23	AGD	54	713417	6119919	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0036	Tooleybuc	AGD	54	712960	6122661	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0037	Tooleybuc.	AGD	54	715702	6121747	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0038	Tooleybuc,	AGD	54	715702	6119005	Open site	Valid	Earth Mound : -, Shell : -, Artefact : -	Midden	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0039	Tooleybuc 11	AGD	54	715702	6119005	Open site	Valid	Earth Mound : -, Shell : -, Artefact : -	Midden	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0040	Tooleybuc (Lake Coomaroop)	AGD	54	715702	6119005	Open site	Valid	Earth Mound : -, Shell : -, Artefact : -	Midden	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0041	Tooley Landing.	AGD	54	715702	6114434	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0042	Lake Coomaroop 27	AGD	54	716616	6120833	Open site	Valid	Earth Mound : -, Shell : -, Artefact : -	Midden	1051
	Contact	Recorders	ASRSYS					Permits		

Report generated by AHIMS Web Service on 07/10/2014 for Rani Attwood for the following area at Search using shape-file redline_polygon_38.SHP with a buffer of 0 meters. Additional Info : Aboriginal heritage constraints assessment to inform VIC and NSW heritage requirements.. Number of Aboriginal sites and Aboriginal objects found is 73

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : Tooleybuc CHMP
Client Service ID : 150019

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
53-2-0043	Tooleybuc Minnie Bend	AGD	54	712046	6119919	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0044	Murray River Tooleybuc	AGD	54	713874	6119919	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0045	Lake Coomaroop 20	AGD	54	713874	6120833	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0048	Tooleybuc 4;	AGD	54	714331	6121290	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0049	Lake Coomaroop-	AGD	54	713874	6119005	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0050	Lake Coomaroop:	AGD	54	714331	6119919	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0013	Lake Coomeroop	AGD	54	714331	6119919	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0153	TOOLEYBUC BURIAL NO1	AGD	54	715315	6118828	Open site	Valid	Burial : 1, Shell : 1		
	Contact Gerry Saals	Recorders	Mr.Lawrence Clarke					Permits		
53-2-0046	Lake Coomaroop 21	AGD	54	713874	6120833	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0047	Lake Coomaroop 13	AGD	54	714331	6120833	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	1051
	Contact	Recorders	ASRSYS					Permits		
53-2-0166	Lake Coomeroop Ring Tree 1	GDA	54	714912	6121458	Open site	Valid	Modified Tree (Carved or Scarred) : 1		103066
	Contact	Recorders	Doctor.Darran Jordan,AECOM Australia Pty Ltd (previously HLA-Envirosciences)					Permits		

Report generated by AHIMS Web Service on 07/10/2014 for Rani Attwood for the following area at Search using shape-file redline_polygon_38.SHP with a buffer of 0 meters. Additional Info : Aboriginal heritage constraints assessment to inform VIC and NSW heritage requirements.. Number of Aboriginal sites and Aboriginal objects found is 73

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Office of Environment & Heritage

AHIMS Web Services (AWS)
Search Result

Your Ref Number : Tooleybuc CHMP

Client Service ID : 150019

Jacobs Group (Australia) Pty Ltd - Melbourne

Date: 07 October 2014

PO Box 312 Flinders Lane
Melbourne Victoria 8009

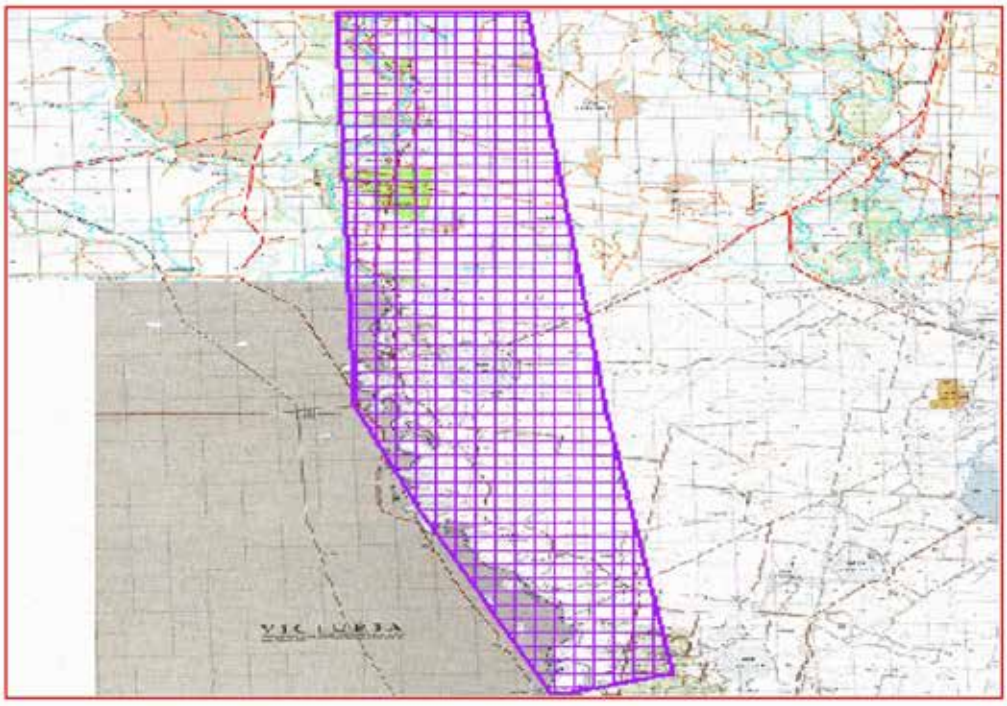
Attention: Rani Attwood

Email: rattwood@globalskm.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Search using shape-file redline_polygon_38.SHP with a buffer of 0 meters. Additional Info : Aboriginal heritage constraints assessment to inform VIC and NSW heritage requirements, conducted by Rani Attwood on 07 October 2014.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

73	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

Appendix C. Consultation log

Table C.1 : Consultation log for the Tooleybuc Bridge Replacement project

Date	Consultation method	From	To	Summary of details
24 September 2014	Phone	Cynthia Pappin	Andrew Whitton	Cynthia left msg for me to call re: Tooleybuc bridge (4.02pm)
25 September 2014	Phone	Andrew Whitton	Cynthia Pappin	Andrew phoned Cynthia's number. Did not answer (8.55am). Will try again a little later.
25 September 2014	Phone	Andrew Whitton	Cynthia Pappin	Cynthia was seeking info re: Kyalite bridge (not related to this project).
17 October 2014	Correspondence	Andrew Whitton	All registrants	Invitation to AFG, draft methodologies, agenda, constraints report, site officer application
22 October 2014	Phone message	Ray Kennedy	Andrew Whitton	Ray asked for more Aboriginal site officer application forms to be forwarded to him
22 October 2014	Mail out	Andrew Whitton	Ray Kennedy	3 x copies of the Tooleybuc Bridge (replacement) Aboriginal site officer applications
27 October 2014	Phone	Andrew Whitton	Ray Kennedy	No answer. Left msg that I had mailed out the 3 x Site Officer applications
29 October 2014	Phone	Andrew Whitton	John Kennedy	John just phoned and registered his interest in consultation. I phoned John back and advised the first AFG is on tomorrow at Tooleybuc. John advised his father (Richie) and Uncle Ray were going across.
30 October 2014	Meeting	RMS	Registered Aboriginal parties	First Aboriginal Focus Group meeting held at Tooleybuc Sporting Club.
30 October 2014	Face to face	Greg Kennedy	Andrew Whitton	Greg asked for his name to included/added to the registration for consultation.
31 October 2014	Phone	Andrew Whitton	Ritchie Kennedy	Needed a mailing address to forward registration letter and attachments
31 October 2014	Phone	Andrew Whitton	Steven Firebrace	Needed a mailing address to forward registration letter and attachments
31 October 2014	Mail out	Andrew Whitton	Steven Firebrace, Greg Kennedy, John Kennedy, Wayne Firebrace, Ritchie Kennedy	Registration letters, draft methodologies, Aboriginal cultural heritage constraints report & Aboriginal Site officer application
31 October 2014	Phone	Andrew Whitton	Greg Kennedy	Seeking permission from Greg to pass on his registration to OEH & WWLALC. Greg gave his permission.
6 November 2014	Phone	Andrew Whitton	Wayne Firebrace	I returned a missed call. Went to msg bank. Left a msg for Wayne.
7 November 2014	Phone	Andrew Whitton	Wayne Firebrace	Discussions with Wayne re: site officer application. Wayne advised he will complete and forward in mail. I confirmed with Wayne the closing date 14 Nov. 2014.
7 November 2014	Phone	Wayne Firebrace	Andrew Whitton	Wayne seeking 12 site officer applications. I returned a txt msg advising 12 application in tonites mail.

Date	Consultation method	From	To	Summary of details
7 November 2014	Text message	Felicia Morgan	Andrew Whitton	Felicia phoned and asked to register for consultation and also for 3 x site officer application forms.
7 November 2014	Phone	Wayne Firebrace	Andrew Whitton	Wayne asking whether female site officer applications may be accepted. Advised Wayne applications from women is encouraged, and discussed the need for female applicants in case gender specific areas are identified.
7 November 2014	Phone	Andrew Whitton	All registered Aboriginal parties	Reminder the closing date for comment against the draft methodologies, site officer applications and nominations of relevant Aboriginal cultural knowledge holders closes Friday 14 November 2014.
10 November 2014	Phone	Desmond Farrall	Andrew Whitton	Registration for consultation and site work. Des asked me to email a site officer application to Ritchie Kennedy's email address
10 November 2014	Email	Andrew Whitton	Ritchie Kennedy	As requested from Des Farrall, I emailed the site officer application to Ritchie Kennedy's email.
10 November 2014	Email	Richie Kennedy	Andrew Whitton	Completed sites application for Des Farrell. I acknowledged receipt with a return email.
12 November 2014	Phone	Maria Maher (National Koorie Site Mgt)	Andrew Whitton	Maria asked me to email the Tooleybuc Bridge Aboriginal Sites Officer application form. Done. Maria advised some sorry business in family at the moment. Acknowledged.
14 November 2014	Phone	Daryl Pappin	Andrew Whitton	Daryl advised he been out bush this week, but still wants to put in site officer applications. I acknowledged and advised an extension may be granted until Friday 28 November 2014. Daryl acknowledged. I forwarded an email stating the same.
17 November 2014	Phone	Felicia Morgan	Andrew Whitton	Missed call. Felicia advised she only just received site officer application and would like to submit, but acknowledged closing date last Friday.
18 November 2014	Phone	Andrew Whitton	Felicia Morgan	Confirmed with Felicia the comment period for methodology, site officers etc closed last Friday. Felicia advised she did not receive applications until Monday 17/11. I acknowledged and gave an extension until this coming Friday (21/11).
18 November 2014	Correspondence	Andrew Whitton	All registered Aboriginal parties	Letter seeking nomination of relevant Aboriginal cultural knowledge holders – closes 5/12/14.
18 November 2014	Correspondence	Andrew Whitton	All registered Aboriginal parties	Minutes of 1st AFG, including aerial plan/alignment
21 November 2014	Email	Richie Kennedy	Andrew Whitton	2 x site officer applications

Date	Consultation method	From	To	Summary of details
27 November 2014	Email	Daryl Pappin	Andrew Whitton	Site officer applications
28 November 2014	Phone	Daryl Pappin	Andrew Whitton	Daryl called to confirm receipt of site officer applications, for his family. I confirmed and advised they will be considered as late applications as they due 24/11/14 (extension) . Daryl acknowledged. Daryl also nominated his mother (Mary Pappin) as a knowledge holder for this area. I thanked Daryl for this nomination.
1 December 2014	Phone	Felicia Morgan	Andrew Whitton	Missed Felicia's call
1 December 2014	Phone	Andrew Whitton	Felicia Morgan	Felicia asking about when works may start (site work). I advised Felicia RMS and an archaeologist will be on site next week with 2 selected site officers to conduct a foot survey. I advise Felicia test excavation works will not commence until Feb/March next year (tbc).

Appendix D. Consultation evidence

Transport Roads & Maritime Services

16 May 2014

Harvey Johnston
OEH
PO Box 318
BURONGA NSW 2739

Dear Harvey,

To seek Aboriginal knowledge holders to assist Roads and Maritime Services (RMS) to prepare a cultural heritage assessment report for Tooleybuc Bridge (replacement)

The RMS is seeking the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places within the project area for Tooleybuc Bridge (replacement).

Aboriginal people identified by your agency will be notified of the project and invited to participate in the assessment process as described in OEH's requirements. Please forward the details of relevant Aboriginal people to the RMS before Monday 2 June 2014.

The contact details for this project are:

Andrew Whitton, Aboriginal Cultural Heritage Officer
Roads & Maritime Services
PO Box 484
Wagga Wagga NSW 2650

(02) 69 371647

RMS is working in partnership with VicRoads to identify the preferred location of a replacement Murray River bridge and bridge approaches at Tooleybuc. Tooleybuc is on the NSW / Victorian border about 150km east of Mildura.

The current Tooleybuc Bridge is a single lane lift span timber bridge which opened in 1924. The bridge is on the Mallee Highway linking Balranald in south-western NSW to the Murray Valley Highway in north-western Victoria. The Mallee Highway is a strategic freight route in NSW and Victoria and forms part of an alternative freight route between Sydney and Adelaide.

Three potential options for a replacement bridge and approaches are proposed (see attached):

- A "Yellow" fixed span option downstream of the current bridge.
- A "Blue" lift span option next to the current bridge.
- A "Purple" lift span option upstream of the current bridge.
-

Roads and Maritime Services

1 Simmons Street Wagga Wagga NSW 2650
PO Box 484 Wagga Wagga NSW 2650 DX 5407
www.rms.nsw.gov.au | 13 17 82

This letter forms part of the RMS's commitment to actively identify relevant Aboriginal people in accordance with section 4.1.2 of the Office of Environment and Heritage (OEH) *Aboriginal cultural heritage consultation requirements for proponents* (2010).

Yours sincerely

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 May 2014

NSW Aboriginal Land Council
PO Box 1125
PARRAMATTA NSW 2124

Dear Sir/Madam,

To seek Aboriginal knowledge holders to assist Roads and Maritime Services (RMS) to prepare a cultural heritage assessment report for Tooleybuc Bridge (replacement)

The RMS is seeking the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places within the project area for Tooleybuc Bridge (replacement).

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Yours sincerely

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 May 2014

Wamba Wamba LALC
PO Box 165
SWAN HILL VIC 3585

Dear Debbie,

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Yours sincerely

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 May 2014

Office of the Registrar
NSW Aboriginal Land Rights
PO Box 112
GLEBE NSW 2037

Dear Sir/Madam,

To seek Aboriginal knowledge holders to assist Roads and Maritime Services (RMS) to prepare a cultural heritage assessment report for Tooleybuc Bridge (replacement)

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Yours sincerely

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

JACOBS

NSW GOVERNMENT | Transport Roads & Maritime Services

16 May 2014

National Native Title Tribunal
GPO Box 9973
SYDNEY NSW 2001

Dear Sir/Madam,

To seek Aboriginal knowledge holders to assist Roads and Maritime Services (RMS) to prepare a cultural heritage assessment report for Tooleybuc Bridge (replacement)

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Yours sincerely

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 May 2014

Native Title Services Corp. Ltd
PO Box 2105
STRAWBERRY HILLS NSW 2012

Dear Sir/Madam,

To seek Aboriginal knowledge holders to assist Roads and Maritime Services (RMS) to prepare a cultural heritage assessment report for Tooleybuc Bridge (replacement)

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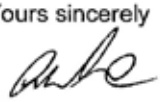

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 May 2014

Murray Local Land Services
PO Box 835
DENILIQUIN NSW 2710

Dear Sir/Madam,

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Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 May 2014

General Manager
Wakool Shire Council
Private Bag 40
Moulemein NSW 2733

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PO Box 484 Wagga Wagga NSW 2650 DX 5407
www.rms.nsw.gov.au | 13 17 82

This letter forms part of the RMS's commitment to actively identify relevant Aboriginal people in accordance with section 4.1.2 of the Office of Environment and Heritage (OEH) *Aboriginal cultural heritage consultation requirements for proponents* (2010).

Yours sincerely

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport
Roads & Maritime
Services

NSW GOVERNMENT

Aboriginal Heritage
Tooleybuc Bridge Replacement

Roads and Maritime Services proposes to build a new Murray River bridge to replace the existing single lane bridge at Tooleybuc, in South West NSW.

Roads and Maritime invites Aboriginal people and Aboriginal groups who would like to be consulted and hold cultural knowledge relevant to determining the significance of Aboriginal objects and places for Tooleybuc Bridge to register their interest with:

Andrew Whitton
Aboriginal Cultural Heritage Officer
1 Simmons Street
Wagga Wagga NSW 2650
Ph: (02) 6937 1647
Email: Andrew.Whitton@rms.nsw.gov.au

Registrations must be received by phone or in writing by **Wednesday 20 August 2014.**

The proposal to replace Tooleybuc Bridge may result in Roads and Maritime:

- Applying for an Aboriginal Heritage Impact Permit (AHIP) under Part 6 of the *National Parks and Wildlife Act 1974*, and/or
- Undertaking investigations in accordance with the *Code of practice for archaeological investigations in NSW 2010*, and/or
- Undertaking an environmental impact assessment under the *Environmental Planning & Assessment Act 1979*.

N45730

22 THE KOORI MAIL, WEDNESDAY, JULY 30, 201

Transport Roads & Maritime Services

16 October 2014

Chairperson
Wamba Wamba LALC
PO Box 2011
SWAN HILL VIC 3585

Dear Lena,

Invitation to participate in the heritage assessment process and to attend an Aboriginal focus group meeting for Tooleybuc Bridge replacement

Roads and Maritime Services (RMS) proposes to build a new Murray River bridge at Tooleybuc. Three options are being considered, including a high level bridge and two lift span options. All options would include road approach embankments and piers built in the river.

RMS believes that the project may have an impact on Aboriginal cultural heritage. As a consequence, the RMS may require approvals under *National Parks & Wildlife Act 1974* and/or the *Environmental Planning & Assessment Act 1979* for this project.

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RMS will be holding an Aboriginal focus group meeting to discuss the management of Aboriginal cultural heritage for this project at Tooleybuc Sporting Club, 30 October 2014, commencing at 2.00pm.. An agenda for the meeting has been enclosed.

Also find enclosed a copy of the draft archaeological methodology and archaeological report for your review and comment.

All comments on the cultural values of the study area, the archaeological methodology and/or archaeological report must be received by 14 November 2014. Comments can be provided in writing, by phone or at the Aboriginal focus group meeting.

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Please advise RMS whether any specific disability assistance may be required to assist in your attendance at the meeting, such as wheelchair access, hearing loops.

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We look forward to your participation in the assessment of this project.

Yours faithfully

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 October 2014

Cynthia Pappin
PO Box 243
Balranald NSW 2715

Dear Cynthia,

Invitation to participate in the heritage assessment process and to attend an Aboriginal focus group meeting for Tooleybuc Bridge replacement

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Yours faithfully

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 October 2014

Gary Pappin
PO Box 243
Balranald NSW 2715

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We look forward to your participation in the assessment of this project.

Yours faithfully

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 October 2014

Daryl Pappin
2 Alfred Close
MILDURA VIC 3500

Dear Daryl,

Invitation to participate in the heritage assessment process and to attend an Aboriginal focus group meeting for Tooleybuc Bridge replacement

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We look forward to your participation in the assessment of this project.

Yours faithfully

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 October 2014

Mary Pappin
2 Alfred Close
MILDURA VIC 3500

Dear Mary,

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We look forward to your participation in the assessment of this project.

Yours faithfully

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 October 2014

Ray Kennedy
69 Riverina Hwy
ALBURY NSW 2640

Dear Ray,

Invitation to participate in the heritage assessment process and to attend an Aboriginal focus group meeting for Tooleybuc Bridge replacement

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We look forward to your participation in the assessment of this project.

Yours faithfully

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 October 2014

Ali Maher
National Koori Site Management
14 Werrang Street
PRIMBEE NSW 2502

Dear Ali,

Invitation to participate in the heritage assessment process and to attend an Aboriginal focus group meeting for Tooleybuc Bridge replacement

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We look forward to your participation in the assessment of this project.

Yours faithfully

Andrew Whitton
Aboriginal Cultural Heritage Officer – South West

Transport Roads & Maritime Services

16 October 2014

Paul Charles
Kullila Site Consultants
14 Werrang Street
PRIMBEE NSW 2502

Dear Paul,

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AGENDA

Transport Roads & Maritime Services

RESOURCE 20

Name of meeting: Tooleybuc Bridge (replacement)

Location of meeting: Tooleybuc Sporting Club

Meeting facilitator: Jeff Hill (Jacobs) & Tim Wilson (RMS)

Date: 30 October 2014 **Time:** 2.00pm

Attendees: Jeff Hill (Jacobs), Tim Wilson (RMS), Kristy Campbell (RMS), Andrew Whitton (RMS), All registrants have been invited to this meeting.

Please read: Draft methodologies, preliminary report prepared by AECOM (RMS Stage 2 investigations)

Please bring: Draft methodologies, preliminary report prepared by AECOM (RMS Stage 2 investigations)

1. Welcome to country/acknowledgement (2.10pm)

Andrew will ask those attending to nominate an appropriate person to undertake "Welcome to Country". If no nomination, Andrew will acknowledge Country, Elders and those attending today.

2. Introductions and apologies (2.15pm)

All

3. The proposal (2.20pm)

Tim Wilson, NSW Roads & Maritime Services

4. Archaeological assessment/draft methodologies (2.30pm)

Jeff Hill, Jocobs

5. Cultural assessment (2.40pm)

All. Discussion points may include:

- Cultural concerns, as advised by registrants ie: will any known Aboriginal places be impacted
- Is a detailed cultural assessment required
- Who are the appropriate knowledge holders
- 28 day review period (to draft methodologies)

6. Site officer applications (2.55pm)

All

7. Review of outcomes/actions (3.00pm)

All

Meeting End

Memo

Page 1 of 1

JACOBS

To	Roads and Maritime Services Registered Aboriginal Parties	Date	10 October 2014
From	Jeffrey Hill	Project No	VW07681
Copy	Vanessa Edmonds		
Subject	**Tooleybuc Bridge Replacement Project - Sub-surface Testing Methodology**		

Tooleybuc Bridge Replacement Project – sub-surface testing methodology

1. Introduction

The intent of this letter is to provide the proposed methodology for archaeological investigations for the Tooleybuc Bridge Replacement Project. The existing Tooleybuc Bridge is currently unable to accommodate High Mass Limit (HML) vehicles. A new bridge at Tooleybuc would cater for HML vehicles increasing the productivity of road freight transport. Three options for the location of the new bridge are being assessed. This methodology has been developed to assess the potential impacts to Aboriginal cultural heritage by the project within these options, with the preferred option yet to be decided.

1.1 Archaeological assessment to date

AECOM (2014) has undertaken a desktop analysis and a foot survey of the three proposed options to meet the requirements of a Stage 2 Aboriginal cultural heritage assessment in accordance with *Roads and Maritime Services procedure for Aboriginal cultural heritage consultation and investigation* (PACHCI).

The survey report that was prepared to document the Stage 2 assessment provided these key findings:

- Shell midden site #52-2-0012, while identified as being located within the study area but outside of the three proposal corridors, it may extend into the three proposal corridors as sub-surface deposits
- Three areas of potential archaeological sensitivity:
  - The banks of the Murray River, up to 200 metres on either side.
  - The banks of Lake Coomaroop, NSW.
  - The area surrounding and including the lunette landform system in NSW.

As sections of all three proposal corridors are located within areas of high archaeological sensitivity, it has been recommended that the preferred option be subject to archaeological sub-surface testing prior to the commencement of ground disturbance works.

2. Aims

The aims of the sub-surface testing will be as follows:

- To undertake sub-surface testing of the preferred option only
- To undertake sub-surface testing within the areas of moderate - high archaeological sensitivity that appear undisturbed

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- To consult with Aboriginal stakeholders in regards to this work and the areas being tested

Preliminary management recommendations and Aboriginal cultural (social) significance may be discussed informally in the field during this time, however recommendations will be discussed more formally at a post-excavation Aboriginal Focus Group meeting.

3. Sub-surface test excavation methodology

Sub-surface test excavation is proposed for the preferred option for the Tooleybuc Bridge replacement. The methodology implemented during the test excavations would comprise:

- Excavation units will only be placed within the preferred option construction footprint
- Excavation units will generally be placed along transects or grids at approximately 15 metre intervals, depending upon observed disturbance of the area, and the predicted sensitivity of the landform. Excavation units will be placed at closer intervals where required to further investigate the extent of an identified site. The exact placement and number of excavation units will be determined by the supervising archaeologist in consultation with site officers for the relevant RAPs
- Excavations will include a series of 0.50 m x 0.50 m test-pits by hand tools (eg trowel and shovel)
- Excavation will be in a controlled manner, with the first test pit for each test area in 50 mm spits (depth units), and subsequent test-pits in that test-area in 50 mm – 100 mm spits (depending on soil layers identified)
- All material excavated from the test excavation units will be sieved using approximately 5 mm aperture wire-mesh sieve (mechanical or manual).
- Excavation units will be excavated until the culturally sterile layer is reached (generally the clay layer) or until Work Health and Safety (WH&S) restrictions force a cessation of further excavation at that location.
- Photographic and scale-drawn records of the stratigraphy/soil profile, features and informative Aboriginal objects will be made for a representative sample of excavation points. This includes recording of the stratigraphy/soil profile of each distinct landform sampled and of each test excavation unit in which an archaeological feature or Aboriginal object is identified.
- Soil colour and type, texture, acidity and stratification will be recorded to increase understanding of the sub-surface conditions of the preferred option and how they may relate to site formation processes influencing the presence and condition of sub-surface archaeological deposits.
- Soil colours will be recorded from a representative sample of soil strata, using a Munsell colour chart to ensure consistency.
- Soil acidity will be measured for a representative sample of soil types using a pH testing kit.
- The location of each excavation unit will be recorded using a mobile GIS Unit (Trimble® GeoXH™ GeoExplorer® or the Trimble® Nomad). This will allow for the spatial datasets collected in the field to be post-processed to sub-metre level accuracy once the GPS co-ordinates have been differentially corrected.
- Excavations units will be backfilled as soon as practicable.
- An Aboriginal Site Impact Recording form (ASIRF) will be completed and submitted to the AHIMS Registrar if a registered PAD or site is investigated.

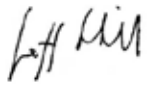
JACOBS

- If suspected human skeletal remains are encountered, works potentially affecting the find would cease immediately and the Roads and Maritime's Standard Management Procedure – Unexpected Heritage Items would be followed.

Any Aboriginal objects that are uncovered during test excavation will be analysed at Jacob's Melbourne office (452 Flinders Street, Melbourne) and reburied as soon as practicable in a secure temporary storage location pending determination of the long-term management of the Aboriginal objects. The location of the secure temporary storage location will be submitted to AHIMS with a site update record card for the site(s) in question. The long-term management of these artefacts will be discussed with the RAPs and Roads and Maritime and presented in the Aboriginal Cultural Heritage Assessment Report (ACHAR).

In the event that non-Aboriginal objects are discovered at any time, protocols according to the *Heritage Act 1977* will be followed.

Yours sincerely



Yours sincerely

Jeffrey Hill
Senior Archaeologist
03 8668 3154
jeffrey.hill@jacobs.com

Tooleybuc Bridge Replacement – Aboriginal Focus Group meeting

Tooleybuc Sporting Club, Thursday 30 October 2014.

Meeting opened 2.10pm.

Present:

Andrew Whitton (RMS), Tim Wilson (RMS) Jeff Hill (Jacobs), Graham Fry (VicRoads), Greg Kennedy, Ronald Jackson, Stephen Kirby, Ray Kennedy, Gary Pappin and Ken Knight (Wamba Wamba LALC).

1. Welcome to Country.

Ray Kennedy welcomed all to Country, acknowledged Elders past and present and thanked those for attending today.

Apologies - Steven Firebrace, Cynthia Pappin, Richie Kennedy, Lena Sweeney

2. Introductions

A quick introduction of those attending.

Ray expressed his disappointment with not being reimbursed for his fuel monies. Andrew advised RMS do not pay any monies for consultation. Andrew advised should site work be required for this project, those Aboriginal site officer engaged will be paid for their services. All acknowledged. However, all not happy about no payment(s) for attending AFG. RMS noted.

3. The Proposal

Tim Wilson (RMS) gave an overview of the project and spoke to the handout (attached) showing the 3 options being considered. Tim advised the purpose of today's discussions was related purely to NSW only. Tim & Andrew advised that the Victorian side will need to be assessed as per Victorian legislation.

Some comments, particularly from Ray, Gary & Greg regarding the potential impacts to Aboriginal cultural heritage, and the need for an additional site survey. General consensus from RMS, VicRoads & Jacobs was this can be accommodated.

4. Archaeological assessment/draft methodologies

Jeff spoke about the previous foot survey, conducted by AECOM and Wamba Wamba LALC. Jeff gave an overview of the draft methodologies for this project, should testing be required. Gary very sternly advised he would not like to see any items impacted during the testing program go off site. Gary advised all Aboriginal objects need to remain on Country. This was the general consensus from all the Aboriginal parties. Gary expressed his concerns with "Intellectual Property Rights". Andrew advised the Aboriginal objects will never be the property of Roads & Maritime Services. We spoke about the reports generated. These reports will be the property of RMS, and will be used, during consultation with Aboriginal parties, and also during the planning stages of this project.

Gary proposed that the registered Aboriginal parties be co-writers of the Aboriginal Cultural Heritage Report. Gary proposed their contribution be acknowledged on the front cover and that the cooperation held up as an example at the forthcoming AAA conference in Japan.

5. Cultural assessment

Andrew asked the registered Aboriginal parties if they knew of any cultural sensitivities with any of the three proposals. Andrew also asked the registered Aboriginal parties to nominate other people who may have cultural knowledge (not present today) for the proposed project areas. Gary and Ray advised they need to talk with the old people first. Gary mentioned a female archaeologist may be required (gender specific area). This was acknowledged. Andrew reiterated the 28 day comment period, which closes 14 November 2014, but advised if more time was required for cultural knowledge, to please give him a call.

6. Site Officer application

Andrew advised all Aboriginal parties that the Aboriginal Site Officer application form for Tooleybuc Bridge replacement was attached to previous mail out. Gary handed in his application, and his wife's (Cynthia) applications.

Greg asked for this paperwork to be forwarded to him. Andrew acknowledged.

Andrew advised site officer applications are due 14 November 2014.

7 Review of outcomes/actions

Andrew quickly mentioned the following discussions:

- Increasing size of proposed test pits (600mm x 600mm) - further discussion required
- Intellectual property rights - as raised by Gary
- Greg asked for relevant paperwork to be distributed to his address
- Ray & Gary will speak with relevant persons regarding cultural knowledge.
- Discussion regarding the naming of the new structure with an Aboriginal word/name, and also "Welcome to Wadi Wadi/Muthi Muthi nations" respectively
- Comment period (draft methodologies & cultural knowledge) closes 14 November 2014.
- Gary Pappin raised the topic of employment of local Aboriginals during the construction phase of the project. Andrew pointed out that the procurement policies of RMS would require some local Aboriginals to be employed by the bridge contractor and sub-contractors. Andrew said he would be personally involved to ensure that occurred

Meeting closed 4.20 pm.

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To	Roads and Maritime Services Registered Aboriginal Parties	Date	26 March 2015
From	Jeffrey Hill	Project No	IS085600
Copy			
Subject	**Tooleybuc Bridge Replacement Project - Consultation Methodology**		

Tooleybuc Bridge Replacement Project – Consultation Methodology

1. Background

The objective of community consultation is to ensure that Aboriginal people have the opportunity to improve assessment outcomes by:

- providing relevant information about the cultural significance and values of the Aboriginal object(s) and/or place(s)
- influencing the design of the method to assess cultural and scientific significance of Aboriginal object(s) and/or place(s)
- actively contributing to the development of cultural heritage management options and recommendations for any Aboriginal object(s) and/or place(s) within the proposed project area.

Consultation with Aboriginal Site Officers during the field survey on 18 December 2014 indicated the potential presence of Aboriginal fish-traps in the Murray River where the Yellow Option is aligned. Only through further consultation with Aboriginal Knowledge Holders for the Tooleybuc area can the presence of cultural significant objects or places be determined.

2. Aims

The aims of the consultation strategy presented in this paper are to undertake a detailed consultation process in order to establish the presence of Aboriginal fish-traps within the Murray River at Tooleybuc, and to record the cultural significance of the Tooleybuc area to Aboriginal people.

3. Consultation Methodology

3.1 Informal meeting / BBQ Tooleybuc

An informal meeting / BBQ is proposed be held at Tooleybuc (Mensforth Park) with the Aboriginal Knowledge Holders to discuss the Project and traditional links to the area. The identified Aboriginal Knowledge Holders listed below will be invited to attend this meeting to be held on-site in order to provide the opportunity for people to associate memories with the physical area.

Additional nominations for registration as Aboriginal Knowledge Holders will be accepted at the discretion of Roads and Maritime Services. Jacobs will be responsible for contacting the Aboriginal Knowledge Holders in order to arrange a meeting date that is acceptable to the majority of the invitees. Roads and Maritime Services personnel invited to attend. Jacobs will be responsible for the payment of the Aboriginal Knowledge Holders that attend this meeting. The payment rates are Roads and Maritime Services standard rates of $100 per hour (GST inc) plus travel costs.

The meeting will only continue if sufficient numbers are available to attend (4-6 people). If the meeting does not go-ahead due to a lack of numbers available to attend then the individuals will

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be contacted by phone (Vanessa Edmonds, Jacobs to call) for the purpose of evaluating whether follow-up face to face interviews would be beneficial.

- Irene Moore
- Nelly Moore
- John Ross
- Vincent Ross
- Mary Pappin
- Alf Kelly
- Bev Moore/Whyman
- Ray Murray
- Shirley Davis
- John Jackson.

At the meeting:

- A1 sized mapping of the area will be available as a discussion starting point. If possible to undertake, cultural mapping will be carried out using these maps taking into account the landscape and landforms present within and adjacent to the Project area; the resources available to Aboriginal people in the past and present; and known cultural or social features of significance. It is anticipated that the majority of the cultural mapping can be completed at the informal meeting / BBQ.
- Through informal discussions on the day Aboriginal Knowledge Holders with relevant knowledge of the area will be identified for potential follow-up interviews in consultation with Roads and Maritime Services.
- It is recognised that some Aboriginal Knowledge Holders may not wish to discuss their own knowledge in front of others. These people will also be identified for follow-up interviews in consultation with Roads and Maritime Services.
- During the meeting photographic consent will be requested of the Aboriginal Knowledge Holders, so that photographs of the consultation process may be used by Jacobs and Roads and Maritime Services in future productions for the Project (eg ACHAR and internal newsletters).

3.2 Hold Point

Following the meeting Roads and Maritime Services are to advise what further information is required or needed in order to complete the investigation. The informal meeting / BBQ may provide enough information for the purposes of the Project.

3.3 Oral history collection

If further investigation is required then one on one interview will be held with the Aboriginal Knowledge Holders who were:

- Identified as having relevant information at the informal meeting (either given freely at the meeting or had knowledge that they weren't willing to share on the day), or
- Were absent from the meeting but are recognised as having relevant cultural knowledge that they wish to share.

Vanessa Edmonds (Practice Leader Cultural Heritage Assessments, Jacobs) will conduct the interviews due to her vast experience undertaking similar interviews and in order to allow female

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Elders to feel comfortable during the interview. The preference will be for the interviews to be face to face in an atmosphere in which the individual is comfortable in (eg their home). As the known Aboriginal Knowledge Holders are wide-spread (Mildura, Swan Hill, Balranald) it is proposed that Vanessa will conduct the interviews over two – three consecutive days (depending upon final numbers of interviewees). The interviews will comprise a collection of oral histories linked to the Project area. Oral history recordings will meet the standards identified in OEH's *Talking History: Oral History Guidelines*.

It is recognised that not all of the Aboriginal Knowledge Holders may be available during this period depending upon each individual's circumstance. Where interviews cannot be undertaken face to face, they will be conducted over the phone with the Aboriginal Knowledge Holders permission.

Jacobs will again be responsible for the payment of the Aboriginal Knowledge Holders that are interviewed at the Roads and Maritime Services standard rate of $100 per hour (GST inc) plus travel costs (if required).

4. Outcomes

By carrying out the above methodology we hope to achieve the following outcomes:

- Consult with the nominated Aboriginal Knowledge Holders in order to identify those with relevant information requiring follow-up interviews
- Collect oral histories relating to the Project area
- Establish Aboriginal knowledge regarding the presence and cultural significance of Aboriginal fish-traps within the Project area
- Establish the presence and cultural significance of undisclosed or intangible Aboriginal object(s) and/or place(s) within the Project area
- Obtain photographic consent for the use in publications
- Inform the final Option selection with this information.

Yours sincerely

Yours sincerely

Jeffrey Hill
Senior Archaeologist
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Meeting Minutes

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Purpose	**Informal Meeting with Elders/Knowledge Holders re Tooleybuc Bridge Replacement**		
Project	Tooleybuc Bridge Replacement	**Project No.**	IS0856000
Prepared by	Vanessa Edmonds (03 8668 3544)	**Date/Time**	27 May 2015
Location	Mensforth Park, Tooleybuc	**Apologies**	None
Participants	Vanessa Edmonds (Technical Leader, Jacobs) Jeff Hill (Project Archaeologist, Jacobs) Andrew Whitton (Aboriginal Cultural Heritage Advisor, Roads and Maritime) Mary Pappin (Muthi Muthi Elder)		Mary Pappin Jnr (Driver, Muthi Muthi) Ray Murray (Wiradjeri/Wemba Wemba Elder) Kelvin Murray (Driver, Wemba Wemba) Neville Wyman (Wadi Wadi Elder) Johnny Jackson (Wadi Wadi Elder) Irene Wellington (nee Moore) (Wemba Wemba Elder) Lena Sweeney (Wemba Wemba LALC- helping Aunty Irene)
Distribution	Tim Wilson (Senior Project Development Manager, Roads and Maritime) Andrew Whitton (Roads and Maritime)		Rose Overberg (Project Manager, Jacobs) Jeff Hill (Jacobs) Vanessa Edmonds (Technical Leader, Jacobs)

Notes	Action
• Ray Murray (RM) and Johnny Jackson (JJ) both mentioned seeing fishtrap in the river somewhere near the yellow option at last low river level (2011?) • Mary Pappin (MP) mentioned a Western Lands Commission study which reported on a River Red Gum survey undertaken by her father (Alf Kelly-Wemba Wemba) and her mother (Alice Kelly). She said it might mention fishtrap. • MP says that most fish traps on river based on outcrops leading off rocky part of riverbank which were then added to with branches and loose rocks. These would be washed away at time of high river levels. • MP 'liked' the pink option • Uncle Neville Wyman (NW) mentioned three big holes being located within the river. One close to the Victorian bank was where the yellow option is proposed is associated with the fishtrap.	Jeff Hill (JH) to investigate location and if this report exists

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Holders re Tooleybuc Bridge Replacement

Meeting Minutes

Informal Meeting with Elders/Knowledge

27 May 2015

• JH mentioned the bathymetry survey and the potential to locate a rocky feature. Some of the Elders were interested in this potential	JH to follow up
• NW asked whether fill material was being brought in or "borrowed" from an area close to work site. Uncle Neville asked if material was being brought in who will be "smoking" (associated with cleansing).	AW to follow up
• Vanessa Edmonds (VE) queried the fill as being 'associated works' which may need to be assessed in the CHMP process if fill coming from unlicensed source in Victoria	JH to follow up
• Brief discussions by AW with Aunty Mary (Pappin) re: interpretative boards. Obviously the contents for any interpretative signage/boards would come from the nominated knowledge holders and the finalised proposal(s) would require their endorsement	AW to follow up at an appropriate time
• AW says that Gary Pappin stated he had been fishing (by boat) when younger at the possible fish trap location (yellow option) and there was always good fishing there.	
• Aunty Irene Moore (IM) said there was definitely a rock outcrop adjacent to the current bridge on the upstream side. Her son's(?) car had hit these rocks years ago. Aunty Irene used to live in Tooleybuc when younger.	
• MP said that rocky banks along the river were important to block off the inner Murray channel when river levels were low. She stated that corroborees (men and womens-in different areas) would be held at these area.	
• MP says it (Tooleybuc) was a cultural area.	
• MP said that the trap was probably used to channel water into Lake Coomeroop.	
• MP would like to see old bridge on display somewhere when demolished.	
• NW happy with yellow option but concerned about blackfellows camp directly downstream of this option on NSW side.	
• NW does not want there to be any disturbance outside the identified alignment	
• Elders want to walk alignment particularly of yellow option in order to establish if there are any other 'cultural' areas (as opposed to archaeological)	JH to get better defined construction corridor when available
• NW (in response to query by VE) said there might be other Knowledge Holders to talk to but you would never get hold of them	
• There was a discussion about buffers around known sites (in Victoria). 50 m buffer was mentioned	

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Appendix E. Bathymetry survey report

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Tooleybuc Reservoir Bathymetry Survey – Report for Jacobs

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Tooleybuc Bathymetry Survey – Report for Jacobs

- Final
- August 2015

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1. Introduction

Austral Research and Consulting were contracted by Jacobs to undertake a bathymetry survey of the proposed Toolibuc bridge (Figure 1). There were two aims of the bathymetric survey;

1) The primary aim was to assess the presence of archeological sites on the river bed.

2) The secondary aim was to provide bathymetry data that will assist with the bridge design.

The primary aim of the survey was to investigate the presence of archelogical sites on the left bank (Victorian side of the Murray River) of the Murray River based on anecdotal evidence. The secondary aim of the project was to collect detailed data that will feed into the detailed design of the bridge. The area of interest is located downstream of the existing bridge (Figure 1) as indicated by the dashed line. There is also a buried cable located upstream of the proposed bridge.

- **Figure 1: Aerial imagery of study site, Tooleybuc. Dashed line indicates the approximate location of the proposed bridge. Arrow indicates direction of flow (Ref Google Earth)**

2. Methods

A CEESCOPE dual frequency sonar (33/200 kHz) mounted to a 4.8m aluminium punt was used to undertake the survey. A Trimble R4 base station was used over a survey marker and linked with the on board GPS to provide improved accuracy (generally ±1 to 5cm) to the data collected. A blanking distance of 60 cm was applied to the sonar collection process which results in any area shallower than the 60cm below the sonar head will register as a flat line at RL ~56.00 AHD. Field surveys were completed between 20 - 22 July 2015.

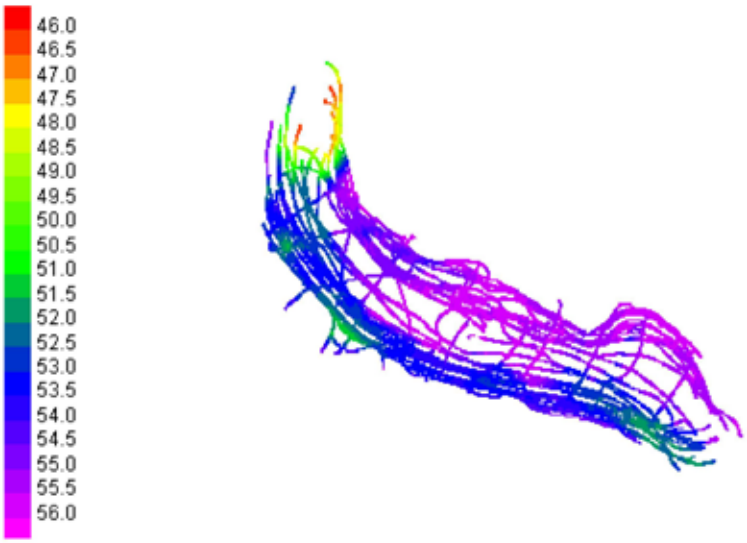
Prior to the detailed sonar survey being conducted a side scan sonar was used to examine the river bed for any obvious features. A shape file was provided by Roads and Maritime Services (RMS) was used to prepare planned survey lines. The survey lines were planned as long sections and cross sections at 2m intervals within the specified survey location (100m upstream and downstream of the proposed bridge).

The data was post processed in HYPACK software package. The data was processed and sorted to reduce the data volume to 10% of the original data volume. The data was then processed to produce a TIN model (similar to a DEM).

3. Results

Data was collected on the 21st July 2015. Conditions were fine with sunny patches and no rain at the time of the survey. River levels were low which restricted boat access in some areas. The river bed was found to be heavy clays based on physical observations of the substrate.

The planned line file could not be used for the survey as the supplied data was provided in an incompatible projection. Therefore long section and cross section sonar data was collected (Figure 2). Good coverage was obtained adjacent to the Victorian border of the river which had the deeper water. Shallower water was concentrated from the centre to the NSW bank of the river (right bank) and restricted the survey coverage. The collection of cross sectional data was restricted due to shallow water. A deeper hole was present at the downstream extent of our survey. The cross sections penetrate to the bank as much as possible around snags.



- **Figure 2: Survey lines collected during the bathymetric survey of the Murray River at Tooleybuc.**

The generated tin model highlights the deeper hole are the end of the survey reach (Figure 3). The NSW side of the river (right hand side of the river) is shallow at this point in the river. The deeper channel is located on the Victorian side of the river (left hand bank) of the river. There are two deeper areas located on the eastern bank and the cable crossing location upstream of the proposed beidge is clearly visible.

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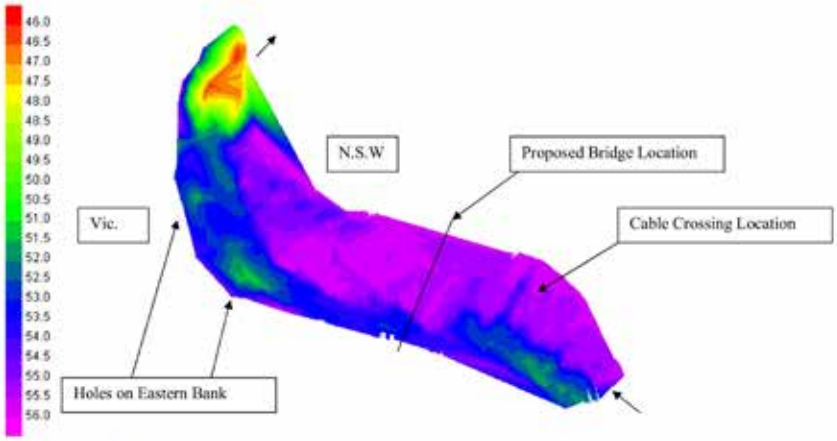
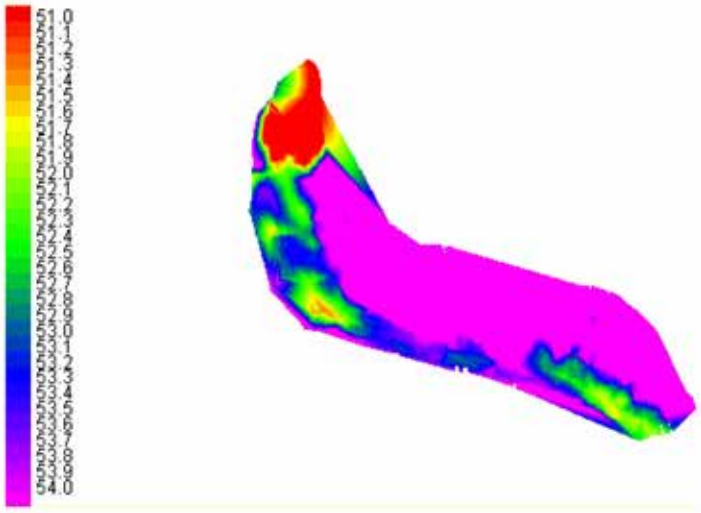


- Figure 3: Tin model developed from survey data. Arrows indicate direction of flow.

Figure 4 highlights the holes located on the Victorian side of the river (left bank). Cross sectional data generated from the Tin model (Figure 5) highlight the depth of the cable trench located upstream of the proposed bridge which is approximately 1m deep. The two holes adjacent to the Victorian bank of the river (left bank) are 1-2m deep.



- Figure 4: Highlight of deep holes along the left bank.

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Jacobs Tooleybuc Bathymetry Survey

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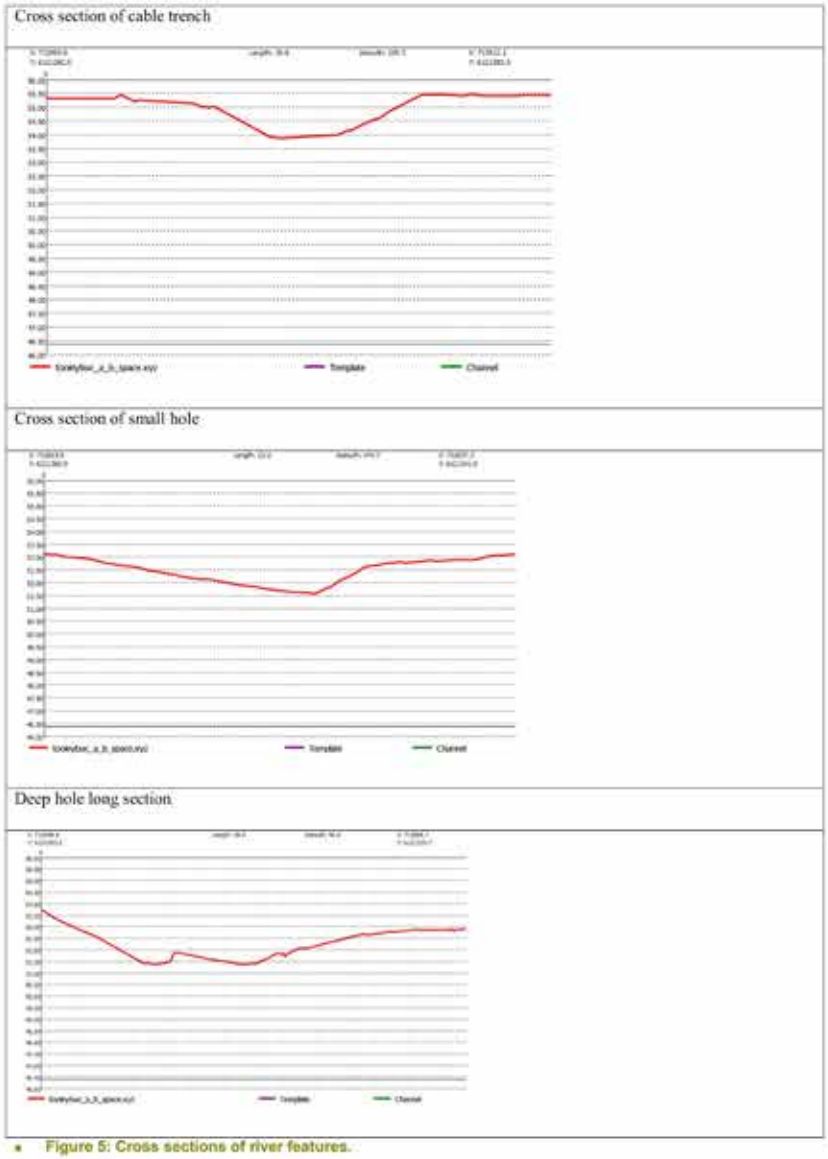

Figure 5: Cross sections of river features.

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4. Conclusions

Our conclusions are based on the output from the sonar survey only. No conclusions regarding cultural heritage significance is included.

1) The Murray Rivers substrate is heavy clay around the location of the proposed bridge based on our site visit.
2) There is a large scour hole downstream of the proposed bridge location.
3) There are two smaller features (holes) on the Victorian side of the river.
4) The cabling trench that was created at the crossing location upstream of the proposed bridge location is still visible.
5) There are minimal bathymetric features on the NSW side of the river.