Cultural Heritage Report

Report on Assessment for Aboriginal Cultural Heritage Values, Echuca-Moama Bridge Project

Report Prepared for VicRoads
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Executive Summary

E1 Introduction

VicRoads, in partnership with New South Wales Roads and Maritime Services (Roads and Maritime), is planning for a second Murray River crossing at Echuca Moama. The second crossing, known as the 'Echuca-Moama Bridge Project' (the Project) would:

- ease congestion on the existing bridge
- provide an alternate access for traffic between the two towns
- support road freight, including Higher Mass Limits vehicles (HML) and High Productivity Freight Vehicles (HPFV).

On 14 June 2013, the (Victorian) Minister for Planning determined that an Environment Effects Statement (EES) would be required to assess the Project's potential environmental effects within Victoria. As the Project extends into NSW, a Review of Environmental Factors (REF) would be required to assess impacts within New South Wales.

This EES considers three (3) alignment options within Victoria comprising roads and bridges that provide an alternate access over the Murray River and Campaspe River between Echuca and Moama. The three alignments considered as part of this EES are identified as the:

- Mid-West Option;
- Mid-West 2A Option; and
- Mid-West 2B Option.

Of these three alignments, the Mid-West Option was determined to be the better performing option when considering a balance between environmental, social and economic considerations and was selected for detailed risk and impact assessment. The Mid-West Option uses existing road reserves for part of its length, has the least impact on biodiversity and habitat values, cultural heritage values and satisfies the Project objectives. This report considers the Aboriginal heritage impacts of the Mid-West Option in Victoria and supports its selection as the Preferred Alignment.

The Right of Way (ROW) for the Mid-West Option is the area required to construct and maintain the proposed carriageway. The proposed road to be built within the ROW is approximately 4.3km in length and includes a 650m bridge across the Murray River, between Victoria and NSW. It extends from the intersection of Warren Street and the Murray Valley Highway, proceeds eastward along Warren Street, then north-east to cross the Campaspe River. From the Campaspe River it continues in a north-easterly direction to Victoria Park on the Murray River in Victoria. The study area for the project is broader than the project Right-of-Way, and encompasses the township of Echuca(Map 1).

This Aboriginal impact assessment report assesses project impacts in Victoria.

E2 Results of the Cultural Heritage Assessment

Desktop Assessment – Aboriginal Archaeological Sites

The aim of the desktop assessment was to review all of the previous assessments for the Study Area in which the ROW is located, including all of the previous assessments for options that were considered for constructing a second Murray River crossing between Echuca and Moama. This included assessments carried out between 2007 – 2009 and additional work that had been done for Options 2A – 2D in 2011. The objectives of the assessment were to identify previously recorded Aboriginal sites within the Right of Way (ROW) and assess the potential for further sites to be found. A search of the OAAV site registry was carried out as part of the desktop assessment.

VAHR Number	Field Name	Site Type
7825-0371	Murray Scar Tree 3	Scarred Tree
7825-0372	Murray Scar Tree 4	Scarred Tree
7825-0386	Murray Scar Tree 10	Scarred Tree
7825-0396	Murray Scar Tree 21	Scarred Tree
7825-0398	Murray Scar Tree 22	Scarred Tree
7825-0399	Murray Scar Tree 23	Scarred Tree

Table E1: Previously registered Aboriginal scarred trees within the ROW

There are six previously recorded Aboriginal archaeological sites within the ROW, all of which are scarred trees. These are listed in Table E1. The site locations are shown in Maps 2-6 (see also Plates 1-6). These trees were identified during surveys of a broad corridor and then a specific ROW, between 2007 – 2009. Almost all of the current ROW was surveyed during that time. A large sand hill extending between the former Echuca College and Reflection Bend on the Murray River, was identified as an area of high archaeological potential and a landform which had a high potential to contain ancestral human remains. A section of the current ROW on freehold land that is situated on the south side of Warren Street, was not part of the assessment between 2007 – 2011. The latter was surveyed as part of the current ROW assessment.

Further Field Survey (2014) - Aboriginal Archaeological Sites

A field survey of land which may be acquired for the Mid-West ROW on the south side of Warren Street, was carried out on 3/9/2014 in association with Yorta Yorta Nations representatives.

Three new scarred trees were recorded during the field assessment. These have been registered with OAAV as sites 7825-0480 - 0482 VAHR**.** Summary data regarding the trees is contained in Table E2. Two of the trees (7825-0480 and 7825-0481 VAHR) are more than 50m from the southern edge of the existing road reserve in Warren Street. One tree (7825-0482 VAHR) is situated some 46m south of the southern edge of the road reserve but near or within an area where a roundabout is proposed. Site locations are shown in Maps 7-9.

VAHR Number	Field Name	Site Type
7825-0480	Mid-West Corridor 2 – Scarred Tree 10	Scarred Tree
7825-0481	Mid-West Corridor 2 – Scarred Tree 12	Scarred Tree
7825-0482	Mid-West Corridor 2 – Scarred Tree 11	Scarred Tree

Table E2: Aboriginal scarred trees recorded during the field survey

No other Aboriginal sites were recorded during the field survey. Although ground visibility was poor, there is a low likelihood of other Aboriginal sites being found within the corridor of land which was surveyed. This is because there has been considerable ground disturbance as a result of agricultural activities and logging and also because the survey area was regularly inundated during flood events, prior to the construction of levees and other flood mitigation measures. There are no natural rises or levees within the ROW and it is unlikely that campsites would be established on land that was prone to inundation.

Recent consultation with Yorta Yorta has identified places of intangible heritage value near the ROW. These are areas north and south of Warren Street where families of Yorta Yorta and Wemba Wemba people settled after walking off Cummeragunga Station. These places are close to but not within the ROW. VicRoads are engaged in on-going discussions with the Yorta Yorta Nations about possible ways to acknowledge the importance of the area to Yorta Yorta and Wemba Wemba people, particularly those families still living in Echuca.

Sub-surface Testing 2015

Sub-surface testing at potential bridge pylon sites was carried out on the north and south banks of the Campaspe River on 18th – 19th February and 24th – 27th March 2015. No evidence of Aboriginal cultural places was found on the south bank of the river. Two new Aboriginal places, sites 7825-0485 and 7825-0486 VAHR were identified on the north bank of the Campaspe River. Site 7825-0486 VAHR is a single stone artefact found in highly disturbed soil. Site 7825-0485 VAHR is a sub-surface deposit of stone artefacts found on the north side of scenic drive. As 7825-0486 is only a single stone artefact found in highly disturbed soil, further disturbance will not impact on any intact cultural features or material. Analysis of the sites is on-going and recommendations for avoiding these sites and mitigating development impacts have been discussed with the Yorta Yorta Nations and will be included in the CHMP. Mitigation of impacts on these sites has also been addressed in the EES.

It was also found that the sand hill bordering the former Echuca College site and the Echuca Tennis Courts extends further than was previously identified. The sand hill extends through the former Echuca High School site toward the Campaspe River. Parts of the sand hill where the high school buildings were situated have been excavated to depths of greater than 1 mere in some areas. However, it was also found that the sand hill was less disturbed to the south of the former school building sites, between the building envelopes and Crofton Street/Scenic Drive.

E3 Assessment of Cultural Significance

The cultural significance of the sites located during the field survey has been assessed against criteria in the Australia ICOMOS (Burra) Charter for the Conservation of Cultural Significance. The Aboriginal scarred trees located during the assessment have been assessed as being of high

aesthetic, historic, scientific and social value to the contemporary Yorta Yorta Nations community and to the wider community. Site 7825-0386 is assessed as being of moderate scientific value, however, as the scar is situated on a stump which is largely rotted out at the base.

E5 Consultation with the Yorta Yorta Nations

Consultation with the Yorta Yorta Nations is on-going and discussed in Section 5.0 of the report. Three meetings have been held with Yorta Yorta Nations to date, two of which have been larger workshops with VicRoads, the consultants and cultural heritage staff of Yorta Yorta Nations. A third smaller meeting was held with cultural heritage staff of Yorta Yorta Nations to discuss specific issues relating to the EES and CHMP and also to review the Mid-West Option with cultural heritage staff unfamiliar with specific sites.

Some of the main issues to emerge from the consultation to date are:

- Conservation and treatment of two scarred trees which would be removed prior to road construction;
- The potential impacts of the bridge pylons near the banks of the Murray and Campaspe Rivers and a need to conduct sub-surface testing at these sites as part of the CHMP;
- Timeframes for the EES and CHMP;
- Consideration of options for collecting plant resources of significance to Yorta Yorta Nations people from the ROW prior to construction works commencing; and
- The issue of past and present Aboriginal residents of Warren Street, their contributions to the history of the Yorta Yorta Nations and Wemba Wemba peoples and to Echuca more broadly and options for interpretation of this history and other aspects of Yorta Yorta Nations culture within the context of the road.

E6 Statutory Requirements

VicRoads is required to complete a Cultural Heritage Management Plan (CHMP) pursuant to the *Aboriginal Heritage Act 2006* for the section of the ROW in Victoria. Under section 49 of the Aboriginal Heritage Regulations 2007, preparation of a CHMP is mandatory for any project for which an EES has been required. The proposed project is also defined as a high impact activity, which occurs within an area of cultural heritage sensitivity and therefore required preparation of a CHMP. The areas of cultural heritage sensitivity are land within 200m of the Murray and Campaspe Rivers and land within 50m of a registered Aboriginal place, specifically the scarred trees. Full details are provided in Section 6.0 of the report. Statutory protection to Aboriginal places is also provided by the *Planning and Environment Act 1987*.

E7 Assessment of Impacts

An assessment of the impacts and risks of the project are contained in Sections 7.3 and 7.4 of the report.

Construction of the project would directly impact on one dead scarred tree 7825-0386 VAHR. Duplication of the road in some 20 years would impact on a scarred tree 7825-0399 VAHR. One scarred tree 7825-0372 VAHR would be located adjacent the Murray River bridge structure

and would require lopping. If mitigation measures are not adopted, the project poses a direct threat to these three trees in the short and long term.

Scarred trees 7825-0371, 0372 and 0396 VAHR would be retained in the road reserve adjacent a bridge structure. The location of the bridge structure has been positioned to minimize the potential impact of earth embankments within the drip line of the trees. Detailed design would need to minimise any intrusion of earth embankments within the drip line of the trees. Detailed design would need to minimise any intrusion of earth embankments within the drip line of the trees. All three trees are live and the project poses a threat to the trees if the design of the road embankment is not done in a manner that ensures their long term survival.

There is a risk, unless mitigation measures are adopted, that the project would impact on a highly sensitive area for Aboriginal sites and Ancestral Remains, which is the section of intact sand hill between the site of the former College and the tennis courts.

Overall, the project is assumed to rank well in terms of statutory compliance, positive impacts and improved practice, provided that the management recommendations in the CHMP are adopted and the CHMP is approved by Yorta Yorta Nations.

Environmental management measures for the project are contained in Table 11 and reproduced below.

Risk No.	**Risk Description**	**Management Measures**
1	Road impacts on registered Aboriginal scarred tree 7825-0386 VAHR	This scarred tree (Plate 3) is a stump and would be directly impacted by the road option. It is recommended that the stump be removed and re-instated at a location to be agreed with Yorta Yorta Nations and any other relevant management authorities. The tree is largely rotted out at the base and could be carefully removed by sliding an excavator bucket under the base of the tree, while holding the stump upright. The tree removal must be monitored and assisted by representatives from the Yorta Yorta Nations, in consultation with a qualified arborist. After the tree is removed, it must be transported to a location agreed to with Yorta Yorta Nations to undergo conservation treatment (eg. removal of rotted wood and pests, impregnation with pest resistant chemicals, capping of the stump). The tree must then be re-erected at the agreed location, probably on a cement or concrete base. The conservation work and the re-erection of the tree must be carried out or supervised by a qualified arborist in association with Yorta Yorta Nations community representatives.
2	Road impacts on registered Aboriginal scarred trees 7825-0371 VAHR, 7825-0372 VAHR, 7825-0396 VAHR and newly discovered Aboriginal - scarred tree 7825-0482 VAHR	Scarred trees 7825-0371, 0372 and 0396 VAHR are situated in the Victoria Park section of the road. Scarred trees 7825-0371 and 7825-0396 VAHR are situated within the road reserve adjacent a bridge structure and outside the road embankment and must be retained within the road reserve. Scarred tree 7825-0372 must be retained within the road reserve. Scarred tree 7825-0482 VAHR is situated on Crown Land on the south side of Warren Street near an area where a roundabout would be constructed. The trees are all live and the way in which the trees are conserved in the road reserve must ensure the long-term health of the tree. Detailed design would need to minimise the extent of earth embankments

Risk No.	Risk Description	Management Measures
		within the drip line of the trees, through the final positioning of bridge structures. While the design is not yet finalised, it is recommended that the following must occur to help ensure the long-term conservation of the trees: a) The trees must be inspected by a qualified arborist in association with representatives from the Yorta Yorta Nations and their condition assessed, prior to any measures to conserve the trees. The arborist and Yorta Yorta Nations representatives must make an assessment of requirements to conserve the trees. b) The final design of the road embankment around site 7825-0372 VAHR, must ensure that the tree and its root system are not damaged by the weight of soil (load) in the adjacent road embankment and that there is adequate drainage around the tree root system. Any other issues identified by the arborist must be addressed in the design. c) The final design of the road embankment adjacent the trees, must not cause detrimental impacts on Aboriginal scarred trees 7825-0371-0372 VAHR, 7825-0396 VAHR and Mid-West Scarred 7825-0482 VAHR. The final design must be reviewed by an arborist and presented to Yorta Yorta Nations for consideration at least two months prior to construction works commencing. The Yorta Yorta Nations must confirm in writing that the design complies with the management recommendations in the CHMP and that the design avoids harm to the scarred trees. d) The scarred trees must all be fenced with temporary webbing which extends at least as far as the crown of the trees, in order to protect both the trunk and root system. The temporary webbing must be installed prior to construction.
3	Option impacts on registered Aboriginal scarred tree 7825-0372 VAHR. Tree impacted by lopping of tree branches.	Branches would need to be lopped from this tree when the road is duplicated in future as they would overhang the road and pose a risk to vehicles. The tree itself would be retained in the road reserve. Lopping of the tree branches must be carried out by a qualified arborist with the assistance of representatives from the Yorta Yorta Nations. It would be preferable if lopping could be carried out prior to any future construction works for duplication of the road. The lopping of branches must be carried out in such a way as to not endanger the long-term health of the tree.
4	Road impacts on registered Aboriginal scarred tree 7825-0399 VAHR	This is a whole dead tree situated on the south side of Warren Street (Plate 6). It would not be impacted by the initial road construction and may safely be retained in the road reserve in the short term. There are two options for treatment of the tree: a) The tree can be retained in its current position within Warren Street for the immediate future. However, it must be noted that the base of the tree is rotted and although it is not in immediate danger of collapse, it may fall over at some point in the future, before (or if) Warren Street is duplicated. If the tree is retained in its current location, a barrier or fence must be erected around the tree, since construction of the road would

Risk No.	Risk Description	Management Measures
		make the tree considerably more visible and exposed than at present and there would be greater pedestrian access to the tree. Vic Roads, as the agency responsible for maintenance of the road reserve, must ensure that the condition of the tree is monitored regularly (at least once per year) to assess the likelihood of the tree collapsing. If it appears likely, at any point in time, that the tree will collapse, VicRoads must contact the Yorta Yorta Nations to discuss treatment of the tree. It is likely, however, that it would be necessary to move the tree, as it may pose a risk to public safety if left within the road reserve. This is because there would be increased pedestrian as well as vehicle access along Warren Street after the road is built. b) If the Yorta Yorta Nations wish the tree to be moved prior to construction of the road, the removal of the tree must be carried out by a qualified arborist in consultation with and the assistance of representatives from the Yorta Yorta Nations. After the tree is removed, it must be transported to a location agreed to with Yorta Yorta Nations to undergo conservation treatment (eg. removal of rotted wood and pests, impregnation with pest resistant chemicals, capping of the stump). The tree must then be re-erected at the agreed location, probably on a cement or concrete base. The conservation work and the re-erection of the tree must be carried out or supervised by a qualified arborist in association with Yorta Yorta Nations community representatives.
5	Construction encounters previously unregistered ancestral remains.	A rigid pavement/concrete slab (or other treatment agreed with Yorta Yorta Nations) must be constructed over the section of sand hill to the north of the former Echuca College subject to approval in the CHMP. Bridge piers must be sunk into the north bank of the Campaspe River south of Scenic Drive and at the bridge abutment at the north end of the bridge. There must be no disturbance to the Aboriginal Heritage Place 7825/0485 VAHR identified during sub-surface testing, other than any disturbance allowed by the CHMP in future. Additional negotiation and approval from Yorta Yorta Nations regarding protocol for protection of ancestral remains. Implement CHMP management measures and recommendations. All work must cease in the area where the remains are found and statutory procedures for reporting the discovery that are contained in the contingency recommendations for the CHMP must be followed.
6	Construction encounters previously unidentified Aboriginal cultural heritage place	The contractor shall undertake all works under the Contract consistent with the approved Cultural Heritage Management Plan in Victoria.. Additional negotiation and approval from Yorta Yorta Nations regarding protocol for protection of burial sitesImplement CHMP management measures and recommendations.
7	Option impacts on sensitive area (sand hill)	A rigid pavement/concrete slab (or other treatment agreed with Yorta Yorta Nations) must be constructed over the section of sand hill to the north of the former Echuca College subject to approval in the CHMP. Bridge piers must be sunk into the north bank of the Campaspe River south of Scenic Drive and at the bridge abutment at the north end of the bridge. There must be no disturbance to the Aboriginal Heritage Places 7825-0485 VAHR identified during sub-surface testing, other than any disturbance allowed by the CHMP in future.

Risk No.	Risk Description	Management Measures
		The contractor shall undertake all works under the Contract consistent with the statutory contingency recommendations in an approved Cultural Heritage Management Plan in Victoria, including immediately stopping work and reporting if an Aboriginal cultural heritage burial/place is encountered.Additional negotiation and approval from Yorta Yorta Nations regarding protocol for protection of burial sites. Implement CHMP management measures and recommendations.
8.	Fill for the road construction is obtained from a source where excavation impacts on Aboriginal sites.	Fill for the roadworks must be sourced from a licenced existing quarry. Any other fill sources are subject to the provisions in the CHMP.

A cultural heritage management plan must be prepared for the project. Once approved by Yorta Yorta Nations, the CHMP becomes a statutory authorisation in respect of Aboriginal cultural heritage for the works. While the EES will inform the CHMP, the recommendations in the CHMP, including the contingency recommendations, will become statutory compliance recommendations for the project, once the CHMP is approved.

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Glossary

Term	Definition
1 in 100 year flood	A flood which results from a storm which has a statistical probability of occurring once in every 100 years.
Access	The location by which vehicles and / or pedestrians enter and / or leave property adjacent to a road.
Afflux	A rise in upstream water level caused by introducing a constriction such as a bridge, into a stream, channel or floodplain.
Alignment Option	The location and geometric form of a carriageway in both the horizontal and vertical directions. For this impact assessment, the Alignment Option being assessed is the Mid-West Option.
Arterial Road	The nominated traffic routes (such as Murray Valley Highway or Cohuna-Echuca Road / Warren Street), for longer distance travel and larger vehicles.
At grade intersection	An intersection where all roads cross at the same level usually controlled by traffic signals or Stop or Give Way signs.
Attenuation	The reduction in the magnitude of sound pressure level during transmission over a distance or around a barrier.
Axel load limit	Restrictions on how much load can be carried on an axel, single or dual tyres, and on the vehicle or vehicle combinations.
Australian Height Datum (AHD)	The Australian standard height datum for calculating levels.
B-double	A twin trailer articulated vehicle with the second trailer pivoting on the back of the first.
Batter	In road construction, an artificial uniform slope created on the sides of fills or cuts. The proposed batters for the Project have a slope of 2:1 (vertical to horizontal). A batter is also known as an embankment.
Benefit Cost Ratio (BCR)	The ratio of the discounted benefits over the life of a project to the discounted capital costs, or the project's discounted total agency costs.
Bored pile	A steel or reinforced concrete post that is inserted vertically into the ground by drilling, or formed in the ground in a pre-bored hole, to support a load.
Bridge	A bridge is a structure built to cross an obstacle in the road network. The Project comprises bridges across the Campaspe River, the Murray River and some bridging components over the Campaspe/Murray River floodplains.

Term	Definition
Carriageway	That portion of a road or bridge devoted particularly to the use of vehicles, inclusive of shoulders and auxiliary lanes, such as the two-lane, two-way carriageway in the initial alignment.
Chainage	The distance of a point along a control line, measured from a datum point.
Clear Zones	An area within the recovery area which is ideally kept clear of hazards (or within which unmovable hazards are shielded). The width of the clear zone reflects the probability of an accident occurring at that location and the cost-effectiveness of removing hazards. The clear zone width is dependent on traffic speeds, road geometry and traffic volume.
Concept Design	Initial high-level functional layout of a concept, such as a road or road system, to provide a level of understanding to later establish detailed design parameters.
Construction Environmental Management Framework (CEMP)	A site or project specific plan developed to ensure that appropriate environmental management practices are followed during the construction and/or operation of a Project.
Construction Area	The area defined for the Project within the Right of Way that would be directly impacted by construction activities. activities.
Corridor	An area of travel between two points. It may include more than one major route and more than one form of transport. Two corridors were investigated prior to the development of the EES. These corridors were identified as the Mid-West 2 Corridor (which included the Mid-West 2A Option and Mid-West 2B Option) and the Mid-West Corridor, (which included the Mid-West Option).
Culvert	One or more subsurface adjacent pipes or enclosed channels for conveying surface water or a stream below road formation level.
Cut	The depth below the natural surface of the ground to the construction level.
dB(A)	The human ear is not equally sensitive to all parts of the sound frequency range and the scale most commonly used is the A-weighted decibel or dB(A). This unit most accurately reflects human perception of the frequency range normally associated with road traffic noise.
Deceleration lane	An auxiliary traffic lane provided to allow vehicles to decrease speed on the approach to an intersection.
Design speed	A speed fixed for the design and correlation of those geometric features of a carriageway that influence vehicle operation. The Mid-West Option has been designed to 90 kilometres per hour, for a posted speed limit of 80 kilometres per hour.

Term	Definition
Driven Pile	A steel or reinforced concrete post that is driven vertically into previously unexcavated soil by striking it with a pile driving hammer.
Earthworks	All operations involved in loosening, removing, depositing, shaping and compacting soil or rock.
Environmental Management Framework (EMF)	Outlines the environmental measures recommended to be adopted as part of the EES.
Environment	For the purpose of the EES, environment incorporates physical, biological, heritage, cultural, economic and social aspects.
Environment Effects Statement (EES)	A statement prepared at the request of the Victorian Minister for Planning, pursuant to the Victorian Environment Effects Act 1978, on the potential environment impact of a proposed development.
Fill	One or more of the following: 1. The depth from the pavement subgrade level to the natural surface. 2. That portion of road where the formation is above the natural surface. 3. The material placed in an embankment.
Floodway	Land that is identified as carrying active flood flows associated with waterways and open drainage systems.
Freehold land	Privately owned land.
Gradeline	The level and gradient of a road carriageway along the centreline.
High Productivity Freight Vehicles (HPFV)	Larger combination vehicles such as B triples and super B doubles that are restricted to specific arterial routes.
Higher Mass Limits (HML)	Allows for higher axle loading for various axle groups in compliance with National accreditation and restricted to specific routes.
Highway	A principal road in the road network with direct property access, such as the Murray Valley Highway.
Initial Alignment	For the purpose of this EES, the initial alignment comprises the construction of a two lane, two-way carriageway road including bridges across the Campaspe and Murray Rivers.
Intersection	The place at which two or more roads meet or cross.
Land use	The type of development permitted in an area: industrial, commercial, residential, recreational or a combination of some or all of these different uses.

Term	Definition
Local access path	Minor path generally located in a local or residential area that links road and/or off road cycling routes, and off road pedestrian paths, such as those paths within Victoria Park.
Major Road	A road to which is assigned a permanent priority for traffic movement over that of other roads.
Mid-West Alignment (Preferred Alignment)	The Mid-West Option extends from the Murray Valley Highway along Warren Street before diverting to the northwest where it crosses Campaspe Esplanade and the Campaspe River, then turns north-east to cross the Murray River north of the Victoria Park Boat Ramp. This alignment then extends north in New South Wales to cross Boundary Road in Moama and connect with the Cobb Highway at Meninya Street.
Mid-West 2A Alignment	The Mid-West 2A Option extends north/northwest on a new alignment from the intersection of the Murray Valley Highway and Warren Street, crosses the Campaspe River north of the Echuca Cemetery, before turning northeast towards Reflection Bend on the Murray River. This alignment then passes immediately south of Reflection Bend and crosses the Murray River north of the Victoria Park Boat Ramp, then extends north in New South Wales to cross Boundary Road in Moama and connect with the Cobb Highway at Meninya Street.
Mid-West 2B Alignment	The Mid-West 2B Option extends north/northwest on a new alignment from the intersection of the Murray River Highway and Warren Street, crosses the Campaspe River northeast of the Echuca Cemetery, before turning north towards the Echuca Sports and Recreation Reserve. This alignment crosses the Murray River north of the Victoria Park Boat Ramp, then extends north in New South Wales to cross Boundary Road in Moama and connect with the Cobb Highway at Meninya Street.
Mitigation Measures	Measures which are implemented to reduce an adverse impact caused by road construction and operation.
No Project Option	This assumes no additional bridge crossing of the Murray River and assumes existing road conditions and networks remain unchanged.
Preferred Alignment	The preferred alignment within Victoria is the Mid-West Option.
Property	A property is land owned by a single or more landowners. It may include multiple contiguous titles owned by the same registered proprietor.
Recovery Area	The area beside the traffic lane required for a run-off-road vehicle to stop safely or be brought under control before re-joining the traffic lane.

Term	Definition
Review of Environmental Factors (REF)	A report prepared to satisfy the planning approval requirements of the Environmental Planning and Assessment Act 1979.
Right-of-Way	The Right-of-Way is a strip of land that is reserved through a planning scheme amendment for the public purpose of a road (road reserve) and encompasses sufficient land to construct and maintain the Project. The Right-of-Way for the Project comprises the sealed road surfaces (including shoulders / verges) and a 5m to 10m wide strip of land on either side of the road formation of the ultimate duplication. Note: In NSW, a Right-of-Way is known as a Road Reserve.
Right-turn lane	Right-turn lanes are used to provide space for the deceleration and storage of turning vehicles.
Risk Assessment	The processes of reaching a decision or recommendation on whether risks are tolerable and current risk control measures are adequate, and if not, whether alternative risk control measures are justified or would be implemented.
Roads and Maritime Services (Roads and Maritime)	Roads and Maritime Services is the co-proponent for the Echuca-Moama Bridge Project. Roads and Maritime Services is the NSW state government department responsible for the environmental assessment on the NSW component of the Project.
Roundabout	A channelised intersection at which all traffic moves clockwise around a central traffic island. The roundabouts proposed as part of the Project are located at the Murray Valley Highway/Warren Street intersection, and on Warren Street. Both are three-leg roundabouts.
Scoping Requirements	The Scoping Requirements for the EES under the Victorian Environment Effects Act 1978 entitled 'The Second Crossing of the Murray River at Echuca-Moama', dated June 2014.
Service Road	A road designed or developed to be used, wholly or mainly, by traffic servicing adjacent land along the north west side of Warren Street as part of the Mid-West Option only.
Shared Path	A paved area particularly designed (with appropriate dimensions, alignment and signing) for the movement of cyclists and pedestrians.
Spill Basins	Engineered basins designed to contain spills on the new carriageway, preventing contaminates from entering the floodplain.
Staged Construction	A construction sequence in which the initial alignment comprising a single traffic lane in each direction is constructed and then, should traffic demand warrant an increase in road capacity, the road and bridge structures are duplicated, providing two traffic lanes in each direction.

Term	Definition
Study Area	The area identified by individual specialists to determine potential impacts for the Project relating to a specific discipline.
Super "T"	A type of bridge span construction where the load-bearing structure (usually reinforced concrete) has a T-shaped cross-section.
The Project	The Echuca-Moama Bridge EES (the Project) involves the construction and operation of a second road bridge crossing of the Murray and Campaspe Rivers at Echuca-Moama.
Title	A title is an official record of who owns a parcel of land. Adjoining titles in the same ownership are considered and assessed as a 'property' in the impact assessment.
Turning lanes	An auxiliary lane reserved for turning traffic, providing deceleration length and storage for turning vehicles.
Two Way Carriageway	A carriageway with two traffic lanes allotted for use by traffic in opposing directions.
Ultimate Duplication	For the EES, the ultimate duplication comprises the construction of a duplicated roadway and bridges. The ultimate duplication would be constructed if future traffic demand warrants an increase in road capacity. The EES considers the potential impacts of the ultimate duplication.
VicRoads	VicRoads (Roads Corporation) is the co-proponent for the Echuca-Moama Bridge Project. VicRoads is responsible for project management of the planning and would manage the construction of the Project.
Work Hours	'Work' is defined as any activity other than office bound duties, including the starting up of plant and machinery. Work for the Project would not be undertaken outside the hours of 7am or sunrise, whichever is the later, and 6pm or sunset, whichever is earlier. Work outside these hours requires prior consent.

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1.0 Introduction

VicRoads, in partnership with New South Wales Roads and Maritime Services (Roads and Maritime), is planning for a second Murray River crossing at Echuca Moama. The second crossing, known as the Echuca-Moama Bridge Project, would ease congestion on the existing bridge, provide an alternate access for vehicles and pedestrians between the two towns and cater for freight and agricultural machinery.

As part of the assessment and approvals processes, the Project was referred to the Victorian Minister for Planning to decide whether an assessment under the *Environment Effects Act 1978* was needed to determine the Project's potential for significant environment effects. On 14th June 2013, the Minister determined an Environment Effects Statement (EES) was required to assess environmental effects within Victoria. As the Project extends into New South Wales, a Review of Environmental Factors (REF) would be required to assess impacts within NSW.

This Aboriginal cultural heritage Impact Assessment has been prepared to inform the EES, and the scope of this assessment is confined to Victoria only. The EES is required to consider the Project's potential environmental effects, inform the public and other stakeholders and enable a Minister's Assessment to inform decision makers. Roads and Maritime Services in NSW will conduct a separate assessment for the NSW section of the Mid-West Option..

The Project EES has considered three alignment options. As part of the EES options assessment, the Mid-West alignment was found to be the better performing option and this impact assessment has been prepared based on the Mid-West Alignment (the preferred alignment).

The purpose of this report is to document the potential Aboriginal cultural heritage impacts and to outline the methodology, risks and proposed mitigation measures for the project.

The proposed Right-of-Way (ROW) for the Mid-West Option is shown on Map 1. The ROW is the area required to construct and maintain the road alignment.

The Project ROW is sufficient to build a four lane road and duplicated bridges across both the Murray and Campaspe Rivers. The initial stage would involve the construction of a two lane, single carriageway road including a bridge across each waterway. A duplicated roadway and bridges would be constructed if required to meet future traffic demands.

VicRoads has also requested that the consultants assess a 'no project' option, which assumes that the existing bridge and road approaches remain unchanged and no alternate crossing is provided.

The main construction activities associated with the Project would comprise:

- Civil and structural works associated with the construction of new elevated roadway and bridges across the Murray and the Campaspe River;
- Construction of earthworks and flood relief structures for the new road section across the Murray River and Campaspe River floodplains; and
- Improvements to existing roads and intersections on approaches in Victoria and New South Wales, including the construction of a large diameter roundabout at the Murray Valley Highway / Warren Street intersection.

Construction activities would include clearing of vegetation, general earthworks (including topsoil stripping, filling and topsoil spreading), relocation of utility services, drainage installation, pavement construction, bridgeworks, landscaping, installation of noise barriers and installation of traffic controls, lighting and signage.

An emergency access to the sand hill area will be constructed. The access would be on the west side of the alignment, adjacent to the northbound traffic lane, onto an existing informal vehicle track on the sand hill. Minimal pavement material will be placed on top of the existing surface to minimise disturbance to the natural surface. The emergency access will be gated and locked, with access keys provided to the local emergency services.

Excavation required for the project is expected to be limited as the majority of the project would be elevated above the existing ground level in order to ensure flood free passage of vehicles. Therefore it is expected that fill would need to be imported to the site and excavation works would be limited to topsoil stripping and piled foundations for the roadway and bridge structures.

The main operational activity would be ongoing road maintenance consistent with VicRoads and Roads and Maritime Services practices and standards, including the maintenance of landscape, stormwater drains, retention basins, road pavement, bridges, electrical assets, traffic signals, road furniture and line marking.

The Mid-West Option includes:

- A new roundabout at the intersection of the Murray Valley Highway;
- Upgrade works along Warren Street, including line marking and intersection upgrades at Homan Street and Redman Street;
- Construction of a new service road on the western side of Warren Street between Homan Street and Redman Street;
- Line marking for a dedicated right-turn lane for traffic turning into Homan Street;
- Construction of a new 'three-leg' roundabout approximately 120m south of Campaspe Esplanade;
- Construction of a new road extending north-west from Warren Street and construction of a new bridge across the Campaspe River at Crofton Street;
- Construction of a new road extending north over part of the former Echuca College site and construction of a new road over a slab on the edge of an existing sand hill;
- A new road extending north-east over the western and northern tennis court and to the north of the Echuca Caravan Park;
- Construction of a new 650m bridge over the Murray River near the existing boat ramp;
- Construction of an elevated road east of the Murray River over Boundary Road to connect with Cobb Highway;
- Signalising the intersection of the Cobb Highway and Perricoota Road; and
- Construction of Francis Street to intersect with the Cobb Highway and creation of a new signalising intersection.

Summary details of the Option are included in Table 1.

Summary Details of Mid-West Option	
Approximate Length:	4.3km
Upgrade to existing roads:	1.4km
New raised road formation:	1.3km
Murray River Bridge Length:	650m
Height of Murray River bridge above river banks:	15m
Height above Echuca-Moama Floodplain:	2m
Upgrade to Murray Valley Highway / Warren Street intersection:	✓
Shared path:	✓
Changes to property access:	✓
New service road along Warren Street:	✓

Table 1: Summary Details of the Mid-West Option

The ROW is located on the western side of the township of Echuca which is considered to be that area which is located to the north of the east-west section of the Northern Highway, also known as Ogilvie Avenue and east of Wharparilla Drive. It commences at Warren Street, on the western side of Echuca. It extends eastward from the Murray Valley Highway along Warren Street, then extends north-east, crossing freehold and Crown Land situated on the floodplain of the Murray River. The Crown Land is open eucalypt woodland. It crosses the Campaspe River near the western end of Crofton Street. On the north bank of the Campaspe River, there is an extensive sand hill which extends between the former Echuca College and Reflection Bend on the Murray River. The Mid-West Option crosses a short section of sand hill near the Echuca Tennis Courts. The sand hill also contains stands of remnant Murray Pine. After crossing the sand hill, the Mid-West Option then extends in a north-easterly direction to the crossing of the Murray River at Victoria Park.

The study area for the project is the township of Echuca (Map 1) which is also the Geographic Region for the purposes of the Aboriginal heritage assessment, both in the EES and in the Cultural Heritage Management Plan (CHMP) which is being prepared separately to the EES. The Activity Area is the area required to construct, operate and maintain the road carriageway. , For the purposes of the EES and the Cultural Heritage Management Plan, the Right of Way (ROW) is the Activity Area for the preferred alignment..

Aboriginal places and areas of land which have the potential to contain sensitive sites and which may be impacted by the alignment have been considered in this impact assessment.

Although it has been logged, the current use of the Crown Land is largely passive recreation. The Echuca Scenic Drive extends from Victoria Park to the junction of the Murray and Campaspe Rivers, then follows the north bank of the Campaspe eastwards to Victoria Park. There are several other vehicle tracks throughout the Mid-West Option. Much of the freehold land is regenerated open eucalypt woodland or grey box and more rarely, black box.

This report is not a Cultural Heritage Management Plan (CHMP) pursuant to the Aboriginal Heritage Act 2006. The assessment has been carried out in association with the Yorta Yorta Nations Aboriginal Corporation. The Yorta Yorta Nations Aboriginal Corporation is a Registered Aboriginal Party under the Aboriginal Heritage Act 2006 (Vic), and has responsibilities under that Act in relation to the management and administration of Aboriginal Cultural Heritage matters in the Mid-West Option where the works would take place.

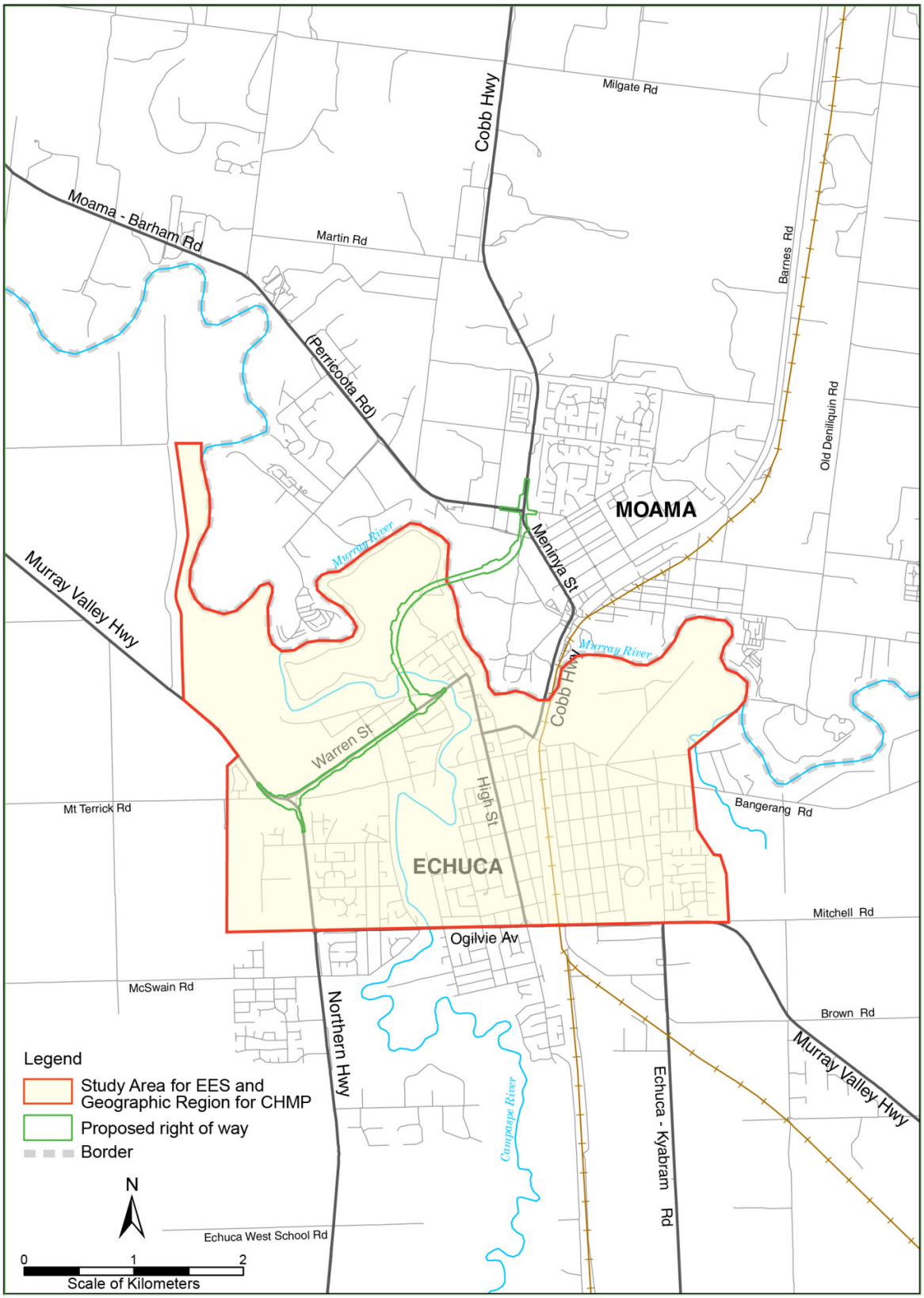
A separate CHMP will be prepared by VicRoads for the Mid-West Option.

The objectives of the cultural heritage assessment as defined in the project brief issued by VicRoads are:

- A clear description of the cultural heritage values of the Mid-West Option based on collated existing data the provider's field investigations and consultation with cultural heritage stakeholders;
- Appropriate liaison with cultural heritage stakeholders regarding the identification, significance and management of cultural heritage within the Mid-West Option;
- An appraisal of any implications for the project arising from relevant State and Commonwealth legislation or policy;

This report describes the commission of the above tasks.

Map 1: Location of the Mid-West Option



2.0. Aboriginal Cultural Heritage Assessment

2.1. Desktop Assessment

The aim of the desktop assessment was to produce an archaeological site prediction model, which would assist in the design of the fieldwork, the interpretation of the fieldwork results, the assessment of cultural significance and the design of the management recommendations. The desktop assessment involved a review of:

- The site registry at OAAV and previous archaeological studies, to identify any previously registered Aboriginal archaeological sites either within or surrounding the Mid-West Option and the results of previous archaeological assessments. OAAV Registry searches were carried out in 2007, 2008, 2009, 2011 and 2013 during the preparation and review of due diligence assessments of a broader Mid-West Option and route options.

- A brief review of any written and oral local history regarding Aboriginal people in the Echuca area;

- The landforms or geomorphology of the Mid-West Option and identification and determination of the geographic region of which the Mid-West Option forms a part that is relevant to the Aboriginal cultural heritage that may be present in the Mid-West Option;

- Environmental resources available to Aboriginal people within the geographic region of the Mid-West Option; and

- The land-use history of the Mid-West Option, particularly evidence for the extent and nature of past land disturbance.

This information was used to produce an archaeological site prediction model. The site prediction model assists in determining the type of archaeological sites which may potentially occur within the Mid-West Option, the possible contents of these sites, the possible past use of the landscape by Aboriginal people and the likely extent of ground disturbance to archaeological sites. The information provided by the site prediction model is used to design a fieldwork strategy for investigating the Aboriginal archaeological sites, by, for example, allowing the field team to target areas which have a high probability of containing archaeological sites. However, areas or landforms which were assessed as having a low probability of containing Aboriginal archaeological sites were also assessed, in order to test the effectiveness of the site prediction model. No obstacles were encountered during the preparation of this desktop assessment.

2.1.1. Study Area

The study area for this report is the geographic region in which the Mid-West Option is located, which is the township of Echuca. For the purposes of this cultural heritage assessment, the township of Echuca is considered to be that which is located to the north of the east-west section of the Northern Highway, also known as Ogilvie Avenue and east of Wharparilla Drive. The township of Echuca contains environmental conditions that can be considered to be a microcosm of the broader Murray River floodplain. Only areas of cultural heritage importance

that have potential to be impacted by the alignment have been considered in this impact assessment.

2.1.2. Environmental Conditions

Landforms and Geomorphology

The Mid-West Option is located on two geomorphic units; the western half being located on 'Older Alluvium – Shepparton' and the eastern half being located on 'Riverine Plain Present Floodplain – Murray Valley'.

The Mid-West Option is also located on two landforms; the western half being located on 'Plain above flood level (relative relief <9m)' and the eastern half being located on 'Present Floodplain'.

The Mid-West Option is located on two geological formations. Much of the western half of the Mid-West Option, that which runs along Warren Street, is aligned along a low-lying floodplain formed by Cainozoic deposits of alluvium that form part of the Shepparton Formation. The Shepparton Formation within the Mid-West Option comprises floodplain deposits of clay, sand, silt and gravel (DPI Geovic Interactive Map Accessed 2008). In areas of better drainage the soil profile on the Shepparton Formation consists of red-brown sodic duplex soils.

A prominent sand hill, a relict aeolian landform, is situated north of Warren Street. The sand hill extends across the area between Nolan Street, Homan Street and about 50 metres north of Jarman Street and is the site of the Echuca cemetery (Map 2). The sand hill and cemetery are outside and north of the Mid-West Option.

The section of the Mid-West Option from the intersection of Warren Street and Campaspe Esplanade and north to the Campaspe River , is located on the geological formation 'Unnamed Alluvium'. 'Unnamed Alluvium', is comprised of recent Quaternary alluvium containing such deposits as gravel, sand, silt and clay and forms part of the present floodplain of the Murray River and the Campaspe River (DPI Geovic Interactive Map, Accessed 14/1/2009).

To the west of the former Echuca College is a second sand hill, a relict aeolian landform. The sand hill is covered with largely regenerated red gum and box woodland, but also contains the only remnant stand of Murray Pine in the local area. This is likely to be a source bordering dune associated with a prior stream or an ancestral course of the Murray or Campaspe Rivers, although there has been no previous geomorphological assessment of the site.

Climate

Temperature averages at Echuca indicate a warm maximum average of 13.5°C in July to 30.9°C in January. Minimum average temperatures throughout the year range from 3.0°C in July to 15°C in February. The annual average rainfall for the area is 700mm. These climatic conditions would have placed no restrictions on Aboriginal or European occupation of the area (Bureau of Meteorology Website, Accessed 2008).

Water Sources

Two major watercourses, the Murray River and the Campaspe River flow through the current Mid-West Option. The Murray River and the Campaspe River provided a permanent water source, thus freshwater is likely to have been available during all seasons. The proximity of two

major watercourses to the Mid-West Option is likely to have influences on both Aboriginal and European settlement of the Mid-West Option and the geographic region more generally. The geographic region is the township of Echuca, which contains environmental conditions that can be considered to be a microcosm of the broader Murray River floodplain. In addition to the Campaspe River and the Murray River, there were two 1788 wetlands located within the geographic region. These wetlands, both shallow freshwater marshes, were located in close proximity to the Murray River and would, like the Murray River, have undoubtedly provided not only a potable fresh water source but also wetland species of flora and fauna as resources to Aboriginal people.

Description of Pre-Contact and Existing Vegetation

The vegetation communities which survive in the Mid-West Option today have been substantially modified since European settlement. The vegetation of the land along Warren Street would have been Riverine Chenopod Woodland (EVC 103) (DSE Biodiversity Interactive Map 2.0, Accessed 22/09/2011). Near the Campaspe River crossing, the option would have run through Grassy Riverine Forest (EVC 106) and Riverine Grassy Woodland (EVC 295) Between the north side of the Campaspe River and the Murray River, the vegetation was predominantly Riverine Chenopod Woodland (EVC 103), with a Riverine Grassy Woodland/Sedgy Riverine Forest mosaic (EVC 255) charactering the banks of the Murray River (DPI Biodiversity Interactive Map, 14/1/2009).

Department of Sustainability and Environment 2011b, *Biodiversity Interactive Map 2.0*. Department of Sustainability and Environment, East Melbourne, Victoria, viewed 22nd September 2011, <http://www.dse.vic.gov.au>.

Plains Grassland (EVC 132) occurs on lowland plains on fertile clay loams of Quaternary and Tertiary origin. It is a treeless vegetation dominated by largely grass and herb life forms. Shrubs and trees may be also occasionally present. Historically, the most significant feature of Plains Grassland was the Kangaroo Grass Themeda triandra dominated ground cover.

Riverine Chenopod Woodland (EVC 103) is a eucalypt woodland with a diverse shrubby and grassy understorey occurring on most elevated riverine terraces. Confined to heavy clay soils on higher level terraces within or on the margins of riverine floodplains (or former floodplains), naturally subject to only extremely infrequent incidental shallow flooding from major events if at all flooded (Department of Sustainability and Environment Website, Accessed 29/07/2010).

Grassy Riverine Forest (EVC 106) occurs on the floodplain of major rivers, in a slightly elevated position where floods are infrequent, on deposited silts and sands, forming fertile alluvial soils. River Red Gum forest to 25 m tall with a groundlayer dominated by graminoids. Occasional tall shrubs present (Department of Sustainability and Environment Website, Accessed 29/07/2010).

Riverine Grassy Woodland (EVC 295) occurs on the floodplain of major rivers, in a slightly elevated position where floods are rare, on deposited silts and sands, forming fertile alluvial soils. River Red Gum woodland to 20 m tall with a groundlayer dominated by graminoids and sometimes lightly shrubby or with chenopod shrubs (Department of Sustainability and Environment Website, Accessed 29/07/2010).

Floodplain Riparian Woodland (EVC 56) is an open eucalypt woodland over a medium to large shrub layer with a ground layer consisting of amphibious and aquatic herbs and sedges. Occurs

along the banks and floodplains of the larger meandering rivers and major creeks, often in conjunction with one or more floodplain wetland communities. Elevation and rainfall are relatively low and soils are fertile alluviums subject to periodic flooding and inundation (Department of Sustainability and Environment Website, Accessed 29/07/2010).

Riverine Grassy Woodland/Sedgy Riverine Forest (EVC 255) is a mosaic of Riverine Grassy Woodland (EVC 295) described above and Sedgy Riverine Forest (EVC 816) which is a eucalypt forest with understorey dominated by larger sedges. Understorey composition indicative of at least occasional shallow flooding and a tolerance of gaps between floods of several years. Typically on heavy soils which can become wet in winter. It is considered to occupy areas infrequently flooded and in which flood duration may be short, typically areas that are the last to flood and the first from which floods quickly recede. Soils are typically heavy clays. The major understorey species Hollow Sedge Carex tereticaulis is intolerant of total immersion (at least in turbid water) (Department of Sustainability and Environment Website, Accessed 29/07/2010).

The vegetation in the Mid-West Option today is dominated by eucalypt and box trees with little or no understorey vegetation.

Fauna

A number of animals would have been present within the Mid-West Option and are likely to have been hunted by traditional owners. These include the Eastern Grey Kangaroo (Macropus giganteus), Common Brushtail Possum (Trichosurus vulpecula), Common Ringtail Possum (Pseudocherinus peregrinus), Short Beaked Echidna (Tachyglossus aculeatus) and the Wombat (Vomatus ursinus). Birds, bird eggs and reptiles may have also been utilised. The Murray and Campaspe Rivers would have been a significant source of marine fauna, including fish and shellfish, such as the freshwater mussels which are commonly found in shell middens along the river (Viridians Biological Database).

Resources

Prior to European settlement, the Mid-West Option and surrounding land would have contained a number of resources that could have been utilised by the traditional Aboriginal owners. The region would have supported a diverse range of fauna including 30 species of marsupial, 150 species of birds, and numerous reptiles (McNiven and Russell 1996: 9). The Murray and Campaspe Rivers contain several edible fish species including Bony Bream, Macquarie Perch, Silver Perch, Trout Cod, Murray Cod and catfish.

Freshwater would have been available from the evident watercourses, namely the Murray River and Campaspe River that flow through the current Mid-West Option. The lowland and grassy forest that covered the Mid-West Option would have provided protection for camping during wet winter months. A number of plants would have been seasonally available, especially along the river and the fresh supply of water would have also attracted animals to the area.

Stone suitable for the manufacture of tools is rare within the region. Curr (1883: 273, McNiven and Russell 1996: 12) observed that Yorta Yorta territory was devoid of stone suitable for the manufacture of stone tools. He noted that stone for cutting and scraping implements was obtained from the Ngooraialum and Pimpandoor people further to the south, spear barbs were obtained by 'barter'. Locke (1878: 298-99) alludes to the exchange of reed spears from the lower Goulburn and Murray River area, and stone axes from Mount William near Lancefield, Central Victoria.

2.1.3. Ethnography

The traditional owners of the land on which the Mid-West Option is situated were the clans of the Yorta Yorta language group. Few written published descriptions of 'traditional' Aboriginal life ways for the current Mid-West Corridor exist, but a detailed account is provided by Edward M. Curr who established the 'Tongala' Station on the lower Goulburn in 1841 (Curr 1883). Curr made detailed recordings of Aboriginal culture along the Murray Valley. Other researchers have considered his accounts to be consistent with Aboriginal people living in a resource rich environment (Craib 1991: 67).

The Yorta Yorta were reportedly located at a place, which is now Echuca and went 'out to join some of the Goulburn River tribes' (Morgan 1952: 3 cited in Clark 1990: 398, Curr 1883). This is supported by Robinson's account of the Yorta Yorta occupying 'the country extending east from the junction of the Goulburn with the Murray Rivers for 20 miles' (In Clark 1990: 399).

It is believed the Yorta Yorta language group was comprised of 15 clans, and although the earliest reference to the group dates from 1839, most of the information does not include specific locational data for clans (Clark 1990: 398). Uncle Henry Atkinson, an elder of the Yorta Yorta Nations, has indicated that members of the Wollithiga clan are the traditional owners in the region of the Mid-West Option (cited in Bell 2005: 5). Curr (1883) noted that the region of Echuca belonged to the 'Wollithiga' who numbered 50 people. Curr believed that the Wollithiga had seceded from the core area of the Bangerang language group, which was located further east.

Curr's ethnographic accounts of the traditional owners of the Echuca region indicate that subsistence activities were variable, drawing on riverine and terrestrial resources. Curr did not comment on the Wollithiga people specifically, but noted that the neighbouring Towroonban were mostly 'opossum hunting people', while the Wongatpan 'lived chiefly on fish and roots', and rarely left the banks of the Murray and the swamps and reed beds in the immediate vicinity. It is likely therefore that the primary subsistence activity of different groups was influenced by environmental setting.

Dr. Wayne Atkinson states that the Yorta Yorta peoples' lifestyle and culture was based on hunting, fishing and collecting food from the variety of food sources provided by the ancestral lands. He further states that being river based people the majority of time was occupied by fishing, as the majority of food that was provided came from the rich network of rivers, lagoons, creeks and wetlands which are still regarded as the life source and the spirit of the Yorta Yorta Nations (Atkinson on YYNAC Website, Accessed 30/07/2010).

The emphasis on fish for riverine groups is also emphasised by Locke (1878: 290). Curr noted that fish were speared, poisoned or trapped in weirs (1883: 240-241), and kangaroo, emu, a wide range of birds, reptiles, amphibians and insects were also eaten (Curr 1883: 240-266).

Stone suitable for the manufacture of tools is rare within the region. Curr (1883: 273, McNiven and Russell 1996: 12) observed that Yorta Yorta territory was devoid of stone suitable for the manufacture of stone tools. He noted that stone for cutting and scraping implements was obtained from the Ngooraialum and Pimpandoor people further to the south, spear barbs were obtained by 'barter'. Locke (1878: 298-99) alludes to the exchange of reed spears from the lower Goulburn and Murray River area, and stone axes from Mount William near Lancefield, Central Victoria.

The arrival of Europeans had a devastating impact on the Yorta Yorta people. It is estimated that within the first generation of the European invasion, the Yorta Yorta population of approximately 6,000 was reduced by 85% (Atkinson on YYNAC Website, Accessed 30/07/2010). Clark (1997: 9-10) notes that there were numerous conflicts between Yorta people and European settlers, particularly attacks on European stations in the vicinity of the Murray and Goulburn Rivers. During 1838, a party of Yorta Yorta people attacked George Faithfull's overlanding party at the Broken River, killing seven of his men and dispersing his flocks of sheep (Clark, 1997: 9). According to Clark (1997: 10), these attacks continued well into the 1840's. Conflict with Europeans is likely to have been one cause of the rapid population decline following European settlement.

In 1858, the Board for the Protection of Aborigines was established following a Parliamentary Select Committee inquiry. This moved to relocate Aboriginal people to missions and stations throughout the state. Aboriginal people living in the vicinity of the Mid-West Option were relocated to Coranderrk, near Healesville. When Maloga mission was established near Barmah in 1874, many people returned to traditional country. In 1883, 1800 acres adjacent the Maloga site, was gazetted by the NSW government for the purpose of accommodating the Murray River tribes. It was renamed Cummeragunja in 1889 and has continued in some form to the present day (Atkinson and Berryman 1983; Yorta Yorta Aboriginal community v The State of Victoria and Others 1998: 17-19, TerraCulture 2000:8; Bell 2001: 10).

In 1939, the residents of Cummeragunja 'walked off' in protest against the living conditions, the leasing of most of the reserve land to a European, and the oppressive laws of the reserve system (Bennett 1991: 5). At a recent meeting with Yorta Yorta Nations Elders in Echuca on 9/10/2014, Auntie Melva Johnson and Auntie Barbara Day stated that some of the people who left Cummeragunja purchased houses in Warren Street and that some of the houses had remained in their families since that time. She stated that she felt that this history should be discussed further in the report and that it was important to recognise that these families not only lived in Warren Street but that they also purchased the houses and land themselves. Uncle Col Walker also stated that it was important to recognise the role that women had played in this resettlement process. Further consultation with Yorta Yorta Nations regarding this issue will be on-going and it will be discussed in more detail the Cultural Heritage Management Plan (CHMP).

Between 1860 and 1994 there were approximately 18 separate attempts to claim land and compensation by the Yorta Yorta Nations community. The only land that has been returned is 1200 acres of the former Cummeragunja Reserve, which was originally 2965 acres.

The formal structure of representation for Yorta Yorta Nations rights and interests in their ancestral lands has been an evolving process. Since 1999, the Yorta Yorta people have been represented by the Yorta Yorta Nations Aboriginal Corporation (Atkinson on YYNAC Website, Accessed 30/07/2010). The Yorta Yorta Nations is currently the Registered Aboriginal Party (RAP) for the region, pursuant to the Aboriginal Heritage Act (2006).

2.1.4. Search of the Victorian Aboriginal Heritage Register

An updated search of the Victorian Aboriginal Heritage Register (VAHR) for sites and reports relating to the Study Area of the Mid-West Option was undertaken on 14/8/2014. The results of this search are discussed and summarised below in Sections 2.1.5 and 2.1.6.

2.1.5. Aboriginal Places in the Study Area

As part of the desktop assessment for this report, searches of the Victorian Aboriginal Heritage Register [VAHR] were undertaken on 16/05/2011 and 5/3/2013. An updated search was carried out on 14/8/2014.

There are 87 registered Aboriginal archaeological sites located within the township of Echuca. These comprise 70 scarred trees, 8 shell middens, 6 artefact scatters or low density artefact deposits, two oven mounds/earth features and one Aboriginal historic place. During past surveys for all of the different western road corridors and road options for the second Murray River crossing at Echuca-Moama, there have been 59 Aboriginal sites recorded. These comprise 54 scarred trees and 5 shell middens. They account for 65% of all the Aboriginal sites recorded within the township of Echuca.

The large number of Aboriginal archaeological sites located within the various study corridors that have been surveyed for the western option of the Murray River Crossing is biased by the intensive survey coverage of the area between Warren Street, the Murray River and Campaspe Rivers over the years between 2000 and 2013. While this has resulted in the discovery of a large number of sites, particularly scarred trees in this specific area, there has been relatively little survey coverage over the balance of the township of Echuca for this study.

Owing to the large number of Aboriginal archaeological sites located in close proximity to the Mid-West Option, it is not logical to discuss each of the previously recorded Aboriginal archaeological sites within a given radius i.e. 1km, of the Mid-West Option. Aboriginal archaeological sites located in the Study Area are shown in Maps 2-9. Aboriginal archaeological sites within or within 1m of the ROW for the Mid-West Option are shown in Table 2, Maps 2-6 and Plates 1-6. A distance of +/- 1 metre was allowed as a margin of error on the ROW boundary, as some previously recorded Aboriginal places (scarred trees) are situated on or close to the edge of the ROW boundary. Details of the sites within the ROW are contained in Appendix 1, the site gazetteer.

The 2011 search found that there was a pattern in the landforms selected for the locations of human ancestral remains in Victoria. The majority of these places were found to be situated on sand hills or lunettes that were once associated with Lake Kanyapella. A smaller number of sites are located on lowland and alluvial plains. Further, the majority of the registrations on the VAHR were multiple burials in the sand hills or lunettes. On the NSW side of the river, it was found that there were 12 registrations of places containing ancestral remains on the AHIMS system in the area of NSW searched. The landforms upon which these burials were situated are not listed in AHIMS. Table 3 summarises the land forms and the approximate number of registrations associated with them.

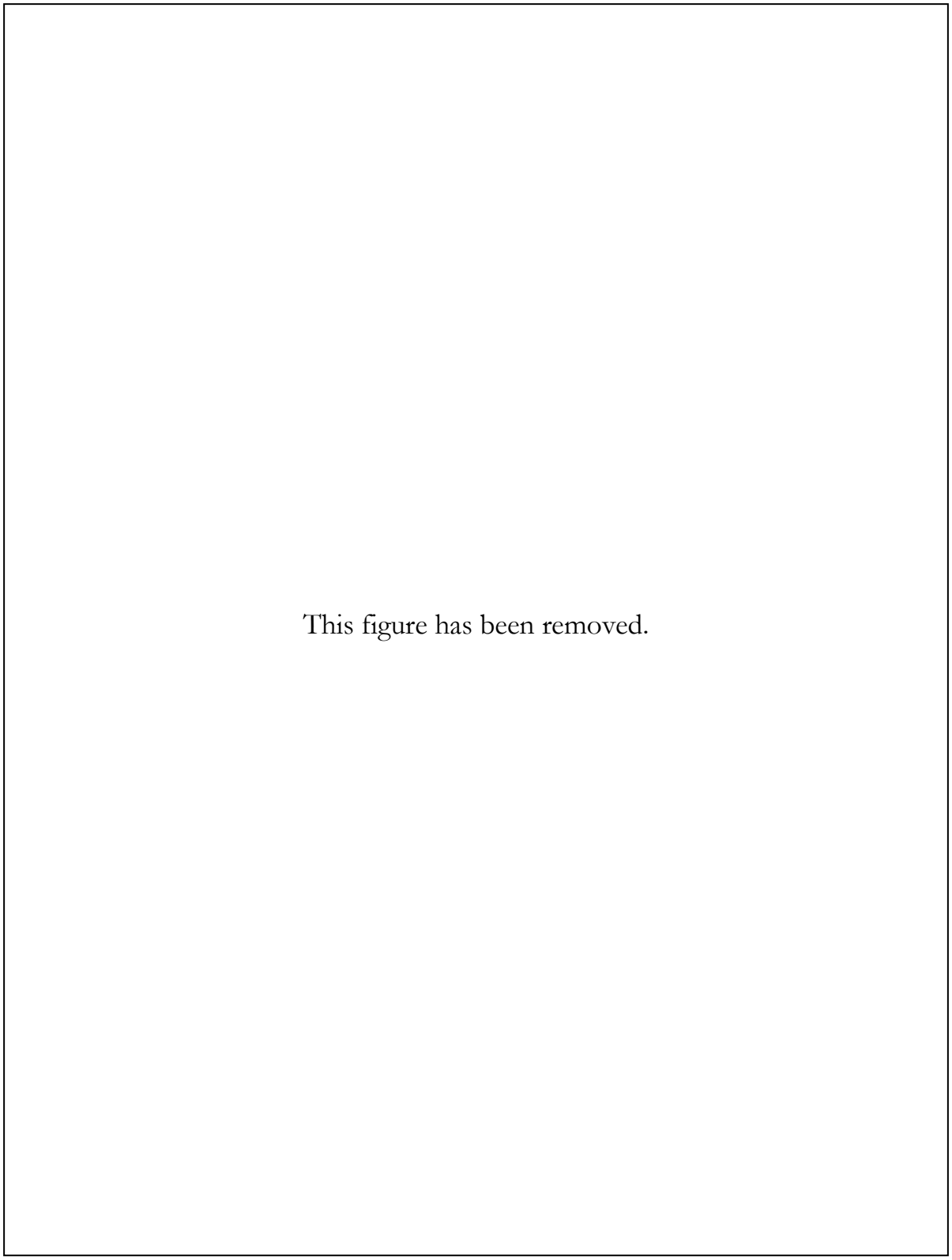
Table 2: Previously registered Aboriginal archaeological sites within and within 1m of the road corridor which will contain the Mid-West Option

VAHR Number	Field Name	Site Type
7825-0371	Murray Scar Tree 3	Scarred Tree
7825-0372	Murray Scar Tree 4	Scarred Tree
7825-0386	Murray Scar Tree 10	Scarred Tree
7825-0396	Murray Scar Tree 21	Scarred Tree
7825-0398	Murray Scar Tree 22	Scarred Tree
7825-0399	Murray Scar Tree 23	Scarred Tree

Six previously registered Aboriginal scarred trees are situated within the road corridor for the Mid-West Option. One of these trees – site 7825-0396 – is situated on or within 1m of the boundary of the road corridor. The location of these and other previously recorded sites are shown in Maps 2 – 6.

The Mid-West Option crosses the corner of a sand hill, which is situated between the former Echuca College and the Murray River. The sand hill is a source bordering dune associated with a prior stream channel which may be an ancestral course of the Murray or Campaspe Rivers. There has been some concern expressed about the potential of the Option to impact on human ancestral remains if they are contained within the sand hill.

At the request of VicRoads and the Yorta Yorta Nations in 2012, a search of the Victorian Aboriginal Heritage Register (Using the Aboriginal Cultural Heritage Register Information System (ACHRIS) portal) and the Aboriginal Heritage Information Management System (AHIMS) of New South Wales was searched on 30th July 2012, to establish locations and landforms on which Aboriginal human ancestral remains have been found. This wider search around the Echuca Township covered a rectangular area with Echuca in the centre. The search covered an area of 1321.6km^2 around the location once covered by paleo Lake Kanyapella and the related sand dunes that still exist in the region today. The rectangle covered 23kms to the west and 23kms to the east and 15kms in both north and south directions. No new burial sites have been recorded within this radius in Victoria since the search was originally carried out and a search of the AHIMS was not carried out for the current (2014) study, as this does not include the NSW section of the Option.



Map 2: Aboriginal archaeological sites recorded in surveys carried out for the Western Road Options between 2000 and 2014

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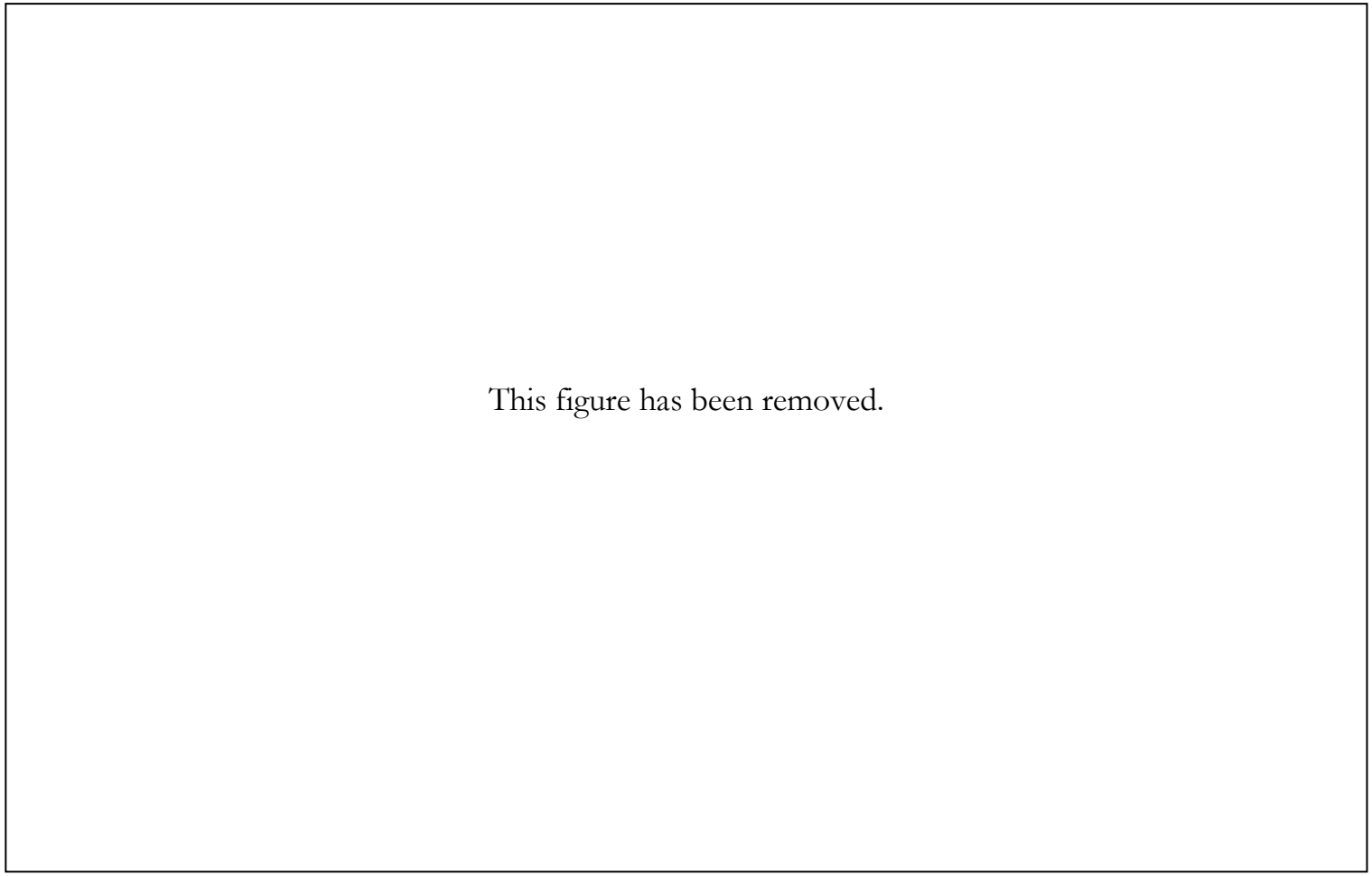
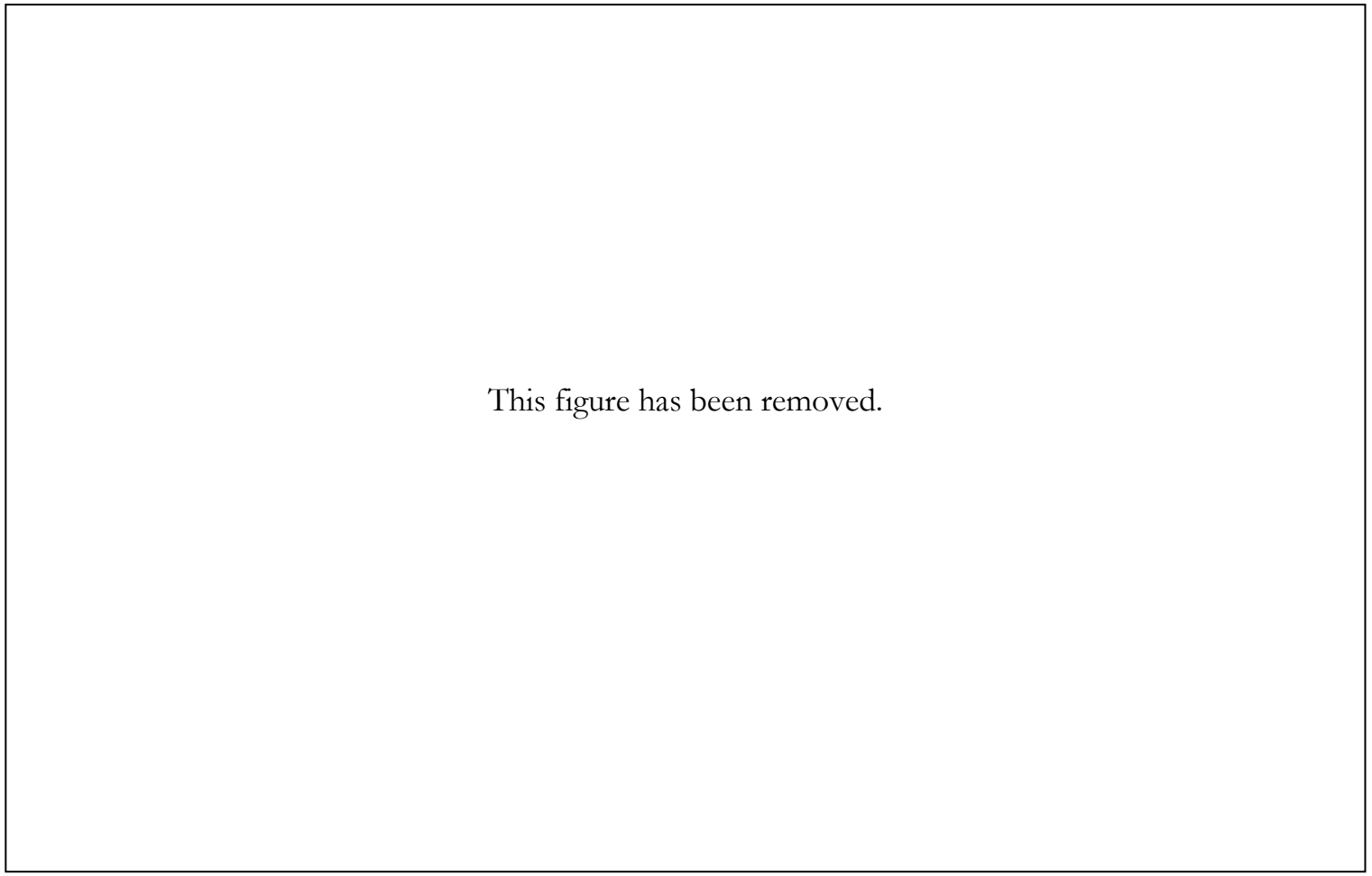
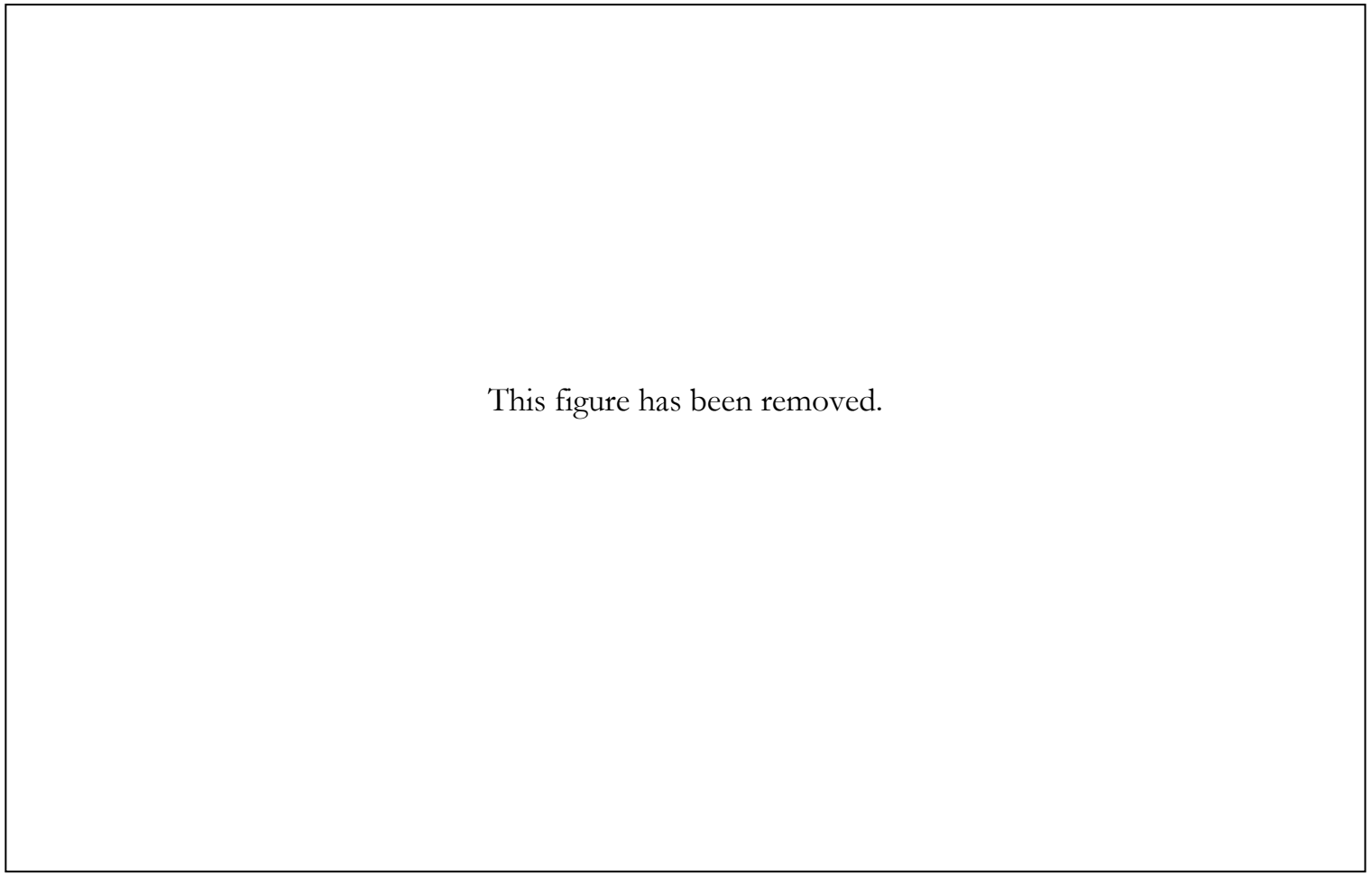
Map 3: Key map for detailed site maps following



Map 4: Location of Aboriginal sites within and adjoining the Mid-West Option



Map 5: Location of Aboriginal sites within and adjoining the Mid-West Option



Map 6: Location of Aboriginal sites within and adjoining the mid-west Option

This figure has been removed. **Plate 1: Scarred tree 7825-0371 VAHR**	This figure has been removed. **Plate 2: Scarred tree 7825-0372 VAHR**
This figure has been removed. **Plate 3: Scarred tree 7825-0386 VAHR**	This figure has been removed. **Plate 4: Scarred tree 7825-0396 VAHR**
This figure has been removed. **Plate 5: Scarred tree 7825-0398 VAHR**	This figure has been removed. **Plate 6: Scarred tree 7825-0399 VAHR**

Number of Sites Containing Ancestral Remains	Landform	State
>3	Sand Bank	Victoria
>2	Lunette	Victoria
1	Recent Alluvial Plain	Victoria
1	Lowland Plain	Victoria
12	Unknown	New South Wales

Table 3: The number of human burials (ancestral remains) found in the search area if NSW and Victoria and the landforms on which they are situated.

A previous study by Pardoe (1998) investigated the distribution, sex and grave goods of burials in far north Victoria and southern New South Wales. Pardoe (1998: 7) found that burials on "..sandy country, single burials are very common. Most sand dunes have one or a few graves". Further, single burials are often found in proximity to dense scatters of stone tools and hearths, which are all buried at different stratigraphic levels that cover huge time spans (Pardoe 1998: 7). At larger cemeteries containing many burials, the remnants/evidence of campsites, revisited over long periods of time, are absent (Pardoe 1998: 7). Pardoe (1998) found that burials in proximity to the Murray River were even numbers of men and women.

The assessment carried out in 2012, showed that there was a high likelihood that locations containing human ancestral remains could be found in the sand hill that is traversed by the Mid-West Option. Although the sand hill has been disturbed by sand extraction, the latter activity has not occurred over the entire area of the sand hill. In the area around Echuca, human ancestral remains are more commonly found in sand hills than in other locations. The possibility that human remains may also be found on the lowland plain cannot entirely be discounted, however. A single burial was found on the lowland plain during construction of the Echuca railway bridge during the late nineteenth century.

2.1.6. Previous Archaeological Work in the Study Area

There have been a number of previous archaeological studies in the Study Area/geographic region of the township of Echuca . Early archaeological research in the region tended toward broad regional studies of the Murray River floodplain i.e. Thorne (1975), Nelson (late 1980s), Craib (1991), and Pardoe (1995) however, more recently there have been a number of archaeological studies, including Cultural Heritage Management Plans, for proposed developments within the geographic region. A synthesis of the previous archaeological studies in the geographic region most relevant to the current Mid-West Option is presented below.

Previous archaeological research in the geographic region and the broader Murray River floodplain has provided evidence of human occupation dating to at least 30,000 years (Pardoe 1995).

Archaeological excavations by Alan Thorne at Kow Swamp, 50 km north-west of Echuca in the central Murray Valley, between 1968 and 1972 recovered the partial skeletal remains of more than 22 individuals (Thorne 1975, 1976; Thorne and Macumber 1972). Radiocarbon dates obtained dated to between 6500 BP -13,000 BP. The Kow Swamp remains are consistent with well dated skeletons like Nacurrie 1 and support a terminal Pleistocene date for some of the burials. Several years ago the Kow Swamp skeletons were reburied at the request of Aboriginal communities in northern Victoria.

After 30 years the age of the Kow Swamp burials, particularly KS 9 which was the only burial excavated in situ, has recently been revisited. Stone and Cupper (2003) report optically stimulated luminescence (OSL) dates for Kow Swamp which they argue are at odds with the published radiocarbon dates. Their OSL dates indicating to them that the cemetery was in use between 22,000 and 19,000 years ago.

A recent synthesis of archaeological information on the development of Aboriginal society along the cental Murray over the past 30,000 years ago is provided by Pardoe (1995). He argues that site locations and contents reveal that lakes have always been 'nodes for occupation and group affiliation' for the region. This pattern is particularly evident after 16,000 years ago with the development of shell middens. The most dramatic changes occur 7000 years ago with the development of large numbers of social groupings along the Murray, which Pardoe argues is a response to the establishment of rich riverine resources. Pardoe argues that increased social differentiation and territoriality is reflected in a decrease in skeletal size caused by localised gene pools, the use of cemeteries, headbinding and tooth avulsion as related markers of group association (Pardoe 1995). Webb later noted that bone pathologies on burials within the last 1000 years in the Central Murray reveal patterns consistent with a high and segregated population. Webb states that late Holocene stresses in Aboriginal skeletal remains from the Central Murray are a reflection of the 'the health of a large, sedentary population intensifying its economy to feed itself' (Webb 1995).

In the late 1980s, an archaeological field survey on the floodplain of the Murray River within and around the present Mid-West Option was carried out by Gary Nelson, a former Aboriginal site officer with the former Victoria Archaeological Survey (VAS). Yorta Yorta Nations Aboriginal community representatives stated that during this survey, a number of scarred trees had been recorded; however, it appears that these trees were not registered with either the VAS or OAAV.

In 1989, Weaver undertook an archaeological assessment of a proposed pipeline between Kyabram and Echuca. It was predicted that likely site types would be mounds located in 'undisturbed areas of bushland, creek banks and high, dry areas in swamp land'. A survey of the route later confirmed this site prediction model, with two artefact scatters, five isolated artefacts and five scarred trees located.

Craib's (1991) study of the Moira, Millewa and Gulpa State Forests resulted in the recording of 149 sites comprising 68 cultural deposits, 61 scarred trees, 15 shell middens, 2 cemeteries, 2 traditional areas and only 1 stone artefact scatter. High site densities were noted along watercourses (1.5/km) whereas site densities for floodplains were extremely low and consisted of mostly scarred trees.

Bell (2005) conducted an investigation of the proposed residential Wharparilla estate approximately 1km west of the current Mid-West Option. The archaeological survey located four scarred trees on the Murray River floodplain. Bell considered that poor ground surface visibility obscured archaeological sites, and land modification activities associated with European activities within the Mid-West Option would have severely disturbed Aboriginal archaeological sites.

Rhodes (2008) prepared a Cultural Heritage Management Plan to a complex assessment for a proposed footbridge and pedestrian pathway crossing the east and west banks of the Campaspe River at Anstruther Street, Echuca. No Aboriginal cultural materials or evidence of Aboriginal archaeological sites was found in either the test pit or the augur holes. The excavation of the test pit demonstrated that the soil at the site of the screw pile on the east bank of the Campaspe River is extensively disturbed. The soil in the test pit was comprised entirely of fill (Rhodes 2008: iv).

Rhodes (2009) prepared a Cultural Heritage Management Plan to a complex assessment for a proposed footpath and footbridge linking Eyre Street to Campaspe Boulevard and crossing the Campaspe River. No Aboriginal archaeological sites were identified during the assessment.

Young and Rhodes (2009) prepared a Cultural Heritage Management Plan to a complex assessment for a proposed shared walking and cycling track along the west bank of the Campaspe River between Anstruther Street and Warren Street, Echuca. This path alignment terminated near the eastern end of the Mid-West Option in Warren Street. A single Aboriginal archaeological site, a scarred tree was identified during the standard assessment. The scarred tree was registered with the VAHR as River Walk Scarred Tree 1 (7825-0406 VAHR) and is a grey box scarred tree located on the alluvial flat of the west bank of the Campaspe River, Echuca. No Aboriginal cultural materials or evidence of Aboriginal archaeological sites was found in either the test pit or the auger probes. Glass (clear and brown beer bottle) was consistently found in the top 400mm of the auger probes. This suggests that the top 400mm of the soil profile is likely to be recent alluvium deposited in historical flooding events (Young and Rhodes 2009: vi).

Thus, previous archaeological research has shown that the geographic region has been occupied by humans for at least 30,000 years. Human occupation in the geographic region has been consistently related to the proximity of fresh water sources. Indeed, of the many previous archaeological studies undertaken in the geographic region, the vast majority has concluded that a strong correlation exists between proximity to major watercourses and Aboriginal archaeological sites. It has been shown (Craib 1991 and Rhodes 2000) that in close proximity to major watercourses Aboriginal archaeological sites are more numerous and the site types more varied, whereas on the floodplain sites are less numerous and scarred trees tend to be only site type represented. The most recent archaeological research in the geographic region (Bell 2005, Rhodes 2008, Rhodes 2009 and Young and Rhodes 2009) have commented on the high level of ground disturbance in close proximity to the major watercourses of the Murray River and the Campaspe River in the area around Echuca.

2.1.6.1 Previous Investigations for Road Options for the Second Murray River Crossing in Echuca

Archaeological Surveys in 2000

In 2000, Rhodes surveyed part of the land within the current Mid-West Option on the NSW and Victorian sides of the Murray River during an assessment for three potential road options for a second Murray River Crossing (Terra Culture Pty Ltd, 2000). Part of the current Mid-West Option in NSW was surveyed during the 2000 fieldwork. On the section of the mid-west option in NSW, the survey found that the area had been extensively disturbed by earthworks, including the construction of drains which criss-cross the area and the construction of earth levees (TerraCulture Pty Ltd, 2000). The native vegetation across much of this area was regenerated Eucalypt woodland, with very little understorey. No Aboriginal sites were located during the survey. It was considered highly unlikely that significant Aboriginal sites would have survived in this area, due to the extent of ground disturbance on the floodplain. There are no specific landforms of high archaeological significance, such as sand hills, within this area.

On the Victorian side of the Murray River, it was found that there is a high probability that Aboriginal archaeological sites would be found, particularly on the floodplain of the Murray River. Site types are most likely to consist of scarred trees and shell middens. In addition to this, the sand hill on which Warren Street is located and the sand hill to the north of the former Echuca College were identified as being areas of high archaeological sensitivity for Aboriginal human burials.

Rhodes (2000) generated a site prediction model for the Murray River floodplain which is as follows:

- There will be higher density of archaeological site types close to the banks of the Murray River and Campaspe River. This site distribution may be partly a reflection of post-contact land clearance during the nineteenth century.
- There will be a greater range of archaeological site types and complex occupation sites near river banks including scarred trees, shell middens, mounds and human burials. Land clearance may have disturbed sites.
- Scarred trees are likely to occur on all landforms.
- Human burials may be located near river banks
- Aboriginal occupation sites are most likely to date from the mid-Holocene (5000 years ago).

Results of Corridor Survey for the Mid-West Option, November 2007

An archaeological field survey of a broad corridor for the Mid-West Option was conducted between 20-21 November 2007. The field team comprised Bob Adams and Alan Beavis from VicRoads, Damien Morgan Bulled, Travis Morgan and Uncle Col Walker from the Yorta Yorta Nations Aboriginal Corporation, Joe Day from the Moama Local Aboriginal Land Council, and David Rhodes and Boheme Rawoteea from Heritage Insight Pty Ltd. On 20 November, the survey was conducted in exceptionally hot weather, with temperatures in Echuca reaching 43°C.

Within Victoria, the Yorta Yorta Nations Aboriginal Corporation is the Registered Aboriginal Party for the region, in respect of the *Aboriginal Heritage Act 2006* and the *Aboriginal Heritage Regulations 2007*.

Prior to the field assessment commencing, a meeting was held with VicRoads and Aboriginal community representatives, to discuss the purpose of the walkover, a description of the study corridor under consideration and any local knowledge held by the Aboriginal community representatives in relation to the area. All of the Aboriginal communities expressed some concern about the section of the study corridor which crossed the remnant sand hill between Echuca College and the tennis courts north of Warren Street.

'Moama' in the Yorta Yorta language, means 'burial ground' and there have previously been a number of Aboriginal human burials found within the local area. Damien Morgan-Bulled also pointed out that another sand hill existed to the north of the former Echuca College, part of which was close to the southern boundary of the study corridor. Damien also stated that there was a well-preserved example of a scarred tree (not impacted by the current option) with a dual scar near the base of the Sandhill.

Aboriginal human burials frequently occur in the soft, sandy soils of sand hills on the alluvial plain. These landforms are considered to be of high potential to contain Aboriginal archaeological sites generally and of particularly high potential for human burials. Human burials are of very considerable cultural and spiritual significance to Aboriginal people.

David Rhodes from Heritage Insight Pty Ltd also pointed out that there may be some possibility of historic Aboriginal and non-Aboriginal burials occurring outside the grounds of the existing cemetery.

A total of nineteen Aboriginal archaeological sites, all of which were scarred trees, were located along or near the Mid-West Option within Victoria. All of the archaeological sites occurred on the floodplain of the Murray River. Thirteen of the nineteen scarred trees were assessed as being in good condition and one in

fair to good condition. Two of the scars were on dead (standing) trees and one was on a tree which was dying.

In most cases, the scars, caused by the removal of bark for the manufacture of technological items, shelters and canoes, were also in good condition, with the heartwood intact.

Four of the trees located contained multiple scars and one contained a scar and toeholds. The majority of scars on live trees were on grey box or unidentified box trees, and only one was found on a red gum.

The sand hill to the north of the former Echuca College was also inspected closely. This sand hill contains a remnant stand of native Murray Pine. Ground surface visibility on the sand hill was variable, and was generally around 100% where there had been no regeneration of the understorey vegetation. Some of the sand hill had been subject to sand mining in the past, but the majority was fairly intact, although there was some surface disturbance across the entire area. The main body of the sand hill and the Murray Pines were avoided by the Option.

Two scarred trees (7825-0370 VAHR and 7825-0384 VAHR) were located near the base of the north side of the sand hill. Site 7825-0384 is situated on the sand hill proper, but 7825-0370 is on the floodplain immediately north of the sand hill. Site 7825-0370, is a scarred tree with multiple scars, which was shown to the consultants by Damien Morgan-Bulled.

The majority of the scarred trees were clustered between the Murray Valley Highway and the Campaspe River (sites 7825/0376 – 7825/0383 VAHR) and between the sand hill north of the Secondary College and the west bank of the Murray River (7825/0370 – 7825/0374 and 7825/0385 – 7825/0387 VAHR). Two sites (7825-0369 and 7825-0375 VAHR) were situated less than 50m from the south bank of the Campaspe River.

There was considerable earth disturbance found along part of the option, which was caused by a large and recent landfill site situated north of Warren Street. The landfill has been placed in a depression formed by a flood runner, and there has also been excavation around the edges of the landfill site. Nonetheless, there were still several mature native trees within the landfill and one scarred tree (7825-0375 VAHR) was found on the north edge of the landfill site.

Results of the Archaeological Survey of the Mid-West Option, April 2008

An archaeological field survey of a revised Mid-West Option was carried out on 2nd April 2008. The survey was carried out by David Rhodes and John Young from Heritage Insight Pty Ltd, Uncle Col Walker from the Yorta Yorta Nations Aboriginal Corporation and Bob Adams and Alan Beavis from VicRoads.

The survey found that much of the land within the study corridor had undergone substantial ground disturbance.

The route of the road option along Warren Street was extensively disturbed. Warren Street abuts urban areas to the north and larger rural residential properties to the south. Underground services, including sewer and stormwater have been laid along either side of the road.

Where the option departs Warren Street, it crosses a vacant allotment on which a residence had previously been constructed and removed. The allotment has been graded and filled to raise the site above flood level.

There has also been excavation on the property to the north of Campaspe Esplanade, including excavation of dams and holes for dumping rubbish.

The land surface near the south bank of the Campaspe River was less disturbed, although large trees on the river bank have been logged in the past and there is considerable erosion. Significantly, there is a natural levee above the river bank; although ground surface visibility was good in this area and no evidence of surface sites was located on the levee, this landform element still has some potential to contain buried archaeological sites.

To the north of the Campaspe River, the option crosses the site of the former Echuca College and western extremity of the Echuca Lawn Tennis Courts. The former Echuca College site is an area of land which has undergone extensive disturbance, including excavation to create level sites for buildings and playing fields. The tennis courts have been created by partial excavation into a sand hill to the north of the secondary college.

The study corridor crosses a small section of the sand hill to the north of the former Echuca College. The sand hill, as discussed in Section 3.2, is a source bordering dune possibly associated with an ancestral course of the Murray or Campaspe Rivers. No surface evidence of Aboriginal archaeological sites was noted on the sand hill, but this area was assessed as having a very high potential to contain buried Aboriginal archaeological sites and human burials.

To the north of the tennis courts, the study corridor passes through a short section of woodland before connecting with an existing vehicle track. Two Aboriginal scarred trees (7825/0371 and 0387 VAHR) were recorded in the 2007 survey around 100m to the east and west of the study corridor at this point (see Figure 2).

There has been considerable ground modification on the south bank of the Murray River in the vicinity of the boat ramp. The point where the study corridor crosses the Murray River has been used as a formal car park and has been levelled.

Two new Aboriginal archaeological sites, both scarred trees, were found during this assessment. Site 7825-0395 VAHR was a scar on a dead tree on the north side of Campaspe Esplanade. Although the tree was dead, both the scar and the tree were in good condition. Site 7825/0396 VAHR is a scar on a live grey box, approximately 100m west of the study corridor and north of the tennis courts and situated close to a scarred tree (7825-0387 VAHR) recorded during the 2007 field survey. Although the scar on the tree extended to ground level, it was recorded because of the regularity of the scar shape and regrowth around the scar, and also because it appeared that soil had accumulated around the base of the tree, covering the base of the scar. The soil has most likely been pushed up from vehicle tracks which have been graded on the floodplain immediately in front of the tree.

Results of the Archaeological Survey, January 2009

The entire Mid-West Option was again surveyed between 20-21 January 2009 by David Rhodes and John Young from Heritage Insight Pty Ltd, Wade Morgan from the Yorta Yorta Nations Aboriginal Corporation and Phil Hudson from the Moama Local Aboriginal Land Council.

The option surveyed in January 2009 was largely the same as that surveyed in April 2008, but with the addition of a roundabout immediately west of the intersection of the Murray Valley Highway and Warren

Street and a reduction in the area potential impact on the sand hill. The option had also been moved closer to the Victoria Park caravan park than the one surveyed in 2008.

A total of 8 new scarred trees were recorded during this field survey. These sites were registered with OAAV as 7825-0398 to 7825-0405 VAHR. All of these scarred trees were within or in close proximity to the edge of the study corridor. Two of the scarred trees were situated in or near Warren Street (sites 7825-0398 – 0399 VAHR), the other five were situated in close proximity to Victoria Park (sites 7825-0400-0405 VAHR). The trees near Victoria Park had not previously been recorded as they were not in the broad corridor and the option surveyed in 2007 or 2008.

Site 7825-0398 VAHR was a scarred tree in the area past the western end of Warren Street, where a roundabout would be constructed at the intersection with the Murray Valley Highway. Site 7825-0399 VAHR was a good example of a cooliman (container) scar on a dead tree near the section of the study corridor at the east end of Warren Street. Although the tree is dead, it appears to be intact and in good condition. The scar was also intact.

A total of five scarred trees were found clustered within the road option to the south of the Echuca Caravan Park (7825-0400 – 0403). One of these trees (7825-0401) was dead, the remainder were in good health. A large canoe tree (7825-0404) was amongst the live trees in this area. A toehold tree (scars from toeholds cut into a tree for the purpose of climbing it) was found approximately 100m north-east of the tennis courts. This tree was recorded as 7825-0405 VAHR.

The area of the sand hill situated north of the former Echuca College and within the study corridor was inspected closely. The surface of the sand hill has been extensively disturbed by vehicle access and some cutting and dumping of rubbish, but there does not appear to have been any deep excavation into the sand hill apart from the excavation for the tennis courts. A small scatter of crushed mussel shell and some scattered charcoal was also noted on this occasion, on the surface of the sand hill. This did not appear to be a definite archaeological site or an intact or *in situ* component of an archaeological site, but could possibly have been derived from a site which was destroyed during removal of surface sand in the past. This was not recorded as an archaeological site, but could be indicative of the presence of similar buried sites in the undisturbed portion of the sand hill.

The cut through the sand hill that was made for the tennis courts, has left a small soil section exposed on the north side of the sand hill. While the cutting is partly overgrown by grass and does not appear to contain any cultural remains, it does indicate that there is approximately 2 metres of undisturbed sand below the existing disturbed ground surface.

Results of Archaeological Surveys, 2011

During 2011 Heritage Insight was commissioned by VicRoads to conduct field assessments of a new study corridor and four options (2A – 2D) for the second Murray River Crossing. The first stage of survey was a survey of a broad corridor, which was conducted on 30/5/2011. Portions of this corridor had been surveyed in previous assessments for the Mid-West Option. During the corridor survey, several new scarred trees were identified. As there was not sufficient time to record them in detail during May, a second field survey was carried out between 12-14/12/2011 to record the scarred trees in detail.

During May 2011 the extent of a large sand hill in the corridor and the locations of former borrow pits were mapped using a differential GPS. This sand hill was identified in an assessment of a road corridor along Warren Street.

The field surveys did not include the options in NSW.

The field survey during May 2011 was carried out by David Rhodes of Heritage Insight Pty Ltd, Neville Hallam from VicRoads Northern Region and Freddie Firebrace from the Yorta Yorta Nations Aboriginal Corporation. The field survey during December 2012 was carried out by David Rhodes and Melissa Dunk from Heritage Insight Pty Ltd and Steven Morrison and Leon Wacker from the Yorta Yorta Nations Aboriginal Corporation.

A total of nine Aboriginal scarred trees were recorded during the field assessment. These sites were registered with OAAV as sites 7825-0418-0424 VAHR. All of the archaeological sites recorded were scarred trees. While some of the scarred trees were dead, all of the scars were in a good to fair condition. One exceptional scarred tree (7825-0422 VAHR) was a dead red gum, containing a large canoe scar plus two smaller canoe scars. This tree was situated near the north bank of the Campaspe River, not far from its junction with the Murray River.

The sand hill was also mapped during the fieldwork. The sand hill extends from the site of the former Echuca College in Crofton Street to Reflection Bend on the Murray River. A section of the sand hill is visible in the bank of the river. The perimeter of the sand hill is approximately 1841.807m. The area of land covered by the sand hill is approximately 10.095ha. A small natural levee on the north bank of the Campaspe River was also noted. This would have been a suitable location for campsites during times of high floodwater.

The sand hill is an area of high cultural heritage sensitivity. Although it has been mined in the past, there are intact portions remaining. The section of the sand hill exposed in the bank of the Murray River at Reflection Bend is over 1m in depth, indicating that the sand extends to well below the surface level of the floodplain. The sand hill contains some of the scarred trees recorded in the current and previous surveys and despite disturbance in the recent past, has a high potential to contain human ancestral remains.

2.1.7. Land Use History of the Mid-West Option

Initial European occupation of the land around Echuca and Moama was associated with the overland cattle routes between Victoria and NSW. Hawdon and Bonney first drove stock through Echuca in 1838, in the area around Radcliffe Street, situated south of the Mid-West Option and then crossed the Campaspe, near the Rotary Park (Coulson, 1995: 4).

The early settlement of Echuca and Moama, stems largely from the rivalry between James Maiden and Henry Hopwood. In 1842, James Maiden was the superintendent of Perricoota Station on the NSW side of the Murray River, and, taking advantage of the traffic to meat and wool markets in Melbourne, constructed a punt across the Murray River, in the present-day town of Moama (Coulson, 1995:20-21). Maiden's punt was located well to the east of the present-day road bridge. In 1846, he constructed the Junction Inn at Moama, which was situated near the punt (Coulson, 1995:20-21).

Henry Hopwood arrived on the Murray River in 1849, and initially attempted to establish a bush inn on the Tattalia Run (Coulson, 1995: 31). This initial venture failed, and in 1852, he obtained a licence for the

portion of the Wharparilla Run in Victoria, on the Junction of the Murray and Campaspe Rivers (Coulson, 1995: 35). Between 1854 and 1857 Hopwood established a punt, inn, two stores, two smiths, a doctor and a bakery to cater for travellers and residents (Coulson, 1995: 35). He subsequently constructed a pontoon and the still extant Bridge Hotel, on the corner of Hopwood Place in Echuca (Coulson, 1995: 38). The locations of Hopwood's original punt and hotel are shown on an 1857 map of Echuca township. The latter were situated within the boundaries of the township of Echuca, around 550 metres south-east of the Mid-West Option.

The area currently known as Victoria Park, which is traversed by the Mid-West Option, was originally part of the Wharparilla Run and was leased by Hopwood. This area of land, between the west bank of the Murray River, the junction of the Campaspe and Murray Rivers and the north bank of the Campaspe River, was known as the 'Junction Paddock' prior to being named Victoria Park (Coulson, 1995: 35, Priestley, 1965: 21). There is no evidence from historical sources, however, that any structures or buildings associated with Hopwood's settlement were associated with the Junction Paddock. The western half of the paddock was used by the police to graze their horses, and some early attempts at cultivation were made in the paddock near the Campaspe River (Priestley, 1965: 21).

The bush park area north of the Victoria Park oval and tennis courts has been used for a range of activities, including cattle grazing, sand mining, a shooting range, timber cutting for firewood, a hockey field and a reserve for social gatherings (Heather Rendle, pers. comm. 14/8/2008). During WWII an army camp was established on the oval and the adjacent bushland was used for training (Heather Rendle, letter to David Rhodes, 20/8/2008).

The original township of Echuca was laid out to the north and east of the Campaspe River and a small section of the corridor passes through the original township area at the western end of Crofton Street. A large extant homestead, grounds and outbuildings, now known as St Leonards, is situated in this area. Parts of the original homestead were built as early as 1857, but all of these are situated east of the Mid-West Option.

The Echuca Cemetery was gazetted in 1860 and the first official burial took place on 30/6/1860 (Heather Rendle, pers. comm. 14/8/2008). However the land containing the cemetery was set aside for cemetery use when the town was first surveyed in 1853 and burials took place within the cemetery between c. 1853-1860 (Heather Rendle, pers. comm. 14/8/2008, Priestley, 1965: 21). The exact location of the graves is not known, but Heather Rendle (pers. comm. 14/8/2008) believes that they would have been within 'The Circle', which is the oldest part of the cemetery. The original access to the cemetery was from Jarman Street to the north (Heather Rendle, pers. comm. 14/8/2008). The current access from Homan Street on the east side of the cemetery was established after the cemetery reserve was expanded to Homan Street (Heather Rendle, pers. comm. 14/8/2008).

Very little historical evidence for past land use has been found for the section of the Mid-West Option which traverses the land between the east bank of the Murray River and Meninya Street in Moama. Anecdotal history provided to Bob Adams of VicRoads by a current Murray Shire Councillor, indicates that this area was repeatedly logged until recently, and that timber milling also occurred within it. There was extensive logging and removal of timber on this land after floods in 1956 and there was possibly some cropping on the site after this time (Heather Rendle, pers. comm. 14/8/2008).

2.1.8. Conclusions from the Desktop Assessment

The main conclusions that can be drawn from the desktop assessment are as follows:

- A search of the OAAV site registry indicated that there are 87 recorded Aboriginal archaeological sites located within the geographic region, the township of Echuca. The vast majority (n=48, 79%) of the Aboriginal archaeological sites located in the geographic region are scarred trees. There are also a small number of shell middens, artefact scatters and mixed sites. The highest density of recorded Aboriginal archaeological sites in the geographic region occurs in close proximity to the junction of the Murray River and the Campaspe River, to the north of Warren Street.
- Previous archaeological research has demonstrated that the Murray River floodplain has been occupied for 30,000 years. From approximately 7,000 years ago there is evidence for large social groupings along the Murray River which is likely a response to the establishment of rich riverine resources. Previous archaeological research has commented on high site densities in close proximity to watercourses and low site densities on the floodplain,, with the majority of sites on the floodplain being scarred trees. In particular, previous archaeological research has commented on the impact of post-contact land clearance on Aboriginal archaeological site distribution. More recent archaeological research, in the form of Cultural Heritage Management Plans, have commented on the high level of ground disturbance in the Echuca township.

- The traditional Aboriginal owners of the geographic region are the 'Wollithiga' clan of the Yorta Yorta people. The lifestyle and culture of the Yorta Yorta people was based on hunting, fishing and collecting food from the variety of food sources in the Yorta Yorta ancestral lands.

- The Mid-West Option is located within two geomorphic units. The western half of the Mid-West Option is located on 'Older Alluvium – Shepparton' and the eastern half is located on 'Riverine Plain Present Floodplain – Murray Valley'.

- The Mid-West Option is located within two geological formations. The western half of the Mid-West Option is located on 'Shepparton Formation' and the eastern half is located on 'Unnamed Alluvium'.

- The Mid-West Option is located on two landforms. The western half of the Mid-West Option is located on 'Plain above flood level' and the eastern half is located on 'Present floodplain'.

- The climate of the geographic region is temperate and would not have placed any restrictions on occupation by Aboriginal people.

- Fresh water was readily available within the geographic region. The Murray River and the Campaspe River both run through the geographic region and would have provided a reliable source of potable water to Aboriginal occupants.

- The vegetation within the geographic region was extremely diverse and would have provided many food and utilitarian resources to Aboriginal occupants.

- The fauna within the geographic region was extremely diverse comprising of terrestrial and riverine species and would have provided many food and utilitarian resources to Aboriginal occupants.

- Stone resources were not readily available within the geographic region and would have been traded for with people to the south of the Yorta Yorta ancestral lands.

- Houses in Warren Street were purchased and occupied by Yorta Yorta and Wemba Wemba people who walked off Cummeragunja Mission in NSW. Some of these houses have remained in the same families. They are situated on the north side of the Mid-West Option and would not be impacted by it, but Yorta people feel that it is important that this history be acknowledged in this report and other reports on the option.

- The land use history of the geographic region indicates that the European activities that would have impacted on Aboriginal archaeological sites are i) initial clearance of native vegetation; ii) cattle grazing; iii) sand mining; iv) grading of the floodplain; and v) construction of the township of Echuca.

The desktop assessment has also concluded that there are 6 scarred trees situated within the ROW for the current Mid-West Option, although one scarred tree may be within +/- 1 m of the ROW.

2.2 Archaeological Site Prediction Model

A site prediction model is intended to be used as a guideline to designing the field survey and as an indication of the types of archaeological sites which may occur in a given area. The site prediction model is tested against the results of the field survey.

The results of the desktop assessment of the geographic region have indicated that the site prediction model developed by Rhodes (2000) for the Murray River floodplain is highly applicable and is as follows:

- There will be higher density of archaeological site types close to the banks of the Murray River and Campaspe River. This site distribution may be partly a reflection of post-contact land clearance during the nineteenth century, which meant that archaeological sites or some specific site types are more likely to survive on land closer to the rivers.

- There will be a greater range of archaeological site types and complex occupation sites near river banks including scarred trees, shell middens, mounds and human burials. Land clearance may have disturbed sites.

- Scarred trees are likely to occur on all landforms within and around the road corridor.

- Ancestral human remains are most likely to be located within the sand hill, but could also potentially be located on the lowland plain, particularly near river banks.

- Aboriginal occupation sites are most likely to date from the mid-Holocene (5000 years ago).

- It is unlikely that there will be landforms associated with older watercourses underlying the floodplain, even though the channel of the river has migrated over millennia and study corridor is near the junction of the Campaspe and Murray Rivers. Lidar data is being checked to assess this issue further.

3.0 Archaeological Field Survey of the Current Mid-West Corridor 2014

An archaeological survey of the study corridor was carried out on 3/9/2014 by David Rhodes (Heritage Insight Pty Ltd) in association with Tyrone Miller and Harry Nelson (Yorta Yorta Nations Aboriginal Corporation). The survey was of a strip of land some 50m in width x 1.27km in length, encompassing 63,500m^2 of freehold land on the south side of Warren Street in Echuca. An additional area of land where a roundabout would be constructed on the north and south sides of Warren Street was also surveyed. The additional area of land is Crown Land on the south side of Warren Street, measuring 81m NW-SE x 214m SW-NE (17,334m^2). Survey coverage is shown on Maps 7-9.

3.1 Survey Methodology

The survey was carried out by the field team walking systematic transects along the small corridor of land shown in Map 8. The study corridor was systematically walked twice, once closer to the edge of the road reserve in Warren Street between the Campaspe River and the Murray Valley Highway and a second time between 25 – 50m from the Murray Valley Highway to the Campaspe River. A wider area of 17,334m^2 of Crown Land at the site of a proposed roundabout on Warren Street was completely surveyed. The survey coverage was slightly wider than the land likely to be acquired on the south side of Warren Street, in order to ensure that any sites near the boundary of this land were identified. This was because the designs for the road corridor had not been finalised at the time of the fieldwork.

The road reserve on the south side of Warren Street was previously surveyed during 2009 and 2011 and was not included in the current fieldwork.

Mature eucalypts were inspected for evidence of cultural scars. Ground surface visibility and ground surface disturbance were also recorded.

New Aboriginal sites comprising scarred trees were located during the field survey. The location of the trees was recorded with differential GPS in the field and details of the scars were also recorded. The sites were subsequently registered with OAAV.

3.2 Survey Results

Three scarred trees were recorded during the field survey. Summary details of the trees are provided in Table 4 and details are also provided in the site gazetteer (Appendix 1). Two of the trees (MWC2-ST10 and MWC2-ST12) are likely to be situated outside land that would be acquired as part of the road corridor. One scarred tree (MWC2-ST11), which is situated on Crown Land, may be close to the edge of a proposed roundabout on Warren Street. The locations of Aboriginal sites recorded during the field survey are shown in Maps 7-9 and Plates 7-9.

This figure has been removed. **Plate 7: Scarred tree 7825-0480 VAHR facing south**	This figure has been removed. **Plate 8: Scarred tree 7825-0482 VAHR facing 340^0**
This figure has been removed. **Plate 9: Scarred tree 7825-0481 VAHR facing 40^0**	

One additional tree on the edge of the road reserve was noted. This tree had two scars, one of which was caused by heartwood growing from the centre of the tree. The tree was on the edge of the road reserve and had also been inspected during 2009. The tree is a live red gum and the trunk had been burnt internally, suggesting that it had been struck by lightning. The largest scar from which the heartwood was growing, extended to the ground surface and there had been no build up of soil around the base of the trunk, indicating that the base of the scar had not been buried by sediment. It would appear that the scar was a split in the trunk that had been caused by a lightning strike in the past, and that the heartwood had grown out of the split in the trunk. The scar on the opposite side of the tree is irregular and the regrowth is uneven, indicating that the latter is not cultural in origin. Photos of the tree and the two scars are shown in Plates 10-11.

VAHR Number	Field Name	Site Type
7825-0480	Mid-West Corridor 2 – Scarred Tree 10	Scarred Tree
7825-0481	Mid-West Corridor 2 – Scarred Tree 12	Scarred Tree
7825-0482	Mid-West Corridor 2 – Scarred Tree 11	Scarred Tree

Table 4: Scarred trees identified during the current field survey

Ground surface visibility over much of the survey area was poor. On the Crown Land there was dense undergrowth in places. On freehold land, the ground surface was generally obscured by heavy grass cover, although it tended to improve in the small areas of open woodland where there was very little understorey

vegetation. Overall ground visibility ranged between 0-10%. Although visibility was poor, there has been considerable land disturbance throughout all of the area surveyed. There is evidence of past logging and milling activities. It is evident that much although not all, mature native trees were felled for timber at some point. Freehold land in along the south side of Warren Street has also been part of land that has been repeatedly ploughed and cropped. The land inspected during the current survey would also have been frequently inundated prior to European settlement and the construction of levees.

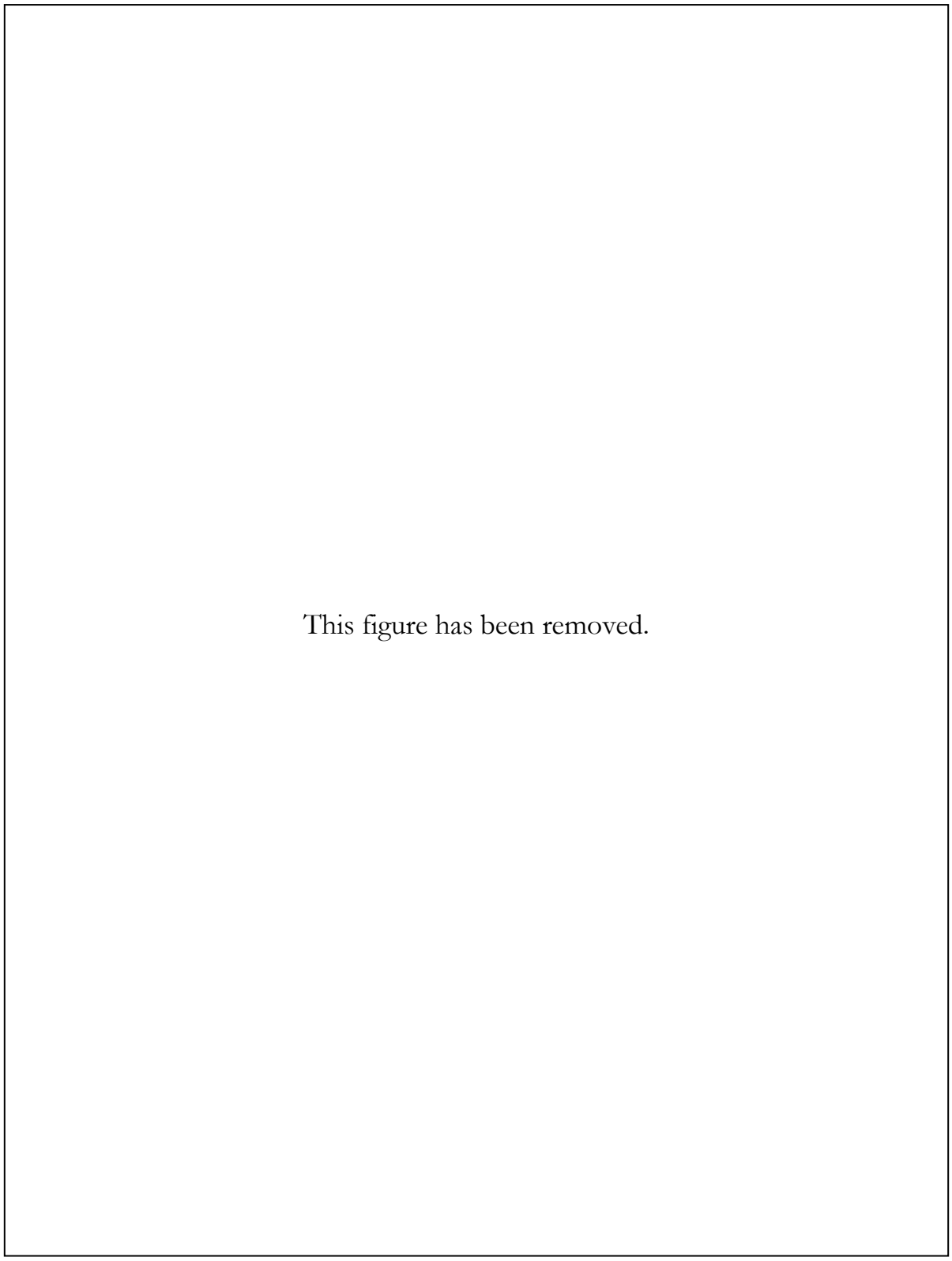
Consequently, although ground visibility was poor, it was considered unlikely that there would be material remains of past Aboriginal occupation sites within the survey area, including sites such as surface artefacts scatters, oven mounds and shell middens. There are no natural levees or higher ground which would have been suitable for campsites. Consequently, although the scarred trees suggest that Aboriginal people utilised resources within the survey area, it is unlikely that campsites were established on much of the floodplain.

The issue of intangible heritage within the study corridor was discussed with Yorta Yorta Nations prior to the recent field survey. No significant places within the entire Mid-West corridor were identified by Yorta Yorta Nations prior to the current assessment. No additional places have as yet been identified by Yorta Yorta Nations.

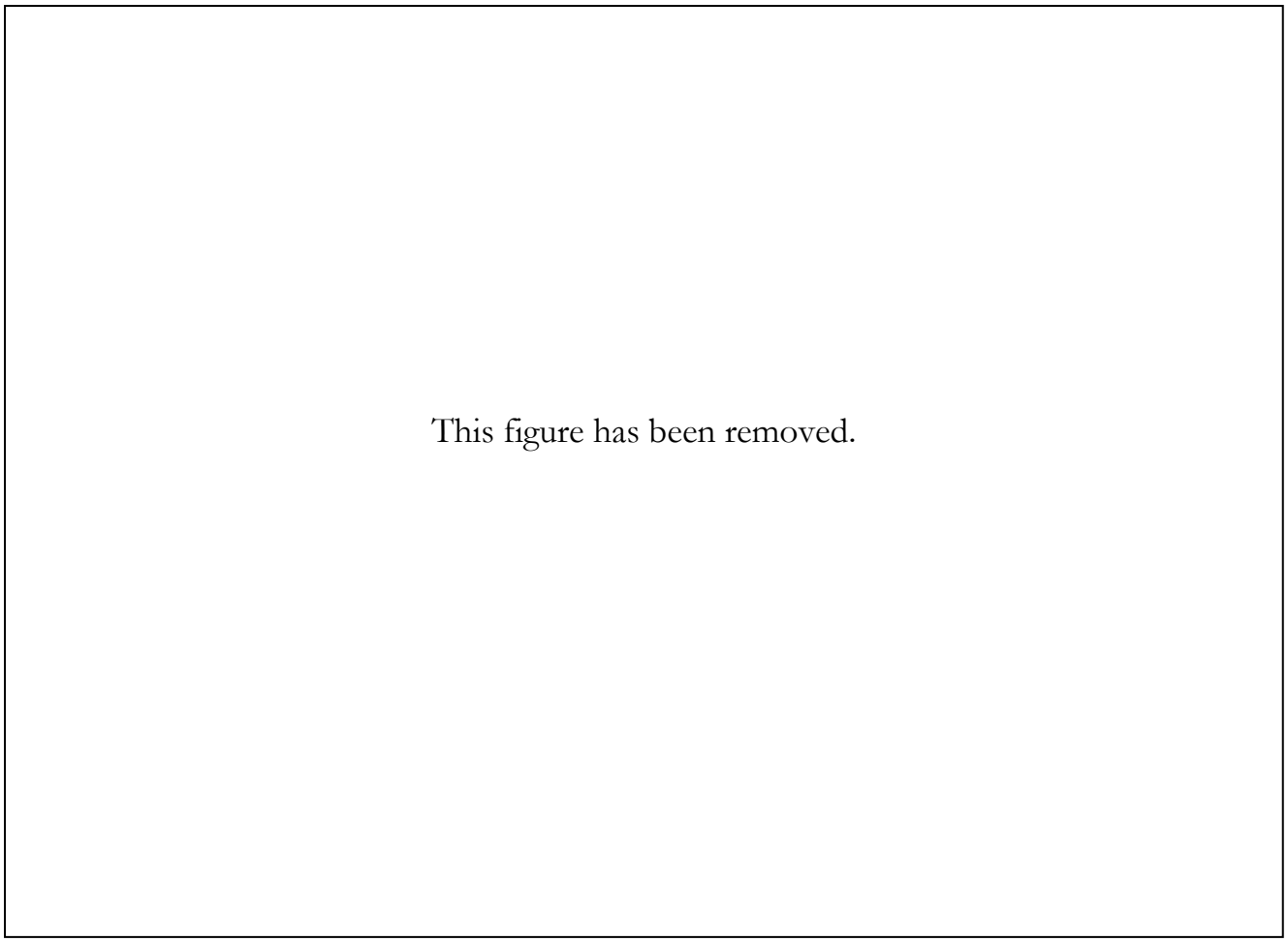
3.3 Sub-surface Testing

Sub-surface testing at potential bridge pylon sites was carried out on the north and south banks of the Campaspe River on 18th – 19th February and 24th – 27th March 2015. No evidence of Aboriginal cultural places was found on the south bank of the river. Two new Aboriginal places, sites 7825-0485 and 7825-0486 VAHR were identified on the north bank of the Campaspe River. Site 7825-0486 VAHR is a single stone artefact found in highly disturbed soil. Site 7825-0485 VAHR is a sub-surface deposit of stone artefacts found on the north side of scenic drive. As 7825-0486 is only a single stone artefact found in highly disturbed soil, further disturbance will not impact on any intact cultural features or material. Analysis of the sites is on-going and recommendations for avoiding these sites and mitigating development impacts have been discussed with the Yorta Yorta Nations and will be included in the CHMP. Mitigation of impacts on these sites has also been addressed in the EES.

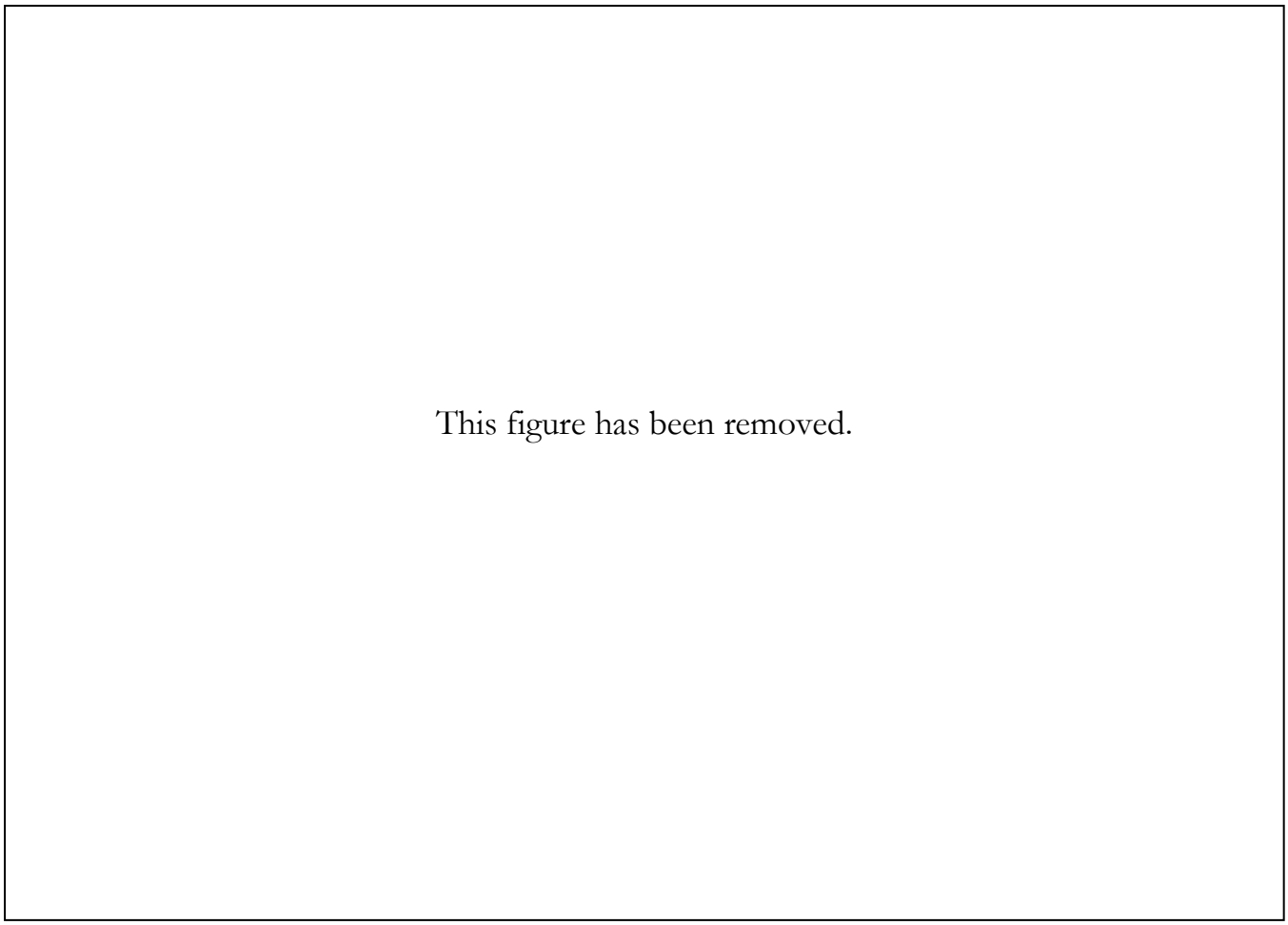
It was also found that the sand hill bordering the former Echuca College site and the Echuca Tennis Courts extends further than was previously identified. The sand hill extends through the former Echuca High School site toward the Campaspe River. Parts of the sand hill where the high school buildings were situated have been excavated to depths of greater than 1 mere in some areas. However, it was also found that the sand hill was less disturbed to the south of the former school building sites, between the building envelopes and Crofton Street/Scenic Drive.



Map 7: Location of survey area and scarred trees recorded during the field survey



Map 8: Location of survey areas and scarred trees recorded during the survey (detail)



Map 9: Location of survey areas and scarred trees recorded during the survey (detail)

This figure has been removed. **Plate 10: Red gum with heartwood growing out of a scar at the base of a tree. It is considered that this scar is natural in origin.**	This figure has been removed. **Plate 11: Scar on the opposite side of the same red gum as that shown in Plate 10. The scar is irregular in shape and although bark has grown over the exposed heartwood, it is also considered that this scar is natural in origin.**

4.0 Archaeological Sites – Assessment of Significance

The significance of the six Aboriginal scarred trees (7825-0371-0372, 7825-0386, 7825-0396, 7825-0398-0399, 7825-0480-482 VAHR within the ROW has been assessed against the Australia ICOMOS Burra Charter Criteria for the assessment of cultural significance (Australia ICOMOS, 1999).

In the Burra Charter, Cultural Significance is defined as:

"..aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of meanings for individuals or groups." (Australia ICOMOS, 1999).

The specific definitions of aesthetic, historic, scientific and social value in relation to assessing cultural significance are included as Appendix 2.

Aesthetic Value

The six Aboriginal scarred trees within the ROW for the Mid-West Option are situated in a remnant although altered natural environment, in which there are several other scarred trees outside the ROW conserved. The trees are, therefore, preserved in a remnant of the natural environment of the floodplain which leaves a visual and sensory impression of the landscape in which they existed, when bark was removed from the trunks by the traditional owners. Although some trees are dead, this does not detract from their aesthetic values, as the dead trees still form an important part of the natural and cultural landscape. The trees, therefore, are assessed as being of high aesthetic value.

Historic Value

The six Aboriginal scarred trees within the Mid-West Option are of considerable historical value to the Yorta Yorta people in particular, in demonstrating historical connection to country. There have been some 70 Aboriginal scarred trees recorded on the floodplain of the Murray River between the Murray Valley Highway, Warren Street and the banks of the Murray River at Echuca north of Victoria Park. The large number of scarred trees surviving at present, after many years of logging and land clearance, is an indication of the intensity to which the floodplain was traditionally used by Yorta Yorta people and of the historical links of the people to this area. Taken in conjunction with the remaining trees on the floodplain, the six Aboriginal scarred trees within the ROW are of considerable historical value to the Yorta Yorta people.

Scientific Value

Assessment of scientific value based on site contents, condition and representativeness is set out in Table 4. All of the scarred trees within the ROW are assessed as being of high scientific value, with the exception of site 7825-0386 VAHR and 7825-0481 VAHR which contains a scar on a dead tree stump that is rotted and in poor condition. Although there are many Aboriginal scarred trees recorded along the banks of the Murray River, the trees recorded during the mid-west assessment are significant as a group of trees still in relatively good condition and clustered close to two large towns (Echuca-Moama) that provide the most extant material evidence of the past use of the land by Aboriginal traditional owners. Most of the trees are alive and the scars in good condition. As noted above, although a commonly occurring site type along the Murray River, their numbers are still dwindling with time and there are comparatively few trees surviving on the riverine plain away from the major streams, such as the Murray and Goulburn Rivers.

VAHR NO	Site Contents	Site Condition	Representativeness	Overall Scientific Significance
7825-0371	3	3	2	7 (High)
7825-0372	3	3	2	8 (High)
7825-0386	3	1	2	6 (Moderate)
7825-0396	3	2	2	7 (High)
7825-0398	3	2	2	7 (High)
7825-0399	3	2	2	7 (High)
7825-0480	2	3	2	7 (High)
7825-0482	2	3	2	7 (High)
7825-0481	3	1	2	6 (Moderate)

Table 5: Assessment of Scientific Value for Aboriginal sites within the Mid-West ROW

Social Value

Many Aboriginal people regard archaeological sites as holding considerable social and cultural value, irrespective of their scientific significance. This arises not only from the material remains which represent a connection to their ancestors, but also from beliefs in the association of archaeological sites and land or country. Protection of archaeological sites and remnant sections of landscape form part of their traditional obligations to looking after country, which were handed down to them by their ancestors.

In studies already carried out for the mid-west and other road options in Echuca and Moama, the Yorta Yorta Nations and other Aboriginal communities, have stated repeatedly that the Aboriginal sites and places on the Murray River, including those recorded during surveys for the different road options, are of considerable social value. They are an important part of the community's history and show a tangible and on-going connection to the country around the banks of the Murray River.

Statement of Cultural Significance

The scarred trees within the ROW as well as those on the surrounding floodplain, are of considerable aesthetic, historical, scientific and social value both to contemporary Yorta Yorta people and other Aboriginal communities, but also to the wider Australian community. The large number of scarred trees and other sites such as shell middens which were recorded during surveys for the new road options, are rare in close proximity to a large rural towns such as Echuca and Moama. Together with the other historical fabric of Echuca, they illustrate the diverse tapestry of the past in the local area.

5.0 Consultation with the Yorta Yorta Nations

Consultation with Yorta Yorta Nations is on-going and will progress throughout the course of the CHMP. To date, three meetings or workshops have been held with Yorta Yorta Nations, the contents of which are summarised below.

A workshop was held on 18/8/2014 between VicRoads, the consultant, David Rhodes of Heritage Insight Pty Ltd and cultural heritage staff and elders of the Yorta Yorta Nations to introduce the current project and review studies conducted on previous options. Cultural heritage staff and Elders from Yorta Yorta Nations had a range of questions relating to the construction and operation of the Mid-West Option which were addressed to VicRoads.

Arrangements were made for additional survey work on the south side of Warren Street at this meeting.

A second workshop was held between VicRoads, the consultant, David Rhodes of Heritage Insight Pty Ltd and cultural heritage staff and elders of the Yorta Yorta Nations on 9/10/2014 to discuss the results of the field survey on the south side of Warren Street and project. This meeting was attended by a number of elders who lived locally. During this meeting VicRoads provided a detailed update on the project and several new issues relating to cultural heritage were discussed. Impacts on three Aboriginal scarred trees were discussed in detail and also impacts on other scarred trees within the Mid-West Option. VicRoads presented an animated visualisation of the road through Warren Street and crossing the Murray River into Moama to the elders. During the course of this second meeting, elders Aunty Melva Johnson, Aunty Barbara Day and Uncle Col Walker entered into discussion regarding Yorta and Wemba people who walked off Cummerangunga Mission in NSW and purchased properties in Warren Street. The elders were keen to see some recognition of this important event in the project. Options for possible interpretation including signage and visual references were discussed. The Yorta Yorta Nations also raised the issue of other aspects of their culture affected by the project, including flora and fauna resources. The possibility of rescuing plants of significance to Yorta Yorta people on the Mid-West Option prior to construction was discussed.

A third and smaller workshop was held with Emily Lodder (VicRoads) and cultural heritage staff of Yorta Yorta Nations on 31/10/2014. During this workshop, options for proceeding with the CHMP were discussed. After reviewing the method of construction for the bridge pylons near the banks of the Murray and Campaspe, it was agreed that a small complex assessment should be carried out at the pylon sites as part of the CHMP. This was due to the inadequacy of monitoring geotechnical works, particularly because of the risk that equipment used for geotechnical testing could easily destroy fragile sites such as shell middens, or ancestral remains. A walkover of the study corridor was carried out with staff who had not previously visited the scarred trees impacted by the Mid-West Option or on the sand hill. Options for moving the scarred trees that would be impacted by construction, including temporary storage at a VicRoads depot and treatment of the timber for borers were discussed. The Yorta Yorta Nations will consider options for relocating the trees. At this stage, the general consensus was that the scarred tree in Warren Street (7825-0399 VAHR) should be moved, rather than being allowed to remain in the road reserve. A meeting with elders to discuss oral history surrounding the Warren Street Houses is planned for the near future. Information from this meeting will be reproduced in the CHMP.

6.0 Statutory Legislation

Statutory legislation is described below. The management recommendations are designed to ensure statutory compliance in the event of the construction for each option. The management recommendations are also based on the outcome of negotiations between VicRoads and Yorta Yorta Nations and a consideration of the design opportunities and constraints for the Mid-West Option.

Blanket projection to all Aboriginal cultural heritage in Victoria is provided by the *Aboriginal Heritage Act 2006*, which is supported by the *Aboriginal Heritage Regulations 2007*. The Aboriginal Heritage Act 2006 provides for:

- The ownership and custody of Aboriginal Cultural Heritage;
- The protection of Aboriginal Cultural Heritage;
- The preparation of mandatory and voluntary Cultural Heritage Management Plans for Aboriginal Cultural Heritage;
- The making of Cultural Heritage Agreements;
- Provision of cultural heritage audits, stop orders and protection declarations;
- Resolution of disputes regarding Aboriginal Cultural Heritage;
- Administration of the Act, including the appointment of an Aboriginal Heritage Council and Registered Aboriginal Parties; and
- Enforcement provisions.

Under Sections 27-28 of the Act, harming Aboriginal cultural heritage or doing an Act likely to harm Aboriginal cultural heritage is unlawful. Penalties may apply for a breach of Sections 27 or 28. In addition, the Act provides for the issue of Stop Orders (Part 6, Division 2) and Interim or On-Going Declarations of Preservation (Part 7 Divisions 1-2) where the Act has been breached.

Harm to Aboriginal cultural heritage is permitted when either a Permit to Harm Aboriginal Cultural Heritage is issued or an approved Cultural Heritage Management Plan (CHMP) which allows for harm to Aboriginal Cultural Heritage is completed. In some circumstances the preparation of a mandatory CHMP is required. These circumstances are set out in Part 2 of the *Aboriginal Heritage Regulations 2007*.

The preparation of a mandatory CHMP is required where an activity is carried out within an area of cultural heritage sensitivity defined in Part 2, Division 3 of the Regulations and where that activity is a high impact activity defined in Part 2, Division 5 of the Regulations.

The CHMP must comply with standards set out in Part 3 and Schedule 2 of the Regulations. Once completed, the CHMP must be submitted for evaluation. Where a Registered Aboriginal Party is appointed, the plan will be evaluated by the RAP. Where no RAP is appointed, the plan is evaluated by the delegate of the Secretary, Department of Premier and Cabinet.

The Planning and Environment Act (1987) and the Campaspe Planning Scheme including clause 15.03-2 also provide some protection for Aboriginal places. An objective of the Planning and Environment Act (1987) is to "conserve and enhance those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value." Clause 15.03-2 states:

"15.03-2 Aboriginal Cultural Heritage"

Objective

To ensure the protection and conservation of places of Aboriginal cultural heritage significance.

Strategies

Identify, assess and document places of Aboriginal cultural heritage significance, in consultation with Registered Aboriginal Parties, as a basis for their inclusion in the planning scheme.

Provide for the protection and conservation of pre- and post contact Aboriginal cultural heritage places.

Ensure that permit approvals align with recommendations of a Cultural Heritage Management Plan approved under the Aboriginal Heritage Act 2006.

Policy Guidelines

Planning must consider as relevant:

- The Aboriginal Heritage Act 2006 for all Aboriginal cultural heritage.
- The findings and recommendations of the Aboriginal Heritage Council.
- The finding and recommendations of the Victorian Heritage Council for post-contact Aboriginal heritage places where relevant.

6.1 Statutory Requirements for this Project

The preparation of a mandatory CHMP will be required by the *Aboriginal Heritage Regulations 2007* for any of the road option selected. The CHMP will be required because;

- The activity area (ROW) is within 200m of a named watercourse, specifically the Murray and Campaspe Rivers. Land within 200m of a named watercourse is an area of cultural heritage sensitivity specified in Part 2, Division 3, Regulation 23.

- .Under section 49 of the *Aboriginal Heritage Regulations 2007*, preparation of a CHMP is mandatory for any project for which an EES has been required.

- The proposed activity is a high impact activity, as defined in Part 2, Division 5, Regulation 44(1)(e), specifically the construction of a road with a length exceeding 100m.

Parts of the Mid-West Option have not been subject to significant ground disturbance as defined in the Regulations along their entire length. Consequently the Mid-West Option is not exempted from a CHMP because they have undergone significant ground disturbance.

There is a Registered Aboriginal Party (RAP) appointed for the region in which Echuca and the road options are located. The RAP is the Yorta Yorta Nations Aboriginal Corporation. Consultation with the RAP is required during the preparation of the CHMP, including consultation regarding the project

methodology and management recommendations. Once the CHMP has been completed, it must submitted to the Yorta Yorta Nations for evaluation. A fee prescribed in the legislation is payable to the Yorta Yorta Nations for evaluation of the plan.

It should be noted that consultation between VicRoads and Yorta Yorta Nations has been on-going throughout the course of this project. The management recommendations presented below have been developed in consultation with Yorta Yorta Nations.

7.0 Scoping Requirements

The Scoping Requirements set out the specific cultural heritage matters that are to be investigated and documented in this impact assessment.

Draft Evaluation Objective - To avoid or minimise adverse effects on Aboriginal and historic cultural heritage values.

Key issues for objective

- The potential for adverse effects on Aboriginal cultural heritage.

Priorities for characterising the existing environment

- Identify and characterise Aboriginal cultural heritage sites and areas of sensitivity within the project area, in accordance with the requirements for the CHMP under the AH Act.

Design and mitigation measures

- Identify and describe potential and proposed design and mitigation measures to address effects on any Aboriginal and historic cultural heritage.

Assessment of likely effects

- Identify and assess the likely effects on Aboriginal and historic cultural heritage resulting from the project.
- Archaeological investigations are to evaluate the significance, location and extent of historic archaeological sites that may be affected by the project works, in accordance with the Guidelines for Investigating Historical Archaeological Artefacts and Sites (Heritage Victoria, 2012).

Approach to manage performance

- Identify in the EES any further methods proposed to manage risks of effects on cultural heritage values, including as part of the EMF (see section 4.10) and resulting residual effects.
- Respond to any relevant requirements under the AH Act, such as preparation of a draft CHMP.

8.0 Assessment of Impacts

8.1 Assessment of Impacts, Mid-West Option

Construction of the road on the Mid-West Option would directly impact on one Aboriginal scarred tree 7825-0386 VAHR. This tree contains a cultural scar on a dead tree stump. The tree would be destroyed by construction of the road if no actions to mitigate the impacts of construction were taken.

Construction of the initial dual land road would not immediately impact on a scarred tree 7825-0399 VAHR in Warren Street, but eventual extension of this road to a four lane carriageway in c. 20 years would result in the destruction of the tree if no mitigation actions were taken. This tree is a dead tree with trunk and branches and contains a definite cultural scar. The tree is rotted out at the base and may likely fall over in the near future. However, it is one of the better examples of a scarred tree found during fieldwork.

One tree 7825-0372 VAHR, a live tree with a cultural scar, requires lopping of overhanging branches when the road is eventually duplicated. This may damage or kill the tree if it is not done in a manner which ensures that the tree remains in good health.

Scarred trees 7825-0371, 0372 and 0396 VAHR would not be directly impacted on by the road construction, but would need to be retained in the road reserve or embankment. All of these trees are live and healthy. If an appropriate design to ensure that the health of the trees is not affected by the construction of the road embankment is not implemented, the long-term health of the trees would be at risk.

One scarred tree 7825-0398 VAHR near the intersection of Warren Street and the Murray Valley Highway is within the Mid-West Option but would not be impacted, since it would be retained within a roundabout.

These trees are shown in Plates 1-6.

The road would not impact on the sand hill due to the use of a rigid pavement that has been adopted to cross the sand hill. No excavation, other than clearing of surface vegetation, is required to cross the sand hill. The design of the rigid pavement would ensure that the load would be evenly distributed on the sand hill, thereby minimizing potential compression of the underlying sand deposits.

The three scarred trees identified during the current assessment (7825-0480-0482 VAHR) would not be impacted by the road construction as all three trees are outside the road corridor.

The construction of the two river bridges would require installation of driven piles on the banks of the Murray and Campaspe Rivers. Excavation for geotechnical testing at the sites of the bridge piles would be required on or near the banks of the Murray and Campaspe Rivers. The embankments and land within 200m of the river banks are sensitive landforms and areas of Cultural Heritage Sensitivity defined in the *Aboriginal Heritage Regulations 2007* which have a high potential to contain sub-surface sites, including shell middens and ancestral remains. Other flood relief structures located on the flood plain may also use driven piles.

Construction of the road would also require excavation, including stripping of topsoil and, in some cases, the excavation of sediment ponds adjoining the road. Sensitive areas abutting the river banks would not be stripped as the bridge structure extends a considerable distance beyond the banks. Other sediment ponds

would be built up using fill on top of the existing land surface. On the south side of Warren Street, the sediment ponds would be excavated on sections of the alluvial plain that have previously been ploughed and have been regularly inundated in the past by floods. There is a low likelihood that Aboriginal archaeological sites would be present on this section of the floodplain' but any sites to depths of up to 1m may be impacted on by excavation works if they are present.

Temporary sedimentation basins may also be excavated during works. These are required to capture runoff and silt from road construction works. Depending on the location where these are excavated, they may have the potential to impact on Aboriginal cultural heritage. The risks of impacts are highest on the sand hill and on the banks of the Murray and Campaspe Rivers.

8.2 Assessment of Impacts, No Road Option

If the road is not constructed, none of the Aboriginal sites or areas of high sensitivity for Aboriginal sites would be impacted in any way. The dead scarred trees 7825-0372 VAHR and 7825-0399 VAHR would eventually rot and collapse.

8.3 Risk Assessment

8.3.1 Methodology

The risk assessment for the Project included identification and management of Project risks and Environmental risks. Project risks were identified by VicRoads before an environmental risk assessment was undertaken with key specialists. A summary of the Project risks are outlined in Chapter 6 of the EES.

The environmental risk assessment developed for the EES included the development of impact pathways and mitigation measures that could reduce the impact of the Mid-West Option.

A quantitative risk assessment was undertaken with key specialists. VicRoads and key members of the Project Team developed a risk register based upon a detailed understanding of the Project and the preferred option. The risk register was sent to key specialists for review and consideration prior to attendance at a workshop to:

- Review the consequence criteria developed;
- Review the risks identified;
- Identify any additional risks that need to be addressed; and
- Develop detailed mitigation measures.

8.3.2 Risk Significance

The significance of risks were identified having regard to the Consequence Criteria and Likelihood Guide.

Consequence criteria were developed by VicRoads and reviewed by project specialists to define a scale of magnitude from "insignificant" to "catastrophic" risks. The scale of magnitude was based on the spatial area affected and expected recovery time of the value impacted. Accordingly, insignificant consequences were generally situated within a localised area with a recovery time potential within the range of normal variability. Conversely, catastrophic consequence criteria describe scenarios involving a very high magnitude event, affecting a State-wide area, or requiring over a decade to reach functional recovery.

The Consequence criteria for cultural heritage associated with the Project are outlined in Table**.**

Table 6 : Consequence Criteria

Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
Aboriginal Cultural Heritage	*It is not possible to insignificantly affect cultural heritage values*	*Destruction of common occurrence site containing:* *i) a small number of artefacts (<10) or a limited range of cultural materials with no evident stratification.* *Site is destroyed or in a deteriorated condition with a high degree of disturbance with some cultural materials remaining*	*Destruction of common occurrence site containing:* *i) a larger number of artefacts (>10) but limited range of cultural materials; and/or* *ii) some intact stratified deposit remains* *Site in fair to good condition, but with some disturbance*	*Destruction of rate occurrence site (eg. Burnt mounds) containing:* *i) a large number and diverse range of cultural materials; and / or* *ii) largely intact stratified deposit; and / or* *iii) surface spatial patterning of cultural materials that still reflect the way in which the cultural materials were laid down.* *Site in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural materials still reflects the way in which the cultural materials were laid down.*	*Destruction of a site containing:* *i) a burial;* *A response to OAAV identifying that these site types were of high cultural heritage significance and their presence could prevent construction of an alignment*

The significance of the risks were determined having regard to the Likelihood Guide(see Table 7)

Table 7: Likelihood Guide

Descriptor	Explanation
Almost Certain	The event is expected to occur in most circumstances
Likely	The event will probably occur in most circumstances
Possible	The event could occur
Unlikely	The event could occur but is not expected
Rare	The event may occur only in exceptional circumstances

Table 8: Risk Significance Matrix

Likelihood	Consequence Level				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Low	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Negligible	Low	Medium	High	High
Unlikely	Negligible	Low	Medium	Medium	High
Rare	Negligible	Negligible	Low	Medium	Medium

8.3.2.1 Risk Workshop

The Environmental Risk Assessment Workshop was held on 18 September 2014 to consider the risks and mitigation measures that would apply to the preferred option (Mid-West Option). The risk workshop was attended by the flora and fauna, cultural heritage, hydrology, noise, aquatic, traffic and geology specialists. The workshop also included representatives of VicRoads and the NSW Department of Roads and Maritime Services.

Initial discussions at the workshop were held regarding the suggested consequence criteria developed for each of the relevant specialist's disciplines for the Project and was followed by review of environmental risks.

The workshop included review of the Extreme, High and Medium initial risks. As part of the workshop, it was agreed that the consequence criteria or likelihood of some of the initial Medium, High and Extreme risks could be revised. The risk ratings were revised within the workshop and specialists were asked to review the updated risk register as part of their impact assessment to confirm or recommend if any further changes would be required. Table 9 outlines the cultural heritage risks identified for the preferred option.

Table 9: Risk Register

Risk No.	Impact pathway	Description of consequences	VicRoads Contract Specification Section 177 Reference	Planned Controls to Manage Risk (as per Section 177 and Project Description)	Initial Risk			Additional Controls Recommended to Reduce Risk	Residual Risk		
					Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
1	Road impacts on registered Aboriginal scarred tree 7825-0386 VAHR	Destruction of tree	177.A2	Approval of CHMP recommending relocation of tree.	*Moderate*	*Almost Certain*	*High*	Specific management measure relating to relocation of the tree to be agreed with Yorta Yorta Nations.	*Moderate*	*Rare*	*Low*
2	Road impacts on registered Aboriginal scarred trees 7825-0371 VAHR, 7825-0396 VAHR, 7825-0398 VAHR and newly discovered Aboriginal scarred tree 7825-0482 VAHR	Destruction of trees	177.A2	Trees to be retained in road reserve/embankment. Methodology for retention would need to be defined in and approved as part of CHMP. Site 7825-0398 VAHR to be retained in a roundabout at the intersection of the Murray Valley Highway and Warren Street.	*Minor*	*Unlikely*	*Low*	Design road reserve or embankment to protect trees. Ensure road embankment does not impeded drainage to trees or impact on root system. Final design of protective measures subject to approval in CHMP.	*Minor*	*Unlikely*	*Low*

Risk No.	Impact pathway	Description of consequences	VicRoads Contract Specification Section 177 Reference	Planned Controls to Manage Risk (as per Section 177 and Project Description)	Initial Risk			Additional Controls Recommended to Reduce Risk	Residual Risk		
					Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
3	Option impacts on registered Aboriginal scarred tree 7825-0372 VAHR. Tree impacted by lopping of tree branches when road is eventually duplicated.	Destruction of tree	177.A2	Tree to be retained in road reserve/embankment. Tree to be lopped by qualified arborist. Methodology for retention would need to be defined in and approved as part of CHMP.	*Minor*	*Unlikely*	*Low*	Design road embankment to protect tree. Ensure road embankment does not impeded drainage to tree or impact to root system. Ensure tree is lopped by a qualified arborist and that branch lopping does not damage tree. Final design subject to approval in CHMP	*Minor*	*Unlikely*	*Low*
4	Road impacts on registered Aboriginal scarred tree 7825-0399 VAHR when road is duplicated.	Destruction of Aboriginal scarred tree	177.J1	Approval of CHMP recommending relocation of tree.	*Moderate*	*Almost Certain*	*High*	Specific management measure relating to relocation of the tree to be agreed with Yorta Yorta Nations.	*Minor*	*Almost Certain*	*Medium*

Risk No.	Impact pathway	Description of consequences	VicRoads Contract Specification Section 177 Reference	Planned Controls to Manage Risk (as per Section 177 and Project Description)	Initial Risk			Additional Controls Recommended to Reduce Risk	Residual Risk		
					Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
5	Construction encounters previously unregistered ancestral remains	Destruction of Aboriginal ancestral remains.	177.J1	A rigid pavement/concrete slab (or other treatment agreed with Yorta Yorta Nations) must be constructed over the section of sand hill to the north of the former Echuca College subject to approval in the CHMP. Bridge piers must be sunk into the north bank of the Campaspe River south of Scenic Drive and at the bridge abutment at the north end of the bridge. The contractor shall undertake all works under the Contract consistent with the statutory contingency recommendations in an approved Cultural Heritage Management Plan in Victoria, including immediately stopping work and reporting if an Aboriginal cultural heritage burial/place is encountered.	*Catastrophic*	*Unlikely*	*High*	Additional negotiation and approval from Yorta Yorta Nations regarding protocol for protection of ancestral remains. Implement CHMP management measures and recommendations. All work must cease in the area where the remains are found and statutory procedures for reporting the discovery that are contained in the contingency recommendations for the CHMP must be followed.	*Catastrophic*	*Unlikely*	*High*
6	Construction encounters previously unidentified Aboriginal cultural heritage place.	Destruction of Aboriginal cultural heritage place	177.J1	The contractor shall undertake all works under the Contract consistent with the approved Cultural Heritage Management Plan in Victoria..	*Moderate*	*Likely*	*High*	Additional negotiation and approval from Yorta Yorta Nations. Implement CHMP management measures and recommendations.	*Moderate*	*Rare*	*Low*

Risk No.	Impact pathway	Description of consequences	VicRoads Contract Specification Section 177 Reference	Planned Controls to Manage Risk (as per Section 177 and Project Description)	Initial Risk			Additional Controls Recommended to Reduce Risk	Residual Risk		
					Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
7	Construction encounters Aboriginal Cultural Heritage place in sensitive locations, including in the sand hill and river banks of the Murray and Campaspe Rivers.	Destruction of Aboriginal cultural heritage place and potential impacts on site 7825-0485 VAHR identified during sub-surface testing.	177.A2	A rigid pavement/concrete slab (or other treatment agreed with Yorta Yorta Nations) must be constructed over the section of sand hill to the north of the former Echuca College subject to approval in the CHMP. Bridge piers must be sunk into the north bank of the Campaspe River south of Scenic Drive and at the bridge abutment at the north end of the bridge. There must be no disturbance to the Aboriginal Heritage Place 7825-0485VAHR identified during sub-surface testing, other than any disturbance allowed by the CHMP in future. The contractor shall undertake all works under the Contract consistent with the statutory contingency recommendations in an approved Cultural Heritage Management Plan in Victoria, including immediately stopping work and reporting if an Aboriginal cultural heritage burial/place is encountered.	*Moderate*	*Almost Certain*	*High*	Additional negotiation and approval from Yorta Yorta Nations. Implement CHMP management measures and recommendations.	*Moderate*	*Rare*	*Low*

Risk No.	Impact pathway	Description of consequences	VicRoads Contract Specification Section 177 Reference	Planned Controls to Manage Risk (as per Section 177 and Project Description)	Initial Risk			Additional Controls Recommended to Reduce Risk	Residual Risk		
					Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
8	Fill for the road construction is obtained from a source where excavation impacts on Aboriginal sites	Destruction of Aboriginal place	177.J1	Source fill from existing accredited quarry.	*Minor*	*Unlikely*	*Low*	Minimise impacts at known locations through detailed design or construction planning	*Minor*	*Unlikely*	*Low*

8.3.3 Design and Mitigation Measures

In order to mitigate the risks for the Project, standard VicRoads and RMS environmental protection measures and some additional project specific have been identified for incorporation into the Environmental Management Framework (EMF). VicRoads, as the responsible proponent for the construction of the Project, would require the construction contractor to incorporate all of these measures from the Environmental Management Framework into the Construction Environmental Management Plan (CEMP).

Standard protection measures for the cultural heritage impacts that would be adopted for this Project include the following Clauses of the VicRoads DCI contract specifications (Refer to EES Appendix O):

- Clause 177.J1
- Clause 177.A2

There are several additional project specific controls that have been recommended to avoid, mitigate and manage potential cultural heritage effects, reducing residual risks/impacts to an acceptable level. These additional controls and the responsibility for implementing them are outlined in Table and would be included as part of a Cultural Heritage Management Plan.

Table 10: Environmental Management Measures

Risk No.	Risk Description	Management Measures
1	Road impacts on registered Aboriginal scarred tree 7825-0386 VAHR	This scarred tree (Plate 3) is a stump and would be directly impacted by the road option. It is recommended that the stump be removed and re-instated at a location to be agreed with Yorta Yorta Nations and any other relevant management authorities. The tree is largely rotted out at the base and could be carefully removed by sliding an excavator bucket under the base of the tree, while holding the stump upright. The tree removal must be monitored and assisted by representatives from the Yorta Yorta Nations, in consultation with a qualified arborist. After the tree is removed, it must be transported to a location agreed to with Yorta Yorta Nations to undergo conservation treatment (eg. removal of rotted wood and pests, impregnation with pest resistant chemicals, capping of the stump). The tree must then be re-erected at the agreed location, probably on a cement or concrete base. The conservation work and the re-erection of the tree must be carried out or supervised by a qualified arborist in association with Yorta Yorta Nations community representatives.
2	Road impacts on registered Aboriginal scarred trees 7825-0371 VAHR, 7825-0372 VAHR, 7825-0396 VAHR and newly discovered Aboriginal - scarred tree 7825-0482 VAHR	Scarred trees 7825-0371, 0372 and 0396 VAHR are situated in the Victoria Park section of the road. Scarred trees 7825-0371 and 7825-0396 VAHR are situated within the road reserve adjacent a bridge structure and outside the road embankment and must be retained within the road reserve. Scarred tree 7825-0372 must be retained within the road reserve. Scarred tree 7825-0482 VAHR is situated on Crown Land on the south side of Warren Street near an area where a roundabout would be constructed. The trees are all live and the way in which the trees are conserved in the road reserve must ensure the long-term

Risk No.	Risk Description	Management Measures
		health of the tree. Detailed design would need to minimise the extent of earth embankments within the drip line of the trees, through the final positioning of bridge structures. While the design is not yet finalised, it is recommended that the following must occur to help ensure the long-term conservation of the trees: a) The trees must be inspected by a qualified arborist in association with representatives from the Yorta Yorta Nations and their condition assessed, prior to any measures to conserve the trees. The arborist and Yorta Yorta Nations representatives must make an assessment of requirements to conserve the trees. b) The final design of the road embankment around site 7825-0372 VAHR, must ensure that the tree and its root system are not damaged by the weight of soil (load) in the adjacent road embankment and that there is adequate drainage around the tree root system. Any other issues identified by the arborist must be addressed in the design. c) The final design of the road embankment adjacent the trees, must not cause detrimental impacts on Aboriginal scarred trees 7825-0371-0372 VAHR, 7825-0396 VAHR and Mid-West Scarred 7825-0482 VAHR. The final design must be reviewed by an arborist and presented to Yorta Yorta Nations for consideration at least two months prior to construction works commencing. The Yorta Yorta Nations must confirm in writing that the design complies with the management recommendations in the CHMP and that the design avoids harm to the scarred trees. d) The scarred trees must all be fenced with temporary webbing which extends at least as far as the crown of the trees, in order to protect both the trunk and root system. The temporary webbing must be installed prior to construction.
3	Option impacts on registered Aboriginal scarred tree 7825-0372 VAHR. Tree impacted by lopping of tree branches.	Branches would need to be lopped from this tree when the road is duplicated in future as they would overhang the road and pose a risk to vehicles. The tree itself would be retained in the road reserve. Lopping of the tree branches must be carried out by a qualified arborist with the assistance of representatives from the Yorta Yorta Nations. It would be preferable if lopping could be carried out prior to any future construction works for duplication of the road. The lopping of branches must be carried out in such a way as to not endanger the long-term health of the tree.
4	Road impacts on registered Aboriginal scarred tree 7825-0399 VAHR	This is a whole dead tree situated on the south side of Warren Street (Plate 6). It would not be impacted by the initial road construction and may safely be retained in the road reserve in the short term. There are two options for treatment of the tree: a) The tree can be retained in its current position within Warren Street for the immediate future. However, it must be noted that the base of the tree is rotted and although it is not in immediate danger of collapse, it may fall over at some point in the future, before (or if) Warren Street is duplicated.

Risk No.	Risk Description	Management Measures
		If the tree is retained in its current location, a barrier or fence must be erected around the tree, since construction of the road would make the tree considerably more visible and exposed than at present and there would be greater pedestrian access to the tree. Vic Roads, as the agency responsible for maintenance of the road reserve, must ensure that the condition of the tree is monitored regularly (at least once per year) to assess the likelihood of the tree collapsing. If it appears likely, at any point in time, that the tree will collapse, VicRoads must contact the Yorta Yorta Nations to discuss treatment of the tree. It is likely, however, that it would be necessary to move the tree, as it may pose a risk to public safety if left within the road reserve. This is because there would be increased pedestrian as well as vehicle access along Warren Street after the road is built. b) If the Yorta Yorta Nations wish the tree to be moved prior to construction of the road, the removal of the tree must be carried out by a qualified arborist in consultation with and the assistance of representatives from the Yorta Yorta Nations. After the tree is removed, it must be transported to a location agreed to with Yorta Yorta Nations to undergo conservation treatment (eg. removal of rotted wood and pests, impregnation with pest resistant chemicals, capping of the stump). The tree must then be re-erected at the agreed location, probably on a cement or concrete base. The conservation work and the re-erection of the tree must be carried out or supervised by a qualified arborist in association with Yorta Yorta Nations community representatives.
5	Construction encounters previously unregistered ancestral remains.	A rigid pavement/concrete slab (or other treatment agreed with Yorta Yorta Nations) must be constructed over the section of sand hill to the north of the former Echuca College subject to approval in the CHMP. Bridge piers must be sunk into the north bank of the Campaspe River south of Scenic Drive and at the bridge abutment at the north end of the bridge. There must be no disturbance to the Aboriginal Heritage Place 7825/0485 VAHR identified during sub-surface testing, other than any disturbance allowed by the CHMP in future. Additional negotiation and approval from Yorta Yorta Nations regarding protocol for protection of ancestral remains. Implement CHMP management measures and recommendations. All work must cease in the area where the remains are found and statutory procedures for reporting the discovery that are contained in the contingency recommendations for the CHMP must be followed.
6	Construction encounters previously unidentified Aboriginal cultural heritage place	The contractor shall undertake all works under the Contract consistent with the approved Cultural Heritage Management Plan in Victoria.. Additional negotiation and approval from Yorta Yorta Nations regarding protocol for protection of burial sitesImplement CHMP management measures and recommendations.
7	Option impacts on sensitive area (sand hill)	A rigid pavement/concrete slab (or other treatment agreed with Yorta Yorta Nations) must be constructed over the section of sand hill to the north of the former Echuca College subject to approval in the CHMP. Bridge piers must be sunk into the

Risk No.	Risk Description	Management Measures
		north bank of the Campaspe River south of Scenic Drive and at the bridge abutment at the north end of the bridge. There must be no disturbance to the Aboriginal Heritage Places 7825-0485 VAHR identified during sub-surface testing, other than any disturbance allowed by the CHMP in future. The contractor shall undertake all works under the Contract consistent with the statutory contingency recommendations in an approved Cultural Heritage Management Plan in Victoria, including immediately stopping work and reporting if an Aboriginal cultural heritage burial/place is encountered.Additional negotiation and approval from Yorta Yorta Nations regarding protocol for protection of burial sites. Implement CHMP management measures and recommendations.
8.	Fill for the road construction is obtained from a source where excavation impacts on Aboriginal sites.	Fill for the roadworks must be sourced from a licenced existing quarry. Any other fill sources are subject to the provisions in the CHMP.

A cultural heritage management plan must be prepared for the project. Once approved by Yorta Yorta Nations, the CHMP becomes a statutory authorisation in respect of Aboriginal cultural heritage for the works.

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Appendix 1: Aboriginal Site Gazetteer (Sites within ROW)

VAHR No	Aspect	Cultural Materials	Dimensions N-S (m)	Dimensions E-W (m)	Condition	Integrity	Sources of Disturbance	Scarred Tree Data
7825/0371 MST 3	E	Single cultural scar	N/A	N/A	Good – Tree Healthy	Intact	Vehicular and pedestrian visitation, fire disturbance	Tree height (est.): 11m Girth at 1.5m: 2.5m Species: Grey Box HAG:0m Scar length: 3.42m Scar width: 0.45m Regrowth T=11cm M=13cm B=:11cm
7825/0372 MST 4	N	Single cultural scar	N/A	N/A	Good – Tree Healthy	Intact	Vehicular and pedestrian visitation, fire disturbance	Tree height (est.): 10m Girth at 1.5m: ? Species: Grey Box HAG:0.50m Scar length: 0.90m Scar width:8cm Regrowth T=16cm M=16cm B=:16cm
7825/0386 MST 18	NW	Single cultural scar	N/A	N/A	Good – Tree Healthy	Intact	Pedestrian visitation, vehicle, fire disturbance, water erosion	Tree height (est.): 145cm Girth at 1.5m: 1.32 Species: Box (not specified) HAG:0.28 Scar length: 0.50m Scar width: 0.11 m Regrowth T= 9cm M= 11 cm B= 10m

VAHR No	Aspect	Cultural Materials	Dimensions N-S (m)	Dimensions E-W (m)	Condition	Integrity	Sources of Disturbance	Scarred Tree Data
7825/0396 MST-21	N	Single cultural scar	N/A	N/A	Tree healthy – heartwood burnt out of scar	Intact	Adjacent to vehicle tracks	Tree height (est.): 15m Girth at 1.5m: 4m Species: Grey box HAG: 0m Scar length: 1.7m Scar width: 0.33 m Regrowth T= 12cm M= 10 cm B= 23 cm
7825/0398 MST-22	NE	Single Cultural Scar	N/A	N/A	Good Health	Intact	None	Tree height (est.): 20m Girth at 1.5m: 3.05m Species: Grey box HAG: 0.22m Scar length: 3.26 Scar width: 0.40m Regrowth T= 10cm M= 10 cm B= 8 cm 1 possible stone axe mark
7825/0399 MST-23	SW	Single Cultural Scar	N/A	N/A	Tree Dead	Intact	None	Tree height (est.): 10m Girth at 1.5m: 1.72m Species: Unidentified – poss. red gum. HAG: 0.88m Scar length: 0.44m Scar width: 0.15m Regrowth T= 5 cm M= 3.5 cm B= 2.5 cm

VAHR No	Aspect	Cultural Materials	Dimensions N-S (m)	Dimensions E-W (m)	Condition	Integrity	Sources of Disturbance	Scarred Tree Data
7825-0480 MWC2-ST10	N	Single cultural scar	N/A	N/A	Tree healthy	Intact	None	Tree height (est.): 10m Girth at 1.5m: 3.20m Species: Black box HAG: 0.50m Scar length: 1.45m Scar width: 0.37m Regrowth T= 14 cm M= 10 cm B= 12 cm
7825-0482 MWC2-ST11	SE	Single cultural scar	N/A	N/A	Tree healthy	Intact	None	Tree height (est.): 15m Girth at 1.5m: 3.17m Species: Black box HAG: 0.93m Scar length: 1.28m Scar width: 0.21m Regrowth T= 12 cm M= 12 cm B= 10 cm
7825-0481 MWC2-ST12	SW	Single cultural scar	N/A	N/A	Tree dead	Stump only remaining	Logging	Stump height: 1.20m Girth at 1.5m: 3.47m Species: Unidentified – possibly red gum HAG: 0.40m Scar length: 0.34m Scar width: 0.19m Regrowth T= 4 cm M= 5 cm B= 7 cm

Appendix 2: Burra Charter Criteria

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

Historic value is defined as the history of aesthetics, science and society…. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.

Scientific value is defined as "..upon the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute further substantial information."

Assessment of scientific value has been further refined by Bowdler and Sullivan (1984). Scientific value can be assessed by examining research potential and representativeness.

Research potential is assessed by examining site contents and site condition. Site contents also refers to the site structure – the size of the site, the patterning of cultural materials within the site, the presence of any stratified deposits and the rarity of particular artefact types. As the site contents criterion is not applicable to scarred trees, the assessment of scarred trees is outlined separately below. Site condition refers to the degree of disturbance to the contents of a site at the time it was recorded.

Representativeness refers to the regional distribution of a particular site type. Representativeness is assessed by whether the site is common, occasional, or rare in a given region. Assessments of representativeness are subjectively biased by current knowledge of the distribution and number of archaeological sites in a region. This varies from place to place depending on the extent of archaeological research. Consequently, a site that is assigned low significance values for contents and condition, but a high significance value for representativeness, can only be regarded as significant in terms of knowledge of the regional archaeology. Any such site should be subject to re-assessment as more archaeological research is undertaken. Assessment of representativeness also takes into account the contents and condition of a site. For example, in any region there may only be a limited number of sites of any type that have suffered minimal disturbance. Such sites would therefore be given a high significance rating for representativeness, although they may occur commonly within the region.

In this report, numeric values have been provided as an indication of site contents, condition and representativeness.

The site contents ratings used for archaeological sites are:

0 No cultural material remaining.

1 Site contains a small number (e.g. 0–10 artefacts) or limited range of cultural materials with no evident stratification.

2 Site contains:
(a) a larger number, but limited range of cultural materials; and/or

(b) some intact stratified deposit remains; and/or
(c) rare or unusual example(s) of a particular artefact type.

3 Site contains:
(a) a large number and diverse range of cultural materials; and/or
(b) largely intact stratified deposit; and/or
(c) surface spatial patterning of cultural materials that still reflect the way in which the cultural materials were deposited.

The site condition ratings used for archaeological sites are:

0 Site destroyed.

1 Site in a deteriorated condition with a high degree of disturbance; some cultural materials remaining.

2 Site in a fair to good condition, but with some disturbance.

3 Site in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural materials still reflects the way in which the cultural materials were laid down.

The representativeness ratings used for archaeological sites are:

1 common occurrence
2 occasional occurrence
3 rare occurrence

Overall scientific significance ratings for sites, based on a cumulative score for site contents, site integrity and representativeness are:

1-3 low scientific significance
4-6 moderate scientific significance
7-9 high scientific significance

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

The Burra Charter states that "cultural significance may change as a result of the continuing history of the place. Understanding of cultural significance may change as a result of new information."

Although the Burra Charter is more applicable to non-Aboriginal sites and structures, it may be adapted to assess Aboriginal heritage significance. In particular, the views of contemporary Aboriginal people must be taken into consideration when assessing all of the values described above. Ratings for archaeological site contents and condition are given below.