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Aboriginal Cultural Heritage Impact Assessment

Melbourne Metro Rail Authority

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Glossary and Abbreviations

Term	Definition	Abbreviation
Aboriginal Cultural Heritage Impact Assessment	NA	ACHIA
<i>Aboriginal Heritage Act 2006</i>	NA	the Act
Aboriginal historical places	Are generally related to occupation of particular areas after dislocation and interference caused by European occupation of the region. They incorporate a wide range of places, sites and events that are of significance to Aboriginal communities but may not necessarily comprise archaeological deposits. These are, however, considered to be Aboriginal Places under the Act.	NA
Aboriginal Heritage Regulations 2007	NA	the Regulations
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	NA	the Commonwealth Act
Activity area	Means the area or areas to be used or developed for an activity.	NA
Artefact scatters	Generally consist of a small number of artefacts on the surface within the vicinity of a watercourse. Depending upon location in the landscape artefact scatters can have varying degrees of integrity. In areas subject to repeated inundation artefacts can be dispersed across a large area. Artefact scatters that are found in more stable areas are likely to have a fair degree of integrity.	NA
Before Present	Used for scientific dating, and in archaeology, is often used to reflect radiocarbon dates. As the 'present' changes, Before Present has been universally set to 1 January 1950.	BP
Boon Wurrung Foundation Ltd	Aboriginal stakeholder group	BWF
Bunurong Land Council Aboriginal Corporation	Aboriginal stakeholder group	BLCAC
Bunurong Land and Sea Association Inc	Aboriginal stakeholder group	BLSA
Burials	Are generally restricted to cemeteries and reburial sites within the geographic region. Burial practices have varied over time and include flexed, extended and cremated inhumations. Older burials (Pleistocene age) are most likely to be found in the preserved lower lunette sands and sediments around lake systems or coastal areas. Human burials are often found in association with earth mounds and shell middens, and represent a change of function in the site over the passage of time from a living area to an area used solely for the interment of the dead.	NA



Term	Definition	Abbreviation
Central Business District	NA	CBD
Coastal plains with ridges and dunefields (Brighton, Cranbourne)	NA	Coastal plains
Commonwealth Heritage List	NA	CHL
Cultural Heritage Management Plan	Larger developments and many high impact activities in culturally sensitive landscapes can cause significant harm to Aboriginal cultural heritage. The Act prescribes in the Regulations circumstances in which a CHMP would be required for certain types of development or activities located in sensitive areas before they can commence. CHMPs are required to be prepared in a prescribed legal format and would be evaluated by a RAP or if a RAP has not been elected across an activity area, then the Plan would be evaluated by OAAV.	CHMP
Debitage	All the material produced during the process of lithic reduction and the production of chipped stone tools. This assemblage includes, but is not limited to, different kinds of lithic flakes and lithic blades, shatter and production debris, and production rejects.	NA
Department of Economic Development, Jobs, Transport and Resources	NA	DEDJTR
Department of Premier and Cabinet	NA	DPC
<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>	NA	EPBC Act
Environmental Performance Requirement	NA	EPR
Environment Effects Statement	NA	EES
Flake	A stone piece removed from a core by percussion or by pressure. It is identified by the presence of a striking platform and bulb of percussion, not usually found on a naturally shattered stone.	NA
Floodplain	The area covered by water during a major flood and/or the area of alluvium deposits laid down during past floods.	NA
Former swamps and lagoonal deposits (Koo-Wee-Rup, Tobin Yallock, Bass River Delta, Carrum Downs)	NA	Former swamps
Ground penetrating radar	NA	GPR
<i>In situ</i>	A description of any cultural material that lies undisturbed in its original point of deposition.	NA



Term	Definition	Abbreviation
Low density artefact distribution	NA	LDAD
National Heritage List	NA	NHL
Notice of Intent	Notice of Intent to prepare a CHMP	NOI
Office of Aboriginal Affairs Victoria	NA	OAAV
Outlying ridges and hills (Warby Range, Lurg Hills, Howe Range, Mt Dandenong)	NA	Outlying ridges
Plains with poorly developed drainage and shallow regolith (Plains)	NA	Plains
Potential archaeological sensitivity	A part of the landscape that has a likelihood of possessing sub-surface cultural material.	PAS
Quartz	A mineral composed of silica with an irregular fracture pattern. Quartz used in artefact manufacture is generally semi-translucent, although it varies from milky white to glassy (crystal). Quartz can be derived from water worn pebbles, crystalline or vein (terrestrial) sources.	NA
Quartzite	A form of metamorphosed sandstone. It is often white or grey in colour, but can occur in other shades due to mineral impurities.	NA
Registered cultural heritage places	These are Aboriginal archaeological sites, remains or features registered on the VAHR.	Aboriginal Places
Register of the National Estate	NA	RNE
Regulation	NA	r
Registered Aboriginal Party	An Aboriginal group that is registered under Part 10 of the <i>Aboriginal Heritage Act 2006</i> .	RAP
Resource zone	An area of the landscape or part of the environment that provides a resource (be it food or material items such as a source of stone for making artefacts) for Aboriginal people.	NA
Scarred tree	Aboriginal derived scars are distinct from naturally occurring scars by their oval or symmetrical shape and occasional presence of steel, or more rarely, stone axe marks on the scar's surface. Other types of scarring include toeholds cut in the trunks or branches of trees for climbing purposes and removal of bark to indicate the presence of burials in the area. Generally, scars occur on river red gums (<i>E camaldulensis</i>) or grey box (<i>E microcarpa</i>) trees. River red gums are usually found along the margins of rivers, creeks and swamps with grey box on near and far floodplains. Size and shape of the scar depended on the use for which the bark was intended. For example, bark was used for a variety of	NA



Term	Definition	Abbreviation
	dishes and containers, shields, canoes and the construction of huts.	
Section	NA	s
Significant ground disturbance	Disturbance of: a) the topsoil or surface rock layer of the ground; or b) a waterway by machinery in the course of grading, excavating, digging, dredging or deep ripping, but does not include ploughing other than deep ripping.	SGD
Silcrete	Soil, clay or sand sediments that have silicified under basalt through groundwater percolation. It ranges in texture from very fine grained to coarse grained. At one extreme it is cryptocrystalline with very few clasts. It generally has characteristic yellow streaks of titanium oxide that occur within a grey and less commonly reddish background. Used for flaked stone artefacts.	NA
Terraces, floodplains and lakes, swamps and lunettes and their deposits (Lough Culvert, Lower Woody Yallock River, Chain of Ponds, Condah Swamp, Lake Murdeduke and lunette)	NA	Terraces and floodplains
Victorian Aboriginal Heritage Register	A list of all registered Aboriginal cultural heritage in Victoria.	VAHR
Victorian Civil and Administrative Tribunal	NA	VCAT



Executive Summary

This report provides an assessment of the potential Aboriginal cultural heritage-related aspects associated with the construction and operation of the Melbourne Metro Rail Project (Melbourne Metro). The report presents an appraisal of the potential impacts of Melbourne Metro on Aboriginal cultural heritage within the Melbourne Metro study area. Historical cultural heritage issues are related and are addressed in Technical Appendix J *Historical Cultural Heritage*.

Aboriginal Cultural Heritage Context

The Melbourne Metro comprises two nine-kilometre-long rail tunnels from Kensington to South Yarra, travelling underneath Swanston Street in the Central Business district (CBD), as part of a new Sunbury and Cranbourne/Pakenham railway lines to form the new Sunshine-Dandenong Line, including five new stations and associated works.

The Melbourne Metro is located at the junction of the Eastern Plains, Western Plains and Eastern Uplands geomorphological regions. This confluence would have resulted in a diverse and rich landscape for Aboriginal people living in the Melbourne area. In addition, the hydrological history of the Melbourne area – including the numerous swamps, lagoons, coastal regions, rivers and creeks – resulted in a late Holocene landscape that would have provided a rich and varied resource zone for Aboriginal people. The CBD itself would have potentially been an ideal camping location, as it is located on a series of undulating rises above the Yarra River. Historical accounts also state that Aboriginal people camped within or near to the Melbourne area into the 19th century, despite pressures by non-Aboriginal settlers for the removal of Aboriginal people from the area. As such, parklands near the Melbourne CBD (including Fawkner Park) and the South Yarra Mission would have provided potential camping locations for Aboriginal people.

While there has been significant ground disturbance (SGD) within the Melbourne CBD, prior archaeological assessments have indicated that small numbers of Aboriginal stone artefact scatters are still present underneath city buildings. These Aboriginal Places were found through historical heritage excavation and it is possible that further sites would be discovered in much the same manner. Buildings or roadways with footings/basements or bases that descend into sterile deposits, such as clay, are unlikely to contain Aboriginal heritage.

Methodology

The methods employed in the development of this Aboriginal cultural heritage impact assessment included:

- Completion of a desktop assessment, including:
 - Desktop research of the Victorian Aboriginal Heritage Register (VAHR)
 - Identification of the geographic region relevant to this assessment
 - Documentation review (e.g. background literature, geological and environmental conditions)
 - Development of a predictive model of Aboriginal Place types within the geographic region
 - Initial consultation with a range of stakeholders, including Bunurong Land and Sea Association, Bunurong Land Council, Boon Wurrung Foundation, Office of Aboriginal Affairs Victoria and Wurundjeri Tribe Land and Compensation Cultural Heritage Council Incorporated.



- Completion of a standard assessment, including:
 - Archaeological survey of the study area, including examination of ground surface, mature trees and cave, rock shelters or cave entrances in the study area
 - Field survey including identification of potential archaeological sensitivity (PAS) that may require complex assessment and Ground Penetrating Radar (GPR) investigations.
- Completion of a complex assessment (archaeological excavation), at the following locations:
 - Fawkner Park
 - Edmund Herring Oval
 - South Yarra Siding Reserve.

The findings of the complex assessment would be incorporated into a Cultural Heritage Management Plan (CHMP), however, preliminary results indicate that one previously unknown Aboriginal Place has been recorded within the study area.

In addition, areas of historical archaeological potential identified within the historical cultural heritage impact assessment would also be assessed for the presence of Aboriginal cultural heritage material, during historical based test excavations.

Risk Assessment

A risk assessment process was adopted that identified potential construction and operational hazards, impact pathways, consequences to Aboriginal cultural heritage values and likelihood of impacts. Risk to values was determined as the combination of consequence and likelihood. The risk assessment identified initial risk ratings for the following key risk areas:

- Impacts on known or unknown Aboriginal Places as a result of construction activities
- Construction being undertaken in areas of archaeologically sensitivity.

A CHMP commenced on 27 November 2015, with the findings used to inform the risk assessment. The CHMP aims to provide information on the potential for Aboriginal cultural heritage to be present within the Melbourne Metro boundary. A mandatory CHMP is required in accordance with the *Aboriginal Heritage Act 2006* as the Minister for Planning declared that an EES was required to be prepared for the project (section 49 of the Act). As the CHMP is yet to be completed, a preliminary desktop assessment was undertaken as part of this impact assessment, using the same methodology as that required for a CHMP, to inform the EES.

Based on the information collected in this report, the residual risk to Aboriginal cultural heritage values is considered to be low to very low after following implementation of the Environmental Performance Requirements.

Benefits and Opportunities

The key benefits and opportunities arising from Melbourne Metro would include undertaking sub-surface test excavation outside areas of cultural heritage sensitivity, but within areas of potential archaeological sensitivity. The sub-surface test excavation would establish whether Aboriginal cultural heritage is present or absent, which would build on our knowledge of Aboriginal occupation and use of the landscape – both post-contact and pre-contact – and to check the accuracy of the predictive model developed during the CHMP.



Environmental Performance Requirements

The following Environmental Performance Requirement is recommended.

Environmental Performance Requirement

Comply with a Cultural Heritage Management Plan approved under the *Aboriginal Heritage Act 2006* and prepared in accordance with the *Aboriginal Heritage Regulations 2007*.



1 Introduction

This report provides an assessment of the potential impacts to Aboriginal cultural heritage resulting from the Melbourne Metro Rail Project (Melbourne Metro). Related issues associated with historical cultural heritage are assessed within Technical Appendix J *Historical Cultural Heritage*.

1.1 Project Description

The Melbourne Metro comprises two nine-kilometre-long rail tunnels from Kensington to South Yarra, travelling underneath Swanston Street in the Central Business District (CBD), as part of a new Sunbury to Cranbourne/Pakenham line to form the new Sunshine-Dandenong Line.

The infrastructure proposed to be constructed as part of Melbourne Metro broadly comprises:

- Twin nine-kilometre rail tunnels from Kensington to South Yarra connecting the Sunbury and Cranbourne/ Pakenham railway lines (with the tunnels to be used by electric trains)
- Rail tunnel portals (entrances) at Kensington and South Yarra
- New underground stations at Arden, Parkville, CBD North, CBD South and Domain with longer platforms to accommodate longer High Capacity Metro Trains (HCMTs). The stations at CBD North and CBD South would feature direct interchange with the existing Melbourne Central and Flinders Street Stations respectively
- Train/tram interchange at Domain station.

Proposed construction methods would involve bored and mined tunnels, cut-and-cover construction of station boxes at Arden, Parkville and Domain and portals, and cavern construction at CBD North and South. The project would require planning, environmental and land tenure-related approvals to proceed.

1.2 Purpose of the Report

The purpose of this report is to provide an understanding of the Aboriginal cultural heritage present within the Melbourne Metro study area and to identify potential risk, as it relates to Aboriginal cultural heritage. The outcome of this assessment provides context for the risk assessment process and to meet the EES assessment requirements. This report would form the basis of the Cultural Heritage Management Plan (CHMP), specifically the desktop assessment sections.

1.3 Project Precincts

For assessment purposes, the proposed project boundary has been divided into precincts as outlined below. The precincts have been defined based on the location of project components and required construction works, the potential impacts on local areas and the character of surrounding communities.

The proposed precincts are:

- Precinct 1: Tunnels (outside other precincts)
- Precinct 2: Western portal (Kensington)
- Precinct 3: Arden station (including substations)
- Precinct 4: Parkville station
- Precinct 5: CBD North station



- Precinct 6: CBD South station
- Precinct 7: Domain station
- Precinct 8: Eastern portal (South Yarra)
- Precinct 9: Western turnback.

The nine precincts are shown in Figure 1-2.

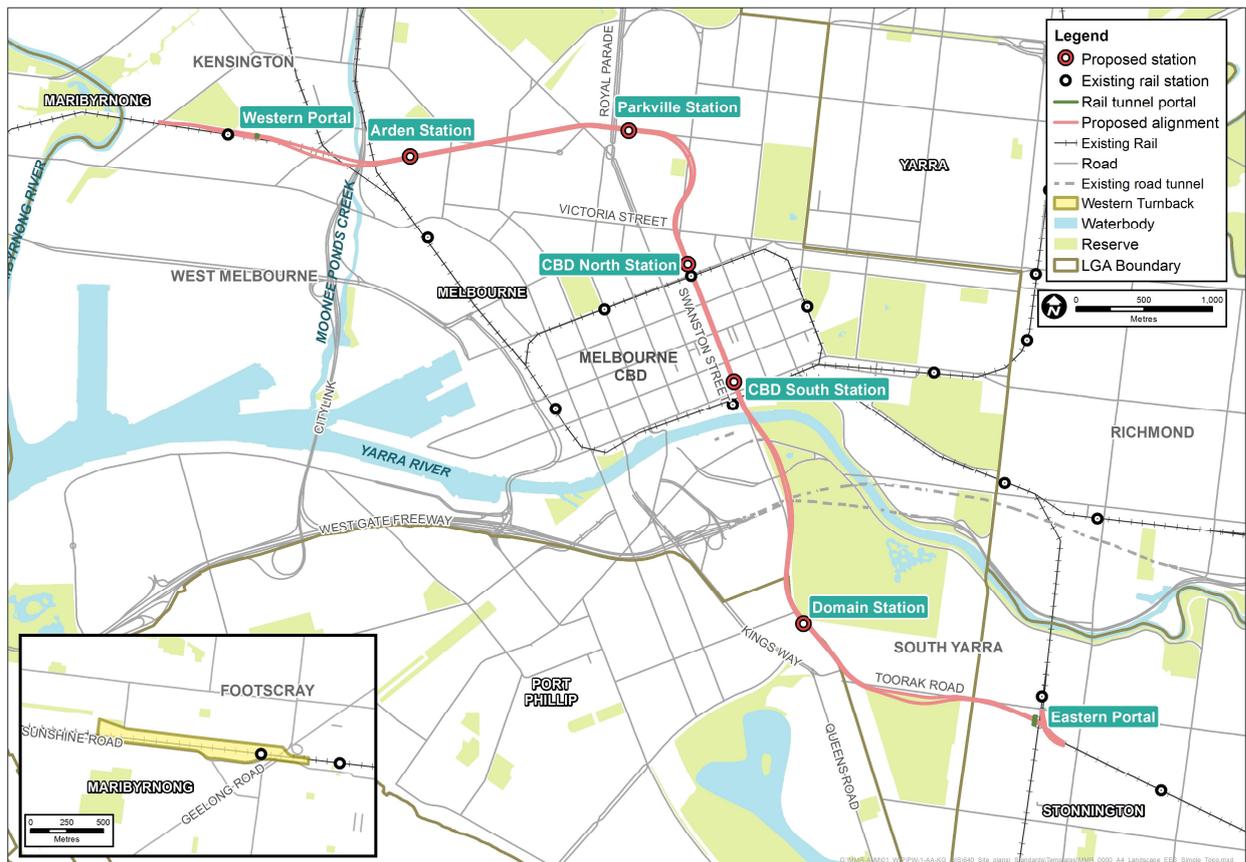


Figure 1-1 Map of the Melbourne Metro alignment and five underground stations

1.4 Study Area

The study area for this assessment has been defined as land falling within the proposed project boundary.

1.5 Benefits and Opportunities

The key benefits for the project would include undertaking archaeological sub-surface test excavation outside areas of cultural heritage sensitivity as defined by the *Aboriginal Heritage Regulations 2007* (the Regulations), but within areas of Aboriginal archaeological potential. The sub-surface test excavation would establish whether Aboriginal cultural heritage is present or absent, which would build on our knowledge of Aboriginal occupation and use of the landscape – both post-contact and pre-contact.

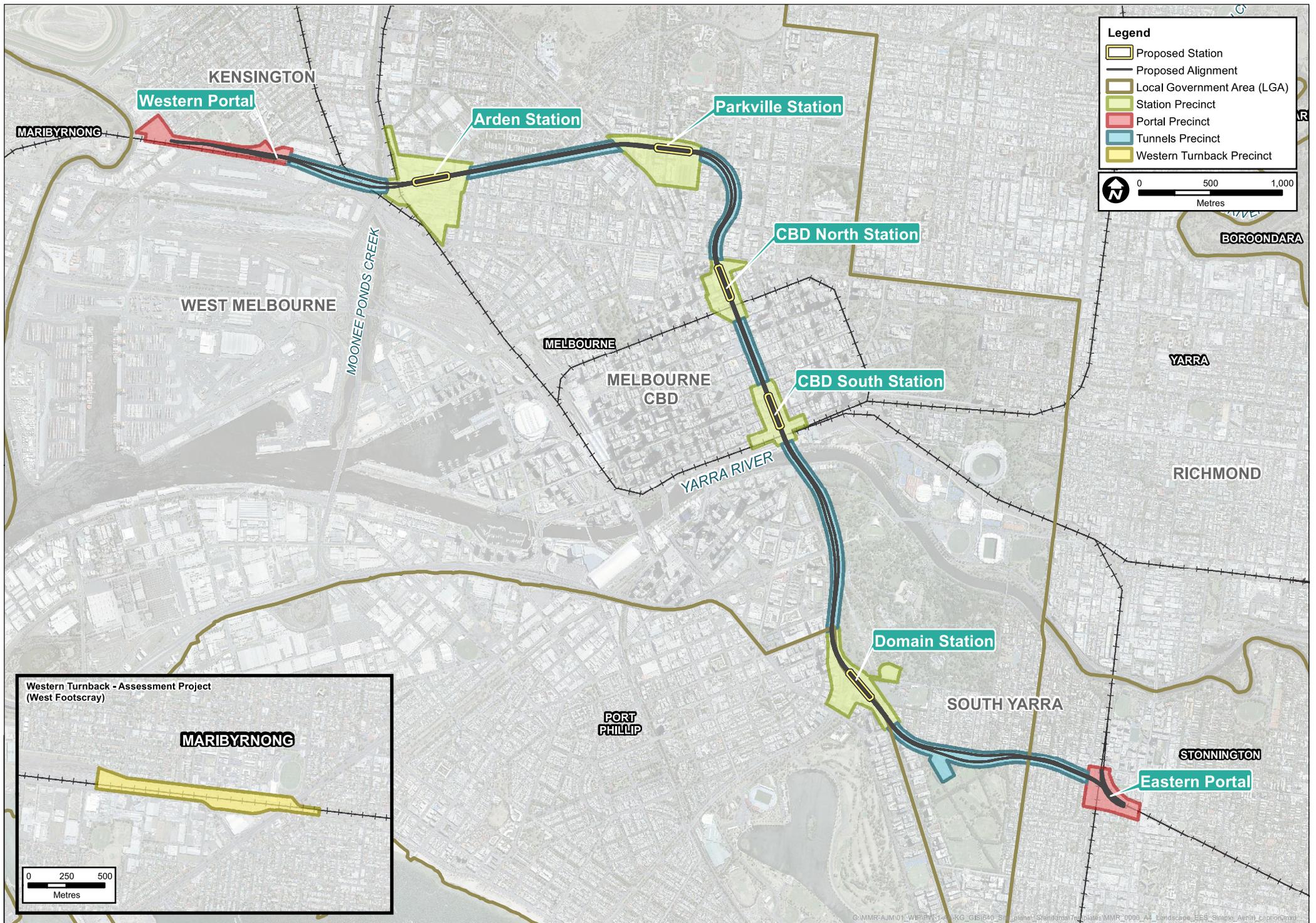


Figure 1-2 Melbourne Metro precincts



2 Scoping Requirements

2.1 EES Objectives

The following draft evaluation objective is relevant to Aboriginal cultural heritage and identifies the desired outcomes in the context of potential project effects. The draft evaluation objectives provide a framework to guide integrated assessment of the environmental effects of the project, in accordance with the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978*.

Table 2-1 Draft evaluation objectives for cultural heritage

Draft EES evaluation objective	Key legislation
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	<i>Aboriginal Heritage Act 2006</i> <i>Heritage Act 1995</i> <i>Planning and Environment Act 1987</i>

2.2 EES Scoping Requirements

The following extracts from the Scoping Requirements, issued by the Minister for Planning, are relevant to the cultural heritage draft evaluation objective.

Table 2-2 Scoping Requirements for cultural heritage

Aspect	Relevant response
Key Issues	<ul style="list-style-type: none"> Potential adverse effects on tangible or intangible Aboriginal cultural heritage values. Preparation of a Cultural Heritage Management Plan (CHMP) under the <i>Aboriginal Heritage Act 2006</i>.
Priorities for characterising the existing environment	<ul style="list-style-type: none"> Identification of Aboriginal cultural heritage sites and values which could be affected by the project. Identification of areas of Aboriginal cultural heritage sensitivity relevant to the project (if any).
Design and mitigation measures	<ul style="list-style-type: none"> Describe and evaluate proposed design, management or site protection measures, which could avoid or mitigate potential adverse effects on Aboriginal cultural heritage or historic cultural heritage values, especially with regard to project construction.
Assessment of likely effects	<ul style="list-style-type: none"> Assess potential effects of the project on identified sites or places of Aboriginal cultural heritage, with due regard for relative levels of significance and possible impact pathways, including vibration.
Approach to manage performance	<ul style="list-style-type: none"> Describe the principles for developing measures to mitigate and manage residual effects on Aboriginal cultural heritage, within the framework of a draft CHMP.



3 Legislation, Policy and Guidelines

Table 3-1 summarises the relevant primary legislation that applies to the project as well as the implications, required approvals and interdependencies, and information requirements associated with obtaining approvals. Descriptions of all relevant legislation are contained in Appendix A of this report.

Table 3-1 Primary legislation and associated information

Legislation / policy	Key policies / strategies	Implications for this project	Approvals required	Timing / interdependencies
Commonwealth				
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	Protects areas and objects that are of particular significance to Aboriginal people. Allows the Commonwealth Minister for the Environment, on the application of an Aboriginal person or group of persons, to make a declaration to protect an area, object or class of objects from a threat of injury or desecration.	Provides for the protection of any intangible or contemporary Aboriginal values related to the Concept Design.	None	Consultation with Traditional Owners
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Establishes the National Heritage List (NHL), which includes natural, Indigenous and historic places that are of outstanding heritage value to the nation.	There are no items listed on the NHL or Commonwealth Heritage List (CHL) that contain known Aboriginal cultural heritage values within the study area.	None	None
State				
Aboriginal Heritage Act 2006	To provide for the protection of Aboriginal cultural heritage in Victoria. To recognise Aboriginal people as the primary guardians, keepers and knowledge holders of Aboriginal cultural	States a CHMP is required for any project requiring an EES.	Approved CHMP	Timing dependent on finalised activity area for CHMP and requirement for sub-surface testing. Statutory timeframe is 30 days for approval/rejection of a



Legislation / policy	Key policies / strategies	Implications for this project	Approvals required	Timing / interdependencies
	heritage. To promote the use of agreements that provide for the management and protection of Aboriginal cultural heritage.			CHMP.
Aboriginal Heritage Regulations 2007	To provide for the protection of Aboriginal cultural heritage in Victoria. States when a CHMP is required. Sets standards and fees for the preparation of CHMPs.	Sets standards and fees for the preparation of CHMPs.	Approved CHMP	Timing dependent on finalised activity area for CHMP and requirement for sub-surface testing. Statutory timeframe is 30 days for approval/rejection of a CHMP.



4 Methodology

4.1 Cultural Heritage Management Plan

A CHMP would be prepared under the *Aboriginal Heritage Act 2006*, as a CHMP is required if ‘...a proponent or other person is required to prepare an EES under the *Environment Effects Act 1978* in respect of any works’ (section 49 of the Act). In addition, a mandatory CHMP would have been triggered for the Melbourne Metro, independent of the EES process, as the activity constitutes a high impact activity (r 43 of the Regulations) and is within an area of cultural heritage sensitivity (r 22 and r 23 of the Regulations).

The Notice of Intent (NOI) to prepare a CHMP was lodged on 27 November 2015, and work has commenced on the CHMP. This assessment was prepared using the same methodology as for a desktop CHMP and the preliminary results from the standard and complex assessments, which are outlined below. The CHMP would comprise the following methodology:

Desktop Assessment

- Conduct consultation meetings with Aboriginal stakeholders to discuss the following:
 - Scope and nature of the project and confidentiality obligations/requirements
 - Aboriginal stakeholder participation in the fieldwork and expectation of participants
 - The identification of key knowledge holders
 - Reporting timeframes and scope for input or feedback to the project
- A search of the Victorian Aboriginal Heritage Register (VAHR) for information that is related to the activity area and to identify any registered cultural heritage places (Aboriginal Places)
- The identification of the geographic region present in the activity area, where relevant to Aboriginal cultural heritage
- A review of reports and published works about Aboriginal cultural heritage relevant to the geographic region identified above
- A review of historical and ethno-historical accounts of Aboriginal occupation relating to the geographic region identified above
- A review of the landforms or geomorphology of the activity area
- A review of the land use history of the activity area
- Development of a predictive model of Aboriginal Place types within the geographic region and within the activity area.

Standard Assessment

In accordance with the Regulations (r 58(1)), a standard assessment is required if the results of a desktop assessment show that it is reasonably possible that Aboriginal cultural heritage is present in the activity area. The standard assessment involved the following:

- Archaeological survey of the activity area in accordance with proper archaeological practice, including the examination of:
 - The ground surface of the activity area (archaeologists and Aboriginal stakeholders targeted areas that have been subject to minimal significant ground disturbance (SGD) – identified in the following chapters – and systematically surveyed these areas)
 - Any mature trees in the activity area



- Any cave, rock shelter or cave entrance in the activity area.
- The field survey:
 - Recorded any previously unknown Aboriginal Places
 - Identified/confirmed areas of potential archaeological sensitivity (PAS) that may require complex assessment
 - Furthered consultation with Aboriginal stakeholders.

The Melbourne Metro alignment has been subject to Ground Penetrating Radar (GPR) investigations. These results have assisted in informing the locations for the complex assessment and would be discussed in further detail in the CHMP.

Complex Assessment

A complex assessment is required by the Regulations (r 60(1)) if the desktop assessment or standard assessment shows that–

- a) Aboriginal cultural heritage is, or is likely to be, present in the activity area; and
- b) It is not possible to identify the extent, nature and significance of the Aboriginal cultural heritage in the activity area unless a complex assessment is carried out.

Despite sub-regulation (1), a complex assessment is not required in respect of an area to which the standard assessment applied if the activity will not harm Aboriginal cultural heritage in that area. A complex assessment involves the following:

- Undertake sub-surface testing (complex test excavation) of the activity area in order to identify the nature and extent of any Aboriginal Places within. However, complex testing would be limited to areas with the potential for natural soil deposits to remain and where ground surface impacts would occur (the GPR investigation may provide information about the location of fill and natural soil deposits). Complex testing is proposed for the following locations:
 - Fawkner Park potential southern TBM launch site (Precinct 1 – Tunnels precinct)
 - Fawkner Park north-east location (Precinct 1 – Tunnels precinct)
 - Construction work site at Edmund Herring Oval (Precinct 7 – Domain station precinct)
 - South Yarra Siding Reserve (Precinct 8 – Eastern Portal precinct).
- The complex testing will:
 - Be undertaken using both mechanical excavation and manual excavation methods:
 - Sediments would be removed in controlled spits of 100 mm
 - Where Aboriginal cultural heritage features such as hearths and knapping floors are exposed by machine, excavation would cease and these features would be further excavated by hand techniques
 - Excavation would cease when it is determined, in agreement between the archaeologist and the Aboriginal stakeholder representatives present on the day, that a culturally sterile basal deposit has been reached
 - All excavated trenches and shovel test pits and any identified artefact locations would be plotted using a DGPS
 - All excavated units would be photographically recorded and stratigraphic drawings completed for representative sections
 - Determine the extent of any Aboriginal Places through radial testing.
 - Record any previously unknown Aboriginal Places and prepare an Aboriginal Place Form(s) for submission to OAAV.



- Conduct consultation to outline the results of the complex testing and to discuss any management recommendations proposed for the project.

4.2 Risk and Impact Assessment

4.2.1 Overview

An Environmental Risk Assessment has been completed for impacts of Melbourne Metro. The risk-based approach is integral to the EES as required by Section 3.1 of the Scoping Requirements for the EES. Importantly, an environmental risk is different from an environmental impact.

The overall risk assessment process adopted was based on AS/NZS ISO 31000:2009, as illustrated in Figure 4-1.

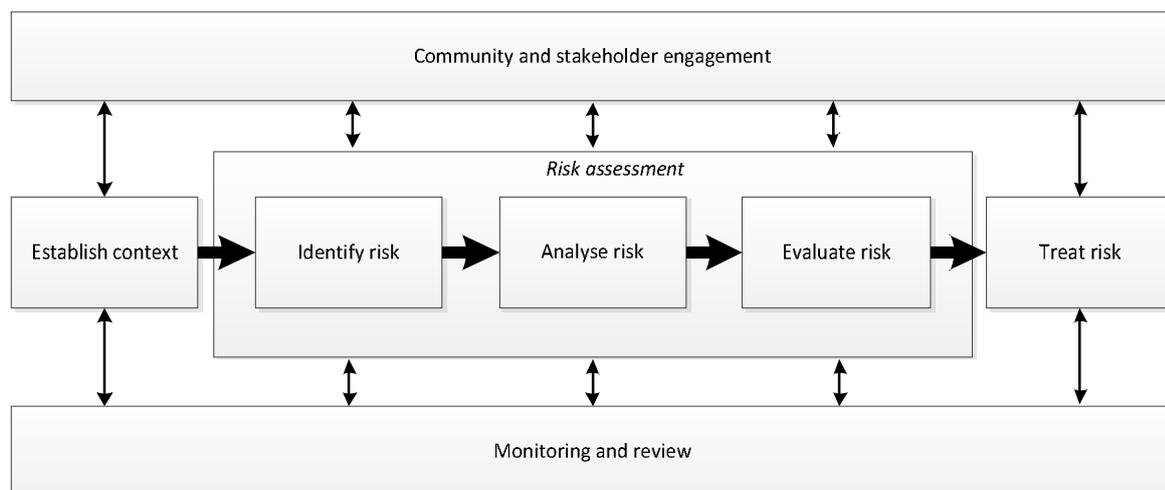


Figure 4-1 Overview of AS/NZS ISO 31000-2009 risk process

The following tasks were undertaken to determine the impact pathways and assess the risks:

- Setting of the context for the environmental risk assessment
- Development of consequence and likelihood frameworks and the risk assessment matrix
- Review of project description and identification of impact assessment pathways by specialists in each relevant discipline area
- Allocation of consequence and likelihood categories and determination of preliminary initial risks
- Workshops with specialist team members from different yet related discipline areas and focussing on very high, high and moderate initial risks to ensure a consistent approach to risk assessment and to identify possible interactions between discipline areas
- Follow-up liaison with specialist team members and consolidation of the risk register.

A more detailed description of each step in the risk assessment process is provided in Technical Appendix B *Environmental Risk Assessment Report*.

4.2.2 Context

The overall context for the risk assessment and a specific context for each specialist study is described in Technical Appendix B *Environmental Risk Assessment Report*. The context describes the setting for evaluation of risks arising from Melbourne Metro. The specific context for the Aboriginal cultural heritage impact assessment is provided as follows.



The Melbourne Metro is to be established within the heavily developed environs of the Melbourne CBD. As such, there is low-moderate likelihood of disturbing Aboriginal Places. While there has been significant ground disturbance within the Melbourne CBD, prior archaeological assessments have indicated that small numbers of Aboriginal stone artefact scatters are still present underneath city buildings. These Aboriginal Places were found through historical heritage excavation and it is possible that further sites would be discovered in much the same manner. Buildings or roadways with footings/basements or bases that descend into sterile deposits, such as clay, are unlikely to contain Aboriginal heritage.

There is one Aboriginal Place within the area of ground potentially disturbed by construction of Melbourne Metro. For the majority of the Melbourne Metro alignment, works would largely be constructed below ground, at depths below potential Aboriginal archaeological deposits. For the construction of stations, portals and other structures near the ground surface, as well as disturbance within construction work areas, the potential to destroy, reduce or intrude upon Aboriginal heritage is largely unknown. There is a higher potential for impact to occur in areas of potential archaeological sensitivity (as defined under the Aboriginal Heritage Regulations 2007), which include areas which are likely to have been most intensively occupied by Aboriginal communities.

A CHMP is being prepared in accordance with the Aboriginal Heritage Act 2006. A CHMP is a legally binding document that includes cultural heritage assessment, consultation with Aboriginal stakeholders and management recommendations/contingencies for the protection of Aboriginal cultural heritage.

The likelihood rating criteria used in the risk assessment by all specialists is shown in Table 4-1.

Table 4-1 Likelihood rating criteria

Level	Description
Rare	The event is very unlikely to occur but may occur in exceptional circumstances.
Unlikely	The event may occur under unusual circumstances but is not expected.
Possible	The event may occur once within a five-year timeframe.
Likely	The event is likely to occur several times within a five-year timeframe.
Almost Certain	The event is almost certain to occur one or more times a year.

The consequence criteria framework used in the risk assessment is shown in Table 4-2. Each specialist has used this framework to develop criteria specifically for their assessment.



Table 4-2 Consequence framework

Level	Qualitative description of biophysical/ environmental consequence	Qualitative description of socio-economic consequence
Negligible	No detectable change in a local environmental setting.	No detectable impact on economic, cultural, recreational, aesthetic or social values.
Minor	Short-term, reversible changes, within natural variability range, in a local environmental setting.	Short-term, localised impact on economic, cultural, recreational, aesthetic or social values.
Moderate	Long-term but limited changes to local environmental setting that are able to be managed.	Significant and/or long-term change in quality of economic, cultural, recreational, aesthetic or social values in local setting. Limited impacts at regional level.
Major	Long-term, significant changes resulting in risks to human health and/or the environment beyond the local environmental setting.	Significant, long-term change in quality of economic, cultural, recreational, aesthetic or social values at local, regional and State levels. Limited impacts at national level.
Severe	Irreversible, significant changes resulting in widespread risks to human health and/or the environment at a regional scale or broader.	Significant, permanent impact on regional economy and/or irreversible changes to cultural, recreational, aesthetic or social values at regional, State and national levels.

The consequence rating criteria used in the risk assessment specifically for this assessment is shown in Table 4-3.

Table 4-3 Consequence rating criteria – Aboriginal cultural heritage

Level of consequence	Consequence criteria
Negligible	<ul style="list-style-type: none"> • Nil impact to Aboriginal archaeological objects or sites. • No impact to intangible cultural heritage values such as contemporary sites or Dreaming Places.
Minor	<ul style="list-style-type: none"> • Partial disturbance or removal of Aboriginal archaeological objects from one archaeological site. • Intrusion on one of the following values of an intangible site – aesthetic, social, religious, historic or cultural.
Moderate	<ul style="list-style-type: none"> • Complete removal of one or more Aboriginal archaeological site or removal of numerous objects at a number of site locations. • Intrusion on more than two of the following values of an intangible site – aesthetic, social, religious, historic or cultural.
Major	<ul style="list-style-type: none"> • Complete removal of a large number of Aboriginal objects or complete removal of Aboriginal sites at many locations. • Disturbance/removal of an Aboriginal archaeological/burial site(s) of high significance to the Aboriginal community or of high scientific significance. • Intrusion to multiple values (e.g. aesthetic, social, religious, historic or cultural) of more than one intangible site.
Severe	<ul style="list-style-type: none"> • Widespread removal of Aboriginal archaeological objects and/or sites/burials across all locations. • Complete destruction of numerous sites or objects of high Aboriginal significance or high scientific significance. • Complete destruction of all values (e.g. aesthetic, social, religious, historic or cultural) relating to one or more intangible sites.



Table 4-4 Risk Assessment Matrix

		Consequence rating				
		Negligible	Minor	Moderate	Major	Severe
Likelihood rating	Rare	Very Low	Very Low	Low	Medium	Medium
	Unlikely	Very Low	Low	Low	Medium	High
	Possible	Low	Low	Medium	High	High
	Likely	Low	Medium	Medium	High	Very High
	Almost Certain	Low	Medium	High	Very High	Very High

Section 6 provides a summary of the Aboriginal cultural heritage risks assessed as part of the EES.

4.3 Assumptions

The following assumptions are applicable:

- That all identified construction areas would be assessed with the assumption that the works would result in significant ground disturbance.
- The assessment was based on the Concept Design of the Melbourne Metro at the time of assessment. If design details change, the outcomes of this report may need to be updated.

4.4 Stakeholder Engagement

The following stakeholders were consulted for this project:

- Bunurong Land and Sea Association
- Bunurong Land Council Aboriginal Council
- Boon Wurrung Foundation
- Office of Aboriginal Affairs Victoria
- Wurundjeri Tribe Land and Compensation Cultural Heritage Council Incorporated.

As part of this assessment, the following specific engagement with stakeholders was undertaken.

Table 4-5 Summary of stakeholder engagement

Activity	When	Matters discussed / issues raised	Consultation outcomes
Inception Meeting	19 November 2015 23 November 2015	<ul style="list-style-type: none"> • Project background • Geotechnical testing commenced • CHMP methodology • Requirement for standard assessment • Locations for sub-surface testing • Use of mechanical testing for 	<ul style="list-style-type: none"> • Geotechnical testing is an exempt activity from the CHMP • A standard assessment (field survey) is required • Mechanical testing (provided manual excavation is used when necessary) is acceptable • Confirmation that a standard



Activity	When	Matters discussed / issues raised	Consultation outcomes
		complex assessment <ul style="list-style-type: none"> • Post standard assessment meeting requirement • Post complex assessment meeting requirement 	assessment, followed by complex assessment would be required <ul style="list-style-type: none"> • No post standard assessment meeting is required • Post complex assessment meeting required.
Standard Assessment	3 December 2015 9 December 2015	<ul style="list-style-type: none"> • Sub-surface testing areas examined • Locations of testing transects discussed • Size of testing transects discussed • Method of testing discussed at each location (mechanical or hand excavation) • Landscape examined for significant ground disturbance. 	<ul style="list-style-type: none"> • Sub-surface testing methodology developed in consultation with the Aboriginal stakeholder groups • Confirmation of areas requiring further assessment through sub-surface testing • Consultation of the type and level of sub-surface testing required • Confirmation that a standard assessment has limited value for the discovery of Aboriginal cultural heritage due to low ground surface visibility and prior significant ground disturbance.
GPR testing	1-3 February 2016	<ul style="list-style-type: none"> • Locations of testing transects discussed • Size of testing transects discussed. 	<ul style="list-style-type: none"> • Consultation of the type and level of sub-surface testing required.

In addition to the specific agency and TRG consultation (including that listed above), general consultation with the community was also conducted as part of this assessment. Written feedback was obtained through feedback forms and the online engagement platform, and face-to-face consultation occurred at the drop-in sessions (refer to Technical Appendix C *Community and Stakeholder Feedback Summary Report* for further information). Although the community was given the opportunity to offer feedback in regards to Aboriginal cultural heritage, no comments were provided or concerns identified.

4.5 Limitations

The limitations associated with this assessment are as follows:

- The assessment was undertaken using the Concept Design and the alternative design options
- No assessment of Native Title has been undertaken
- As the preparation of the CHMP will continue during 2016, only preliminary results of the complex assessment can be included – CHMP recommendations cannot be included.



5 Regional Context

Environmental factors such as geomorphology, climate, hydrology, flora and fauna influence historical land use patterns, in particular where and how past Aboriginal populations undertook their activities and hence where Aboriginal Places may be found. These factors would be covered in detail within the Melbourne Metro CHMP. A summary is provided below.

5.1 Geographic Region

Melbourne Metro is located at the junction of the Eastern Plains, Western Plains and Eastern Uplands geomorphological regions (Department of Economic Development, Jobs, Transport and Resources (DEDJTR) 2014). This confluence would have resulted in a diverse and rich landscape for Aboriginal people living in the Melbourne area. As the Eastern Plains, Western Plains and Eastern Uplands geomorphological regions are extremely large, for the desktop assessment the geographic region has been restricted to a radius of 2 km surrounding Melbourne Metro. This geographic region was selected as it would capture all the varying landforms, geomorphological regions and geomorphological land systems present (see Section 5.2) within the Melbourne Metro area.

5.2 Geomorphology, Geology and Soils

Melbourne Metro is located within the following geomorphic land systems:

- Former swamps and lagoonal deposits (Former Swamps)
- Coastal plains with ridges and dunefields (Coastal Plains)
- Terraces, floodplains and lakes, swamps and lunettes and their deposits (Terraces and Floodplains)
- Stony rises of the Western Plains (Stony Rises)
- Outlying ridges and hills (Outlying Ridges)
- Plains with poorly developed drainage and shallow regolith (Plains).

Appendix B of this report provides a detailed discussion of the geomorphology of the Melbourne Metro area.

5.3 Climate

The Melbourne Metro study area has undergone numerous climatic changes over the past 30,000 years of Aboriginal habitation. During the late Pleistocene, prior to the onset of the last Ice Age (25,000 Before Present (BP)), the weather was warmer and wetter than today. Climate factors would have influenced the location of habitable sites within the Pleistocene and Holocene. During the Pleistocene, Aboriginal occupation would have focused on coastal areas and on permanent water sources. As sea levels rose, this would have resulted in a reduction of resource zones prior to the formation of swamps. In the late Holocene, the wetter areas created near Melbourne would have provided important resource zones for Aboriginal people.

The modern climate is temperate with warm summers and mild winters. Current temperatures range from a mean maximum of 26.4° Celsius in January to a mean minimum of 13.0° Celsius in July (recorded at Essendon Airport) (Bureau of Meteorology 2015). The average rainfall for Melbourne (near Prahran) in January is 46.9 mm, with 65.6 mm in October (Bureau of Meteorology 2015), with rainfall peaking in spring.



5.4 Hydrology

Currently, there are three main waterbodies in the Melbourne Metro area: Maribyrnong River, Moonee Ponds Creek and the Yarra River. These watercourses, however, were not the only rivers or creeks present in Melbourne prior to the non-Aboriginal settlement of the city (Figure 5-1), with the landscape varying greatly over the past 30,000-40,000 years.

Port Phillip Bay formed approximately 7,000 years ago, and by 5,500 years ago, the shoreline was at its highest, inundating the Yarra Delta as far north as Flemington (Presland 1994; Holdgate, Wagstaff and Gallagher 2011) (Figure 5-1). Approximately 2,800 years ago, the bay entrance became blocked by sand, which resulted in falling water levels and the formation of Lake Phillip. By 1,000 years BP, however, the bay entrance 'unblocked' (Holdgate et al 2011). As such, at the start of the Holocene, the Melbourne area would have been a coastal fringe zone comprising a number of creeks and rivers that could have been used for fishing or hunting. During the late Holocene (approximately 3,000-4,000 years ago), the Melbourne area would have been ideal for occupation, after the development of the swamps, lagoons and marsh resource zones (Presland 1994). Waterways such as the Maribyrnong River, Moonee Ponds Creek, the Yarra River, the West Melbourne Swamp, River Townend and more, would have all provided rich resource zones for Aboriginal people.

5.4.1 Contact Landscape

At the time of non-Aboriginal settlement, Melbourne was a landscape of marshes, swamps, lagoons and rivers. Boggy swamps were located at West Melbourne, Albert Park and Middle Park, with Flinders Street also described as a swamp (Fels, Lavelle and Mider 1993, p 30; Presland 1994). Lagoons were present in the current Royal Botanic Gardens (Presland 1983) and Elizabeth Street was once a former creek (River Townend) (Garryowen cited in City of Melbourne 1997, p 13). The West Melbourne swamp would have been an important economic resource for Aboriginal people (Presland 1983), with Batman describing the swamp as:

About one and a half mile wide, by three or four miles long, of the richest description of soil – not a tree. At the upper end of this marsh is a lagoon. I should think from the distance I saw, that it is upward of a mile across, and full of swans, ducks, geese etc (cited in Melbourne Water 1998).

A salt lagoon and marsh were also recorded at the base of Pleasant Hill (Batman's Hill), between Batman's proposed house site and the river (Lewis, Goad and Mayne 1994). Batman also noted that there was an extensive marsh between the Yarra and the Maribyrnong Rivers (Lewis et al. 1994). Attempts to drain the West Melbourne Swamp commenced in the 1870s, but was not completed until the 1970s (Weaver 1991).

The Yarra River prior to non-Aboriginal occupation of the Melbourne area had a vastly different aspect to what is visible today. The Yarra River's course was altered after 1842, where it was eventually straightened near Olympic Park (City of Melbourne 1997). In contrast, the Maribyrnong River has raised levees that stretch along its length, resulting from the changes in water flow over the last 30,000-40,000 years (Presland 1994). The Maribyrnong River has a rich archaeological history, which is only partially known. Archeological sites have been recorded on a river terrace at Keilor, with artefacts dated to 26,000 years BP, and a human skull dated to 13,000 years BP (Freslov 2002).

At the time of non-Aboriginal settlement, Moonee Ponds Creek – a tributary of the Yarra River – was a small creek, perhaps more a series of ponds leading back to Tullamarine. The creek was surrounded by rich vegetation, such as bullrushes, black wattle (*Acacia mearnsii*), river red gums (*Eucalyptus camaldulensis*), and murnong (Presland 1983; Weaver 1991; du Cros & Associates 1992; Presland 1994). Moonee Ponds Creek originally ran southward into the West Melbourne Swamp, before reaching a salt marsh (du Cros & Associates 1992; Melbourne Water 1998). Since settlement, the banks of Moonee Ponds Creek have been heavily modified with the creek being channelised and a connection formed with the Yarra River (Weaver 1991; du Cros & Associates 1992).



The late Holocene waterbodies within and adjacent to the Melbourne Metro would have provided a rich resource zone for Aboriginal people. The numerous swamps, creeks, rivers, lagoons and marshes would have comprised a variety of flora and fauna species that could have been used for food, tools, shelter, canoes and other everyday commodities. Non-Aboriginal settlement modifications of the Yarra River, Moonee Ponds Creek and the West Melbourne Swamp have resulted in disturbances to these waterways and in the loss of Aboriginal cultural heritage.

5.5 Flora

The flora of Melbourne has altered much over time, in response to climate and landscape changes. Twenty thousand years ago, the climate was colder and wetter, with Melbourne host to vegetation such as beech trees, ferns and bracken (Presland 1994). However, it is difficult to know what the exact flora species were within the Melbourne region, as the Melbourne CBD flora has been completely modified since non-Aboriginal settlement took place.

While the harvesting of bark from native tree species has not been recorded within Melbourne Metro area, cultural scars have been noted on river red gum (*E camaldulensis*) within two kilometres of the Melbourne Metro boundary. Furthermore, plant foods such as murnong, as well as resources like water rushes and marsh vegetation, were important assets for Aboriginal people. The swamps, lagoons and marshes of Melbourne would have provided excellent staples for Aboriginal people's everyday life, with plants used for making nets, baskets and ornaments, as well as providing for shelter and watercraft (Gott and Conran 1991; Albrecht 2014). Unfortunately, little remnant native vegetation has survived the settlement of Melbourne, and so evidence of Aboriginal use is limited. No mature indigenous trees remain within the Melbourne Metro area which are of an appropriate age to host Aboriginal cultural scars (refer to Technical Appendix T *Terrestrial Flora and Fauna*).

5.6 Fauna

Over the 30,000 or more years that Aboriginal people have been occupying Victoria, the landscape would have supported a variety of aquatic, avian and terrestrial fauna, some of which could have been consumed by Aboriginal people. At the time of non-Aboriginal settlement, birds such as snipe, plover, companions, ducks, cormorants, water hens and seagulls were noted (Presland 1994). The Yarra River is thought to have been host to 14 species of freshwater fish (with blackfish and grayling the most common), platypus and water rat (Presland 1983). The numerous waterways surrounding Melbourne would have supported a variety of aquatic resources, such as fish, eel, frogs and tortoises, with the surrounding plains supporting kangaroos, wallabies, wombat, possums and emu (Clark and Kostanski 2006). As such, the numerous aquatic, avian and terrestrial resources would have provided abundant food for Aboriginal people camping in the Melbourne Metro area.



Landscape of Melbourne: Pre and Post Contact

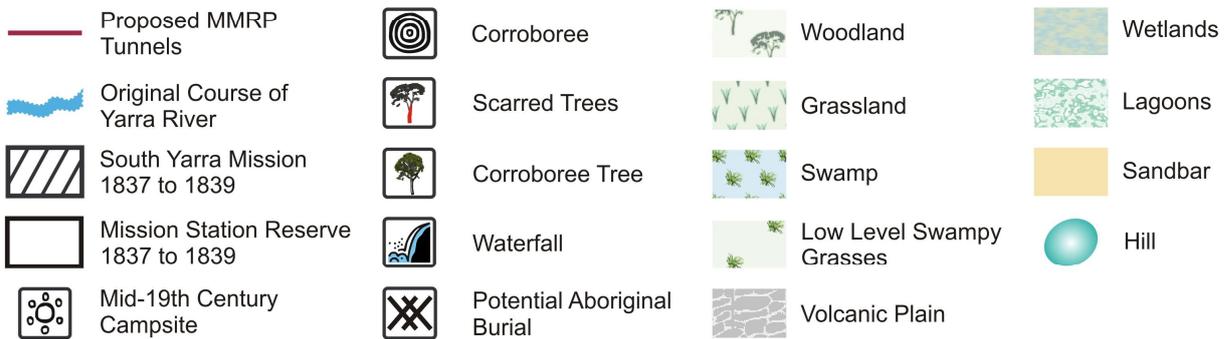
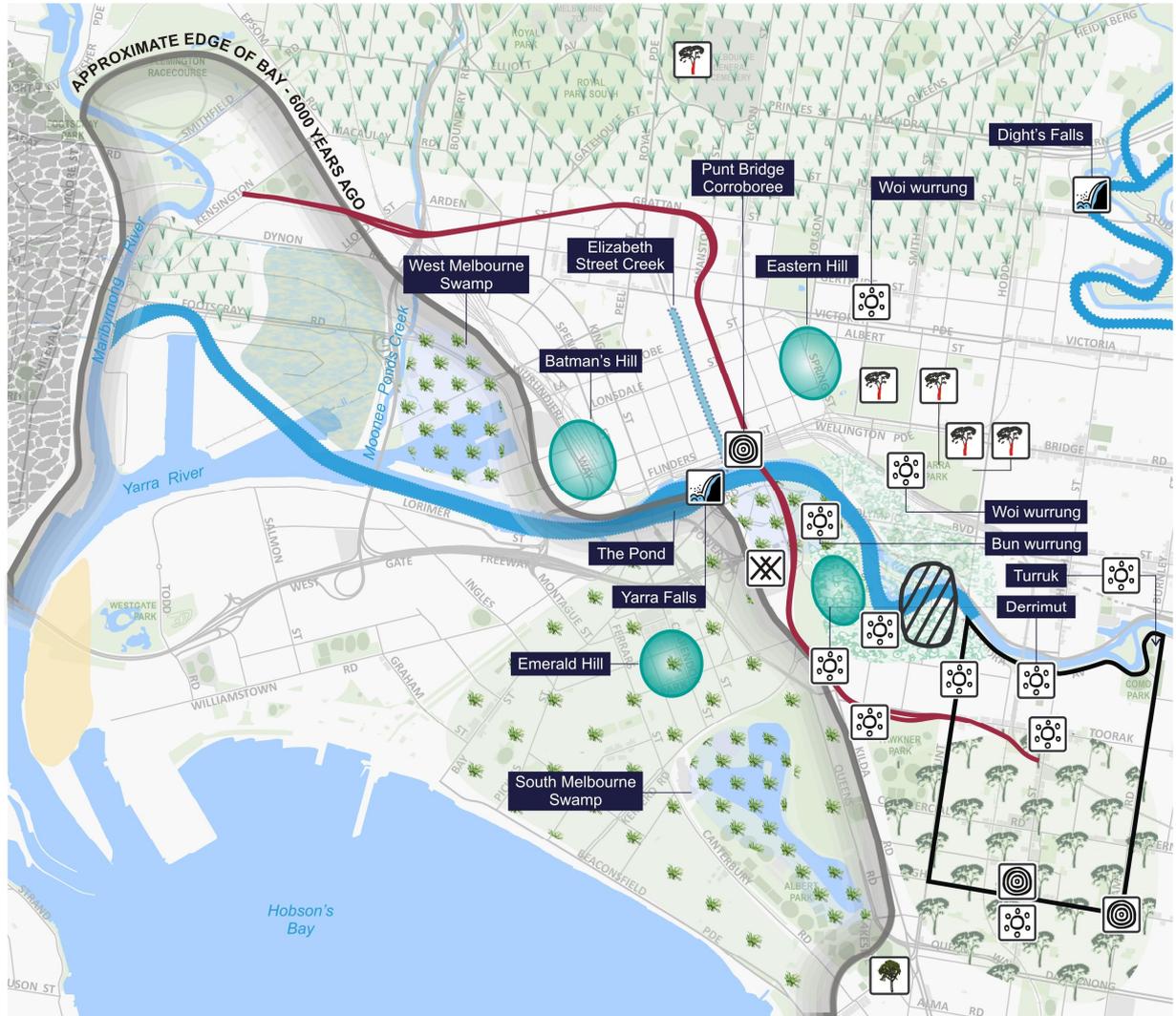


Figure 5-1 Indicative map of the pre and post-contact Aboriginal landscape of Melbourne



5.7 Contact and Post-Contact Aboriginal Settlement

Information which relates to the Aboriginal occupation of the Melbourne Metro area is derived from publications and other surviving forms of documentation which were compiled by early European settlers, missionaries and government officials who went to the region during the mid to late 19th century (Barwick 1984).

The following information was compiled from a number of written sources based on language research and ethno-historic observations. It should be noted that the information provided here does not necessarily reflect the opinions of the Wurundjeri and Bunurong communities regarding their tribal affiliations and boundaries.

5.7.1 Ethno-History

The purpose of this section is to provide a concise summary of the ethno-history of the Melbourne area. This would enable a greater understanding of the potential archaeology of the study area.

Non-Aboriginal settlement of the Melbourne area led to the severe disruption of Aboriginal traditional life. Little information is known regarding the pre-contact lives of those living in the area prior to colonisation. In the literature, Victorian Aboriginal groups have been delineated into a series of 'language groups', which consisted of clusters of neighbouring clans. These clans shared a common dialect and political and economic interests. They were spiritually linked to designated areas of land through their association with topographic features connected to mythic beings or deities (Presland 1994). Clan lands were inalienable, and clan members had religious responsibilities (e.g. conducting rituals), to ensure 'the perpetuation of species associated with the particular mythic beings associated with that territory' (Berndt 1982, p 4).

At the time of non-Aboriginal contact, the Melbourne area was located near the border between the *Bun wurrung* (the 'Coastal Tribe') and *Woi wurrung* (the 'Yarra Yarra Tribe') language groups or tribes (Clark 1990, p 364; Presland 1994; Eidelson 1997). Tribes were comprised of clans, which were composed of bands, or 'foraging' groups made up of family members and potentially, visitors (Presland 1994). It is impossible to know the exact boundaries of the tribes or language groups, as these may have been flexible, and were drawn as the non-Aboriginal settlers understood them (Presland 1994).

Both the *Woi wurrung* and the *Bun wurrung* were members of the Kulin Nation, which was comprised of several language groups, and also included the *Daung wurrung* (Taungurung), *Ngurai-illam-wurrung*, *Wada wurrung* (Wathaurung) and *Dja Dja wurrung* (Clark 1990). The *Woi wurrung* shared over 90 per cent common vocabulary with the *Bun wurrung*, 83 per cent with the *Daung wurrung* and 45 per cent with the *Dja Dja wurrung* (Clark 1996). 'Kulin' was the common word for 'human' in the Nation's dialects (Presland 1994). The *Bun wurrung* were divided into six clans, with the *Woi wurrung* into nine (Clark 1996).

5.7.2 Contact and Post-Contact Period

Urban development of Melbourne resulted in the loss of traditional lands and resources, the spread of disease, social breakdown and removal of both groups and individuals to reserves and mission stations. Aboriginal people from other clans and language groups were attracted to Melbourne for a variety of reasons, making it difficult to identify and document the ethno-history and post-contact history of specific Aboriginal clan groups after the period of initial settlement. Importantly, the development of the city resulted in the direct loss of a meeting ground for the Kulin Nation, which was located to the south of the Yarra River, where the basalt falls (the Falls) allowed people to cross the waterway without need of watercraft (Figure 5-1) (Presland 1994; Eidelson 1997).

In the 1830s, Aboriginal people continued to camp in the vicinity of the township of Melbourne. Mostly they belonged to *Woi wurrung* and *Bun wurrung* clans, with their camping places noted to be along the south bank of the Yarra River (where lagoons were located), opposite the contact settlement of Melbourne and Government Paddocks – between Princes Bridge and Punt Road (refer to Figure 5-1) (Clark and Heydon



1998, p 25). Aboriginal people were said to wander about Melbourne 'in large numbers, half-naked, and armed with spears in the usual way' (Lewis et al. 1994).

In 1835, John Batman signed a treaty with eight Aboriginal clan chiefs. This treaty entitled him to a quarter of a million hectares of land in exchange for 100 pairs of blankets, 100 tomahawks, 100 knives, 50 mirrors, 50 suits of clothing and 50 pairs of scissors (Presland 1994). In 1839, between 400-500 Aboriginal people congregated at the present Botanic Gardens to welcome George Robinson, the Chief Protector of Aborigines in the Port Phillip Protectorate (Presland 1994). In 1844, camp locations for the *Woi wurrung* and *Bun wurrung* were recorded around Melbourne: *Woi wurrung* camps were located at the future Melbourne and Richmond cricket grounds, and at Newton Hill (Fitzroy), with the *Bun wurrung* camp near Government House (Presland 1994). Other campgrounds were present within the current Royal Botanic Gardens, on the corner of Chapel Street and Toorak Road, and the Domain Gardens (City of Stonnington 2006; Clark and Kostanski 2006). The Native Police and Police Paddocks were also located at the Melbourne Cricket Ground (Eidelson 1997). A corroboree tree was recorded in Burnley Park, off Swan Street, with corroborees also known to have occurred at the sites of the Supreme Court, the Melbourne Town Hall, Emerald Hill, Xavier College and St Kilda (Eidelson 1997). A mission was established at South Yarra in the 1830s, with Fawkner Park, to its south, a known camping ground for Aboriginal people (possibly members of the *Bun wurrung*) (Presland 1994; Eidelson 1997; Clark and Kostanski 2006). According to Presland (1994), Aboriginal people camped in the north-west corner of the park. Aboriginal people were also said to camp on the southern side of the Yarra River, opposite the Falls, to approximately one mile south-east along the river during the 1830s and 1840s. Two main camping areas included opposite the Melbourne settlement and by *Tromgin* (see below) (Clark and Kostanski 2006). Some of these camping locations are shown on Figure 5-1.

Through the influence of the government, missionary societies and the new 'landowners', the number of Aboriginal people in the area dwindled as a result of high mortality rates and forced movement out of the township. Complaints from settlers who wanted to exclude Aboriginal people from their newly acquired land, and move them further into the 'bush' and requests by Aboriginal people themselves for a 'station' of their own, led to the establishment of an Aboriginal reserve known as Coranderrk, near Healesville in 1863. The majority of *Woi wurrung* people lived at Coranderrk from 1863 to the early 1900s. The *Aborigines Act 1909* required all 'half castes' to leave mission stations and resulted in many Aboriginal people moving back to Melbourne, attracted by work opportunities (Rhodes 1999, p 88-89).

Mission at South Yarra

The 362-hectare mission station at South Yarra was developed in order for the new Government to 'induce' Aboriginal people to a European lifestyle and to protect them from other settlers (Presland 1994). The mission was established in 1837 under the control of Anglican missionary, George Langhorne (Presland 1994; Eidelson 1997; Canning and Thiele 2010). The mission was located on the southern side of the Yarra River (Figure 5-1) (and intersects the eastern portal and tunnels precinct), with the VAHR registered site located within what is now the Royal Botanic Gardens. The mission is said to have comprised an existing corroboree site, a swamp, and lake known as *Tromgin* to Aboriginal people (Clark and Kostanski 2006; Canning and Thiele 2010). *Tromgin* was also the known location of campsites, cremations, and the later Protectorate office and Walpole's station (1830-1840s) (City of Stonnington 2006; Clark and Kostanski 2006). Langhorne was assisted by William Buckley during the early phase of the mission's life and the site was successful for a brief period of time (Presland 1994). Competition for Aboriginal employment through the Native Police led to conflict between Langhorne and Charles De Villiers, although the Native Police force proved ultimately unsuccessful (Presland 1994). By 1838, all employees but Langhorne had left the mission at South Yarra. The actual land reserved for the mission is shown on Figure 5-1. The Government did not fund the site to help maintain the station, as it was planning on initiating the Aboriginal Protectorate Scheme (Presland 1994). The mission was closed in 1839 (Eidelson 1997).



5.8 Land Use History

This section provides a review of the early history of non-Aboriginal Melbourne, in order to highlight how the proposed development of Melbourne Metro may affect the discovery of intact Aboriginal Places. A detailed land use history of each precinct is provided in Section 7-15.

The initial non-Aboriginal settlement of Melbourne was undertaken by two separate syndicates from Tasmania interested in the expansion of pastoral activities in 1835. Representing the Port Phillip Association, John Batman and his party arrived in Port Phillip Bay in May, and purchased 600,000 acres of land from up to eight Aboriginal elders. This area encompassed the sites of both Melbourne and Geelong. John Pascoe Fawkner also led a syndicate to the Port Phillip area in the same year (Butler 1985; City of Melbourne 1997).

On 26 August 1835, the Governor of New South Wales, Sir Richard Bourke, issued a proclamation that all treaties with Aboriginals for the possession of land would be dealt with as if the Aboriginals were trespassers on Crown lands. By April the following year, Bourke was authorised to form a settlement in the Melbourne area. At this time the settlement, which was called Bearbrass, comprised only 13 buildings, 142 men, 35 women, 57 horses, 100 cattle and 26,900 sheep (City of Melbourne 1997, p 9).

Following a survey of the settlement, the first sale of Crown land occurred on 1 June 1836, with the city laid out in 1837 (Howell-Meurs, Alley-Porter, Mathews and Whincop 2010). The area surrounding Moonee Ponds Creek was also surveyed at this time, by Robert Hoddle's Assistant Surveyor, Smythe (Melbourne Water 1998). As late as 1841, streets to the east of Swanston Street were still largely undeveloped (Fels et al. 1993, p 30), with the surveyors' men living in tents at the end of Flinders Street, near the Government Paddocks, which were sited south of Wellington Street (Fels et al. 1993, p 31).

By 1841, the population of Melbourne had risen to 4,479 (City of Melbourne 1997, p 13). Sometime after 1842, the Yarra River's course was altered and was eventually straightened near Olympic Park (City of Melbourne 1997). By 1849, most of the principal streets of the town were paved, the footpaths gravelled and the centres of the roads metalled. Some streets had water channels which were kerbed and pitched, with only one street having a few oil lamps on wooden posts by this time (City of Melbourne 1997, p 21).

The Town of Melbourne was elevated to city status in 1847 and, following the separation of Victoria from New South Wales in 1851, Melbourne became the capital of the colony. The discovery of gold in Victoria in the early 1850s led to enormous growth in Melbourne. By 1854, the population of Melbourne was nearly 80,000 and by 1861 it had risen to 140,000 (City of Melbourne 1997, p 21). Further land booms occurred between 1880 and 1890, with the previous three and four-storey office buildings replaced with eight and nine-storey buildings. However, land to the west of the city remained largely undeveloped at this time, although the street layout for further development between Footscray Road and Ormond Road is apparent on plans from the 1880s. Following the economic downturn of the early 1890s, the new century saw an increase again in construction activity, including large public buildings continuing both before and after World War I.

The early railways in and around Melbourne were largely constructed in the 1850s by private companies. The Melbourne and Suburban Railway Company was established in 1857, with the primary objective of constructing the railway lines to Brighton and Hawthorn. South Yarra station (known then as the Gardiner's Creek Road station) was opened in 1860. South Kensington station was built around 1891. A railway reserve was present near Arden station, with railway sidings present at Queensberry Street.

Building development in Melbourne remained fairly static from the worldwide depression of the 1930s until the early 1950s. The late 1950s and 1960s saw substantial changes in the city's character and fabric including the construction of skyscrapers and the removal of verandahs on city buildings. The 1970s and 1980s saw the excavation of the tunnels for the Melbourne Underground Rail Loop (City Loop) and other major developments throughout the CBD, which are still visible today (City of Melbourne 1997, p 24-25).



Lovell Chen (refer to Technical Appendix J *Historical Cultural Heritage*) has indicated that there is a high potential for historical archaeological sites to be present within the CBD. As Aboriginal Places have largely been recorded during historical archaeological excavations, there is a potential for Aboriginal cultural heritage material to also be present at these sites. However, the presence of Aboriginal Places would be dependent on the level of previous ground disturbance that has taken place within Melbourne Metro (e.g. buildings that contain basement levels would be very unlikely to contain any Aboriginal archaeological material). Overall, despite the gradual development of the Melbourne CBD (and thus the study area) outlined above, there remains potential overall for Aboriginal cultural heritage to be found within the Melbourne Metro areas, which would be subject to surface works.

5.9 Victorian Aboriginal Heritage Register Search

A search of the VAHR was undertaken on 23 November 2015 with a search radius around Melbourne Metro of two kilometres (geographic region) (refer Appendix C of this report). One Aboriginal Place is located within Melbourne Metro: at CBD North station precinct, Little La Trobe St 1 (VAHR 7822-0013). This Aboriginal Place comprises a single silcrete artefact found during historical excavation.

A total of 402 Aboriginal Places were located within the geographic region. Of the Aboriginal Places recorded in the geographic region, the majority were object collections (n=375), which largely comprise artefacts collected from various CHMPs across Victoria and stored at secure locations within the CBD. Of the remaining 27 Aboriginal Places, Aboriginal Historical Places (n=11), followed by artefact scatters were the most common (n=10), scarred trees (n=6), and Aboriginal ancestral remains (burial) (n=2). The Aboriginal Historical Places include missions, campsites, graves/reburials, meeting places, corroboree sites and a social values site (William Cooper's Residence). These historical sites reflect the importance of the Melbourne area to Aboriginal people at the time of non-Aboriginal settlement.

Aboriginal stone artefacts have been recorded to over one metre below the current ground surface (Altson Lane 1, VAHR 7822-3739). Silcrete is the most common raw material present within the geographic region, followed by quartzite. This may be a direct result of the six silcrete quarries and one quartzite quarry on the Maribyrnong River, located within seven kilometres of the CBD.

5.10 Historical References

A search of the VAHR for historical references was undertaken on 23 November 2015 with a search radius of two kilometres. A total of 61 historical references were located within the geographic region. While these locations are not considered Aboriginal Places under the Act, they do indicate the continued use of the landscape after the non-Aboriginal settlement of Melbourne. The historical references include monuments, homes, places of work, campgrounds, ceremonial places, missions, schools, churches, burials, places where Aboriginal people were killed/assaulted/threatened by Europeans and places where Aboriginal people were killed/assaulted/threatened by other Aboriginal people.

5.11 Predictive Statement for Aboriginal Sites and Archaeological Sensitivity

5.11.1 Archaeological Sensitivity

Archaeological sensitivity relates to the probability of the occurrence of physical evidence of past human occupation or activity. It does not imply that the 'cultural' heritage values of particular land systems are more or less significant. Furthermore, Aboriginal Historical Places are not considered in this process because they may not contain physical evidence of human activity. Such places must be identified through targeted research.

An indicative map of zones of archaeological sensitivity is provided in Figure 5-2. The criteria for this assessment are stated below. This map was developed to assist in understanding areas of archaeological



sensitivity, and as such, includes some regions outside of the Melbourne Metro area. The map was produced through assessing:

- The pre-settlement landscape of Melbourne
- The pre and post-settlement historical references
- The location of hills near the CBD
- The current contour data for the Melbourne area
- The location of known Aboriginal Places (both archaeological and historical).

It should be noted, however, that Figure 5-2 does not account for any significant ground disturbance that has taken place since the non-Aboriginal settlement of Melbourne. An evaluation of the nature and extent of significant ground disturbance was undertaken at a desktop level in Sections 7 to 17 of this report. Adjusted levels of potential archaeological sensitivity are presented in those sections accordingly.

5.11.2 Predictive Statements

Craib (1999, p 18) states that:

The goal of predictive models is to correctly identify important aspects of the natural and/or social environment that influenced the location of human activities, and to interpret the archaeological record as the result of a set of functional, temporal, spatial and behavioural responses to a varied environment.

Following a search of the VAHR and a review of the previous literature and archaeological reports relevant to the geographic region, it is predicted that Aboriginal Places would most likely be found within the study area on elevated landforms within proximity to waterways such as creeks, swamps and rivers. However, the occurrence of Aboriginal Places would be heavily influenced by the amount of significant ground disturbance that has occurred due to historical activities. Significant ground disturbance would be assessed in detail during the CHMP process. The following is a list of predictive summary statements relating to the Melbourne Metro area:

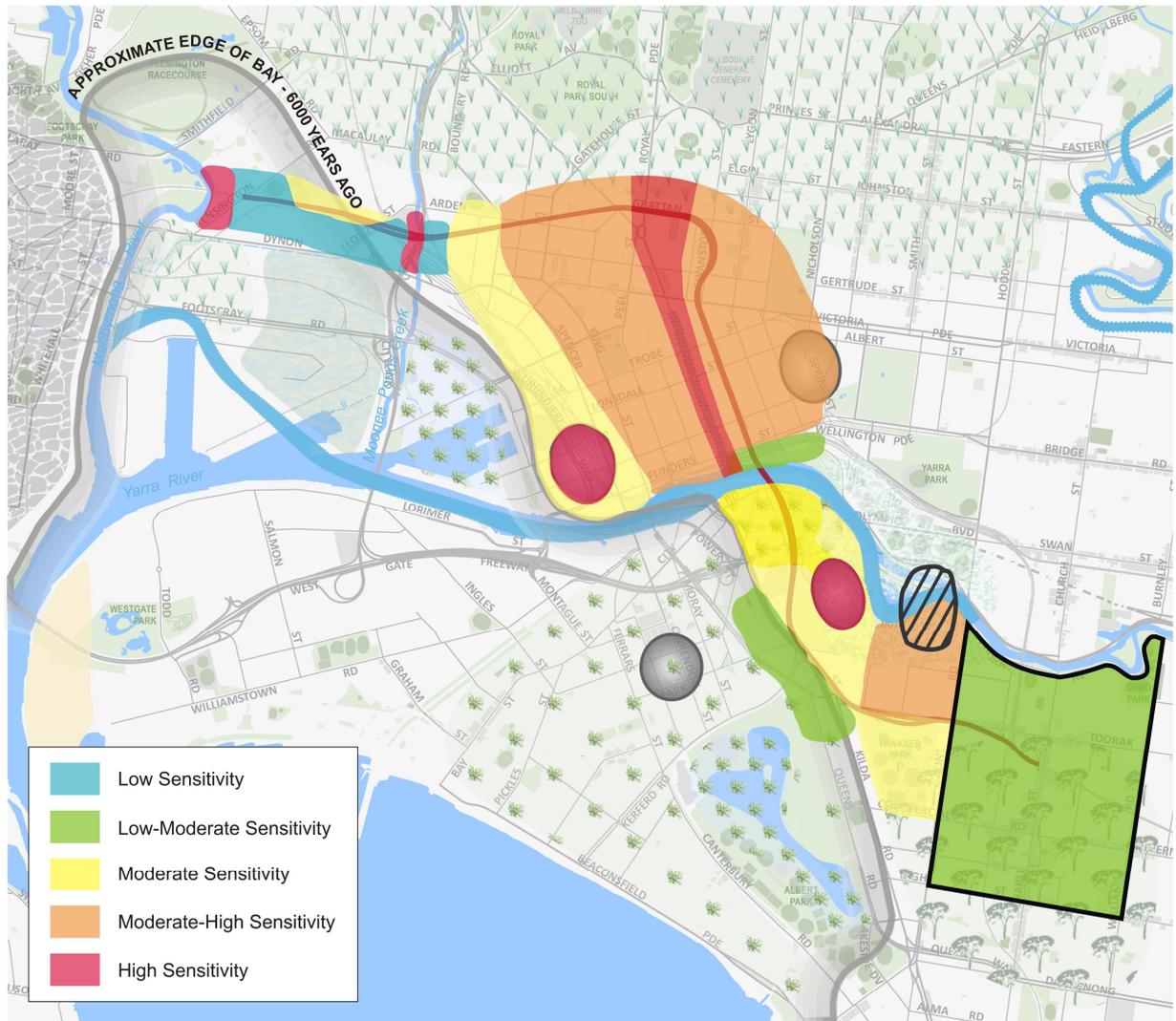
- Low density artefact scatters, such as isolated artefact finds, would be the most likely Aboriginal Place type found within the proposed project area. Scatters would most likely comprise flakes or debitage
- Intact edges of the former Western Swamp/West Melbourne Swamp is likely to contain stone artefacts and shell middens, with hearths and burials also possibly present
- Due to the urbanised nature of the study area, Aboriginal Places are most likely to be identified in parks, largely unmodified sections of creek floodplains or river banks/terraces, near the border of former swamps, or within remnant pockets of native vegetation
- Aboriginal Places dating to the post-contact period may also be present, located near historical campsite areas, such as near the South Yarra Mission, the Royal Botanic Gardens and within the north-western corner of Fawkner Park
- Deep fill deposits may obscure the natural ground surface of features such as the Yarra River banks. As such, cultural deposits may be present underneath fill layers
- As Aboriginal Places have been recorded in the footings of buildings within the CBD, it would be possible that Aboriginal Places may be present underneath the ground floor of buildings, provided that there are no basement levels
- Historical Aboriginal Places may also be present within the activity area, in places such as Fawkner Park, where Aboriginal campgrounds dating to the historical period have been recorded
- Artefact deposits may be present to at least one metre below ground level



- Scarred trees would not be present within the proposed project area due to previous vegetation clearing and the lack of remnant vegetation present within the study area (refer to Technical Appendix T *Terrestrial Flora and Fauna*)
- The most common type of raw material for stone artefact manufacture is silcrete, with quartz, quartzite and basalt also recorded in the geographic region
- The level of previous ground disturbance would determine the likelihood of recording intact Aboriginal Places
- The ability to determine the presence of surface sites, e.g. artefact scatters, would be heavily influenced by the amount of ground exposure and vegetation cover present.



Indicative Archaeological Sensitivity of Melbourne



- Low Sensitivity
- Low-Moderate Sensitivity
- Moderate Sensitivity
- Moderate-High Sensitivity
- High Sensitivity

- Proposed MMRP Tunnels
- Original Course of Yarra River
- South Yarra Mission 1837 to 1839
- Mission Station Reserve 1837 to 1839
- Woodland
- Grassland
- Swamp
- Low Level Swampy Grasses
- Volcanic Plain
- Wetlands
- Lagoons
- Sandbar
- Hill

Figure 5-2 Indicative map of archaeological zones of sensitivity across the study area (Note: this map does not account for SGD, which is to be reviewed during the CHMP)



6 Risk Assessment

Table 6-1 presents the Aboriginal heritage risks associated with the project, based on a precinct basis. The environmental risk assessment methodology is outlined in Section 4.2.

Existing Environmental Performance Requirements were identified to inform the assessment of initial risk ratings; these are based on standard requirements that are typically incorporated into construction contracts for rail projects.

The potential impacts of the identified risks have been assessed, the findings of which are summarised in subsequent sections of this report.

As a result of the risk assessment, project-specific Environmental Performance Requirements have been recommended to reduce risks and hence determine the 'Residual Risk Rating'. The recommended Environmental Performance Requirements are outlined in the following sections of the impact assessment and collated in Table 17-1. All recommended Environmental Performance Requirements are incorporated into the Environmental Management Framework for the project (Chapter 23).

The initial risk rating is reflective of the scarcity of evidence relating to the Aboriginal occupation of the Melbourne CBD and is potentially inflated by the unknown nature of potential Aboriginal archaeological deposits with the Melbourne Metro area. Despite the unknown nature of potential Aboriginal cultural heritage risks, these are addressed in the CHMP. The CHMP is the only Environmental Performance Requirement relating to Aboriginal cultural heritage and is required in order to comply with the *Aboriginal Heritage Act 2006*. The CHMP process will provide a greater understanding of the potential project risks and would provide management and compliance mechanisms that would collectively reduce the overall risk.

For further details refer to the Technical Appendix B *Environmental Risk Assessment Report* of the EES, which includes the full Risk Register, with existing Environmental Performance Requirements and recommended Environmental Performance Requirements assigned to each risk.



Table 6-1 Risk Register for Impact Assessment

Impact pathway		Precinct	Initial risk			Residual risk			Risk no
Category	Event		C	L	Risk level	C	L	Risk level	
Construction									
Removal and/or installation of underground services	Complete removal of one or more Aboriginal archaeological site(s) or removal of numerous objects at a number of site locations.	All	Moderate	Possible	Medium	Minor	Unlikely	Low	AH001
Construction of Melbourne Metro – impacts on known Aboriginal Places	Partial disturbance or complete removal of Aboriginal archaeological site(s) or Aboriginal archaeological object(s).	All	Moderate	Unlikely	Low	Moderate	Unlikely	Low	AH002
Construction of Melbourne Metro – impacts on unknown Aboriginal Places	Partial disturbance or complete removal of Aboriginal archaeological site(s) or Aboriginal archaeological object(s).	All	Moderate	Possible	Medium	Moderate	Unlikely	Low	AH003
Construction of Melbourne Metro – impacts on unknown Aboriginal skeletal remains	Disturbance/removal of Aboriginal human remains and/or Aboriginal archaeological sites/objects of high significance to the Aboriginal community or of high scientific significance.	All	Major	Unlikely	Medium	Moderate	Rare	Low	AH004
Construction of Melbourne Metro – within archaeologically sensitive areas	Complete removal of one or more Aboriginal archaeological site(s) or removal of numerous objects at a number of site locations.	All	Moderate	Possible	Medium	Moderate	Unlikely	Low	AH005
Construction of Melbourne Metro – damage to intangible cultural heritage	Intrusion to multiple values (e.g. aesthetic, social, religious, historic or cultural) of more than one intangible site.	All	Major	Unlikely	Medium	Minor	Rare	Very Low	AH006
Design									
Geotechnical investigations – impacts on known and unknown Aboriginal Places	Partial disturbance or removal of Aboriginal archaeological objects from one archaeological site.	All	Minor	Unlikely	Low	Minor	Rare	Very Low	AH007



7 Precinct 1: Tunnels

7.1 Project Components

7.1.1 Infrastructure

The majority of the works associated with the tunnels are located entirely underground and therefore are of no relevance to Aboriginal cultural heritage (as the works would be at depths below Aboriginal cultural deposits). The relevant above ground elements of the tunnels include:

- The TBM southern launch site at Domain or at Domain and Fawkner Park
- Emergency access shafts.

7.1.1.1 Alternative Design Options

The vertical alignment of the Tunnels precinct is subject to two possible design solutions (above CityLink, and below CityLink). As the CityLink tunnels crossing would be located entirely underground (at depths below Aboriginal cultural deposits), this alternative design option is not considered to be of relevance to Aboriginal cultural heritage.

Two alternative design options are proposed for emergency access shafts located in the following locations:

- The Fawkner Park TBM launch site
- Tom's Block.

7.1.2 Construction

The relevant construction activities for this report are related to the siting of the construction work sites within

- Domain or the use of Domain and Fawkner Park
- Emergency access shafts.

The relevant construction activities for the alternative design options are very similar to those for the Concept Design.

7.1.3 Operation

No adverse Aboriginal heritage impacts would arise out of the operational phase of the project.

7.2 Existing Conditions

The Tunnels precinct is the largest precinct within Melbourne Metro and extends from the western to the eastern portal. The precinct would largely be constructed below ground, at depths below potential Aboriginal archaeological deposits. Areas where ground disturbance would likely take place close to the ground surface are discussed below in relation to their land use history and Aboriginal archaeological potential.

Western Portal to Arden station

Prior to the non-Aboriginal settlement of the area, the landscape comprised the stony rises land system. Vegetation would have included woodland, grasslands, saltmarsh and brackish lake species. The area was located to the north of the West Melbourne Swamp and was low-lying. The Tunnels precinct also crosses Moonee Ponds Creek in this sector. Moonee Ponds Creek is assessed as being of moderate-high



archaeological sensitivity, with stone artefact scatters recorded on creek spurs, tracks and in creek bank profiles (Melbourne Water 1998). Since settlement, the banks of Moonee Ponds Creek have been heavily modified, with the creek being channelised and a connection formed with the Yarra River (Weaver 1991; du Cros & Associates 1992). Up to 2.5 m of fill has been recorded on either side of the creek bank during geotechnical investigations. Due to its abundant resources, Moonee Ponds Creek was considered to have been an important waterway prior to the non-Aboriginal settlement of Melbourne (du Cros & Associates 1992), and had high archaeological sensitivity. However, significant modifications have since greatly reduced its archaeological potential.

No Aboriginal Places are recorded within this section of the Tunnels precinct. Overall, this section of the precinct is assessed as containing the following archaeological potential:

- Areas surrounding Moonee Ponds Creek where intact soils remain: moderate-high
- Channelised banks of Moonee Ponds Creek: low
- Remainder of area: low.

Since non-Aboriginal settlement, the study area in this section has undergone industrial and commercial development, with railway and road infrastructure dominating the landscape. Geotechnical testing results near Bakehouse Road indicate that fill is present up to depths of 2.50 m, followed by basalt, whereas testing near Lloyd Street show fill to 0.60 m, followed by basalt or clayey gravel (Golder Associates 2015a).

Arden Station to Parkville Station

Prior to the non-Aboriginal settlement of the area, the landscape would have comprised the stony rises, the terraces and floodplains, and the outlying ridges land systems. Vegetation would have included woodland and grasslands species. No waterways exist within this sector of the Tunnels precinct and no Aboriginal Places are recorded within this section. However, as this area would have been located on a rise above the West Melbourne Swamp, it is assessed as being of moderate and moderate-high archaeological sensitivity, with some archaeological potential where natural soil deposits remain. Geological layers include fill, overlying Older Volcanics and Pleistocene Alluvium.

Since non-Aboriginal settlement, the Melbourne Metro area in this section has undergone industrial, commercial and residential development. The Tunnels precinct is bound by Flemington Road to the north, with the above ground component of the precinct characterised by urban and industrial development.

Parkville Station to CBD North Station

Prior to the non-Aboriginal settlement of the area, the landscape would have comprised the outlying ridges land system. Vegetation would have included woodland and grasslands species. The Tunnels precinct crosses Bouverie Street, which had a natural creekline running along the valley floor prior to non-Aboriginal settlement of the area. This creek joined the ephemeral River Townend at Elizabeth Street (Presland 2008). The geology of this sector of the Tunnels precinct comprises fill over the Melbourne Formation. No Aboriginal Places are recorded within this sector of the Tunnels precinct. As this area would have been located on a rise above two natural creeklines, it is assessed as being of high archaeological sensitivity with some archaeological potential where natural soil deposits remain.

Since non-Aboriginal settlement, the project area in this sector has undergone commercial, urban and residential development.

CBD North Station to CBD South Station

Prior to the non-Aboriginal settlement of the area, the landscape would have comprised the outlying ridges land system. Vegetation would have included woodland and grasslands species. No Aboriginal Places are recorded within this sector of the Tunnels precinct. As this area would have been located on a rise above the



Yarra River and its associated swamps and lagoons, it is assessed as being of moderate-high archaeological sensitivity, with some archaeological potential where natural soil deposits remain. The geology of this sector of the Tunnels precinct comprises fill over the Melbourne Formation. Geotechnical testing results have indicated that the area contains fill (approximately 0.50 m), overlying silty clay and siltstone.

Since non-Aboriginal settlement, the Melbourne Metro area in this sector has undergone commercial, urban and residential development.

CBD South Station South to Domain Station

Prior to the non-Aboriginal settlement of the area, the landscape would have comprised the outlying ridges land system (Section 5.2 of this report). Vegetation would have included riparian woodland, grassy woodland, grasslands and brackish wetland species. The precinct crosses the Yarra River in this section. A former swamp/lagoon was located to the south of the Yarra River, which has since been reclaimed. The area directly to the south of the Yarra River is low-lying, whereas the Tunnels precinct to the west of the Shrine of Remembrance is located on the edge of a low rise. This area is assessed as being of low-moderate and moderate archaeological sensitivity, with some archaeological potential where natural soil deposits remain. No Aboriginal Places are recorded within this sector of the Tunnels precinct. An Aboriginal cultural place, however, known as the Punt Bridge Corroboree, is located at the former Punt Bridge site, at the Yarra River.

The geology of this sector of the Tunnels precinct comprises fill over the Melbourne Formation to the north of the Yarra. The Yarra River geology is extremely complex, comprising Coode Island Silt, New Volcanics, Fishermens Bend Silt, Early Pleistocene Colluvial and Alluvial Sediments, Holocene Alluvium, Moray Street Gravels and the Melbourne Formation. To the south of the river, the geology comprises fill overlying the Melbourne Formation or the Tertiary aged Brighton Group.

Since non-Aboriginal settlement, the Melbourne Metro area in this sector has undergone commercial, residential, urban and parkland development. The Domain Parklands are located above the tunnels, and include Alexandra Gardens, Alexandra Park, Queen Victoria Gardens, Kings Domain North and Kings Domain South. Alexandra Gardens are located close to the Yarra River, and were formerly a swampy landscape, as they were part of the Yarra River's floodplain. The Yarra River was extensively modified between 1896-1898 to straighten its course near the Royal Botanic Gardens (du Cros & Associates 1992). Around this time, Alexandra Gardens, located between Linlithgow Avenue and St Kilda Road, was created (Context in prep). The proposed location of the emergency access shaft in the Domain Parklands was used for a former Immigrants' Home, constructed in the 1850s and demolished in 1913 (John Patrick and Allom Lovell and Associates 2003). Now, the land is used to house a toilet block, monument and the floral clock. Geotechnical testing results indicate that the area between the Yarra River and north of Alexandra Avenue contains fill up to 5.40 m, followed by silty clay or silty sand (Golder Associates 2015a).

In 1986, the Yarra River was widened on the south side and its depth increased. Fill from these works was used to build up the land level and backfill the lagoons adjacent to the river. Currently, this sector of the Tunnels precinct is located within the ornamental gardens of Alexandra Gardens.

Excavation works undertaken in 1929 recovered evidence of skeletal remains, near the current Anzac Avenue. While no ground-disturbing works would take place at this location, it is worthy of mention. As the remains appeared old and decayed, it was assumed they belonged to an Aboriginal person (*The West Australian*, 13 November 1929, p 14). The event was so notable, it reached newspapers across Australia. The skeletal remains were said to be 'opposite the Defence department, in St Kilda Road, on the northern approach to the Shrine' (*The Argus*, 13 November 1929, p 10). No Aboriginal Place associated with this find has been registered and little additional information about the potential human burial is readily available.



Domain Station to the Eastern Portal

Prior to the non-Aboriginal settlement of the area, the landscape would have comprised the outlying ridges land system. Vegetation would have included grassy woodland species. This sector of the precinct is located to the south of the Yarra River and the north of the former Albert Park Swamp. The Tunnels precinct between Millswyn Street and Punt Road is located on the lower slope of a rise. The geology of this section of the Tunnels precinct comprises the Tertiary aged Brighton Group overlying the Melbourne Formation. This area is assessed as being of low-moderate and moderate archaeological sensitivity, with some archaeological potential, where natural soil deposits remain. No Aboriginal Places are recorded within this sector of the Tunnels precinct.

Since non-Aboriginal settlement, the Melbourne Metro area in this section has undergone commercial, residential, urban and parkland development. The proposed Fawkner Park site is located off St Kilda Road within Fawkner Park, near the tennis courts.

Fawkner Park was reserved in 1862, with the pathways and avenues laid out in 1875. The park has remained relatively unchanged since then (Hassell 2002; City of Melbourne 2005), with land to the south of the park comprising former swamp. During the post-contact era, Fawkner Park was a known camping ground for Aboriginal people (Presland 1994; Eidelson 1997). According to Presland (1994), Aboriginal people camped in the north-west corner of the park as late as 1849. Sections of Fawkner Park have since been excised from the parklands; this includes the Child Welfare Centre, adjacent to the project area. Various sporting facilities were constructed in Fawkner Park during the early part of the 20th century, including tennis courts and a putting green. During World War II, trenches were excavated along the Toorak Road frontage of the park.

Domain is discussed in detail in Section 13 of this report.

7.2.1.1 Alternative Design Options

Areas where ground disturbance would likely take place close to the ground surface are discussed below in relation to their land use history and Aboriginal archaeological potential.

Emergency Access Shaft – Tom’s Block, between Linlithgow Avenue and St Kilda Road

See Section 7.2 for general background information for the Domain Parklands. The proposed location of the emergency access shaft between Linlithgow Avenue and St Kilda Road is located within the Kings Domain North section of the parklands. The area is located on the lower slope of a rise and is within the outlying ridges land system. Historical land use information indicates that the area has not been subject to historical occupation or activities apart from those related to the construction of the park structures, memorials and features. Geotechnical testing results indicate that this area contains fill to 1.40 m, followed by silty clay or clayey sand, then silty clay/sandy clay and clayey sands to siltstone (Golder Associates 2015a). This area is assessed as being of moderate archaeological sensitivity, with archaeological potential where natural soil deposits remain.

Emergency Access Shaft – Fawkner Park TBM Launch Site

See Section 7.2 for general historical background for Fawkner Park. The proposed location of the emergency access shaft is located in the north-east corner of Fawkner Park, close to the entrance opposite Walsh Street. The area is on the upper slope of a rise overlooking a former swamp and is within the outlying ridges land system. Historical land use information indicates that the area has not been subject to historical occupation or activities apart from those related to the construction of the park. This area is assessed as being of moderate archaeological sensitivity, with archaeological potential where natural soil deposits remain.



7.3 Key Issues

The key issue associated with the Concept Design is the potential for unknown Aboriginal cultural heritage to be present within a sub-surface context at the Fawkner Park open space and tennis courts (TBM southern launch site) and the Fawkner Park north-east location (emergency access shaft) (**Risks #AH001, #AH002, #AH003, #AH004, #AH005, #AH006, and #AH007**).

7.3.1.1 Alternative Design Options

The key issues associated with the emergency access shaft options relate to the potential for unknown Aboriginal cultural heritage to be present within a sub-surface context (**Risks #AH001, #AH002, #AH003, #AH004, #AH005, #AH006, and #AH007**).

7.4 Impact Assessment

The following draft EES evaluation objectives and assessment criteria (and indicators where relevant) are relevant to this assessment.

Draft EES evaluation objectives	Assessment criteria
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	Avoid or minimise impacts on Aboriginal cultural heritage values and places.

The project is consistent with the draft EES evaluation objective as:

- A CHMP is being undertaken for Melbourne Metro.

The CHMP would identify any Aboriginal cultural heritage values within the activity area so that recommendations for the minimisation of impacts to these can be provided. Should historical archaeological excavations occur within this area, contingency plans within the CHMP would be developed for the discovery of Aboriginal cultural heritage material. The CHMP would also provide contingency plans for the discovery of Aboriginal cultural heritage material during investigation and construction works. A copy of this CHMP must be on site at all times.

As there are no ground surface works to take place within the following sections of the Tunnels precinct, it would be highly unlikely there would be any impacts to Aboriginal cultural heritage at these sectors:

- Western portal to Arden station
- Arden station to Parkville station
- Parkville station to CBD North station
- CBD North station to CBD South station.

CBD Station South to Domain Station

Ground surface works are proposed to take place within the Domain Parklands/Shrine of Remembrance and for the proposed emergency access shaft in Queen Victoria Gardens, adjacent to Linlithgow Avenue.

These areas have been previously subject to earth moving works and contain fill to up to 5.40 m (within Alexandra Gardens), consequently they have been assessed as being of very low Aboriginal archaeological potential and no further assessment is required.



Domain Station to the Eastern Portal

Ground surface works are proposed to take place within Fawkner Park, at the following locations:

- Fawkner Park open space and tennis courts/TBM launch site
- Fawkner Park north-east location.

Works would have the potential to adversely impact on the unknown Aboriginal cultural heritage values within these areas during the construction phase of Melbourne Metro. The CHMP would provide management measures and contingences in the event that previously unknown items of Aboriginal cultural heritage are uncovered during project works.

7.4.1.1 Alternative Design Options

Emergency access shaft – Tom’s Block, between Linlithgow Avenue and St Kilda Road

Ground surface works are proposed to take place within the Domain Parklands in Tom’s Block.

Works would have the potential to adversely impact on the unknown Aboriginal cultural heritage values within this area during the construction phase of Melbourne Metro. Cultural heritage monitoring would occur during construction to ensure that if Aboriginal cultural material is present, it is identified and recorded according to proper archaeological practice.

Emergency Access Shaft – Fawkner Park TBM Launch Site

Ground surface works are proposed to take place within Fawkner Park open space and tennis courts/TBM launch site.

Works would have the potential to adversely impact on the unknown Aboriginal cultural heritage values within this area during the construction phase of Melbourne Metro. Archaeological investigation during the CHMP process would be required to identify the potential nature and extent of any unknown Aboriginal cultural heritage within this precinct. Cultural heritage investigations for this emergency access shaft location overlap with investigations for the TBM southern launch site at Fawkner Park open space and tennis courts.



7.5 Environmental Performance Requirements

Table 7-1 below provides the recommended Environmental Performance Requirement and proposed mitigation measures for the precinct.

Table 7-1 Environmental Performance Requirements for Precinct 1 – Tunnels

Asset / value	Impact	Environmental Performance Requirements	Proposed mitigation measures	Risk no.
Aboriginal cultural heritage	Harm to Aboriginal cultural heritage values	Comply with a Cultural Heritage Management Plan approved under the <i>Aboriginal Heritage Act 2006</i> and prepared in accordance with the Aboriginal Heritage Regulations 2007.	Specific management recommendations and contingencies within the CHMP	AH001 AH002 AH003 AH004 AH005 AH006 AH007



8 Precinct 2: Western Portal (Kensington)

8.1 Project Components

The Concept Design for Precinct 2 of relevance to this assessment would comprise:

- Western portal.

8.1.1 Construction

The key construction activities to be undertaken within Precinct 2, which are of relevance to this assessment, would comprise:

- Rail reserve upgrades
- Cut and cover tunnel construction
- Development of a construction work site (site compounds/laydown area) at 1-39 Hobsons Road.

8.1.2 Operation

No adverse Aboriginal heritage impacts would arise out of the operational phase of the project.

8.2 Existing Conditions

The western portal would largely be constructed within the existing rail corridor. Areas where ground disturbance would likely take place close to the ground surface are discussed below in relation to their land use history and Aboriginal archaeological potential.

Prior to the non-Aboriginal settlement of the area, the landscape would have comprised the terraces and floodplains land system. Vegetation would have included grassy woodland and brackish grassland species. The area was located to the east of the Maribyrnong River and is low-lying. The Maribyrnong River has raised levees that stretch along its length, resulting from the changes in water flow over the last 30,000-40,000 years. These changes reflect the variations in sea levels and climate (Presland 1994). Fifteen kilometres north-west of Melbourne, the Maribyrnong River has terraces that date back to at least 50,000 years ago (Presland 1994). The Maribyrnong River has a rich archaeological history, which is only partially established in the archaeological record. Aboriginal Places have been recorded on a river terrace at Keilor, with artefacts dated to 26,000 years BP and a human skull dated to 13,000 years BP (Freslov 2002).

The Yarra/Maribyrnong delta extended east-west from the Maribyrnong River under the western half of the CBD and north-south from St Kilda to Flemington, covering Albert Park, Middle Park, Port Melbourne and South Melbourne (Presland 2008). The delta comprised a flat, swampy environment, which overlay stratified layers of silty clay (with gravel lenses) (Presland 2008). The geology of the western portal precinct comprises fill deposits of up to 5 m. To the west of JJ Holland Park (near Kensington Road), the fill layer overlies Quaternary deposits of Coode Island Silt, Pleistocene Alluvium, Moray Street Gravels and the Melbourne Formation (sandstones and siltstones). To the west of JJ Holland Park (to the east of Kensington Road), fill overlies Coode Island Silt, which overlies Older Volcanics. Two former creek courses (which incised the Older Volcanics, but have since been filled with Coode Island Silt), are present within this section. One is located on the western section, to the south of JJ Holland Park, the second to the south of the eastern oval at JJ Holland Park.

No Aboriginal Places are recorded within the western portal precinct. Overall, this precinct was assessed as being of low archaeological sensitivity, with areas surrounding the Maribyrnong River as high. The area in



the northern section of the western portal precinct (the eastern half of JJ Holland Park) was assessed as being of moderate archaeological sensitivity.

Since non-Aboriginal settlement, this precinct has undergone industrial development, with railway infrastructure dominating the landscape. The western portal is currently largely located within rail reserve, with sections sited in industrial and residential areas. The railway was established in this area from the late 19th century, with the surrounding landscape largely undeveloped. South Kensington station was constructed in circa 1891. Private sidings were located to the north and east of the station, such as those for the NZ Loan and Mercantile Agency Co Stores. The land adjacent to the rail reserve was swamp, which has since been reclaimed (Golder Associates 2015b). In recent years, additional railway lines have been added between South Kensington and Footscray.

JJ Holland Park is adjacent to the rail reserve, from Kensington Road east to Ormond Street. The area has been an open space since 1945, however, it was formerly known as 'Seagull Swamp'. JJ Holland Park was created in the early 1960s (City of Melbourne 2008). By 1911, dwellings were primarily located on land between Ormond and Tennyson Streets, to the east of JJ Holland Park.

The construction work site within the western portal precinct would be located at the former Kensington glue factory site at 1-39 Hobsons Road. Buildings associated with the meat industry were located between Hobsons Road and the Maribyrnong River by the 1870s, with the glue factory in use from the 19th century. It was acquired in the 1920s and redeveloped as a factory complex.

Warehouse structures are present to the east of Tennyson Street and, as this site has been extensively redeveloped, the development works are thought to have destroyed any 19th century remains associated with the NZ Loan & Mercantile Agency Co. Stores.

8.3 Key Issues

The key issues associated with the Concept Design are the potential for unknown Aboriginal cultural heritage to be present within a sub-surface context.

8.4 Impact Assessment

The following draft EES evaluation objectives and assessment criteria (and indicators where relevant) are relevant to this assessment.

Draft EES evaluation objectives	Assessment criteria
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	Avoid or minimise impacts on Aboriginal cultural heritage values and places.

The project is consistent with draft EES evaluation objective as:

- A CHMP is being undertaken for Melbourne Metro.

The CHMP would identify any Aboriginal cultural heritage values within the activity area so that recommendations for the minimisation of impacts to these can be provided. Should historical archaeological excavations occur within this precinct, contingency plans within the CHMP would be developed for the discovery of Aboriginal cultural heritage material. The CHMP would also provide contingency plans for the discovery of Aboriginal cultural heritage material during investigation and construction works. A copy of this CHMP must be on site at all times.



Ground surface works would take place within the western portal precinct, at the following locations:

- Construction work site at 1-39 Hobsons Road
- Rail reserve
- 50 Lloyd Street Business Estate.

The rail reserve, road reserve and 50 Lloyd Street Business Estate have been previously subject to earth moving works, consequently these areas have been assessed as having very low Aboriginal archaeological potential and no further assessment is required.

8.5 Environmental Performance Requirements

The recommended Environmental Performance Requirement and proposed mitigation measures for this precinct are the same as for Precinct 1 - Tunnels, as shown in Table 7-1.



9 Precinct 3: Arden Station

9.1 Project Components

The Concept Design of Precinct 3 of relevance to this assessment would comprise:

- Arden station.

9.1.1 Construction

The key construction activities to be undertaken for the Concept Design within Precinct 3, which are of relevance to this assessment, would comprise:

- Ground disturbing works associated with the construction of the station, including excavation, relocation of services, etc.
- Construction work site
- Construction of a substation.

9.1.2 Operation

No adverse Aboriginal heritage impacts would arise out of the operational phase of the project.

9.2 Existing Conditions

The Arden station precinct would largely be constructed within publicly owned land managed by VicTrack. Areas where ground disturbance would likely take place close to the ground surface are discussed below in relation to their land use history and Aboriginal archaeological potential.

The Arden station precinct is currently characterised by a mix of predominantly industrial and railways-related uses. Prior to non-Aboriginal occupation of the area, the Arden station precinct was located near swampland that has since been reclaimed (Golder Associates 2015b). The geomorphology of the area would have comprised the terraces and floodplains land system and the stony rises land system. The terraces and floodplains overlie volcanic terrains and drainage systems, with terraces forming ideal camping locations, while the floodplains would have generally been of lower archaeological sensitivity. As a swamp is present on a 1987 Melbourne and Metropolitan Board of Works map, it is assumed the area has since been filled (Golder Associates 2015b).

The geology of the area contains fill of varying depths (up to three metres). The station box overlies Coode Island Silt, followed by Pleistocene Alluvium, Fishermans Bend Silt, Early Pleistocene Colluvial and Alluvium Sediments, and the Melbourne Formation. To the east of the station box, fill overlies Older Volcanics and the Melbourne Formation. The banks and floodplain of Moonee Ponds Creek appear to be covered by approximately 2.5 m of fill.

No Aboriginal Places are recorded within the Arden station precinct, although it is within an area of cultural heritage sensitivity associated with Moonee Ponds Creek which has been channelised in this area.

The non-Aboriginal development of the Arden station precinct occurred over three phases:

- The late 19th/early 20th centuries
- Early 20th century
- The mid-20th century.



During the first phase of the railway reserve's development, the area to the north of Queensberry Street was mostly unoccupied, while land to the south had several railway sidings and a number of timber stores/buildings. By 1928, extensive construction had occurred over the entire railway reserve, both to the north and south of Queensberry Street. Additional railway sidings had been constructed by this time. The site was further developed over the mid to late 20th century, evidenced by a 1945 aerial photograph and 1970 site plan (Figure 9-1 and Figure 9-2). While modifications have taken place to the site, many of the 1920s structures remain.

The Arden station precinct has been extensively developed over the last century. Previous geotechnical investigations at the Arden station site have indicated that fill is present up to three metres in depth; recent borehole results have corroborated this, with fill recorded down to 2.60 m in one location and 2.30 m in another (Golder Associates 2015b; a). An additional borehole contained no fill, but comprised silty sandy gravels, indicating the potential presence of a former waterbody (Golder Associates 2015a). Construction of the existing buildings and infrastructure is likely to have resulted in significant ground disturbance across the whole site, resulting in a low archaeological potential.



**Figure 9-1 1945 aerial view of the Arden station precinct
(Source: Melbourne Photo-Map, University of Melbourne Maps Collections)**

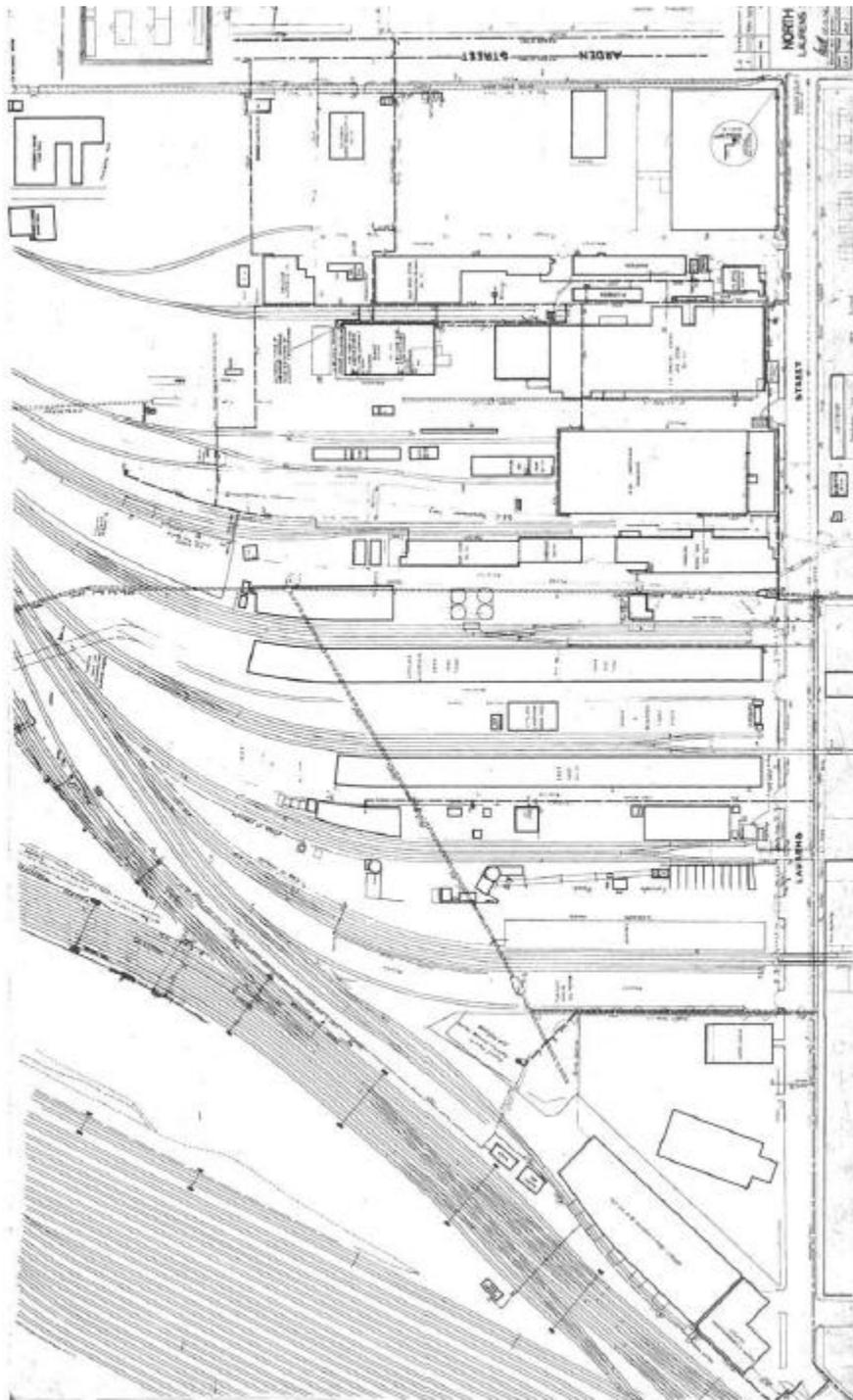


Figure 9-2 1970 plan of Arden station precinct (Source: DEDJTR)



9.2.1 Substation

Four options are under consideration for the substation location. These alternative design options are discussed as follows.

Option 1

Option 1 is located north of Arden Street, between CityLink and Langford Street to the east. It is in an area currently characterised by a mix of predominantly industrial and railway-related uses. Prior to non-Aboriginal occupation of the area, Option 1 was located near Moonee Ponds Creek. The geomorphology of the area would have comprised the terraces and floodplains land system. The terraces and floodplains overlie volcanic terrains and drainage systems, with terraces forming ideal camping locations, while the floodplains would have generally been of lower archaeological sensitivity. No Aboriginal Places are recorded within Option 1, although it is within an area of cultural heritage sensitivity associated with Moonee Ponds Creek, which has been channelised in this area.

The non-Aboriginal development of Option 1 appears to have been industrial. Aerial imagery indicates that warehouses were present on the site by 1945, although these have since been demolished and only a concrete pad remains.

The proposed substation would be located in an area that would have high archaeological sensitivity prior to the modifications of Moonee Ponds Creek and its surrounds; however, the residual archaeological sensitivity is very low due to the subsequent land development that has taken place since non-Aboriginal occupation of the region.

Option 2

Option 2 is proposed to be sited at the MTM traction substation. It would be located in an area currently characterised by a mix of predominantly industrial and railway-related uses. Prior to non-Aboriginal occupation of the area, Option 2 was located near Moonee Ponds Creek. The geomorphology of the area would have comprised the terraces and floodplains land system (see Option 1 for further details). No Aboriginal Places are recorded within Option 2, although it is within an area of cultural heritage sensitivity associated with Moonee Ponds Creek, which has been channelised in this area.

The non-Aboriginal development of Option 2 appears to have been industrial and railway-related. An existing substation is already at the site.

The proposed substation would be located in an area that would have high archaeological sensitivity prior to the modifications of Moonee Ponds Creek and its surrounds; however, the residual archaeological sensitivity is very low due to the subsequent land development that has taken place since non-Aboriginal occupation of the region.

Option 3

Option 3 would be located within the Arden station precinct, between the rail lines to the west and Laurens Street to the east. Refer to Section 9.2 for a summary of the Aboriginal and non-Aboriginal landscape of the area.

Option 4

Option 4 would be located within the western portal precinct, within the industrial estate to the east of Tennyson Street. As this site has been extensively redeveloped, residual archaeological sensitivity is very low due to the subsequent land development that has taken place since non-Aboriginal occupation of the region.



9.3 Key Issues

Refer to Section 8.3.

9.4 Impact Assessment

The following draft EES evaluation objectives and assessment criteria (and indicators where relevant) are relevant to this assessment.

Draft EES evaluation objectives	Assessment criteria
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	Avoid or minimise impacts on Aboriginal cultural heritage values and places.

The project is consistent with draft EES evaluation objective as:

- A CHMP is being undertaken for Melbourne Metro.

The CHMP would identify any Aboriginal cultural heritage values within the activity area so that recommendations for the minimisation of impacts to these can be provided. Should historical archaeological excavations occur within this area, contingency plans within the CHMP would be developed for the discovery of Aboriginal cultural heritage material. The CHMP would also provide contingency plans for the discovery of Aboriginal cultural heritage material during investigation and construction works. A copy of this CHMP must be on site at all times.

The Arden station precinct traverses areas of moderate-high Aboriginal archaeological sensitivity. However, the archaeological potential is low due to the previous ground disturbing activities that have taken place at the precinct. In addition, the Arden station precinct is located within former swamplands. The proposed substation locations are considered to be in areas of low archaeological potential due to the land use alterations that have taken place since non-Aboriginal occupation and no further assessment is required.

9.5 Environmental Performance Requirements

The recommended Environmental Performance Requirement and proposed mitigation measures for this precinct are the same as for Precinct 1 - Tunnels, as shown in Table 7-1.



10 Precinct 4: Parkville Station

10.1 Project Components

The Concept Design for Precinct 4 of relevance to this assessment would comprise:

- Parkville station, including Concept Design entrances.

10.1.1 Construction

The key proposed construction activities to be undertaken for the Concept Design within Precinct 4, which are of relevance to this assessment comprise:

- Ground disturbing works associated with the construction of the station, including excavation, relocation of services, etc
- Construction work site.

10.1.2 Operation

No adverse Aboriginal heritage impacts would arise out of the operational phase of the project.

10.2 Existing Conditions

The Parkville station precinct would largely to be constructed within a road reserve. Areas where impacts to the ground surface would likely take place close to the ground surface are discussed below in relation to their land use history and Aboriginal archaeological potential.

The Parkville station precinct is currently characterised by a mix of predominantly urban and commercial-related uses. Prior to non-Aboriginal occupation of the area, the Parkville station precinct was located on a slope featuring grassy woodland species. The geomorphology of the area would have comprised the outlying ridges land system. The Parkville station precinct is located near Bouverie Street, which had a natural creekline running along the valley floor prior to non-Aboriginal settlement of the area. The stream is thought to have sprung from within the University of Melbourne's grounds and joined the ephemeral River Townend at Elizabeth Street (Presland 2008). Geological layers within the Parkville station precinct comprise fill, overlying the Melbourne Formation.

No Aboriginal Places are recorded within the Parkville station precinct. As this area would have been located on a rise above two natural creeklines, this area is assessed as being of high archaeological sensitivity, with some archaeological potential where natural soil deposits remain.

Since non-Aboriginal settlement, the study area in this precinct has undergone commercial and urban development. This section of Carlton was established from the late 1850s and 1860s, with Elizabeth Street one of the main routes to the goldfields. During the 1850s (to 1939), part of the land near Grattan Street and Royal Parade was known as the Northern Market, and comprised cattle, horse and pig markets. The triangular site to the south of the Northern Market, which was bounded by Royal Parade, Flemington Road and Grattan Street, was a hay market. The Northern Market and hay market were developed from the mid-20th century into the Royal Melbourne Hospital, the Dental Hospital and Dental School. The University of Melbourne developed from 1853, with the Medicine Building, currently facing Grattan Street, constructed in the 1960s. The south-east corner of the Grattan Street/Royal Parade intersection, previously developed for housing, was replaced with Ampol House in 1958. The land to the south of this block, bordered by Berkeley Street, Pelham Street and the Haymarket roundabout, was also developed as housing, generally being



replaced with larger structures related to the automotive industry in the second half of the 20th century. The two townhouses at 226-228 Pelham Street are remnants of this early phase of development.

In the 19th century, the current City Ford car yard site (bounded by Pelham Street, Berkeley Street and the Haymarket/Elizabeth Street) contained the brick Junction Hotel, which was operated by William Lawrence.

Other than for the road reserve, parkland and the City Ford car yard site, the land included in the Parkville station precinct has been extensively developed for the construction of the Royal Melbourne Hospital, the Dental Hospital (now demolished) and the Medicine Building, at the south-western corner of the University grounds.

10.3 Key Issues

Refer to Section 8.3.

10.4 Impact Assessment

The following draft EES evaluation objectives and assessment criteria (and indicators where relevant) are relevant to this assessment.

Draft EES evaluation objectives	Assessment criteria
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	Avoid or minimise impacts on Aboriginal cultural heritage values and places.

The project is consistent with draft EES evaluation objective as:

- A CHMP is being undertaken for Melbourne Metro.

The CHMP would identify any Aboriginal cultural heritage values within the activity area so that recommendations for the minimisation of impacts to these can be provided. The CHMP would also provide contingency plans for the discovery of Aboriginal cultural heritage material during investigation and construction works. A copy of this CHMP must be on site at all times.

Ground surface works are to take place within the Parkville station precinct, at the following locations:

- Construction work site at the City Ford car yard
- Construction work site at University Square
- Potential excavation works along Grattan Street, Barry Street and Royal Parade.

As University Square is the site of an underground car park, this area is assessed as having no Aboriginal archaeological potential. Grattan Street, Barry Street and Royal Parade have been previously subject to earth moving works, and these areas have been assessed as having very low Aboriginal archaeological sensitivity.

There is potential for works to impact upon Aboriginal cultural heritage values within the City Ford car yard, if natural soil deposits occur, as this area has not undergone extensive redevelopment. However, no ground surface disturbance is expected at this site. Should historical archaeological excavations occur within this precinct, contingency plans within the CHMP would be developed for the discovery of Aboriginal cultural heritage material.



10.5 Environmental Performance Requirements

The recommended Environmental Performance Requirement and proposed mitigation measures for this precinct are the same as for Precinct 1 - Tunnels, as shown in Table 7-1.



11 Precinct 5: CBD North Station

11.1 Project Components

The Concept Design for Precinct 5 of relevance to this assessment would comprise:

- CBD North station, including station entrances.

11.1.1 Construction

The key construction activities to be undertaken for the Concept Design within Precinct 5, which are of relevance to this assessment, comprise:

- Ground disturbing works associated with the construction of the station, including excavation, relocation of services, etc.
- Construction work site

11.1.2 Operation

No adverse Aboriginal heritage impacts would arise out of the operational phase of the project.

11.2 Existing Conditions

The CBD North station precinct would largely be constructed below ground, at depths below potential Aboriginal archaeological deposits. Areas where ground disturbance would likely take place close to the ground surface are discussed below in relation to their land use history and Aboriginal archaeological potential.

The CBD North station precinct is currently characterised by a mix of predominantly urban and commercial-related uses. Prior to non-Aboriginal occupation of the area, the CBD North station precinct was located on a slope featuring grassy woodland species. The geomorphology of the area would have comprised the outlying ridges land system. Geological layers within the CBD North station precinct contain fill, overlying the Melbourne Formation. The CBD North station precinct is located approximately one kilometre to the north of the Yarra River. As this area would have been located on a rise above the Yarra River and its associated swamps and lagoons, it is assessed as being of moderate-high archaeological sensitivity, with some archaeological potential where natural soil deposits remain.

One Aboriginal Place has been recorded within the CBD North station precinct: Little La Trobe St 1 (VAHR 7822-0013). It comprises a single silcrete artefact recovered during historical excavations at 22-32 Little La Trobe Street and was found in a pocket of intact sediment.

Since non-Aboriginal settlement, this precinct has undergone commercial, urban and residential development. The CBD North station construction area bordered by Swanston Street to the east and La Trobe Street to the south was developed by the mid-1850s, with one and two-storey brick dwellings present. These buildings persisted throughout the 19th century, and had a light industrial and service industry nature. No basement levels were associated with these structures, indicating that there is a potential for intact soil deposits to remain.

The second construction work site, located along Franklin Street, is bordered by the City Baths, which were first opened in the 1860s. The Archaeological Management Plan for the Central Activities District has identified Franklin Street as having no historical archaeological potential (Fels et al. 1993, p 5). This was determined through investigating the pre-contact topography of the city and any subsequent alterations to



the landscape, which would have resulted in ground disturbance. This area has therefore been assessed as having no historical archaeological potential due to having undergone ground disturbing activities. Consequently there is also a very low potential for Aboriginal Places to be present within this area.

The A'Beckett Street construction work site was bounded by Stewart Street in the late-1850s. A small number of buildings fronted A'Beckett Street on the construction work site. The construction work site was host to light industrial and residential development and continued through to the 19th century. Between 1910 and 1920 the area was acquired by the British and Australasian Tobacco Company and the States Tobacco Company. By 1925, it was developed into a single-storey brick office and box-making room, larger sawtooth-roofed warehouses and a laneway access from Stewart Street. The company also owned two other buildings adjacent to the site, to the east of Stewart Street and fronting both A'Beckett and Swanston Streets. The tobacco warehouse buildings were still present in the early 1960s however, after the departure of British and Australian Tobacco in the 1950s, W D & H O Wills tobacco merchants occupied the site until circa 1963. In circa 1965, the buildings were demolished and the site became used as a commercial car park. In 2014, the car park site was redeveloped as the RMIT Urban Square, which includes sports courts and landscaping. There is a potential that intact soil deposits remain at this construction work site.

The Archaeological Management Plan for the Central Activities District has identified A'Beckett Street as having no historical archaeological potential (Fels et al. 1993, p 5). This area has therefore been assessed as having no historical archaeological potential due to having undergone ground disturbing activities. Consequently, there is also a very low potential for Aboriginal Places to be present within this area.

11.3 Key Issues

Refer to Section 8.3.

11.4 Impact Assessment

The following draft EES evaluation objectives and assessment criteria (and indicators where relevant) are relevant to this assessment.

Draft EES evaluation objectives	Assessment criteria
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	Avoid or minimise impacts on Aboriginal cultural heritage values and places.

The project is consistent with draft EES Evaluation objective as:

- A CHMP is being undertaken for Melbourne Metro.

The CHMP would identify any Aboriginal cultural heritage values within the activity area so that recommendations for the minimisation of impacts to these can be provided. The CHMP would also provide contingency plans for the discovery of Aboriginal cultural heritage material during investigation and construction works. A copy of this CHMP must be on site at all times.

Ground surface works would take place within the CBD North station precinct at the following locations:

- Franklin and A'Beckett Streets
- Construction work site located on the corner of Swanston Street and La Trobe Street
- Construction work site located at A'Beckett Street.



As Franklin and A'Beckett Streets have been previously assessed as having no historical archaeological potential, this area is evaluated as having low Aboriginal archaeological potential. Therefore no further investigation into this area is required.

Works would have the potential to adversely impact on unknown Aboriginal cultural heritage values within the construction work sites located on the corner of Swanston Street and La Trobe Street, and at A'Beckett Street, if excavation works take place within natural soil deposits. Should historical archaeological excavations occur within this precinct, contingency plans within the CHMP would be developed for the discovery of Aboriginal cultural heritage material.

11.5 Environmental Performance Requirements

The recommended Environmental Performance Requirement and proposed mitigation measures for this precinct are the same as for Precinct 1 - Tunnels, as shown in Table 7-1.



12 Precinct 6: CBD South Station

12.1 Project Components

The Concept Design for Precinct 6 of relevance to this assessment would comprise:

- CBD South station, including entrances and connection to Flinders Street Station.

12.1.1 Construction

The key construction activities to be undertaken for the Concept Design within Precinct 6, which are of relevance to this assessment, comprise:

- Ground disturbing works associated with the construction of the station, including excavation, relocation of services, etc
- Construction work site.

12.1.2 Operation

No adverse Aboriginal heritage impacts would arise out of the operational phase of the project.

12.2 Existing Conditions

The CBD South station precinct would largely be constructed below ground, at depths below potential Aboriginal archaeological deposits. Areas where ground disturbance would likely take place close to the ground surface are discussed below in relation to their land use history and Aboriginal archaeological potential.

The CBD South station precinct is currently characterised by a mix of predominantly urban, commercial, cultural and railway-related uses. Prior to non-Aboriginal occupation of the area, the CBD South station precinct would have comprised the outlying ridges land system, with the westernmost corner of the precinct located within the stony rises land system. Vegetation would have comprised woodland and riparian scrub. No Aboriginal Places are recorded within this precinct, although an area of cultural heritage sensitivity associated with the Yarra River is present. An Aboriginal cultural place (although not registered on the VAHR), known as the Punt Bridge Corroboree, is located at the former Punt Bridge site, to the south of the CBD South station precinct.

The CBD South station precinct is located approximately 50 m to the north of the Yarra River. The precinct area closest to the station would be located within the associated swamps and lagoons of the Yarra River's floodplains. This area is assessed as having the following archaeological sensitivity:

- Area surrounding the Yarra River: low-moderate
- Area to the north of the Yarra River, at higher elevation: moderate-high.

In addition, these areas would have some archaeological potential where natural soil deposits remain.

Since non-Aboriginal settlement, this precinct has undergone commercial, urban, residential and railway development. The CBD South station precinct construction area bordered by Swanston Street to the west and Flinders Street to the south was established by the 1860s, with buildings noted in the area as early as the 1830s. By the mid-1850s, this area was occupied by a number of buildings of varying size and the area had a mixed commercial character. By 1863, there were four large store buildings on the block, which were occupied by wholesale merchants, including grocers and wine dealers. In 1888, most of the buildings were of



two storeys, aside from the hotel at 23 Swanston Street which comprised three storeys. Plans from 1895 indicate the location of cellars at the Gippsland Hotel (number 13 Swanston Street), numbers 15, 19 and 27, and under the whole of the Alexander Building.

From 1910 through to 1925, there was some consolidation of rear buildings, but the area still retained its predominantly 19th century built form. The five-storey Alexander Building (27 Swanston Street) was demolished in 1939. By 1948, a three-storey building had been constructed in place of the Alexander Building. The two-storey building at 21-25 Swanston Street had also been replaced by this time. A new building was constructed at n 9-11 Swanston Street, which has since been altered with the addition of another level. None of these new buildings appear to have incorporated a basement, indicating the potential for natural soil deposits to occur.

The construction work site to the east of Swanston Street and to the south of Collins Street is located within City Square. The Archaeological Management Plan for the Central Activities District has identified the City Square as having no historical archaeological potential (Fels et al. 1993, p 5). This was determined through investigating the pre-contact topography of the city and any subsequent alterations to the landscape, which would have resulted in ground disturbance (there is a car park located underneath). This area has therefore been assessed as having no historical archaeological potential due to having undergone ground disturbing activities. Consequently, there is also a very low potential for Aboriginal Places to be present within this area.

The underground entrance connection to Federation Square is within the area of cultural heritage sensitivity associated with the Yarra River; however, Federation Square is located above railway lines and, as such, there is no natural ground surface remaining. Consequently, the underground entrance connection to Federation Square has no Aboriginal archaeological potential.

12.3 Key Issues

Refer to Section 8.3.

12.4 Impact Assessment

The following draft EES evaluation objectives and assessment criteria (and indicators where relevant) are relevant to this assessment.

Draft EES evaluation objectives	Assessment criteria
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	Avoid or minimise impacts on Aboriginal cultural heritage values and places.

The project is consistent with the draft EES evaluation objective as:

- A CHMP is being undertaken for Melbourne Metro.

The CHMP would identify any Aboriginal cultural heritage values within the proposed activity area so that recommendations for the minimisation of impacts to these can be provided. The CHMP would also provide contingency plans for the discovery of Aboriginal cultural heritage material during investigation and construction works. A copy of this CHMP must be on site at all times.

Ground surface works would take place within the CBD South station precinct, at the following locations:



- Construction work site on Swanston Street, between Flinders Lane and Flinders Street
- City Square
- Federation Square.

As City Square has been previously assessed as having no historical archaeological potential (due to a car park being located below), this area is evaluated as having a very low Aboriginal archaeological potential. Federation Square is located above railway lines and is not within a natural ground surface. As such, no further investigations for these areas are required.

Works would have the potential to adversely impact on unknown Aboriginal cultural heritage values within the Swanston Street construction work site, should excavation works within natural soil deposits occur. Should historical archaeological excavations occur within this precinct, contingency plans within the CHMP would be developed for the discovery of Aboriginal cultural heritage material.

12.5 Environmental Performance Requirements

The recommended Environmental Performance Requirement and proposed mitigation measures for this precinct are the same as for Precinct 1 - Tunnels, as shown in Table 7-1.



13 Precinct 7: Domain Station

13.1 Project Components

The Concept Design for Precinct 7 of relevance to this assessment would comprise:

- Domain station, including entrances
- Domain TBM southern launch site.

13.1.1 Construction

The key proposed construction activities that would be undertaken for the Concept Design within Precinct 7, which are of relevance to this assessment comprise:

- Domain TBM launch site
- Ground disturbing works associated with the construction of the station, including excavation, relocation of services, etc
- Site compounds.

13.1.2 Operation

No adverse Aboriginal heritage impacts would arise out of the operational phase of the project.

13.2 Existing Conditions

The Domain station precinct would largely be constructed below ground, at depths below potential Aboriginal archaeological deposits. Areas where ground disturbance would likely take place close to the ground surface are discussed below in relation to their land use history and Aboriginal archaeological potential.

The Domain station precinct is currently characterised predominantly by road-related uses. Prior to non-Aboriginal occupation of the area, the Domain station precinct would have comprised the outlying ridges land system, with the south-western extent (near Albert Street) located within the terraces and lagoons land system. Vegetation would have included grassy woodland species. The geology of this precinct comprises the Tertiary aged Brighton Group overlying the Melbourne Formation. No Aboriginal Places are recorded within this precinct.

The Domain station precinct is located approximately 400 m to the north of the former Albert Swamp (now known as Albert Park Lake) and 650 m to the west of the Yarra River's former lagoons (some of which are now ponds within the Royal Botanic Gardens). This area is assessed as being of low-moderate and moderate archaeological sensitivity, with some potential where natural soil deposits remain.

Since non-Aboriginal settlement, this precinct has undergone residential, tram, road and parkland development. The proposed TBM southern launch site is located on St Kilda Road, spreading into the grounds associated with the Shrine of Remembrance. St Kilda Road was originally known as Baxter's Track and was in place from the late 1830s, although it remained unmade until the 1850s. In 1866, a large residence – later known as The Grange – was constructed for Major General Chute on the corner of Domain Road and St Kilda Road. The mansion was demolished after 1912, and the site graded with 1,200 loads of clay and soil removed, where a triangular area was cut off at the corner of St Kilda and Domain Roads (John Patrick and Allom Lovell and Associates 2003, p 29).



The gradual rise up from St Kilda Road to the Shrine of Remembrance was artificially created and the construction of the Shrine's base required thousands of tonnes of earth to be moved (John Patrick and Allom Lovell and Associates 2003). A steep embankment ran along the western side along St Kilda Road, above which the land rose gently to the east (Lovell Chen 2010, p 15, 51).

A construction area, at Edmund Herring Oval, is proposed to be located off Domain Road to the south of the Shrine of Remembrance. Edmund Herring Oval is the proposed location for the Domain TBM launch service facility site. Edmund Herring Oval was established in 1919 as a cricket ground on part of the site formerly occupied by The Grange. Melbourne Grammar School, however, had first sought to use the area as a sports field in 1916. The school funded the construction of an oval and cricket pitch (John Patrick and Allom Lovell and Associates 2003). As this area appears to have remained largely undeveloped since non-Aboriginal occupation of Melbourne, Edmund Herring Oval is assessed as having some archaeological potential. However, research suggests the oval may have undergone laser-levelling, so it is unknown what areas, if any, remain intact.

A construction area is also proposed along St Kilda Road. St Kilda Road was host to the Brighton cable tram route (running along St Kilda Road and Brighton Road). This ran from the engine house on the corner of St Kilda Road and Bromby Street, which opened in October 1888 (Vines 2011). The site of the former St Kilda Road Cable Tram Engine House Track Precinct has potential to contain significant 19th century archaeological remains (such as tram tracks, wood blocked and/or stone setts paving, deep concrete cable tunnels, inspection manholes and cast iron covers, large brick pits for the historical sheaves and possibly traces of equipment) (VHI citation, H7822-2220). While there is potential for historical archaeological remains to be present within this section of the precinct, it is unlikely that Aboriginal cultural material would have survived the construction of the tramway.

13.3 Key Issues

The key issues associated with the Concept Design are the potential for unknown Aboriginal cultural heritage to be present within a sub-surface context within areas of historical archaeological potential; however, it is unlikely that Aboriginal cultural material would have remained following the construction of the tramway .

13.4 Impact Assessment

The following draft EES evaluation objectives and assessment criteria (and indicators where relevant) are relevant to this assessment.

Draft EES evaluation objectives	Assessment criteria
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	Avoid or minimise impacts on Aboriginal cultural heritage values and places.

The project is consistent with the draft EES evaluation objective as:

- A CHMP is being undertaken for Melbourne Metro.

The CHMP would identify any Aboriginal cultural heritage values within the activity area so that recommendations for the minimisation of impacts to these can be provided. Should historical archaeological excavations occur within this precinct, contingency plans within the CHMP would be developed for the discovery of Aboriginal cultural heritage material. The CHMP would also provide contingency plans for the discovery of Aboriginal cultural heritage material during investigation and construction works. A copy of this CHMP must be on site at all times.



Ground surface works would take place within the Domain station precinct, at the following locations:

- Construction work site at Edmund Herring Oval
- Domain TBM launch site
- Construction work site along St Kilda Road.

As the Domain TBM launch site has been previously subject to earth moving works, this area has been assessed as being of very low Aboriginal archaeological potential and no further assessment is required.

Works would have the potential to adversely impact on unknown Aboriginal cultural heritage values within the construction work site located at Edmund Herring Oval, if excavation works occur within natural soil deposits. The presence of Aboriginal cultural material is largely dependent upon the extent of disturbance from past construction activities, such as the tramway along St Kilda Road. The CHMP would provide management measures and contingences in the event that previously unknown items of Aboriginal cultural heritage are uncovered during project works within this precinct..

13.5 Environmental Performance Requirements

The recommended Environmental Performance Requirement and proposed mitigation measures for this precinct are the same as for Precinct 1 - Tunnels, as shown in Table 7-1.



14 Precinct 8: Eastern Portal (South Yarra)

14.1 Project Components

The Concept Design for Precinct 8 of relevance to this assessment would comprise:

- Eastern portal
- A potential TBM retrieval site, immediately west of the Sandringham line in Osborne Street.

14.1.1 Construction

The key construction activities to be undertaken for the Concept Design within Precinct 8, which are of relevance to this assessment, include:

- Establishment of construction work sites
- Cut and cover tunnel construction
- Widening of the existing rail corridor and construction of retaining walls
- Construction of ventilation shaft, emergency access shaft and substation in Osborne Street Reserve
- Retrieval of the TBM from Osborne Street and the adjoining rail reserve.

14.1.2 Operation

No adverse Aboriginal heritage impacts would arise out of the operational phase of the project.

14.2 Existing Conditions

Parts of the eastern portal precinct would be constructed below ground, at depths below potential Aboriginal archaeological deposits. Areas where ground disturbance would likely take place close to the ground surface are discussed below in relation to their land use history and Aboriginal archaeological potential.

The eastern portal precinct is dominated by residential and commercial development, which was developed by the latter part of the 19th century. Prior to non-Aboriginal settlement of the area, the landscape comprised a coastal plains land system, which was typically formed over Neogene sediments (Pliocene epoch) and overlain by a sand layer (Vandenberg 1974; DEDJTR 2015a). The geology of the area comprises the Brighton Group overlying the Melbourne Formation and Devonian Granites. Vegetation included grassy woodland or herb-rich woodland mosaic species. No registered Aboriginal Places or waterways are recorded within this precinct. This area is assessed as being predominantly of low-moderate archaeological sensitivity, with some archaeological potential at the South Yarra Siding Reserve, provided natural soil deposits remain.

Since non-Aboriginal settlement, this precinct has undergone residential, urban and railway development. Melbourne's railway network was established during the 1850s by private companies and South Yarra station (then known as Gardiner's Creek Road station) was in operation by the end of 1860. The creation of the rail line through from Gippsland was completed in 1879, with the expansion of the railway line resulting in the removal of a number of dwellings – which had been constructed between Osborne and William Streets by the mid-1850s – and in cuttings within the rail reserve.

The South Yarra Siding Reserve is located to the south of Toorak Road, between the Sandringham and Pakenham/Cranbourne railway lines, and is bordered to the east by William Street. This was previously the site of the South Yarra Tennis Club and pavilion, which was opened in 1884 (Figure 14-1). Currently, the South Yarra Siding Reserve is landscaped with footpaths, with the park sloping steeply downwards to the



railway track to the east, north and west. The rail cutting descends up to seven metres below the current ground surface (Golder Associates 2015b).

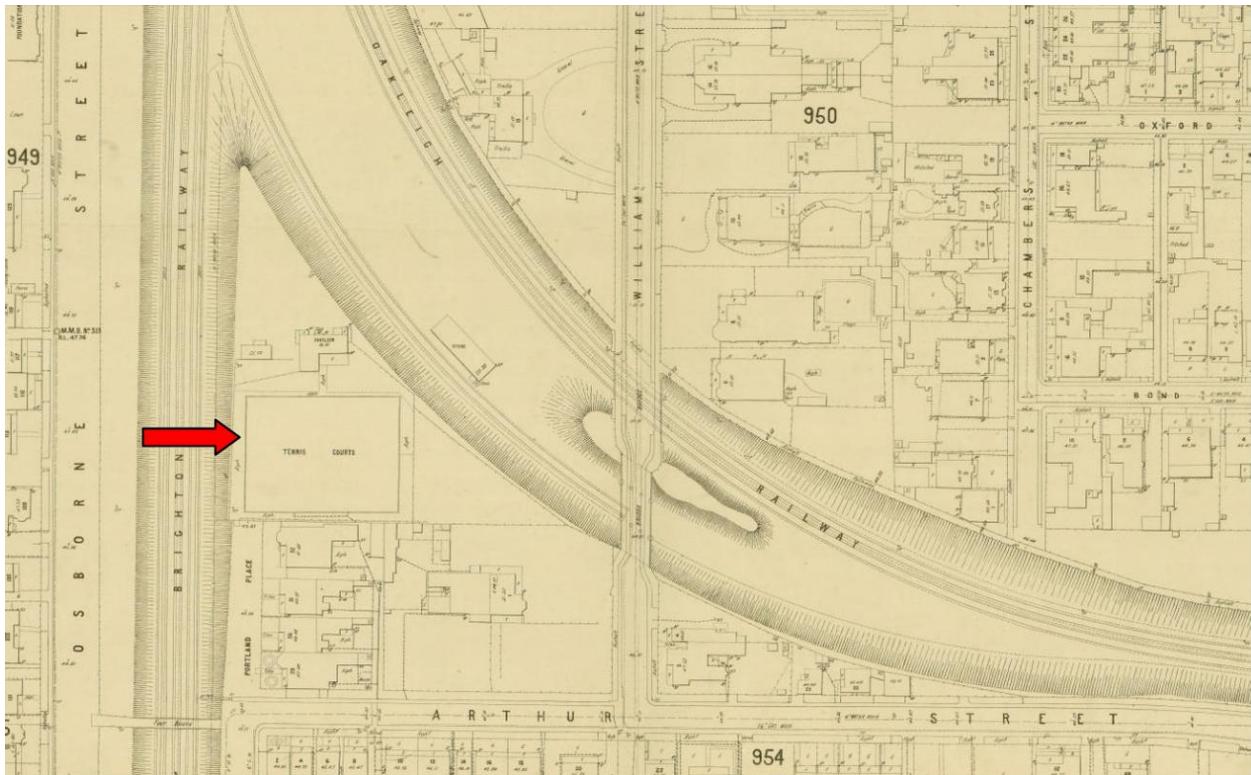


Figure 14-1 1895 MMBW Detail Plan 950, City of Prahran, illustrating the junction of the Oakleigh (now Cranbourne/Pakenham) and Brighton (now Sandringham) Railway Lines (including the tennis courts and pavilion north of Arthur Street)

In 1886, the three tennis courts at the site were constructed from asphalt, with a timber pavilion built in 1891 (Victorian Railway Commissioners in Richard Yallop 1984). In 1926, the tennis club moved location, with the new courts having either lawn or *en-tout-cas* (clay and gravel) surfaces (Lack 2015). It is likely they comprised both. While the construction and demolition of the tennis courts and pavilion would have impacted on the ground and sub-surface of the Yarra Rail Siding Reserve to some degree, it is likely that intact sub-surface sediments could still be present; particularly in the eastern and northern sections of the reserve, and possibly beneath the old courts.

The South Yarra Siding Reserve would be used as a construction work site, although the exact impacts from this use are not yet known. The South Yarra Siding Reserve is not located in an area of cultural heritage sensitivity; however, preliminary results from the complex assessment have shown that there is one previously unknown Aboriginal Place within the South Yarra Siding Reserve.

14.3 Key Issues

The key issue associated with the Concept Design is the potential for impacting on Aboriginal cultural heritage at the South Yarra Siding Reserve.

14.4 Impact Assessment

The following draft EES evaluation objectives and assessment criteria (and indicators where relevant) are relevant to this assessment.



EES draft evaluation objectives	Assessment criteria
<p>Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.</p>	<p>Avoid or minimise impacts on Aboriginal cultural heritage values and places.</p>

The project is consistent with the draft EES evaluation objective as:

- A CHMP is being undertaken for Melbourne Metro.

The CHMP would identify any Aboriginal cultural heritage values within the activity area so that recommendations for the minimisation of impacts to these can be provided. Should historical archaeological excavations occur within this area, contingency plans within the CHMP would be developed for the discovery of Aboriginal cultural heritage material. A copy of this CHMP must be on site at all times.

As most of the ground surface works would take place along the railway reserve, which has been previously subject to significant ground disturbance and is also considered to be of no Aboriginal archaeological potential, no further assessment is required for these areas.

The following works would have the potential to adversely impact on one previously unknown Aboriginal Place within this precinct during the construction phase of Melbourne Metro:

- Construction work site at South Yarra Siding Reserve.

Further archaeological investigation during the CHMP process would be required to identify the potential nature and extent of the new Aboriginal Place within this precinct. The CHMP would also provide contingency plans for further discovery of Aboriginal cultural heritage material during investigation and construction works.

14.5 Environmental Performance Requirements

The recommended Environmental Performance Requirement and proposed mitigation measures for this precinct are the same as for Precinct 1 - Tunnels, as shown in Table 7-1.



15 Precinct 9: Western Turnback

15.1 Project Components

The Concept Design for Precinct 9 of relevance to this assessment would comprise:

- Western turnback.

15.1.1 Construction

The key construction activities that would be undertaken for the Concept Design within Precinct 9, which are of relevance to this assessment comprise:

- Ground disturbing works associated with the construction of the turnback, such as excavation and relocation of services/train tracks.

15.1.2 Operation

No adverse Aboriginal heritage impacts would arise out of the operational phase of the project.

15.2 Existing Conditions

The western turnback precinct is dominated by railway development. Prior to non-Aboriginal settlement of the area, the landscape comprised the plains land system, which was typically formed over Older Volcanics (DEDJTR 2015d). The geology of the area is Newer Volcanics. Vegetation included plains grassland species. No Aboriginal Places are recorded within this precinct.

Since non-Aboriginal settlement, this precinct has undergone urban and railway development. The gold rush led to the development of the Mount Alexander and Murray River railway lines in the mid-19th century. Development was initially commenced by a private company and completed by the State Government (Matthews 2005). Previous archaeological reports determined that the highly disturbed nature of the western turnback precinct meant that it was unlikely that the proposed works would have an impact on any Aboriginal sites (Matthews 2005; Matthews 2006). Since then, additional works associated with the Regional Rail Link project have resulted in further ground disturbance to the western turnback precinct at West Footscray.

15.3 Key Issues

Refer to Section 8.3.

15.4 Impact Assessment

The following draft EES evaluation objectives and assessment criteria (and indicators where relevant) are relevant to this assessment.

Draft EES evaluation objectives	Assessment criteria
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	Avoid or minimise impacts on Aboriginal cultural heritage values and places.



The project is consistent with the draft EES evaluation objective as:

- A CHMP is being undertaken for Melbourne Metro.

The CHMP would identify any Aboriginal cultural heritage values within the activity area so that recommendations for the minimisation of impacts to these can be provided. The CHMP would also provide contingency plans for the discovery of Aboriginal cultural heritage material during investigation and construction works. A copy of this CHMP must be on site at all times.

As most of the ground surface works would take place along the railway reserve, which has been previously subject to significant ground disturbance and is also considered to be of no Aboriginal archaeological potential, no further assessment is required.

15.5 Environmental Performance Requirements

The recommended Environmental Performance Requirement and proposed mitigation measures for this precinct are the same as for Precinct 1 - Tunnels, as shown in Table 7-1.



16 Early Works

16.1 Project Components

A number of early works would be required prior to the commencement of the main construction works. The early works all comprise modifications, temporary works, relocations or new works associated with existing utilities and services as follows:

- Electrical
- Sewer
- Gas
- Water
- Stormwater
- Communications
- Tram works.

All these works are associated with the stations and the portals.

16.2 Existing Conditions

In general, early works seek to modify existing services as they relate to water, sewerage, drainage, power, telecommunications and tramways. Activities associated with the early works component are located in previously developed areas, therefore limiting potential impact to areas of unknown Aboriginal cultural heritage potential.

16.3 Key Issues

Refer to Section 8.3.

16.4 Impact Assessment

It is considered unlikely that Aboriginal cultural heritage would be impacted by early works. The CHMP would provide contingency plans for the discovery of Aboriginal cultural heritage material during investigation and construction works. A copy of this CHMP must be on site at all times.

16.5 Environmental Performance Requirements

The recommended Environmental Performance Requirement and proposed mitigation measures for this precinct are the same as for Precinct 1 - Tunnels, as shown in Table 7-1.



17 Environmental Performance Requirements

This section provides a comprehensive list of the recommended Environmental Performance Requirements and proposed mitigation measures identified as a result of this impact assessment. Table 17-1 provides the Environmental Performance Requirements which applies across the project and on a precinct basis, linked to the draft EES evaluation objective.

Table 17-1 Environmental performance requirements

Draft EES evaluation objective	Impact	Environmental Performance Requirements	Proposed mitigation measures	Precinct	Timing	Risk no.
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	Harm to Aboriginal cultural heritage values	Comply with a Cultural Heritage Management Plan approved under the <i>Aboriginal Heritage Act 2006</i> and prepared in accordance with the Aboriginal Heritage Regulations 2007.	Specific management recommendations and contingencies within the CHMP	All	Design	AH001 AH002 AH003 AH004 AH005 AH006 AH007



18 Conclusion

This report documents the outcomes of an assessment of the risks to Aboriginal cultural heritage from activities associated with construction and operation of the Melbourne Metro.

The report presents an appraisal of the potential impacts (direct and indirect, short and long term) of Melbourne Metro on Aboriginal cultural heritage within the Melbourne Metro study area.

18.1 Relevant EES Objectives

The following draft EES evaluation objectives and assessment criteria (and indicators where relevant) is relevant to this assessment.

Draft EES evaluation objectives	Assessment criteria
Cultural Heritage: To avoid or minimise adverse effects on Aboriginal and historical cultural heritage values.	Avoid or minimise impacts on Aboriginal cultural heritage values and places.

The project is consistent with the draft EES evaluation objective as:

- The Melbourne Metro is to be established within the heavily developed environs of the Melbourne CBD. As such, there is low-moderate likelihood of impacting on any unknown Aboriginal Places
- While there has been significant ground disturbance in the study area, prior archaeological assessments have found a small number of artefact scatters underneath city buildings
- The potential for discovering unknown Aboriginal cultural material would be managed through the preparation of a CHMP, which would be prepared in parallel with the EES process. The CHMP would be informed by considerable stakeholder consultation and extensive sub-surface testing to determine the nature of mitigation measures to be observed during the construction phase to protect aboriginal cultural heritage values. Additionally, the CHMP would establish robust processes in the event that unexpected items of Aboriginal cultural significance are uncovered during construction.

18.2 Impact Assessment Summary

The assessment addresses the specified EES scoping requirements and specifically evaluates potential impacts to Aboriginal cultural heritage based on the assessment criteria.

A risk assessment process was adopted that identified potential construction and operational hazards, impact pathways, consequences to Aboriginal cultural heritage values and likelihood of impacts. Risk to values was determined as the combination of consequence and likelihood. The risk assessment identified initial risk ratings for the following key risk areas:

- Impacts on known or unknown Aboriginal Places as a result of construction activities
- Construction being undertaken in areas of archaeological sensitivity.

A CHMP commenced on 27 November 2015, with the findings used to inform the risk assessment. The CHMP aims to provide information on the potential for Aboriginal cultural heritage to be present within the Melbourne Metro boundary. A mandatory CHMP is required in accordance with the *Aboriginal Heritage Act 2006* as an EES is required (section 49 of the Act). As the CHMP has yet to be completed, preliminary results from the CHMP were incorporated into the impact assessment, using the same methodology as that required for a CHMP, to inform the EES.



Based on the information collected in this report, the residual risk to Aboriginal cultural heritage values is considered to be low after following implementation of the recommended Environmental Performance Requirement.



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Appendices



Appendix A Legislation



A.1. Commonwealth Legislation

A.1.1. *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (the Commonwealth Act) protects Aboriginal cultural property that is significant to Aboriginal people. Cultural property includes any places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'. This includes intangible cultural heritage values; these sites may not necessarily have an archaeological component. Where Aboriginal cultural heritage places have cultural significance in accordance with Aboriginal tradition and are registered under the State's *Aboriginal Heritage Act 2006*, these would also be Aboriginal places subject to the provisions of the Commonwealth Act.

There is no cut-off date and the Commonwealth Act may apply to contemporary Aboriginal cultural property as well as ancient sites. The Commonwealth Act takes precedence over State cultural heritage legislation where there is conflict. Under section (s) 9 and 10 of the Commonwealth Act, the responsible Minister may make a declaration in situations where state or territory laws do not provide adequate protection of heritage places. The declaration can be made in response to verbal or written communication to the Minister, which seeks to protect or preserve a specified area from injury or desecration. Declarations can result in stop work activities and override other approvals that may be in place.

A.1.2. *Native Title Act 1993*

The *Native Title Act 1993* recognises and protects native title, and provides that native title cannot be extinguished contrary to the Act. The National Native Title Tribunal is a Commonwealth Government agency set up under this Act and mediates native title claims under the direction of the Federal Court of Australia. The National Native Title Tribunal maintains the following registers:

- National Native Title Register
- Register of Native Title Claim
- Unregistered claimant applications
- Register of Aboriginal land use agreements.

A Native Title search was not part of the scope of this assessment, and was therefore not conducted.

A.1.2.1. *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (*EPBC Act*) includes 'national heritage' as a matter of National Environmental Significance and protects listed places under the Constitution. It also establishes the National Heritage List (NHL) and the Commonwealth Heritage List (CHL). The following is a description of each of the heritage lists and the protection afforded to places listed on them.

A.1.2.2. **National Heritage List**

The National Heritage List (NHL) is a list of places with outstanding heritage value to Australia. This means that a person cannot take an action that has, would have, or is likely to have, a significant impact on the



national heritage values of a national heritage place without the approval of the Commonwealth Minister for the Environment.

There are no NHL values listed within the Melbourne Metro area.

A.1.2.3. Commonwealth Heritage List

The Commonwealth Heritage List (CHL) is a list of properties owned by the Commonwealth that have been assessed as having significant heritage value. If a place is included on the CHL, its Commonwealth owner is required to prepare a heritage management plan in accordance with the EPBC Regulations 2000, to ensure that activities affecting the place avoid or minimise adverse impacts on the heritage values of the place, and provide ongoing protection of the place in event of sale or transfer. Any proposed actions on CHL places must be assessed for their impact on the heritage values of the place in accordance with *Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies (Significant Impact Guidelines 1.2)*.

One CHL place is listed in the Melbourne Metro area (Victoria Barracks in St Kilda Road); however, it does not contain any known Aboriginal cultural heritage values.

A.1.2.4. Register of the National Estate

The Register of the National Estate (RNE) was formerly compiled as a record of Australia's natural, cultural and Aboriginal heritage places worth keeping for the future (and is indicative of places that may have significance to Aboriginal people). Places on the RNE that are in Commonwealth land, or subject to actions by the Australian Government, are protected under the *EPBC Act* by the same provisions that protect Commonwealth Heritage places.

The RNE was frozen on 19 February 2007, which means that no new places have been added or removed since that time. From February 2012, all references to the RNE were removed from the *EPBC Act* and the *AHC Act*. The RNE is maintained on a non-statutory basis as a publicly available archive.

No Aboriginal RNE places are listed in the Melbourne Metro area.

A.2. Victorian Legislation

A.2.1. Aboriginal Heritage Act 2006

The *Aboriginal Heritage Act 2006* (the Act) is the principal piece of legislation dictating Aboriginal cultural heritage management in Victoria. The Act establishes the Aboriginal Heritage Regulations 2007, of which the main objectives are to specify:

- When a cultural heritage management plan is required
- Standards and fees for the preparation of Cultural Heritage Management Plans (CHMP)
- Protocols and fees for the issuing of Cultural Heritage Permits.

Both the Act and the Regulations are administered by OAAV, Department of Premier and Cabinet (DPC). This Act is currently under review.

A.2.1.1. Cultural Heritage Management Plans



A CHMP is a legally binding document that includes cultural heritage assessment, consultation with Aboriginal stakeholders and management recommendations/contingencies for the protection of Aboriginal cultural heritage. A CHMP is designed to manage Aboriginal cultural heritage issues specific to an activity for a specified activity area. If a CHMP's management recommendations are followed correctly, the CHMP protects the Sponsor of the CHMP against prosecution under the Act.

There are three types of CHMP, each requiring a different level of cultural heritage assessment. The different levels are:

- Desktop (review of background cultural heritage information in relation to a activity area)
- Standard (desktop, survey and consultation)
- Complex (desktop, survey, consultation and sub-surface testing).

The type of CHMP undertaken for a proposed activity depends on the findings of the previous level of assessment. For example, if the survey as part of a standard assessment finds that there is a possibility of sub-surface cultural heritage material, then the CHMP would be upgraded to include a complex assessment.

Following preparation, the CHMP must be submitted to the relevant Registered Aboriginal Party (RAP), or Parties, for evaluation. If a RAP does not exist for the project area or the RAP or RAP(s) decide not to evaluate, then the Secretary takes on the role of RAP for evaluation purposes. Currently, there is no RAP for the Melbourne Metro area and so the Secretary of the Department of Premier and Cabinet would evaluate and approve any CHMP prepared for Melbourne Metro.

Under the Act, evaluation of the CHMP must be undertaken in 30 days, after which time the CHMP must be either approved or rejected. If a CHMP is rejected, it must be amended and resubmitted for evaluation (although the second evaluation period can be up to 30 days). If a Sponsor wishes, it may challenge rejection of the CHMP through the Victorian Civil and Administrative Tribunal (VCAT).

Decision-making authorities, such as State or local government agencies, are not able to issue statutory approvals such as a work authority, licence or planning permit for certain activities without first receiving an approved CHMP for that activity.

A.2.1.2. When is a CHMP required?

Regulation (r) 6 of the Regulations prescribes that a CHMP is required for an activity if:

- (a) All or part of the activity area is defined as an area of cultural heritage sensitivity (see r 4 of the Regulations for definitions); and
- (b) All or part of the activity is a high impact activity (see r 4 of the Regulations for definitions).

However, regardless of points (a) and (b), Section 49 of the *Aboriginal Cultural Heritage Act 2006* states that a CHMP is mandatory if the Sponsor is required to prepare an Environment Effects Statement under the *Environment Effects Act 1978* in respect of any works.

A.2.1.3. CHMP triggers for Melbourne Metro

As Melbourne Metro would require an Environment Effects Statement under the *Environment Effects Act 1978*, a mandatory CHMP would be triggered under the *Aboriginal Heritage Act 2006*.

A.2.1.4. CHMP requirement for 'enabling works'



Parts of the project, such as those specified in Section 1 of the amended EES Order, are excluded from assessment. This report, however, assesses other early works, which form part of Melbourne Metro and have not been specifically excluded.

A.2.1.5. Victorian Aboriginal Heritage Register

The VAHR includes the details of all registered Aboriginal cultural heritage places and objects (Aboriginal Places) within Victoria, including their location and a detailed description. Aboriginal Places are typically identified by archaeologists during archaeological fieldwork and are recorded in accordance with the requirements of the Act. It should be noted that Aboriginal cultural heritage, whether registered (known) or heritage likely to be harmed, is protected by the Act.

A.2.2. *Traditional Owner Settlement Act 2010*

The *Traditional Owner Settlement Act 2010* (Victoria) was created to provide for out-of-court settlements for native title in the State of Victoria. The Act is designed to promote reconciliation and good relations between the State and its traditional owners and to recognise traditional owner groups' rights and associations with traditional lands. The *Traditional Owner Settlement Act 2010* allows the Victorian Government to recognise traditional owners and certain rights to Crown land, although traditional owners must agree to withdraw any native title claim, pursuant to the *Native Title Act 1993*, and to not make any future native title claims. At the time of writing, no recognition and settlement agreement has been entered into with any traditional owner group entity for the Melbourne Metro area.

A.2.3. *Planning and Environment Act 1987*

The Melbourne Metro area is located within the City of Melbourne, City of Port Phillip and City of Stonnington local government areas (LGAs). Heritage Overlays are part of local council planning schemes and help protect the heritage of a local area. Heritage Overlays include places of local significance as well as places included in the Victorian Heritage Register. The Schedules to the Heritage Overlays of the Melbourne, Port Phillip and Stonnington Planning Schemes contain sites of Aboriginal heritage. Under each Heritage Overlay (Clause 43.01-6), every heritage place identified in a schedule as an Aboriginal heritage place is also subject to the requirements of the *Aboriginal Heritage Act 2006*.

A.2.4. Standards and guidelines

The following standards, practice notes and guidelines are relevant for the baseline study:

- OAAV (2014). *Aboriginal Heritage Act 2006: Practice Note: Significant Ground Disturbance*. Department of Premier and Cabinet: Melbourne.
- OAAV (2013) *Standards for Recording Victorian Aboriginal Heritage Places and Objects*. Department of Premier and Cabinet: Melbourne.



Appendix B

Geomorphology and Soils



Land system	Geomorphic region	Precinct	Description
Former swamps	Eastern Plains	Domain station	The former swamps are largely located to the south of Melbourne, and result from recent swamp deposits from streams and rivers. Very little information is available regarding the swamplands surrounding the Melbourne CBD. Only a small section of this land system is located within the Melbourne Metro area, at the south-western extent of the Domain station precinct. Soils within the former swamps surrounding the Carrum Swamp, Dalmore Swamp and the lower reaches of the Lang Lang and Bass Rivers contain high clay contents and crack when dry (Vertosols) (DEDJTR 2015b). Swamps were important resource zones, providing aquatic, avian and terrestrial food sources.
Coastal plains	Eastern Plains	Tunnels Eastern portal	The coastal plains land system are typically formed over Neogene sediments (Pliocene epoch) (Vandenberg 1974; DEDJTR 2015a), which are generally overlain by a sand layer. North-west trending dune ridges lie parallel to the coastline, and may represent former coastlines. Soils tend to be acidic (sandy texture contrast soils or acid sands overlying 'coffee rock' at about 0.8 m) (DEDJTR 2015a). Vegetation is thought to have been grassy woodland or herb-rich woodland mosaic.
Terraces and floodplains	Western Plains	Tunnels Western portal Arden station	The terraces and floodplains land system overly on volcanic terrains and the drainage systems of rivers such as the Barwon, Yarrowee/Leigh and Woody Yaloak. Soils associated with this land system include black and grey self-mulching and cracking clays (Vertosols), dark loam soils (Dermosols), and black (and some red) texture contrast (Sodosols) (DEDJTR 2015e). Terraces were ideal camping locations, with floodplains generally of lower sensitivity. This land system is present within the Melbourne Metro area at the western portal, the Tunnels precinct (between the western portal and the Arden Station precinct) and the Arden station precinct.
Stony rises	Western Plains	Tunnels Arden station CBD South station	The stony rises are a sub-unit of the Newer Volcanic Plains land system (Land Conservation Council 1991). The Newer Volcanics extend from central Victoria to South Australia. Younger eruptions resulted in the stony rises landform (Copper, White and Neilson 2003, p 357), with the basalt deposits attributed to the lava flows from locations such as Mount Fraser and Bald Hill, dating from approximately 4.6 million years ago to 800,000 years ago (Johnston and Ellender 1993, p 9; Ellender 1997, p 9). Basalt was formed from a large number of small vents, extended lava flows and locally merged basalt sheets. The plains are typically flat or undulating landscapes, often with swamp and lake features and as such, were host to food resources that could be utilised by Aboriginal people. Soils are predominantly reddish calcareous duplex soils, grey soils and sodic duplex soils, with black clay originating from weathered basalt in depressions (Land Conservation Council 1991, p 254). The land system intersects with the Melbourne Metro area at the CBD South precinct (at the eastern most extent), the Tunnels precinct (to the east of the Parkville station precinct) and the Arden station precinct (the eastern extent).
Outlying ridges	Eastern Uplands	Tunnels Parkville station	The outlying ridges land system is typically a continuation of the dividing ridges of drainage systems (DEDJTR 2015c). Only a small section of this land system is located within the Melbourne Metro corridor. The Outlying ridges land system is



Land system	Geomorphic region	Precinct	Description
		CBD North station CBD South station Domain station	thought to have comprised woodland and low open forest of Red Stringybark, Broad-leaf Peppermint, Red Box and Long-leaf Box. Soils vary across the land system, with stable, lower valley-side slopes containing red and brown acid texture contrast soils, with red and brown gradational soils present in higher rainfall areas. On less-stable slopes, poorly structured texture contrast soils (Kandosols) and stony soils are more common (DEDJTR 2015c).
Plains	Western Plains	Western turnback	The plains land system developed on the older Newer Volcanic lavas, which date to approximately one to two million years ago. The land system is generally characterised by poorly developed drainage and thin regolith development, with 'floaters' often visible at the surface. Shallow drainage lines and discontinuous drainage lines may end in ephemeral wetlands and swamps. Soils are sodic and non-sodic texture contrast; however, gradational soils and gilgai clay soils are present (DEDJTR 2015d).



Appendix C

VAHR Search Results



C.1. VAHR Search Results

Table C-1 Aboriginal Places (excluding object collections)
located within two kilometres of Melbourne Metro (Aboriginal Places within 50 m of the Melbourne Metro area are highlighted below)

Aboriginal Place name	VAHR number	Aboriginal Place type
Fitzroy Gardens	7822-0002	Scarred Tree
Melbourne Zoo 1	7822-0003	Scarred Tree
Yarra Park 1	7822-0648	Scarred Tree
Yarra Park 2	7822-0649	Scarred Tree
Queen Victoria Market Burials	7822-0931	Aboriginal Ancestral Remains (Burial), Aboriginal Historical Place
Princes Park 1	7822-0979	Scarred Tree
Yarra Park 3	7822-0996	Scarred Tree
Church Of Christ Aborigines Mission	7822-1600	Aboriginal Historical Place
Derrimut's Grave	7822-1601	Aboriginal Historical Place
Flemington Racecourse 1	7822-1775	Artefact Scatter
Exhibition Gardens Meeting Place	7822-2035	Aboriginal Historical Place
Builders Arms, Fitzroy Hotel	7822-2036	Aboriginal Historical Place
Little Bourke Street 1	7822-2296	Artefact Scatter
Melbourne Cricket Ground Camp	7822-2504	Aboriginal Historical Place
Little La Trobe St 1	7822-0013	Artefact Scatter
King's Domain Reburial	7822-2938	Aboriginal Ancestral Remains (Burial), Aboriginal Historical Place
Atherton Gardens	7822-3356	Aboriginal Historical Place
Royal Park IA	7822-3635	LDAD
Leonard Crescent AS	7822-3726	Artefact Scatter
Altson Lane 1	7822-3739	LDAD
Altson Lane 2	7822-3740	Artefact Scatter
Altson Lane 3	7822-3826	LDAD
Prahran – Yarra Mission	7822-3856	Aboriginal Historical Place
Veterinary Research Institute1	7822-3884	LDAD



Aboriginal Place name	VAHR number	Aboriginal Place type
Davidson Street LDAD 1	7822-3885	LDAD
William Cooper's Residence	7822-2886	Aboriginal Historical Place
William Cooper Residence 1-120 Ballarat Road, Footscray	7822-3807	Aboriginal Historical Place

C.2. Description of Aboriginal Places

The following information describes the Aboriginal Places located within or near the Melbourne Metro area:

- **Aboriginal Historical Places** are generally related to occupation of particular areas after dislocation and interference caused by European occupation of the region. They incorporate a wide range of places, sites and events that are of significance to Aboriginal communities but may not necessarily comprise archaeological deposits. These are however, considered to be Aboriginal Places under the Act.
- **Artefact scatters** generally consist of a small number of artefacts on the surface within the vicinity of a watercourse. Depending upon location in the landscape, artefact scatters can have varying degrees of integrity. In areas subject to repeated inundation artefacts can be dispersed across a large area. Artefact scatters that are found in more stable areas are likely to have a fair degree of integrity.
- **LDADs** are a type of artefact scatter (with less than 10 artefacts per 100 square metres).
- **Burials** are generally restricted to cemeteries and reburial sites within the two kilometres geographic region (Section 5.1). Burial practices have varied over time and include flexed, extended and cremated inhumations. Older burials (Pleistocene age) are most likely to be found in the preserved lower lunette sands and sediments around lake systems or coastal areas. Human burials are often found in association with earth mounds and shell middens, and represent a change of function in the site over the passage of time from a living area to an area used solely for the internment of the dead.
- **Scarred trees** are the result of Aboriginal people harvesting bark for various uses such as canoes, shields and containers. Aboriginal people also cut toe holds into trees when hunting possums and these scars can still be found today. Within the geographic region, Aboriginal cultural scars are typically found on mature red gums.



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