1350 Pound Road, Clyde North: Residential Subdivision

SPONSOR:
Parkworth Pty Ltd
Cultural Heritage Management Plan (AAV# 12727)
DRAFT September 2013
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Cultural Heritage Management Plan (AAV#12727)

**DRAFT September 2013**

**Sponsor:** Parkworth Pty Ltd

**Cultural Heritage Advisor:** Stacey Kennedy

**Authors:** Stacey Kennedy & Shannon Sutton

**LARGE Sized Activity**

**Desktop, Standard & Complex Assessment**

Prepared by Archaeological & Heritage Management Solutions (AHMS) Pty Ltd on behalf of Parkworth Pty Ltd

**PLEASE NOTE**

**THIS REPORT CONTAINS PICTURES OF AND INFORMATION ABOUT PEOPLE WHO MAY HAVE PASSED AWAY**
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**PROPOINENT**  Parkworth Pty Ltd  

**PROJECT NAME**  1350 Pound Road, Clyde  

**REAL PROPERTY DESCRIPTION**  Lot 4 PS438890  

**DATE**  18th September 2013  

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**AHMS INTERNAL REVIEW/SIGN OFF**

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EXECUTIVE SUMMARY

Parkworth Pty Ltd (The Sponsor) engaged Archaeological and Heritage Management Solutions (AHMS) Pty Ltd to prepare a Cultural Heritage Management Plan (CHMP) for proposed residential subdivision and development of a 40 hectare property located at 1350 Pound Road, Clyde North. The activity area forms part of the Growth Areas Authority Precinct Structure Plans (PSP 53 & 54) which has recently been the subject of a desktop and standard CHMP assessment prepared by AHMS on behalf of the Growth Areas Authority (GAA) and endorsed by Aboriginal Affairs Victoria (AAV)\(^1\).

A Notice of Intent (NOI) to prepare the CHMP was lodged with Aboriginal Affairs Victoria (AAV) on the 31st of July 2013 (Appendix 1). AAV issued a project number 12727 and advised that as there was no Registered Aboriginal Party, AAV are the evaluating authority.

AHMS undertook a process of consultation with the relevant traditional owner claimant organisations - the Bunurong Land Council Aboriginal Corporation, the Boon Wurrung Foundation and the Wurundjeri Tribe Land and Compensation Cultural Heritage Council. All three groups participated in the assessment fieldwork.

A search of the Victorian Aboriginal Heritage Register (VAHR) was undertaken to identify previously recorded sites within the geographic region. One Aboriginal place, a subsurface artefact scatter (VAHR 7921-1130) had been previously recorded within the activity area. VAHR 7921-1130 comprised a subsurface artefact scatter located on a low rise during a complex assessment conducted for the construction of a power supply alignment for the Victorian desalination plant\(^2\). Another Aboriginal place (VAHR 7921-1038) is situated within 50m of the activity area’s northern boundary. VAHR 7921-1038 comprised 9 closely scattered artefacts found during sub-surface testing for the Desalination Transfer Pipeline Wonthaggi to Cranbourne CHMP 10620\(^3\).

A predictive model was developed as part of the GAA assessment, which drew on desktop research and previous archaeological survey work. The following predictions were made in relation to the GAA precincts as a whole:

- Stone artefact deposits are likely to be found at varying densities across most landforms;
- Higher density artefact scatters and sub-surface deposits may be found on crest landforms and the ‘Cranbourne sands’;
- Higher density artefact scatters and sub-surface deposits are likely to be found adjacent to creeks or wetlands. Artefact density and frequency is likely to increase with higher stream order (for creeks) and permanence (for wetlands);
- The density and complexity of artefact scatters and sub-surface deposits is likely to decrease with distance from water sources and wetlands;
- A particularly high density and complexity of archaeological deposits at major confluences and resource intersection zones;

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\(^1\) Kennedy, Burrow & Foley. ‘Clyde Creek (PSP53) and Thompsons Road (PSP54) Cultural Heritage Management Plan (AAV#12083).’ Unpublished report prepared for The Growth Areas Authority. 2012.


Stable aeolian and alluvial landforms are likely to have deeper profiles and better preservation conditions. These landforms may contain greater archaeological integrity;

Scarred trees may be present within areas containing mature remnant native trees of sufficient age and as isolated mature trees in agricultural settings; and

Isolated finds may be found anywhere across the landscape.

MapInfo GIS software was used to model and map the predictions regarding archaeological potential. The GAA report includes detailed mapping which shows areas of varying archaeological sensitivity graded from very high to disturbed. The modeling and mapping was based on a probabilistic approach, where a combination of traits was used to determine the combined level of potential. The model traits were as follows:

- Areas within 200m of high-mid order stream = Very High Sensitivity;
- Areas within 200m of lower-order stream or outer edge of swamp = Moderate Sensitivity;
- Areas within 200m of former waterway/seasonally inundated stream = Very High Sensitivity;
- Alluvial soils = Moderate Sensitivity;
- ‘Cranbourne Sands’ geological landform = High Sensitivity;
- Crest landforms = High Sensitivity;
- Crest and within 200m of former water (including all stream types and swamp) = Increased Sensitivity by One Level;
- Cut and Fill Disturbance = Disturbed;
- Horticultural/ Market Gardening Disturbance = Very Low Sensitivity;
- Within Wetland = Very Low Sensitivity; and
- All other areas = Low Sensitivity

A survey of the activity area was undertaken on the 13th August 2013. The principal aim of the survey was to identify exposed cultural material (i.e. surface sites) and gauge the extent of prior disturbance. The survey results and observations were used to identify any potential archaeological deposits (i.e. areas that are ‘likely’ to contain Aboriginal sites or objects). They were also used to assess the extent to which past land-uses may have affected natural soil profiles.

The survey confirmed that the activity area has been disturbed by past cattle grazing, and the installation of farm buildings and outhouses. The survey also confirmed parts of the activity area have been heavily disturbed by the installation of utility services, including high voltage power lines, a high pressure gas pipeline and subsurface telecommunication cables.

No Aboriginal cultural heritage was identified within the activity area during the survey.

The Aboriginal Cultural Heritage Assessment prepared by AHMS on behalf of GAA made specific recommendations in relation to minimum sampling densities which would be required different levels of cultural heritage sensitivity identified in the predictive model.
The sampling densities and test excavation methodology outlined in the GAA report were endorsed by AAV and therefore formed the basis for development of the complex assessment methodology for test excavation within the activity area.

A landscape based test excavation approach was adopted for the complex assessment. Areas ranging from moderate to very high sensitivity were subject to systematic landform testing designed to test the predictive model developed in the GAA desktop and standard assessment report. A total of 16 x 1m² controlled manual test trenches were excavated along topo-sequence transects designed to test the specific landforms identified in the standard assessment and environmental variables within the activity area. Soils were excavated in 10cm spits and 100% sieved through 5mm sieves to recover artefacts.

**No Aboriginal cultural heritage was identified during the complex assessment.**

Based on the results of the complex assessment, we made the following conclusions:

- The installation of subsurface utility services has heavily disturbed the location of the previously registered Aboriginal place (VAHR 7921-1130).
- It is likely that past use of this landscape was probably transitory and sporadic rather than long term occupation.

**An abridged summary of the recommendations of this CHMP is as follows:**

- No impact avoidance or minimisation measures are required for VAHR 7921-1130, as the place has been assessed as having a very low level of significance and it is considered unlikely that further Aboriginal cultural heritage associated with the place will be extant within the activity area.
- No further Aboriginal cultural heritage was located during the investigations undertaken for this CHMP. Therefore specific impact avoidance and minimization measures are not required.
- A series of contingencies are provided in the event that Aboriginal cultural heritage is discovered during the activity. The contingencies must be followed to ensure compliance with the requirements of this management plan.
1 INTRODUCTION

1.1 Preamble

Parkworth Pty Ltd (The Sponsor) (ABN: 29 007 061 896) engaged Archaeological and Heritage Management Solutions (AHMS) Pty Ltd to prepare a Cultural Heritage Management Plan (CHMP) for proposed residential subdivision and development at 1350 Pound Road, Clyde North (Figures 1 and 2). The activity area is situated within the municipality of City of Casey and comprises approximately 40 hectares of land.

A notice of intent to prepare the CHMP was lodged with Aboriginal Affairs Victoria (AAV) on the 31st July 2013 (Appendix 1). AAV issued a project number 12727 and advised that as there was no Registered Aboriginal Party, AAV are the evaluating authority.

The CHMP was prepared in accordance with the requirements of the Aboriginal Heritage Act 2006 and associated regulations and guidelines issued by AAV regarding the preparation of CHMPs. The overriding purpose of the CHMP was to document and assess the Aboriginal heritage (archaeological and cultural) values of the subject land, the impact of proposed development on those values and to provide management procedures to minimise and mitigate impact before, during and after development.
Figure 1. General location of the activity area within the Growth Areas Authority PSP 53. Source: GAA/Neaarmap
Figure 2 - Location of activity area. Source: Google Earth
1.2 Reason for the current study

A cultural heritage management plan (CHMP) is required if all or part of an activity area is situated within an area of cultural heritage sensitivity (CHS) and if the proposed activity is defined as ‘high impact’.

- The activity area contains areas of legislated CHS: previously registered Aboriginal cultural heritage places (Aboriginal places), land within 50 meters of an Aboriginal place/s, and a sand sheet including the Cranbourne Sand identified as “Qpd” on the Geological Survey of Victoria 1:250 000 map series SJ55-9 “Queenscliff” (Aboriginal Heritage Regulations 2007, r22, r22(2), & r38).

- The activity is high impact: residential subdivision (Aboriginal Heritage Regulations 2007 r46).

This CHMP has been prepared in accordance with the Aboriginal Heritage Act 2006. The CHMP is designed to identify and assess the nature, extent and significance of Aboriginal sites, objects and cultural heritage values within the subject land and to provide mitigation, protection and contingency procedures to manage those values before, during and after development of the land.

In accordance with Section 61 of the Aboriginal Heritage Act 2006, the following mandatory matters are considered by this CHMP:

- Whether the activity will be conducted in a way that avoids harm to Aboriginal cultural heritage;

- If it does not appear to be possible to conduct the activity in a way that avoids harm to Aboriginal cultural heritage, whether the activity will be conducted in a way that minimises harm to Aboriginal cultural heritage;

- Any specific measures required for the management of Aboriginal cultural heritage likely to be affected by the activity, both during and after the activity;

- Any contingency plans required in relation to disputes, delays and other obstacles that may affect the conduct of the activity; and

- Requirements relating to the custody and management of Aboriginal cultural heritage during the course of the activity.

Specific aims of the CHMP were as follows:

- Identify any known Aboriginal sites, relics and any places of cultural significance to the Aboriginal community within the activity area;

- Assess the potential for Aboriginal cultural heritage in the form of subsurface deposits;

- Assess the heritage significance of any Aboriginal sites, relics, places and areas of archaeological potential in partnership with the local Aboriginal communities;

- Assess the impact of the activity on any Aboriginal sites, relics, places and significance values;

- Make recommendations to help inform PSP design and planning; and
• Make appropriate recommendations for protection of Aboriginal cultural heritage and/or mitigation of development impact, including contingency procedures in consultation with the local Aboriginal community.

1.3 Cultural Heritage Advisor and Authorship

Stacey Kennedy (B.A. Hons) is the Cultural Heritage Advisor (CHA). The primary authors of the report are Stacey Kennedy and Shannon Sutton. Jim Wheeler (BA Hons MAACAI) reviewed the report.

1.4 Acknowledgements

AHMS acknowledges use of information contained in the Aboriginal cultural heritage assessment prepared on behalf of the Growth Areas Authority, which was made available by GAA for individual landowners in the Clyde Creek and Thompsons Road PSPs to use in developing individual CHMPs.

We especially acknowledge the assistance and valuable input provided by Aboriginal community representatives: Izzy and Wayne Pepper (Bunurong), Jarrod Watts, Gary Watson and James Hughes (Boon wurrung), Shane Nicholson, Trevor Downe and Gary Galway (Wurundjeri) as well as, the staff of the Bunurong Land Council, and Boon Wurrung Foundation Wurundjeri Tribe Land & Compensation Cultural Heritage Council.

AHMS acknowledges the assistance provided by Fiona Wiffrie, Bernard Collins and Andrea Bouly of Beveridge Williams, the project town planners and project managers, as well as John Eisner (Sponsor).

2 ACTIVITY DESCRIPTION

The activity comprises subdivision and residential development and is situated within the Growth Areas Authority (GAA) precinct structure plan (PSP) 1053 (Thompsons Road).

The activity area is currently zoned Urban Growth Zone (UGZ) and Farming (FZ) in the City of Casey Planning Scheme but will be rezoned in its entirety through the PSP 1053 process. The UGZ zone attempts to streamline planning controls within PSP areas effectively removing the rezoning process. Therefore, the current zoning of the land as UGZ will remain during the preparation of the PSP 1053 master plan.

Whilst the the activity is known (residential subdivision), development design plans (i.e. placement of dwellings, roads, utilities, fencing and sheds etc) are still in the process of finalisation. Therefore, for this subdivision the “description of the use of development of each lot permitted by the relevant planning scheme” is used to describe the activity. For a comprehensive list of the permissible uses within the UGZ3 zone see Appendix 2.

3 EXTENT OF THE ACTIVITY AREA

For the purposes of this CHMP, the ‘activity area’ refers to 1350 Pound Road, Clyde North (Lot 4 PS438890), as shown on Figure 3. The activity area is approximately 40 hectares in area and bound by Thompsons Road in the north, Pound Road to the east, and rural properties to the south and west.

4 Guide to preparing a CHMP DPCD: 10
Figure 3: Extent of activity area. Source: Nearmap
4 DOCUMENTATION OF CONSULTATION

4.1 Development of Consultation

There was no RAP appointed at the time the notice of intent to prepare this CHMP was provided to AAV. The Wurundjeri Tribe Land and Compensation Cultural Heritage Council (Wurundjeri) currently have a RAP application before the Aboriginal Heritage Council which includes the activity area. Although the Boon Wurrung Foundation (Boon Wurrung) and Bunurong Land Council (Bunurong) do not have current RAP applications before the council, both groups are recognised as being Traditional Owners for the local area. On the advice of AAV we undertook a process of consultation with the Boon Wurrung, Bunurong and Wurundjeri.

Our approach to the Aboriginal community consultation was to undertake all components of the study in partnership with the Boon Wurrung, Bunurong, and Wurundjeri. In practice, we invited representatives of each group to participate in field work undertaken as part of the standard assessment. The representatives of the Aboriginal community stakeholders were consulted about key cultural and landscape values during the survey work.

The representatives that participated in the CHMP, including consultation and on-site attendance is shown in Table 1. The development of consultation with the Boon Wurrung, Bunurong, and Wurundjeri is set out in Table 2.

Table 1. Participants in standard & complex assessment

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<th>Wurundjeri</th>
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<td>Shane Nicholson</td>
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Table 2 - Development of consultation with Aboriginal communities

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<tr>
<td>13/08/2013</td>
<td>Archaeological survey as part of Standard Assessment completed</td>
<td>In Person</td>
</tr>
<tr>
<td>20/08 to 22/08/2013</td>
<td>Sub-surface testing as part of Complex Assessment completed</td>
<td>In Person</td>
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5 DESKTOP ASSESSMENT

5.1 Preamble

This section comprises the ‘desktop assessment’ required by the Aboriginal Heritage Regulations 2007. In accordance with the regulations this section of the report comprises the following:

- A search of the Victorian Aboriginal Heritage Register (VAHR) for information relating to the activity area, including the date(s) the register was accessed;
- An identification and determination of the geographic region of which the activity area forms a part that is relevant to the Aboriginal cultural heritage that may be present in the activity area;
- A concise map or maps showing the geographic region referred to in point 2 and the location of the activity area in that geographic region;
- A review of the registered Aboriginal places in the geographic region referred to in point 2;
- A review of reports and published works about Aboriginal cultural heritage in the geographic region referred to in point 2, relevant to the activity area;
- A review of historical and ethno-historical accounts of Aboriginal occupation of the geographic region referred to in point 2, relevant to the activity area;
- A review of the landforms or geomorphology of the activity area;
- A review of the history of the use of the activity area, including discussion of prior disturbance to ground surfaces and soil deposits if available; and
- A conclusion surmising from the desktop assessment where it is possible Aboriginal cultural heritage may be located in the activity area.

The information obtained during desktop assessments assists in determining the archaeological potential of the activity area in a number of ways. For example, considering the types of natural resources that may have been available within the study area, or in the region, provides an indication of why people may have been present in the area, and of the potential physical traces of such a presence (e.g. the types of stone used for artefact making, whether trees having bark suitable for the manufacture of certain items existed/exist in the area, or whether there exists a known resource - plant animal or otherwise - that may have drawn people to the area).

Information about previously recorded archaeological sites in the region can provide an indication of the types and distribution of archaeological deposits and material that may be present, or may once have been present, in the study area. It also provides comparative information that is essential for the assessment of the archaeological significance of any previously unrecorded archaeological material or deposits.

Environmental and historical information (particularly regarding past and present land use) may indicate the potential for post-depositional processes to have altered or disturbed any archaeological deposits or materials that may have once, or may still, exist within the study area.
5.2 Geographic Region

The geographic region for the purpose of this CHMP is the Bunyip River Basin (Figure 4). Although the Basin includes the Mornington Peninsula it has been excluded from the overall geographic region for this investigation because it has its own distinct characteristics which differ to those of the activity area and immediate surrounds.

The Bunyip River Basin is situated within the greater geological feature of the Westernport sunkland or West Gippsland Plains. The West Gippsland Plains are situated between Drouin and Melbourne. The Plains mainly comprise uplifted marine sediments, fluviatile sands and extensive swamp deposits occurring at Koo-wee-rup and Carrum5.

Many rivers and creeks within the Bunyip River Basin originate in the steep Dandenong Mountains to the north and drain out through extensive plains into Western Port Bay. The majority of the basin has been cleared for agriculture. Land use within the region is predominantly rural although small urban zones are also present on the northern outskirts of Melbourne.

Prior to European settlement the Koo Wee Rup swamp covered a large area near Koo Wee Rup, Bayles and Drouin South. The swamp system was drained out during the 19th and 20th centuries to open up land for agricultural uses. As a result, many of the rivers and creeks in the area were highly modified by the construction of drains6.

Although the geographic region comprises the Bunyip River Basin, the desktop assessment summarized in the following sections of this report focuses on the activity area and the surrounding landscape within a 3km radius. This provides a suitable region for study because it shares common and distinct topographic, drainage, geological and soil landscape characteristics.

5 Hills, E. S. Physiography of Victoria. Whitecombe & Tombs Pty Ltd, Melbourne and Sydney. 1940.
Figure 4 - Geographic region
5.3  Review of Aboriginal Places in the Local Area

A search of the VAHR was undertaken to identify previously registered Aboriginal place types and distribution patterns across the geographic region and within a 3km radius of the activity area (Table 3). The search was undertaken by Stacey Kennedy on the 6th August 2013.

In excess of 1, 200 Aboriginal places have been recorded within the geographic region, with the majority of sites situated within close proximity to major rivers and creeks.

The search also identified a total of 147 Aboriginal places within a 3km radius of the activity area. The vast majority of these Aboriginal places consist of artefact scatters; comprising 98% of all site types (this figure includes artefacts scatters and LDADs). Other Aboriginal places, within a 3km radius of the activity area, included one scarred tree and one object collection. The majority of Aboriginal places are situated within proximity to drainage corridors (particularly Clyde and Cardinia Creek) along with other unnamed watercourses in the area. The current site distribution pattern is clearly weighted towards areas of higher surface visibility within locales which have previously undergone archaeological assessment.

There is one Aboriginal place situated within the activity area (VAHR 7921-1130), one within 50m of its northern boundary (VAHR 7921-1038) and one Aboriginal place (VAHR 7921-1129) situated within 200m of its boundaries (Table 3). The Aboriginal places within the activity area and within 200m of its boundaries are discussed below.

Table 3 - VAHR Aboriginal Places within the Activity Area and within 200m of its Boundaries

<table>
<thead>
<tr>
<th>VAHR #</th>
<th>Site Name</th>
<th>Component Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>7921-1129</td>
<td>Cleveland Park AS1</td>
<td>Stone artefact scatter</td>
</tr>
<tr>
<td>7921-1130</td>
<td>Cleveland Park AS2 (*within activity area)</td>
<td>Stone artefact scatter</td>
</tr>
<tr>
<td>7921-1038</td>
<td>Thompson Road 1 (*within 50m of activity area)</td>
<td>Stone artefact scatter</td>
</tr>
</tbody>
</table>

Cleveland Park AS 2 (VAHR 7921-1130) was located on a low hill within the activity area during subsurface investigation for a proposed power line. VAHR 7921-1130 comprised 9 artefacts spread over an area of 10m x 2m. The artefacts were all manufactured from silcrete, and technological types included whole flakes, one angular flake, a Bondi point and a backed blade7.

Cleveland Park AS 1 (VAHR 7921-1129) was recorded on a gentle hill slope during sub-surface investigations for a proposed power line. Salvage excavation conducted on VAHR 7921-1129 recovered 96 artefacts, comprising broken and complete flakes, backed artefacts and a core. Raw materials found included silcrete, quartz and fine-grained siliceous material8.

Thompson Road 1 (VAHR 7921-1038) comprised 9 closely scattered artefacts found during sub-surface testing for the Desalination Transfer Pipeline Wonthaggi to Cranbourne CHMP 106209. The artefacts were made from quartz and crystal quartz and technological categories present included flakes and angular fragments.

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8 ibid., pp. 73-79
Figure 5. Previously registered Aboriginal places situated within the activity area and within 200m of its boundaries
5.4 Review of Regional Archaeological Context (including reports and published works)

For the purposes of determining settlement and site distribution patterns, archaeologists examine regional and local trends in the distribution of known sites in relation to environment and topography. This provides evidence about economic and social systems in the past and also assists archaeologists in predicting likely site types, site locations and the nature of the archaeological resource in any given area. Key regional studies are reviewed and discussed below.

5.4.1 General Patterns

The distribution, density and size of known Aboriginal archaeological sites is largely dependent on environmental context, post-contact land use and erosion / site formation processes. There is likely to be a correlation between fresh water sources and Aboriginal archaeological deposits. Numerous studies have indicated a higher density and frequency of deposits exist in close proximity to water sources and the level of density and frequency increases with higher stream orders. There is likely to be a higher density and frequency of archaeological deposits in close proximity to former wetlands.

Stone sources are also likely to be associated with a higher density and frequency of archaeological deposits reflecting on-source primary reduction. Resource intersection zones, stream confluences and transitional vegetation may also be associated with a higher density and frequency of archaeological deposits. Other factors (as yet untested in the region) in archaeological potential may include slope gradient, aspect, landform and soil landscape type.

Past disturbance is also likely to have affected the potential for and integrity of archaeological deposits in any given area. Areas that have been permanently or regularly inundated (such as large swamps) may also have a lower level of potential because they were unsuitable for occupation and use.

5.4.2 Smith 1989 (and 1991 - reprint).

A regional study of the Berwick to Bunyip residential growth corridor was undertaken by Smith in 1989. The study area encompassed the Berwick-Pakenham corridor stretching from Dandenong to Bunyip. The aims of the study were to:

- Identify areas of high archaeological potential/significance;
- Determine whether corridor development poses any threat to archaeologically sensitive areas and to make management recommendations for those areas; and
- Consult with local Aboriginal communities to identify and document their views on cultural heritage with regards to the corridor.

Smith also developed a prediction model for site location based on ethnographic data and ground surface survey. The ground surface survey was undertaken over six weeks and identified 62 previously unrecorded sites of which 32 comprised stone artefact scatters, 13 were isolated artefacts, 15 scarred trees and 2 were collections made by local landowners. Smith divided her study area into landscape units comprising: the undulating hills along the northern boundary of the corridor (Landscape Unit 1), the lowland plains within the western port catchment (Landscape Unit 2), the floodplains of the Port Phillip catchment (Landscape Unit 3) and the Cranbourne Sands (Landscape Unit 4). The activity area is situated within Landscape Units 2, 3 and 4. Chert and quartz were identified as being the dominant raw material types for surface stone artefact scatters discovered by...
Smith within the Berwick-Pakenham corridor. Artefact types present within these scatters consisted of flaked pieces and flakes with less than 2% of the assemblages comprising formal tools\(^{10}\).

Smith assessed the following landforms as having archaeological potential within Landscape Unit 2, 3 and 4:

- “The banks, flats and terraces of all permanent creek lines. In addition the temporary tributaries of the following major water courses are also considered to have high potential: Cardinia, Toomuc, Ararat, and Black creeks and the Bunyip River;

- Swamp margins;

- Hill slopes and hill tops overlooking Bunyip River; and

- In particular Cardinia Creek has been identified as the area within Landscape Units 1 & 2 most likely to contain sites\(^{11}\);

- All areas still retaining remnants of the river red gum forests\(^{12}\) (Landscape Unit 3);

- Cardinia and Toomuc Creek. These areas contain a high number of known sites and a high number of archaeologically significant sites. The sites in this area have the potential to answer research questions about the movement of people between the coast and corridor through the Koo-wee-rup Swamp;

- The Cranbourne Sands. Sites located in this area are different to sites in the remainder of the corridor. The sites appear to be larger and all contain unusually high proportions of quartz;

- The Garfield/Bunyip Area. This area also contains sites that are quite different to the remainder of the corridor and discrete manufacturing sites have been identified in this area. Due to limitations only a limited amount of survey work was undertaken in this area and it is considered that this area warrants further archaeological investigation\(^{13}\).

Smith undertook another review of the Berwick-Pakenham corridor in 1991. Although the additional review did not identify any new sites, Smith identified permanent water courses and swamp margins as having higher potential for archaeological sites in accordance with her initial investigation\(^{14}\).

### 5.4.3 du Cros & Rhodes 1998

du Cros and Rhodes\(^{15}\) produced a report for Melbourne Water Corporation in 1998 which mapped the sensitivity of waterways within and surrounding Melbourne, thus encompassing the geographic region. A GIS database was constructed with waterways and floodplains graded into different levels of sensitivity and associated recommendations. The predictive models indicated that many waterways in and around Melbourne should be considered archaeologically sensitive. Sensitive areas identified within the report include high ground near waterways, well drained floodplains and areas containing mature eucalypts.

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\(^{10}\) Smith, L. ‘Berwick-Pakenham Corridor Aboriginal Archaeology’. unpublished report prepared for the Department of Conservation & Environment. 1989:47

\(^{11}\) ibid., p.73

\(^{12}\) ibid., p.74

\(^{13}\) ibid.


5.4.4 Feldman & Long 2004

An Aboriginal archaeological desktop review was undertaken by Feldman & Long 2004 for the Casey-Cardinia Growth Area. The overarching aim of the study was to identify, review and analyse the existing information for Aboriginal cultural heritage within the growth area and to provide technical advice to inform development. The key findings of the study were divided into six landscape zones each with discrete archaeological characteristics. Relevant aspects of these findings are provided below:

- **Zone 1: Major Drainage Corridors** – “the foothills and intermediate plains are drained by four major creek complexes (Cardinia, Toomuc, Deep/Pakenham and Ararat/Back Creeks), which have clearly acted as a focus for Aboriginal occupation in the recent past. The creek margins are associated with a range of comparatively dense artefact scatters and scarred trees, within both the surrounding foothills and plains”\(^{16}\).

- **Zone 2: Intermediate Plains** – “a slightly elevated band of flat or undulating land bordering the northern foothills (Zone 5) and Koo-Wee-Rup Swamp (Zone 4) to the south, dominated by agriculture and urban development. The archaeological record is dominated by stone artefact occurrences on alluvial flats and outwash fans associated with creeks draining the foothills. These occur as comparatively dense, localized scatters and a broader backdrop of diffuse isolated finds. Recent research has demonstrated the potential for buried deposits to occur to a depth of 800mm, possibly in association with a complex of Paleo-landforms (prior and former stream channels), which are obscured below the current alluvial land surface. Scarred trees may also occur within stands of native remnant vegetation in this zone”\(^{17}\).

- **Zone 3: Urban Areas** – “Archaeological sites may still occur in open spaces within these areas, but the scope for identifying high integrity sites is limited”\(^ {18} \).

- **Zone 4: Koo-Wee-Rup Swamp** – “reclaimed lowlying swamp land in the south of the study area, characterized by irrigated agriculture. This zone has not been assessed in previous studies, and has received no effective survey coverage. On the basis of comparative research we can conclude that archaeological sites, notably surface scatters may occur on ridgelines, terraces and in the minor creek valleys which drain the zone. Scarred trees may occur in areas of remnant native vegetation, though much of this zone has been subject to land clearance and logging”\(^ {19} \).

- **Zone 5: Northern Foothills** – “steep, dissected foothills to the Great Dividing Range immediately north of the Princes Highway, characterized by agricultural land and regrowth forest. This area has been largely un-assessed in previous studies, and its archaeological values are uncertain. On the basis of comparative research we can conclude that archaeological sites, notably surface scatters may occur on ridgelines, terraces and in the minor creek valleys which drain the zone. Scarred trees may occur in areas of remnant native vegetation, though much of this zone has been subject to land clearance and logging”\(^ {20} \).

- **Zone 6: Cranbourne Massif and Surrounding plains** – “an area of undulating plains centered on an elevated ridge of volcanics and sedimentary rock (the Cranbourne Massif),

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\(^ {17}\) ibid., p. 3

\(^ {18}\) ibid.

\(^ {19}\) ibid.

\(^ {20}\) ibid.
characterised by widespread sand drifts (the Cranbourne Sands). Today the area is dominated by irrigated agriculture and urban development. The archaeology is dominated by localized dense scatters of stone artefacts associated with sand drifts, ridgelines and drainage lines, within a broader diffuse scatter of isolated artefacts occurring widely in the landscape. Burials may occur in sand deposits”

5.4.5 Review of Local Studies (Pre Aboriginal Heritage Act 2006)

Prior to the commencement of the Aboriginal Heritage Act 2006, archaeological studies were often carried out to satisfy Aboriginal cultural heritage assessment in advance of proposed development. The assessment work varied significantly in methodology and content in comparison to CHMPs, therefore a general indication of the types of studies which have been conducted is provided in Table 4.

The majority of studies conducted prior to the introduction of the Aboriginal Heritage Act (2006) consisted of desktop archaeological assessment or archaeological surveys, with a particular focus on the Cardinia Creek and its surrounding landscape. Only limited archaeological subsurface investigations were carried out prior to the commencement of the Act in 2006.

21 ibid., pp.3-4.
### Table 4 - Pre Aboriginal Heritage Act 2006: Local Studies

<table>
<thead>
<tr>
<th>Report author / (#)</th>
<th>Assessment Type</th>
<th>Location</th>
<th>Aboriginal Heritage Identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marshall &amp; Webb (2003) #1817</td>
<td>Salvage Excavation</td>
<td>Clyde</td>
<td>Salvage excavation of Eden Rise 1 7921-0507 - fifty artefacts recovered from a sandy rise. This excavation occurred so that the rise could be removed as part of proposed development.</td>
</tr>
<tr>
<td>Atkinson et al (2010) #4336</td>
<td>Salvage Excavation</td>
<td>Bypasses southern section of activity area</td>
<td>Salvage excavation of 3 Aboriginal places (none situated within activity area): 7921-1129 (96 artefacts recovered), 7921-1132 (319 artefacts recovered), 7921-1133 (913 artefacts recovered). A total of 56 square metres of salvage excavation occurred. Radiocarbon dating was obtained for charcoal within the test pits and demonstrated a general trend of increased age with depth.</td>
</tr>
<tr>
<td>Tulloch (2001) #1930</td>
<td>Survey</td>
<td>Beaconsfield to Nar Nar Goon</td>
<td>Two isolated artefacts (8021-040 &amp; 7921-401) three artefact scatters (7921-0402, 7921-0245 &amp; 7921-0189) and a scarred tree (7921-0189) were located during the survey. Most of these sites would have been destroyed during subsequent development, however, recommendations were made in relation to monitoring and collection of known artefacts.</td>
</tr>
<tr>
<td>Murphy &amp; Rymer (2007) #3919</td>
<td>Survey</td>
<td>Officer South</td>
<td>No Aboriginal places identified.</td>
</tr>
<tr>
<td>Matthews &amp; Nicolson (2005) #3005</td>
<td>Survey</td>
<td>Berwick South</td>
<td>No Aboriginal places identified.</td>
</tr>
<tr>
<td>Long et al. (2004) #2910</td>
<td>Survey</td>
<td>Cranbourne</td>
<td>Eight new sites identified (7921-0620 to 7921-0624; 7921-0626 &amp; 7921-0656) all of which comprised stone artefact scatters.</td>
</tr>
<tr>
<td>Bell (2002) #2326</td>
<td>Survey</td>
<td>Clyde</td>
<td>No Aboriginal places identified.</td>
</tr>
<tr>
<td>Sciusco (1996) #989</td>
<td>Survey</td>
<td>Clyde</td>
<td>No Aboriginal places identified.</td>
</tr>
<tr>
<td>Murphy &amp; Rymer (2007) #4052</td>
<td>Test Excavation</td>
<td>Pakenham area</td>
<td>Test Excavation/Salvage designed to determine nature extent and significance of 7921-0737, 7921-0739 &amp; 7921-0245. One additional site 7921-0838 was located during excavation.</td>
</tr>
<tr>
<td>Murphy &amp; Rymer (2007) #4012</td>
<td>Test Excavation</td>
<td>Clyde North</td>
<td>Seven Aboriginal places were identified (7921-0786, 7921-0492, 7921-0832, 7921-0833, 7921-0494, 7921-0493 &amp; 7921-0834).</td>
</tr>
<tr>
<td>Report author / (#)</td>
<td>Assessment Type</td>
<td>Location</td>
<td>Aboriginal Heritage Identified</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------</td>
<td>----------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Murphy &amp; Rymer (2006) #3760</td>
<td>Test Excavation</td>
<td>Clyde North</td>
<td>Test excavation designed to test sensitive areas; however, no Aboriginal places were identified.</td>
</tr>
<tr>
<td>du Cros (1992) #485</td>
<td>Test Excavation</td>
<td>One site identified on a terrace 7921-0245</td>
<td></td>
</tr>
<tr>
<td>Marshall (1996) #720</td>
<td>Test Excavation</td>
<td>Berwick South</td>
<td>No Aboriginal places identified</td>
</tr>
<tr>
<td>Howell-Meurs &amp; Long (2006) #3466</td>
<td>Test Excavation</td>
<td>Beaconsfield to Nar Nar Goon</td>
<td>Nine Aboriginal places were identified during the testing (7921-0739, 8021-0147, 8021-0149 - artefact scatters, 7921-0737, 7921-0738, 7921-0740, 7921-0741, 8021-0148, 8021-0150 - isolated artefacts)</td>
</tr>
<tr>
<td>Muir (2005) #3076</td>
<td>Test Excavation</td>
<td>Clyde North</td>
<td>No Aboriginal places identified</td>
</tr>
</tbody>
</table>
5.5 Review of Local Studies (Cultural Heritage Management Plans)

A total of thirteen completed CHMPs have been undertaken within 3km of the activity area. A summary of these CHMPs and any implications for the activity area are provided below.

5.5.1 Murphy and Rymer 2013 (CHMP 12096)

Archaeology at Tardis were commissioned by Moremac Property Group Pty Ltd to prepare a CHMP for a residential subdivision at 335 Grices Road, Clyde North. This project is located approximately 1.6km north east of the activity area\(^{22}\). There were no Aboriginal places recorded during the standard assessment, however, targeted test excavation across sensitive landforms (gentle low rise; within 50m of a dam; & within 50m of the eastern boundary) recovered 32 artefacts from five test pits. These artefacts were recorded as three different Aboriginal places (VAHR 7921-1416, 7921-1417 and 7921-1418)\(^{23}\), all of the place were recovered from alluvial plain landform. VAHR 7921-1416 comprised a low density stone artefact scatter of 28 silcrete artefacts thought to represent a stone reduction sequence indicating microlith production. This site was therefore attributed low-moderate scientific significance. VAHR 7921-1417 & 7921-1418 comprise isolated stone artefacts and were assessed as having extremely low scientific significance. The CHMP recommended further salvage excavation relating to 7921-1416, however, no further investigations were required for 7921-1417 to 7921-1418\(^{24}\).

5.5.2 Barker 2012 (CHMP 12015)

Heritage Insight was commissioned by Pask Group to prepare a CHMP for a residential subdivision at 211 Grices Road, Clyde North; approximately 900 metres north of the activity area\(^{25}\). Two Aboriginal places were identified during the complex assessment: VAHR 7921-1389 & 7921-1390. The places were identified below the crest of a hill and on the edge of a low lying swampy area. Each of the Aboriginal places comprised low density stone artefact scatters\(^{26}\) recovered from disturbed and undisturbed contexts. Reburial of the stone artefacts within the activity area was recommended\(^{27}\).

5.5.3 Day 2010 (CHMP 11051)

Golder Associates Pty Ltd were commissioned by the Growth Areas Authority to prepare a CHMP for the Cranbourne North Stage 2 Precinct Structure Plan 16. This study is located approximately 1.6km east and north east of the activity area. One previously recorded Aboriginal place was present within the activity area (7921-0989) and this CHMP recommends following the original Recommendations in regards to this place in CHMP 10531. One additional Aboriginal place was located during the complex assessment, 7921-1158, consisting of two artefacts which were recommended for retention of these artefacts by the local communities.

5.5.4 Murphy and Rymer 2012a (CHMP 11697)

Tardis Enterprises was commissioned by Sam Mondous to prepare a CHMP for residential and retail subdivision at 1100 Pound Road, Clyde North\(^{28}\). This project was located approximately 1km north west of the activity area. A stone artefact scatter (VAHR 7921-1358) containing 15 artefacts was located during the standard assessment within a disturbed low rise\(^{29}\). The assemblage comprised complete flakes, angular fragments, geometric microliths, cores and an angular fragment which was

\(^{22}\) Murphy, A. & Rymer, T. ‘Subdivision of Land 335 Grices Road Clyde North Cultural Heritage Management Plan’. unpublished report prepared for Moremac Property Group Pty Ltd. 2013:i-ii.

\(^{23}\) ibid., pp.55-63.

\(^{24}\) ibid., p.70.


\(^{26}\) ibid., p.129.

\(^{27}\) ibid., p.149.


\(^{29}\) ibid., p.41.
considered to be typical of the region. The activity area was subjected to an extensive program of test excavation, however, no further Aboriginal places were identified\textsuperscript{30}. Harm could not be avoided to this site during development, however, as it was allocated an extremely low significance threshold, no further assessment or mitigation measures were considered warranted\textsuperscript{31}.

5.5.5 Murphy and Rymer 2012b (CHMP 12115)

Archaeology at Tardis were commissioned by Pound Road Clyde Pty Ltd to prepare a CHMP in relation to the subdivision of land at 1505-1525 (Lot 2) Pond Road, Clyde North\textsuperscript{32}. This project was located approximately 500m south east of the activity area. No Aboriginal places were identified during standard assessment however, two isolated artefacts were found during the complex assessment (VAHR 7921-1420, 7921-1426)\textsuperscript{33}. Both of these artefacts were designated as having very low sensitivity, as they comprised isolated stone artefacts, and no further protection or mitigation measures were deemed warranted\textsuperscript{34}.

5.5.6 Murphy and Rymer 2011 (CHMP 10857)

Tardis Enterprises were commissioned by Australand Holdings Limited to prepare a CHMP for residential and retail subdivision at 1095 Pound Road and 181 Grices Road Clyde North\textsuperscript{35}. This project is located approximately 900 metres north of the activity area. There were no Aboriginal places located within the activity area during the standard assessment; however, the complex assessment located three stone artefacts recorded as 7921-1174\textsuperscript{36}. This place was allocated an extremely low significance threshold and no further assessment of mitigation measures were deemed necessary\textsuperscript{37}.

5.5.7 Debney, Fiddian, Cekalovic, Orr, Lawler, Meara, Regal, Houghton 2009 (CHMP 10620)

The Department of Sustainability and Environment commissioned Biosis Research to prepare a CHMP for the transfer pipeline and power utilities corridor in relation to the desalination project\textsuperscript{38}. A portion of the corridor is situated within close proximity (<20m) to the activity area’s eastern boundary. Aboriginal place VAHR 7921-1038 (a scatter of 8 artefacts\textsuperscript{39}) was located near the northern corner of the activity area during this project and its associated sensitivity extends into the current activity area.

5.5.8 Murphy and Rymer 2011 (CHMP 11636)

This CHMP was commissioned by Moremac Property Group Pty Ltd in relation to a residential subdivision at 121 Grices Road Clyde North\textsuperscript{40}. This project is located approximately 850m north of the activity area. There were no Aboriginal places located within the activity area during this assessment\textsuperscript{41}.

\textsuperscript{30} ibid., p. 53.
\textsuperscript{31} ibid., p.61.
\textsuperscript{32} Murphy, A. & Rymer T. ‘Subdivision of Land 1505-1525 (Lot 2) Pond Road, Clyde North Cultural Heritage Management Plan’. unpublished report prepared for Pound Road Clyde Pty Ltd. 2012b:iii.
\textsuperscript{33} ibid., p.48.
\textsuperscript{34} ibid., p.54.
\textsuperscript{35} Murphy, A. & Rymer T. Residential and retail subdivision 1095 Pound Road and 181 Grices Road, Clyde North Cultural Heritage Management Plan’. unpublished report prepared for Australand Holdings Ltd. 2011:iii.
\textsuperscript{36} ibid., p. 66.
\textsuperscript{37} ibid., p.73.
\textsuperscript{38} Debney et al. Op. Cit., p.i.
\textsuperscript{39} ibid., p. 174.
\textsuperscript{40} Murphy, A. & Rymer, T. ‘Residential Subdivision 121 Grices Road, Clyde North Cultural Heritage Management Plan’. unpublished report prepared for Moremac Property Group Pty Ltd. 2011:i-ii.
\textsuperscript{41} ibid., p.56.
5.5.9 Clarke, Kirkwood & Nicolson 2009 (CHMP 10009)

A CHMP was prepared for a residential housing subdivision in Clyde North, 2.7km west of the activity area and comprised desktop, standard and complex assessments. The desktop assessment identified the presence of three Aboriginal places (VAHR 7921-0884, 7921-0885, 7921-0887) within the activity area which were relocated during archaeological survey undertaken during the standard assessment. Sub-surface testing undertaken during the complex assessment identified further Aboriginal cultural heritage associated with these sites and as a result the extent of each site was expanded. An additional three new Aboriginal places (VAHR 7921-1027, 7921-1028, 7921-1058) were also identified. Each of the above Aboriginal places comprised stone artefact scatters located on elevated landforms such as small rises and hills.

Raw materials identified within the assemblages included silcrete, quartz, crystal quartz, quartzite and basalt. Salvage was recommended for VAHR 7921-0885, 7921-0887, 7921-1027, 7921-1028 and 7921-1058, which were all assessed as having moderate significance. Two Aboriginal places (VAHR 7921-884 and 7921-1058) were assessed as having low scientific significance. These places had been disturbed through pipeline and dam construction, were not considered in situ, and therefore salvage of these sites was not recommended.

5.5.10 Gilchrist 2011 (CHMP 10646)

A CHMP was sponsored by the Brookford Estate for a residential subdivision, approximately 3km west of the activity area, which partially overlaps with the areas investigated by Schell et al and Clarke et al. The investigation comprised desktop, standard and complex assessments, with the complex assessment involving a combination of auger and shovel testing. The activity area had previously been investigated by Barker, in which Aboriginal places VAHR 7921-880, 7921-0881, 7921-0882, 7921-0883, 7921-0884, 7921-0885, 7921-0886, 7821-0887, seven stone artefact scatters and one scarred tree were recorded. A further two Aboriginal places (VAHR 7921-1056 & 7921-1057) were identified by Gilchrist. Both places were located on sandy rises. VAHR 7921-1056 was a stone artefact scatter comprising silcrete, quartz, quartzite and crystal quartz artefacts. Management recommendations for this place included a combination of conservation and some salvage, where harm could not be prevented. VAHR 7921-1057 comprised an isolated surface artefact with no subsurface component. It was therefore recommended that this artefact be collected and relocated.

5.6 Studies undertaken within the activity area.

The following study was undertaken within the activity area.

5.6.1 Ford, Hutchinson, Burch & Freedman. (CHMP 10881)

ERM was commissioned by the Department of Sustainability and Environment to prepare a CHMP for a power supply alignment extension for the Victorian Desalination project. Part of the activity area for CHMP 10881 includes the 1350 Pound Road activity area (Figure 6). No Aboriginal places were located during standard assessment of the activity area. Subsurface testing focused on a low rise in the southern central portion of the activity area. A total of 30 shovel probes and one 1m x 1m test trench were excavated. Aboriginal cultural heritage (VAHR 7921-1130) was located in three of the shovel probes excavated on the easternmost transect. Extent testing of the three shovel probes did

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42 Clarke et al. 2009: 9
43 Ford et al. 2009: 68
44 Ford et al. 2009: 68-74
45 Ford et al. 2009: 88
46 Barker 2007
47 Gilchrist 2011: 36
48 Gilchrist 2011: 39
50 ibid., p. 58
not locate any additional Aboriginal cultural heritage. It was determined that the three trenches which contained Aboriginal cultural heritage comprised the extent of VAHR 7921-113051.

51 ibid., p.110.
Figure 6. ERM defined areas of archaeological sensitivity & subsurface testing within the activity area. Baseplan source: NearMap.
5.7 Summary of Findings (Regional & Local Studies)

The CHMP completed by Ford et al\textsuperscript{52} investigated the southern portion of the activity area and, identified two low rises as having archaeologically sensitivity. Excavation by Ford et al on the westernmost low rise located one subsurface Aboriginal place (VAHR 7921-1130), comprising a discrete low density stone artefact scatter (Figure 6). Another Aboriginal place (VAHR 7921-1038) was identified within 50m of the activity area’s northern boundary and comprised 9 closely scattered stone artefacts found during sub-surface testing for the Desalination Transfer Pipeline Wonthaggi to Cranbourne CHMP 1062\textsuperscript{53}

Assessment of the regional and local studies indicates several key findings relevant to the activity area:

- The Clyde Creek and Cardinia Creek corridors (both within 2.5km of the activity area) are considered to have a high levels of sensitivity for Aboriginal cultural heritage. Land within 100m of tributaries and drainage lines are also considered to have a high level of sensitivity;
- Crests, low rises and any type of high ground situated near water sources such as creeks or swamps are also considered to have influenced subsistence patterns and therefore have a higher potential to contain Aboriginal cultural heritage;
- Isolated stone artefacts and low density stone artefact scatters will be found throughout the landscape. Stone artefacts scatters are the most likely Aboriginal place type for the area; and
- Stone artefact scatters are most likely to date within the past 5,000 years and demonstrate characteristics of the Australian Small Tool Tradition (ASTT).

\textsuperscript{52} Light 2012
5.8 Aboriginal Ethno-history

5.8.1 Preamble

This section presents a history of Aboriginal occupation and use of the activity area based on documentary evidence and early ethnographic records. This information is important in providing a context to archaeological investigations, to assist in interpreting the results of the archaeological test excavations and to aid in assessing the cultural heritage values of the area.

5.8.2 The Bun wurrung Language Group

Prior to permanent European settlement in Victoria, the activity area was occupied by people of the *Bun wurrung* (also *Bunurong, Boon wurrung* and various other spellings). The *Bun wurrung* clan which appears to have had ties to the activity area were the Mayune balug\(^{54}\).

**Food Resources**

Although traditional food gathering practices and access to resources were restricted by European occupation of the region at the time, ethno-historical sources record Aboriginal exploitation of a range of plant and animal foods during the contact period. Food resources would have been comparatively plentiful across the region in the pre-contact period. Plant foods comprised an important part of the diet of the local *Bun wurrung* people, having the advantage over animal resources in that they provided a resource that was ‘more regular and reliable than that derived from hunting or fishing\(^{55}\).

Of the wide variety of plant foods commonly exploited by local Indigenous peoples, the tuber of the Yam Daisy, or *Murnong*, was commented upon by European observers as providing a staple food resource. Thomas records the *Murnong* being eaten both raw (from younger plants), and after being cooked in the ashes of a fire when more mature and fibrous\(^{56}\). Tubers such as that of the Yam Daisy provided a valuable source of carbohydrate for Indigenous populations of the region in spring and early summer, supported by other common plant foods such as the fern-tree (bracken) pulp and ‘some parts of a thistle’\(^{57}\).

Aboriginal people of Port Phillip also readily exploited the fresh and salt-water animal resources of the region. Thomas\(^{58}\) noted the plentiful supply of eels in the district during the summer, describing ‘sufficient numbers to support the Yarra Tribe for one month each year’, which were easily caught with the aid of a spear. Fish were obtained through the use of nets and weirs, and an early (1803) account, prior to European settlement of the area, records the presence of a weir along the Maribrynong River in the vicinity of Keilor\(^{59}\). Middens present both along the coastline and lining inland rivers and streams attest to the exploitation of shellfish as an additional food resource.

Local birdlife, reptiles and mammals also provided potential food resources for the *Bun wurrung*, with kangaroo and possum a popular staple\(^{60}\). Gaughwin details an instance where at a gathering of *Bun wurrung*, and *Daung wurrung* tribes, part of the group travelled to the Dandenongs in order to hunt, procuring ‘kangaroo, porcupine, ‘native bear or sloth’, wombats, oppossum and fish’\(^{61}\).

\(^{54}\) Clark 1990: 364-365


\(^{56}\) Goulding, M, Aboriginal Occupation of the Melbourne Area, District 2: a report to the Land Conservation Council, Land Conservation Council, Melbourne. 1988 21

\(^{57}\) Presland, Op. Cit., p. 35

\(^{58}\) ibid., p. 32

\(^{59}\) ibid., p. 33

\(^{60}\) ibid., p. 34

5.8.3 Review of Thomas Journal to identify Aboriginal use and occupation in the local area

Movements and Camps

The purpose of this section is to review selected sections of the William Thomas Journals held in the Mitchell collection at the State Library of NSW that throw light on specific aspects of Aboriginal occupation and use in and near the activity area. The primary research focused on a journey Thomas took with the Bun wurrung people in his role as Protector of Aborigines between January – May 1840. This particular journey passed through the local area, either through or very near the activity area.

Thomas' journey commenced at Tuerong on 4 February 1840 and ended at Dandenong on 17 March of that year. The final stages of the journey took Thomas from Ruffy's Station "Mayune" (located immediately east of Cranbourne) northeast towards Cardinia Creek past 'Mr Bates' Station (James Bathe) to O'Connor's Station (Terence O'Connor) - a distance of approximately 9km (refer to Figure 7). O'Connor's Station appeared to be a favoured stopping place since the party was well received and work was made available to members of the group. A reasonable road also extended from the Station to Dandenong and thence to Melbourne.

62 Thomas Journal 1840 ZML MSS 214 Item 2 (28) Journal January to May 1840
Figure 7. Undated plan (William Thomas) showing the road from Ruffy’s Mayune Station to O’Connors Station and thence to Dandenong.
Settlement Patterns

Permanent European settlement in the region altered many aspects of Bun wurrung traditional lifestyle within a remarkably short period of time. Thomas’ journey of 1840 was in part a continuance of a traditional seasonal movement through the eastern portion of Bun wurrung territory modified by new points of interest that were to be either avoided or visited\(^6^3\). The appearance of pastoral stations had greatly altered where Bun wurrung people could hunt and camp either through exclusion or attraction. Areas survived within the region that remained largely intact as traditional food gathering areas. This was particularly the case with streams that entered and flowed out of the Koo-wee-rup where vegetation clearance had not been undertaken and where roads had not been formed. Melbourne had also become a particular attraction and it is noteworthy that on finding that a dray was leaving Ruffy’s Mayune Station for ‘town’ a number of Thomas’ party chose to leave the group and take advantage of this conveyance. On the following day at O’Connor’s Station a further five members of the party took another dray to Melbourne leaving the remainder of the party to travel by foot to Dandenong\(^6^4\).

\[\text{Figure 8 - Thomas sketch of Bun wurrung travelling by dray}\]

Other aspects of life documented by Thomas on his journey included the relationship between the Bun wurrung and their neighbours, and particularly the depopulation of the eastern part of the Bun wurrung range where it adjoined Gippsland. The journey itself was from water source to water source. On two occasions poor water was encountered and another two instances absence of water that had been anticipated were recorded. The time spent at any one encampment varied considerably over the 42 nights spent on the journey. Where there was an absence of good water the stay was usually overnight. In one location the party remained for fifteen days and eight at another. Where a lengthy stay was made at any one location small groups would sometimes go hunting for several days before returning to the main encampment.


\(^6^4\) Thomas Journal 1840 ZML MSS 214 Item 2 (28) Journal January to May 1840: entry 14 March 1840
Hunting and Gathering

Thomas’ Journal described the *Bun wurrung* catching a variety of animals, fish and gathering roots. In February 1840, the Tobinerk Camp was in good spirits. The *Bun wurrung* had caught two kangaroos, four large wandals ("like hares") and plenty of eels and gum. ‘Opposums’, bears and beart (like hares) were also regularly hunted. In addition, roots were gathered. Thomas describes large amounts of eels caught and distributed by elder men to the families.

While encamped at Lannen Badgen, the *Bun wurrung* failed to catch eels but caught some duck and native bears in abundance. The "natives caught a very large Guanna" and did not eat it and "said no good one for fat”. At the Tobinerk camp, women go eel spearing after sunrise. The women would return with plenty of eels, four bears, two opposums, a quart or two of “currants” and a quart of “rasberriees”. The *Bun wurrung* also hunted lyre birds.

Thomas’s account of the *Bun wurrung* hunting and gathering practices described mostly women’s activities. The men were most likely away during the time Thomas kept his journal, as he mentions that the women were bewailing the loss of their husbands. Thomas also writes that two hours after sunset some of the women whose husbands were absent moved about 50 yards from his tent and gave a shout in one voice five times in the direction of their husbands. Thomas describes the Aboriginal women as “All quiet – Lubras industrious”. In February 1840, Thomas reported that “women kill kangaroos without assistance” at Tobinerk. Apart from kangaroos, the women returned with eels and gum. It is unknown whether women were hunting kangaroos due to the absence of men or if this was a regular female hunting practice.

Thomas describes the daily practices of the *Bun wurrung* that he witnesses, “The Lubras all stop at home this day plenty food – they have enough to supply them, are reconciled all together and the Lubras who have kept their miam at a little distance come up with the rest and made miam”. “The Lubras all but 3 leave early for kangaroos and opossums, the youth and old men only present when I read in the forenoon - the Lubras return early by 3 o’clock - 3 kangaroos and 9 opossums”. To celebrate the return of the men, the women present them with necklaces made of reeds.

5.8.4 Frontier Violence and Early Settler Relations

Thomas went to the beach and mudflats accompanied by one of the Aborigines from the encampment at Jamieson’s hut – this person was armed with a double-barrelled shot gun. Thomas asked if the Aborigines ever travelled to French Island. His informant told him that before white men came, he and a number of named individuals (known to Thomas) cut a lot of bark and made boats and travelled to French Island. A lot of birds but no kangaroos or possums – “he said they were plenty frightened”. He then pointed to the mountains and said that “all the Blacks from Willsons Promontory & Perrong (?) to Kirkbillesce all this country where we now were dead – not one left – Two Fold Black fellows [Gunnai/Kurnai] long time ago killed many many (?) all dead”.

In February 1840, Thomas’ group decided that they would go Bullen Bullen (lyre-bird hunting) for five days. One of the women later told Thomas that “they were going to kill wild Black fellows & that *Moloco simaluk murrambilina cogella* putting her hand to the thick part of the leg & the (?) part of arm – I immediately shew’d anger. An Old Man being present I turn’d to him told him One Great Father made us all, Black fellows 2 Fold Bay, Black fellows Westen Port, Black fellows Barrubal, Black fellows Goldborn, White Man this country, White Man that country”. Thomas indicated that he would go with them and that they would have to spear him before they speared the Two Fold Blacks. The *Bun wurrung* insisted that they did not intend to kill Black fellows. Ross volunteered to go with them so that Thomas could be informed of their movements and to be convinced that no slaughter took place.

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65 Thomas Journal 1840 ZML MSS 214 Item 2 (28) Journal January to May 1840
66 Thomas Journal 1840 ZML MSS 214 Item 2 (28) Journal January to May 1840
67 Thomas Journal 1840 ZML MSS 214 Item 2 (28) Journal January to May 1840
Thomas recorded evidence of earlier European aggression against the *Bun wurrung*. When questioning a young woman regarding some old scars that Thomas had assumed were spear wounds, he was informed that: Long time ago me Pckaninny - White Man plenty shoot my all Blackfellows\(^\text{68}\). The wounds she carried Thomas surmised were the result of buck shot.

Thomas also describes the mixed relations on the frontier, which often included cycles of violence and reconciliation. For instance, the dogs owned by the *Bun wurrung* killed five or six young chickens just hatched at Jamieson’s hut. In retaliation, Jamieson shot dead the wrong dog and wounded another. A burial ceremony was conducted by the Aboriginal dog owner. Jamieson apologised and paid the owner compensation.

Thomas also wrote about the *Bun wurrung* swimming techniques which he found curious and bizarre. Thomas described the Aboriginal swimming technique as “they do not swim like a white man or so fast, like swans or ducks they work their hand open under their bellies & not spreading out like we swim, you cannot see their legs”. Thomas also observed that they never dived but walked into the water.

It was also clear that many early European settlers were openly hostile to a continued Aboriginal presence in the area. Thomas noted with disdain, after being refused permission to camp on a property close to Dandenong, that “this is the 12th Station where we have been ill received\(^\text{69}\). Within four years of European settlement the *Bun wurrung* had already established etiquette regarding camping on pastoral leases: “The Blacks are very careful where they Encamp to avoid giving offence - they encamp at a nook of the Creek quite out of the way of Cattle & at least half or 3/4 of a mile from the huts\(^\text{70}\).

Thomas noted that firing of the landscape was a source of conflict between the *Bun wurrung* and the squatters. Of most concern to the squatters was the firing of areas that were used to graze stock. During traditional hunting, a firestick was usually carried in order to drive game. According to Thomas’ journal, Aborigines argue that firing the bush is something they have always done for hunting possums, wombats and other animals. The *Bun wurrung* promised not to set any more fires and the party went out without firesticks and returned with plenty of roots\(^\text{71}\).

**Summary**

Some important key points can be drawn from our review of Thomas’ journals:

- Over the course of the journey, camping sites were always located near a creek or water source. Duration of stay varied considerably and appeared to be related to how abundant water and other food sources were;
- Women were actively involved in hunting, including bringing back Kangaroos that appear to have been killed through use of digging sticks as a weapon;
- Firing of the landscape was a frequent occurrence and was primarily used to corral game;
- The *Bun wurrung* had a rich spiritual life and burial ritual; and

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\(^\text{68}\) Thomas Journal 1840 ZML MSS 214 Item 2 (28) Journal January to May 1840: entry 9 February 1840

\(^\text{69}\) Thomas Journal 1840 ZML MSS 214 Item 2 (28) Journal January to May 1840: entry 17 March 1840

\(^\text{70}\) Thomas Journal 1840 ZML MSS 214 Item 2 (28) Journal January to May 1840: entry 17 March 1840

\(^\text{71}\) Thomas Journal 1840 ZML MSS 214 Item 2 (28) Journal January to May 1840
Frontier relations were complex, with good relations between some early European settlers (such as O’Connor) and the *Bun wurrung*, but clear evidence of hostility and violence directed at the *Bun wurrung* from many other settlers.

5.9 Environmental Context (Landforms & Geomorphology)

Archaeological assessment reports include information about the environmental context of study areas because of the important role environmental characteristics played in influencing the types of archaeological sites in any given area. Physical environments influence both the type and availability of natural resources and the types of cultural activities that were carried out in the past. Correspondingly, this also influences the types of archaeological sites that may be found.

A determination of the former environmental context is essential to develop accurate models of cultural activity, site distribution patterns and the archaeological potential of any given area. The environmental setting of the activity area is discussed below.

5.9.1 Landscape and Published Geological Mapping

Published mapping on the GeoVic website shows that the majority of the activity area is located on a Murrundindi Supergroup (Sm) parent material, comprising sedimentary mudstone and sandstones (Figure 9). An Unnamed Swamp and Lake Deposit is mapped as being present in the south eastern corner of the activity area and unnamed dune deposits (Qd2) are mapped as occurring in the south-west corner.
Figure 9 - Published geological mapping. Base image sourced from Geovic - Dept. of Environment & Primary Industries
5.9.2 Vegetation

Published information on vegetation and biodiversity is included on the Victorian Resources Online website (DSE). It provides a good indication of the prevailing vegetation patterns prior to European settlement and clearance of the land. For the purposes of showing the general patterns of vegetation across the activity area, we have re-produced a copy of the DSE 1750 Ecological Vegetation Communities (EVC) Map relevant to the activity area (Figure 10).

The EVC map indicates that the activity area likely contained Heathy Woodland.

Comparison of the 1750 (modelled) and 2005 (current) (Figure 10) ecological vegetation communities (EVC) extent indicates that vegetation across the activity area has been removed; however pockets of plains grassland/grassy woodland may exist outside of the activity area.

Analysis of historical and current aerial photographs indicates the entire activity area has been cleared for agricultural uses (see Figures 15 – 17).
Figure 10 - Ecological vegetation communities (EVC’s) within the activity area. Base image courtesy of the Dept. of Environment & Primary Industries.
5.9.3 Landforms within the activity area

The activity area is located within flat to gently undulating topography, typical of the landscape of the local area.

Two discrete areas of elevation comprising crest / low rise landforms are situated in the south-west and south east sections of the property with associated simple slope running towards the north. These crests/low rises can be seen in the contour mapping outlined in Figure 11.

There are no watercourses within the activity area.
Figure 11 - Landforms within the activity area. Baseplan source: NearMap.
5.10 Landuse History

Historical aerial photographs dating to 1963 (Figure 12) indicate that the activity area has been used for agricultural activities for at least half a century. There is an indication that ploughing may have occurred in some of the paddocks within the activity area.

All of the native vegetation within the activity area appears to have been cleared and the only vegetation remaining is a series of trees along paddock boundaries, most likely installed as wind breaks. Tracks, farm buildings and some cut and fill disturbance are also present within the activity area.

Aerial photographs dating to 1981 (Figure 13) demonstrate that little had changed in the activity area since 1963 other than the installation of electricity pylons in the south of the activity area.

An aerial photograph dating to 2010 (Figure 14) shows that the pipeline/utility service associated with CHMP 10881 has been installed and traverses the southern portion of the activity area.

Figure 12 - 1963 aerial photograph of the activity area. Source Land Victoria Aerial Photography Archive, Laverton
Figure 13 - 1981 aerial photograph of the activity area. Source Land Victoria Aerial Photography Archive, Laverton.
Figure 14 - 2010 aerial photograph of the activity area. Source: NearMap.
5.11 Predictive Model

A predictive model was developed for the Growth Areas Authority PSP study, drawing on desktop research and previous archaeological survey work. The following predictions were made:

- Stone artefact deposits are likely to be found at varying densities across most landforms;
- Higher density artefact scatters and sub-surface deposits may be found on crest landforms and the ‘Cranbourne sands’;
- Higher density artefact scatters and sub-surface deposits are likely to be found adjacent to creeks or wetlands. Artefact density and frequency is likely to increase with higher stream order (for creeks) and permanence (for wetlands);
- The density and complexity of artefact scatters and sub-surface deposits is likely to decrease with distance from water sources and wetlands;
- A particularly high density and complexity of archaeological deposits at major confluences and resource intersection zones;
- Stable aeolian and alluvial landforms are likely to have deeper profiles and better preservation conditions. These landforms may contain greater archaeological integrity;
- Scarred trees may be present within areas containing mature remnant native trees of sufficient age and as isolated mature trees in agricultural settings;
- Isolated finds may be found anywhere across the landscape.

Due to the large area covered by the GAA PSPs, MapInfo GIS (Geographical Information System) was used to develop and map the predictions made regarding archaeological potential. The purpose of the predictive model was to:

- Provide the Growth Areas Authority, individual landowners within the PSP and the Aboriginal community with information about areas of Aboriginal archaeological sensitivity to feed into constraints and opportunities analysis;
- Help inform early PSP planning and design work;
- Provide Desktop and Standard Assessment components of CHMPs, and
- To assist in developing a methodology for Complex Assessments.

In developing the model, a number of environmental and disturbance variables were used to identify areas of varying ‘archaeological sensitivity’. For the purposes of the model, the term ‘archaeological sensitivity’ was defined as a combination of likely density, integrity and research value of archaeological deposits within any given area.

5.11.1 Factors Included in the Model

The following is a list of variables that contribute to archaeological potential within the Growth Areas Authority PSP areas in general, and the activity area specifically. The variables are ranked in order of importance.
Proximity to water sources

Proximity to water is one of the key determinants of archaeological potential. In general, sites are larger, more complex and more frequently found in close proximity to water sources. Levels of sensitivity are predicted to increase with higher order drainage lines and more permanent wetlands. Drainage and hydrology patterns have been significantly altered since European settlement in order to retain water in storage dams for agricultural purposes and drain waterlogged areas to open them up for grazing and cultivation. GIS-modelling combined with analysis of topographic maps and historic aerial photos have been used to determine the likely extent of former wetlands and areas prone to flooding.

The level of sensitivity is predicted to increase with higher order drainage lines and more permanent wetlands.

Alluvial Soils

These areas are considered highly sensitive because their proximity to higher-order water sources increases the potential for higher density artefact scatters and sub-surface deposits (see above). More intact archaeological deposits are likely to survive within these alluvial soils due to their deeper profiles and better preservation. In particular, ethnographic and archaeological studies have indicated that Aboriginal burials are more likely to occur on these landforms.

Crest landforms

Previous investigations in the area have shown that crest landforms are often associated with a higher density and frequency of archaeological deposits – particularly when they are also located in close proximity to water sources. Crest landforms were delineated using aerial photography, topographic mapping and mapping carried out during the survey. The extent of the crest landforms was mapped using Map Info GIS software.

‘Cranbourne Sand’

The Cranbourne Sands landform is predicted to have an elevated level of archaeological sensitivity because this soil landscape is likely to contain deeper cultural sequences and good preservation conditions in areas that have not been disturbed by market gardening. The Cranbourne Sands landform also has a slightly higher potential to contain Aboriginal burials, although the potential for burials within the activity area is still generally low.

Areas of cut and fill disturbance

These areas are considered unlikely to contain Aboriginal archaeological deposits because topsoil units (ie. artefact bearing soil units) have been removed. These areas include roads, dams and the construction of building platforms for houses and sheds. They are considered to have been disturbed.

Areas of market gardening and horticulture

These areas are considered to have a very low level of archaeological sensitivity because topsoil units have been heavily disturbed by deep ploughing, establishment of garden beds, re-grading and establishment of sub-ground watering systems. These areas may contain Aboriginal cultural deposits but they are likely to have a very low level of integrity and a very low level of scientific significance.

Swamps and wetlands

Are considered to have a lower level of archaeological potential because they were unfavourable areas for sustained occupation and use (because they were inundated) and are less likely to contain evidence of Aboriginal occupation and use. There is some potential for these areas to contain low densities of cultural material associated with foraging into the wetlands and exploitation of resources.
5.11.2 Factors Not Included in the Model

The following variables were not included in the model, because the Desktop Assessment research and analysis of the local landscape indicated they are unlikely to be factors that affect local archaeological patterning within the subject land.

Previously recorded Aboriginal archaeological sites

Under the Aboriginal Heritage Act 2006 & Regulations 2007, it is offence to disturb or destroy Aboriginal sites or objects except where a Permit to Harm has been approved by AAV and/or an approved CHMP allows for the disturbance.

These places/sites have not been included as an influence on archaeological sensitivity in the model. This is because most of the sites are surface artefact scatters identified on erosional landforms, in areas of ground exposed by soil disturbance and within areas specifically investigated during previous archaeological studies. Therefore, the current local distribution of known sites is unlikely to accurately reflect the real distribution and nature of sub-surface archaeological deposits.

Areas of ploughing

Are considered to have a lower level of archaeological sensitivity because the top 20 – 30cm of topsoil has been disturbed by ploughing. These areas may contain Aboriginal cultural deposits but they are likely to have a lower level of integrity and a lower level of scientific significance. It is noted, however, that in deeper soils there is potential for more intact archaeological deposits to survive beneath the plough zone.

Areas of ploughing have not been included in the model because the activity area has been cleared of original vegetation and virtually the entirety of the subject land has been subject to some level of ploughing in the past. Therefore, because the ploughing has occurred right across the activity area, it does not have an influence on the model.

Proximity to stone sources

Aboriginal stone sources and geological mapping may provide an indication about where raw materials were gathered for making stone tools. Stone sources may occur across the local landscape in the form of boulders and weathered pieces outcropping on valley slopes and on volcanic plains, and gravels and pebbles washed downstream and deposited in alluvial terraces and on gravel bars.

Dominant raw material types in the region include silcrete, quartz, quartzite and chert, with other materials such as basalt, also present.

No specific stone sources or potential stone sources were identified during the desktop research.

Slope Gradient

The local landscape within the activity areas is flat to gently undulating. Based on our desktop research there appears to be no steep terrain. Therefore, slope gradient is unlikely to be a factor influencing archaeological potential.
5.11.3 Predictive Sensitivity Mapping

MapInfo GIS software was used to model and map the predictions surrounding archaeological potential. This GIS sensitivity mapping developed for the GAA report shows areas of varying archaeological sensitivity graded from high to disturbed. The modeling and mapping was based on a probabilistic approach, where a combination of traits was used to determine the combined level of potential. The model traits are as follows:

- Areas within 200m of high-mid order stream = Very High Sensitivity;
- Areas within 200m of lower-order stream or outer edge of swamp = Moderate Sensitivity;
- Areas within 200m of former waterway/seasonally inundated stream = Very High Sensitivity;
- Alluvial soils = Moderate Sensitivity;
- ‘Cranbourne Sands’ geological landform = High Sensitivity;
- Crest landforms = High Sensitivity;
- Crest and within 200m of former water (including all stream types and swamp) = Increased Sensitivity by One Level;
- Cut and Fill Disturbance = Disturbed;
- Horticultural/ Market Gardening Disturbance = Very Low Sensitivity;
- Within Wetland = Very Low Sensitivity; and
- All other areas = Low Sensitivity.

Figure 15 shows the results of the GIS predictive model. The figure shows areas of high potential (dark pink) grading to very low potential and disturbed areas (dark grey). The activity area is outlined in yellow and has areas of high and low sensitivity.
Figure 15 - Predictive Archaeological Sensitivity Model (cutaway from the GAA PSP Desktop Assessment report). Source: AHMS 2011.
6  STANDARD ASSESSMENT

6.1  Archaeological Survey Details

The following sections describe the results of a survey carried out by AHMS on the 13th August 2013.

The principal aim of the survey was to identify exposed cultural material (i.e. surface sites) and to assess disturbance levels. The survey aimed to identify areas of archaeological potential, landforms, vegetation patterns, geomorphic units, and areas of disturbance.

The investigation was also used to assess the extent to which past land-uses may have affected natural soil profiles. This information was used to assess the depth and potential integrity (intactness) of natural soil profiles across the activity area and the likely impact of future construction.

The results of the survey were used to help inform planning and design, assist in development of a complex excavation methodology and to inform development of management recommendations for the activity area.

AHMS staff and Aboriginal community representatives who participated in the survey are listed below on Table 5.

Table 5 - Survey Participants

<table>
<thead>
<tr>
<th>Date</th>
<th>AHMS</th>
<th>Bunurong</th>
<th>Boon wurrun</th>
<th>Wurundjeri</th>
</tr>
</thead>
<tbody>
<tr>
<td>13/08/2013</td>
<td>Stacey Kennedy</td>
<td>Izzy Pepper</td>
<td>Jarrod Watts</td>
<td>Shane Nicholson</td>
</tr>
</tbody>
</table>

6.2  Survey Methodology

The archaeological survey was designed to comprehensively cover the activity area in a systematic manner by examining all areas of ground surface visibility and sample representative landforms. Any areas of ground exposure were examined for archaeological evidence such as stone artefacts, charcoal and shell. Ground surfaces and cut and fill features were also examined to determine the degree of soil disturbance, erosion and potential for subsurface archaeological deposits.

An analysis of topographic maps and aerial photographs of the activity area was undertaken prior to the survey to identify landforms and areas of ground surface exposure in the form of tracks, dams, cuttings and areas of ground exposure. These areas were targeted during the survey because they provided an opportunity to identify surface artefact scatters and to investigate exposed soil profiles.

The survey used the information obtained from analysis of aerial photographs and topographic maps to survey areas of ground surface visibility (to identify surface artefact scatters).

The Standard Assessment involved a five stage approach:

Stage 1 – AHMS sought contact with the landowner to arrange a date for the archaeological survey to be conducted. AHMS also sought advice from the landowner on access issues and discussed any stipulated requirements.

Stage 2 - An analysis of topographic maps and aerial photographs was undertaken prior to the survey to identify landforms across the activity area and to identify areas of ground surface exposure in the form of tracks, unsealed roads, dams, cuttings and areas of ground exposure. These areas were
targeted during the survey because they provided an opportunity to identify surface artefact scatters and to investigate exposed soil profiles.

**Stage 3** - The first step when entering the activity area was to drive around the property (where the landowner had given permission) to familiarize ourselves with the landscape and identify areas of ground surface visibility. This assisted in scoping out the approach to survey in each property.

**Stage 4** - Following the initial scoping work surveying was conducted on foot. Areas of ground surface visibility were surveyed in their entirety.

The survey used the information obtained from analysis of aerial photographs and topographic maps (Stage 2), as well as the initial scoping work (Stage 3), to survey areas of ground surface visibility (to identify surface artefact scatters). Areas of erosion and ground exposure were examined for archaeological evidence such as stone artefacts, charcoal and shell. Ground surfaces and cuttings were also examined to determine the degree of soil disturbance, erosion and potential for archaeological deposits below the current ground surface.

**Stage 5** – Any surface artefact scatters found during the survey were to be recorded in detail using a pro-forma developed for field recording. The location and extent of each surface site would be recorded with a Leica CS15 Differential GPS which provides sub 1 meter accuracy. Field notes were made and photographs taken to document landscape configuration, soil profiles, soil disturbance, ground visibility and vegetation types. During the survey previously registered Aboriginal places were inspected using a DGPS and the co-ordinates supplied for each place.

### 6.3 Survey Coverage

At the time of the survey, almost the entire activity area was used for cattle grazing and was covered by low pastoral grasses. General access and ground surface visibility was correspondingly very low (5% per m²). Ground surface visibility increased in areas of disturbance (cattle treadage, vehicular access tracks and underneath trees).

Effective coverage is calculated by multiplying the percent (%) ground exposure (or visibility for detecting artefacts) by the % survey coverage (or actual area surveyed). The calculation of effective coverage shows the effectiveness of the surface survey in detecting surface archaeological sites and accordingly, how much weight ought to be put on the results. Effective survey coverage based on ground surface visibility is provided below (Table 6).

**Table 6 - Effective Survey Coverage**

<table>
<thead>
<tr>
<th>Area covered (m²)</th>
<th>Per cent of activity area surveyed</th>
<th>Ground survey visibility (%)</th>
<th>Effective survey coverage (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>400,000</td>
<td>100</td>
<td>5</td>
<td>20,000</td>
</tr>
</tbody>
</table>
6.4 Survey Results

No Aboriginal sites or objects were identified during the survey.

The landforms of the activity area comprise:

- Flat to gently undulating floodplains;

- Two discrete areas of elevation comprising crest/low rise landforms (Figure 16 & Figure 18) situated in the south-west and south east sections of the property with associated simple slope running north for remaining portion;

- The entire activity area is currently used for the grazing of cattle and has associated disturbances (i.e. cattle treadage, construction of wells);

Underground services (electricity, gas & telecommunications) are located within the property. A high pressure gas pipe, oriented north to south runs from the southern boundary (adjacent to Tuckers Road) to the northernmost corner of the property boundary (exiting the activity area at the intersection of Thompsons and Pound Road). Two sets of high voltage lines run parallel to the southern perimeter of the activity area, in an east-west direction. Underground fibre optic cables have been installed underneath the northernmost high voltage power lines. Due to mandatory OH&S requirements, no excavation can occur within 10m of overhead high voltage power lines or within 5m of the high pressure gas pipeline corridor; and

No scarred trees, caves, rock shelters or outcropping stone were observed within the activity area.

Figure 16 - Low rise with high voltage power lines running parallel to southern boundary of property.
Figure 17 - Flat to gently undulating plain landform which characterises the activity area.

Figure 18 - Gentle simple slope descending to open depression and showing low rise in southeast quadrant of property.
6.4.1 Reinspection of previously registered Aboriginal Places 7921-1130

During the survey the location of Cleveland Park AS 2 (VAHR 7921-1130) was assessed. Based on the levels of disturbance associated with the installation of services (i.e., overhead and subsurface high voltage powerlines & high pressure gas pipeline) it was determined that the location of the previously registered Aboriginal place has been heavily disturbed.

It is considered unlikely that any further Aboriginal cultural heritage associated with 7921-1130 is present in the vicinity of the recorded site location due to the high level of prior disturbance associated with the power lines and HP gas line (Figure 20). Therefore, further investigation as part of the complex assessment was not considered to be warranted, particularly as the site location was subject to full extent testing as part of the earlier CHMP prepared by ERM.72

Figure 19 - Ground Surface Survey Map
6.5 Land Use Disturbances and Landforms

The survey was used as an opportunity to improve mapping of the extent and nature of past ground disturbance which had previously been assessed from historical and recent aerial images.

Disturbance within the activity area was extensive and caused by a wide range of factors. The following specific disturbances to the activity area were observed during the survey:

- Installation of high voltage powerlines, subsurface fibre optic cables and a high pressure gas pipeline (Figure 20).
- Construction of a house.
- Construction of farm buildings; sheds, fences, pens and other ancillary structures;
- Construction of tracks and driveways; and
- Cattle grazing.

These impacts have been previously discussed in the desktop assessment and are shown on Figures 11 to 13 and Figure 19.
7 COMPLEX ASSESSMENT

The methodology for the archaeological test excavation was developed taking into consideration results of predictive modelling, desktop research and archaeological survey/site inspections as described in previous sections of this report.

7.1 Objectives & Rationale

The test excavation had four primary objectives:

- To confirm the extent and nature of prior sub-surface soil disturbances across the investigation area;
- Identify and assess the nature, extent and significance of any Aboriginal cultural heritage identified within those areas determined as being likely to contain Aboriginal cultural heritage during the Desktop & Standard Assessment;
- To test the predictive model prepared by AHMS for GAA; and
- To inform management of Aboriginal cultural heritage through the development process.

The specific aims of the work were as follows:

- Sample the activity area in order to characterise the nature, extent and significance of archaeological deposits (if any) in line with the sampling densities recommended in the Aboriginal Cultural Heritage Assessment prepared by AHMS on behalf of GAA;
- Record the vertical extent, sub-surface nature and significance of any archaeological deposits located (if any);
- Record the nature and extent of any ground disturbance;
- Undertake excavation work in partnership with the Aboriginal representative groups;
- Undertake appropriate post-excavation analysis;
- Prepare an excavation report presenting the results of excavations and any post-excavation analysis; and
- Draw on the results of excavation in developing recommendations for management of Aboriginal heritage during development in partnership with the Aboriginal representative groups.

Our excavation approach used the landforms within the activity area as the basis for sampling, and as a means of determining the nature, extent and significance of Aboriginal use and occupation of the various landforms and their associated environmental resources. This approach is informed by the results of extensive excavation in south-eastern Australia, which has shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces and that surface evidence does not accurately reflect the nature of sub-surface archaeological deposits.

Accordingly, the traditional surface-site focus of archaeological excavation is biased in favour of areas of erosion and ground surface visibility (i.e. where surface sites are found) at the expense of buried
sites in areas of low surface visibility or within aggrading soils. As a result, we have adopted a landform approach that seeks to overcome these biases and provide a more accurate characterisation of Aboriginal occupation and use across the landscape. This approach in turn facilitates strategic management approaches that focus more on archaeological and cultural values across landscape rather than individual ‘dot on landscape’ site management. The landscape approach is also better able to incorporate the complexity of cultural values related to broader landscape values and traditional natural resources.

7.2 Excavation Methodology

7.2.1 Preamble

The test excavation was undertaken from the 19th to the 22nd of August 2013. The excavation was directed by Stacey Kennedy who was assisted by archaeologists Adrian Burrow, Shannon Sutton, and Liz Foley. Representatives of the Aboriginal community are shown on Table 7.

7.2.2 Scope of work

The scope of work comprised controlled manual excavation of sixteen 1m x 1m test trenches to the level of B horizon clay sub-soil. All A-horizon deposits were passed through 5mm hand sieves in order to recover any artefacts present (i.e. 100% recovery of archaeological material >5mm).

The programme of work comprised systematic landform testing across parts of the activity area considered likely to contain Aboriginal cultural heritage during the Standard Assessment.

- A total of 16 1m² test trenches were set out at approximately 80m intervals on linear topo-sequence transects designed to sample the range of topography within the activity area;
- The 100 metre trench spacing was considered optimal to allow conclusions to be drawn about the extent of soil disturbance, landscape use, and the nature and extent of the archaeological resources; and
- The test trenches were excavated using controlled manual archaeological excavation methods in 10cm arbitrary spits.

The test excavations sampled all landform elements within the activity area assessed as likely to contain Aboriginal cultural heritage (crest, simple slope and plain), excluding areas of prior cut & fill disturbance that were considered unlikely to contain Aboriginal cultural heritage. In accordance with the endorsed sampling strategy included in the GAA assessment report, the Complex Assessment focused on areas accorded high sensitivity and therefore assessed as being likely to contain Aboriginal cultural heritage. Areas of low sensitivity, assessed as being less likely to contain Aboriginal cultural heritage, were also tested however the sample weighting in this area was less than in the high sensitivity zone.

The systematic landform testing sampled the range of soil types and slope gradients within the activity area to detect any patterns in cultural use (and/or preservation of cultural deposits) on particular landforms, slope classes or soil types.

Figure 20 shows the location of the test trenches. Appendix 4 includes the records of each trench including section drawings, section photos, observations and descriptions.
Figure 20 - Test trench locations.
### Table 7 - Complex Assessment Participants

<table>
<thead>
<tr>
<th>Date</th>
<th>AHMS</th>
<th>Bunurong</th>
<th>Boon wurrung</th>
<th>Wurundjeri</th>
</tr>
</thead>
<tbody>
<tr>
<td>19/08/2013</td>
<td>Stacey Kennedy</td>
<td>Wayne Pepper</td>
<td>James Hughes</td>
<td>Trevor Downe</td>
</tr>
<tr>
<td></td>
<td>Adrian Burrow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shannon Sutton</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20/08/2013</td>
<td>Stacey Kennedy</td>
<td>Wayne Pepper</td>
<td>James Hughes</td>
<td>Gary Galway</td>
</tr>
<tr>
<td></td>
<td>Adrian Burrow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shannon Sutton</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wayne Pepper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>James Hughes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trevor Downe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21/08/2013</td>
<td>Stacey Kennedy</td>
<td>Wayne Pepper</td>
<td>Gary Watkins</td>
<td>Trevor Downe</td>
</tr>
<tr>
<td></td>
<td>Adrian Burrow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shannon Sutton</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Wayne Pepper</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Gary Watkins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trevor Downe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/08/2013</td>
<td>Adrian Burrow</td>
<td>Wayne Pepper</td>
<td>Ngarra Williams</td>
<td>Gary Galway</td>
</tr>
<tr>
<td></td>
<td>Shannon Sutton</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liz Foley</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 7.2.3 Excavation and recording methods

Excavation and recording techniques used during subsurface investigations are described below:

**Trench placement and survey.**

The trenches were located to test all parts of the landform, whilst avoiding areas of previous ground disturbance and existing services. Trench locations were surveyed using a Leica DGPS unit.

**Excavation Methodology.**

- All excavation was undertaken in 10cm arbitrary spits within 1m x 1m spatial units;
- Manual excavation entailed the use of shovel and trowel; and
- Soil samples were retained for pH testing and soil description.

**Sieving.**

- All soil excavated as part of manual testing was dry-sieved using a 5mm hand sieve; and
- B horizon deposits excavated as part of stratigraphic exploration were not sieved because they are culturally sterile, being derived from decomposing parent material that pre-dates Aboriginal occupation.

**Recording.**

- A standard site recording form was used for each spit in each trench. Details included site name, date, site recorder, spit number, soil unit and depth, test trench number, description of finds, description of soil, sketch plan of excavation (if relevant to show structure) and end of spit levels;
- A photographic record was kept of trench excavations, including scaled trench section photos;
- Scaled section drawings of each excavated test trench were made;
• An overall site plan was produced using x, y, z coordinates recorded using a DGPS and offsets from known points (property fence-line) shown on a scaled plan prepared by professional surveyors and provided by the client; and

• The trench locations were established and recorded using a Differential GPS (Leica CS15). The DPGS was also used to establish a site datum for measuring relative levels (RL’s). A dumpy level was then used to measure RL’s at the beginning and end of each excavated trench.

7.2.4 Post-excavation analysis methodology

Stone Artefact Analysis.

No stone artefacts were located as a result of the subsurface testing.

Other Analyses.

7.3 Necessary Variations

It was not possible to excavate any test trenches within a small proportion of the activity area (see Figure 20) as the area was heavily water logged at the time of excavation. Not being able to excavate within this area has not constrained the investigation as this portion of the activity area comprised floodplain landform considered to have low potential to contain Aboriginal cultural heritage. Furthermore, test trenches were excavated on other drier parts of the floodplain landform therefore ensuring that this landform element was adequately sampled.

No test excavation was permitted by the utilities authorities underneath the high voltage powerline easement or over the high pressure gas line easement shown on Figure 20 for OH&S reasons. This included the location of the previously recorded VAHR 7921-1130. However, as discussed previously, VAHR 7921-1130 was subject to full extent testing as part of the earlier approved CHMP and therefore further complex assessment testing was not warranted in any case. Therefore, the OH&S restrictions on excavation under the powerline easement did not adversely affect our ability to systematic sample the full range of landforms within the activity area.

No other remains (faunal, shell, charcoal from hearth etc) were found.
7.4 Excavation Results

7.4.1 General

A total of sixteen 1 m x 1 m trenches were excavated within the activity area and 100% sieved through 5mm screens.

The detailed trench records for each trench (including section drawings and scaled profile photographs) are included in Appendix 4.

No Aboriginal cultural heritage was located during subsurface testing of the activity area. Details and results of each test trench are described in the trench records in Appendix 4.

7.4.2 Soil Profiles

Test excavation revealed the activity area contains one main soil profile, a gradational silty clay profile overlying a clay B horizon. The depth of the B horizon was highly variable.

The level of prior disturbance and homogenization of soils profiles across the activity area varied considerably. All trenches had evidence of disturbance to the upper A Horizon profile resulting from cattle treadage and scuffage to an average depth of approximately 5cm. Some of the profiles contained homogenized A horizon soils.

The A1 horizon typically comprised a brown-dark brown humic clay-silt or loamy silt. The A2 horizon appeared lighter in colour than the A1 horizon and typically contained a higher clay to silt ratio, with clay content gradually increasing with depth. The B horizon comprised an orange/orange-brown-grey mottled sterile clay.

Trenches 10 and 11, located on the low rise in the south eastern corner of the activity area, contained redeposited fill to varying depths, probably related to cut and fill disturbance that could be seen on 1960's aerial photography of the activity area (as discussed in the desktop assessment). Trench 10 contained redeposited fill to an approximate depth of 26cm, beyond which a natural A horizon profile was encountered overlying clay. Trench 11 appears to have been completely truncated as the fill deposit overlaid sterile clay, with no natural A Horizon subsoils encountered.

![Figure 21 - Typical soil profile encountered during the test excavation](image)
7.4.3 Soil Chemistry

For the purposes of gauging soil acidity and assessing the likelihood of bone and organic preservation across the site, we measured soil pH from soil samples taken during excavation. This analysis showed soil pH across the activity area ranges from 6 to 7, being generally neutral to very slightly acidic to alkaline. Despite the presence of slightly alkaline soils that are usually associated with less deterioration of organic materials, it is considered unlikely that any Aboriginal burials would be present in the activity area because the soil profile is generally too shallow.

7.4.4 Prior Land Use and Disturbance Analysis

The degree of disturbance noted during the desktop and standard assessments was confirmed during the test excavations.

Section 7.4.2 discussed the soil profiles encountered during the excavation. Evidence of truncation, homogenization and introduction of fills was widespread. In particular, most of the trenches contained evidence of disturbance to the upper 5cm A Horizon profile resulting from cattle treadage and scuffage. Two of the trenches on the low rise located in the south eastern corner of the activity area contained fill deposits to varying depths; Trench 10 contained fill to approximately 26cm beneath which natural A horizon profiles were encountered. Trench 11 contained fill to sterile clay, indicating that A horizon subsoils had been completely truncated.
8 ABORhINoNAL CULTURAL HERITAGE WITHIN THE ACTIVITY AREA

8.1 Previously Registered Aboriginal Places within the Activity Area.

There is one previously registered Aboriginal place within the activity area (VAHR 7921-1130) (Figure 20).

Table 8 - Description of VAHR 7921-1130

<table>
<thead>
<tr>
<th>Site Name (VAHR #)</th>
<th>Cleveland Park AS2 (7921-1130)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Grid Ref:</td>
<td>GDA94/MGA55</td>
</tr>
<tr>
<td></td>
<td>E - 355515</td>
</tr>
<tr>
<td></td>
<td>N - 5782086</td>
</tr>
<tr>
<td>Landform</td>
<td>Low Rise</td>
</tr>
<tr>
<td>Place Type</td>
<td>Artefact Scatter</td>
</tr>
<tr>
<td>Artefacts</td>
<td>9 silcrete artefacts, including 5 whole flakes, 1 x broken flake, 1 x whole tool, 1 x angular fragment</td>
</tr>
<tr>
<td>Place Condition</td>
<td>Heavily disturbed/destroyed by installation of underground utilities (fibre optic cable).</td>
</tr>
<tr>
<td>Scientific Significance</td>
<td>Very Low.</td>
</tr>
</tbody>
</table>

8.1.1 Extent, Nature and Significance of VAHR 7921-1130

VAHR 7921-1130 is a low density subsurface scatter subsurface scatter located during investigations for CHMP 10881 carried out by ERM in 2009\(^2\). VAHR 7921-1130 was located on a low hill in the southern portion of the activity area and comprised silcrete artefacts (n=9) over an area extending approximately 10m (east-west) x 2m (north-south). The site comprised predominantly whole flakes (56%), a broken flake (11%), a whole tool (n=11%) a broken tool (n=11%) and an angular fragment (n=11%). Tools identified include a backed blade and a bondi point.

All of the artefacts associated with this place were removed during the investigations. VAHR 7921-1130 was assessed as having a very low level of scientific significance with very limited potential to provide any new information. Extent testing carried out by ERM and subsequent test excavation carried out by AHMS as part of the current CHMP complex assessment in the vicinity of the previously recorded place (trench 2) did not identify any further Aboriginal cultural heritage and the place has most likely been destroyed through installation of underground utilities (a fibre optic cable) (Figure 20).

\(^2\) Ford et al 2009
8.2 Distribution Patterns across the Local Landscape

8.2.1 Preamble

In addition to the assessment work carried out for the current study area, AHMS was also engaged to undertake complex CHMPs for five separate parcels of land located within PSP53 and 54 in Clyde North (CHMPs 12529; 12531; 12532; 12533; 12549). A programme of landscape-based test excavation was carried out across these properties in areas ranging from low to very high sensitivity identified in the Aboriginal Cultural Heritage Assessment report prepared for Growth Areas Authority and endorsed by AAV. A total of 80 1m² test trenches were excavated across the five properties as shown on Figure 23 overleaf.

This has provided a robust sample to assist in identifying prevailing archaeological patterns in the local landscape and to test the predictive model developed in the earlier GAA report. The following sections provide a landscape distribution analysis drawing on the results of complex assessment within the five other properties recently investigated by AHMS during complex assessment work. Data from the current activity area is not included because no Aboriginal archaeological deposits were encountered during the complex assessment. Therefore the addition of data would not substantially change the conclusions reached during the analysis of data from the five earlier complex assessments.

8.2.2 Horizontal Variation

Stone artefacts were recovered from 12, or 15% of the 80 excavated test trenches. Artefact density in those trenches containing artefacts varied from a minimum of 1 artefact per trench (1 artefact per m2) to a maximum of 55 artefacts per trench (55 artefacts per m2). Mean artefact count in trenches containing artefacts was 12.55 artefacts (SD=18.902) or about 13 per m². The mean artefact count of all trenches was 1.7 artefacts (SD=7.90) or approximately 2 artefacts per m².

![Figure 22 - Graph showing the total number of artefacts per trench in those trenches containing artefacts (trenches arranged from lowest to highest artefact counts)](image)

The data from these trenches has been used to develop a predictive model which can be used to assess sites in the local landscape which are at risk of archaeological deposits. This model is discussed in the following sections.
Figure 23 - Distribution of trenches containing artefacts across 5 CHMPs recently completed by AHMS. Current activity area outlined orange.
Artefact density and landform.

A slight correlation may exist between landform type and artefact count. A Kruskal-Wallis Test\(^74\) comparing artefact counts of trenches in the categories crest, slope and floodplain suggests a possible (though not statistically significant) correlation between landform and artefact density\(^75\). Certainly the highest mean count of artefacts comes from trenches located on the crests of low rises or hills.

**Table 9 - Comparing artefact counts in trenches located on Crest/Slope/Flat**

<table>
<thead>
<tr>
<th>Trench Location</th>
<th>Number trenches</th>
<th>Mean number of artefacts</th>
<th>Standard Deviation</th>
<th>Minimum number of artefacts</th>
<th>Maximum number of artefacts</th>
<th>Median number of artefacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crest</td>
<td>15</td>
<td>2.93</td>
<td>9.74</td>
<td>0</td>
<td>38</td>
<td>0</td>
</tr>
<tr>
<td>Upper slope</td>
<td>8</td>
<td>0.13</td>
<td>0.35</td>
<td>0</td>
<td>55</td>
<td>0</td>
</tr>
<tr>
<td>Slope</td>
<td>15</td>
<td>1.8</td>
<td>6.70</td>
<td>0</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td>Flat</td>
<td>42</td>
<td>1.57</td>
<td>8.54</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>1.73</strong></td>
<td><strong>7.95</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 10 - Comparing artefact counts in trenches located on Elevated / Low Lying landforms**

<table>
<thead>
<tr>
<th>Trench Location</th>
<th>Number trenches</th>
<th>Mean number of artefacts</th>
<th>Standard Deviation</th>
<th>Minimum number of artefacts</th>
<th>Maximum number of artefacts</th>
<th>Median number of artefacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated</td>
<td>23</td>
<td>1.96</td>
<td>7.89</td>
<td>0</td>
<td>55</td>
<td>0</td>
</tr>
<tr>
<td>Low-lying</td>
<td>57</td>
<td>1.63</td>
<td>8.04</td>
<td>0</td>
<td>38</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>1.73</strong></td>
<td><strong>7.95</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A Mann-Whitney test\(^76\) was also undertaken between elevated (crest + upper slope) and low-lying landforms (flat + slope), which returned a more significant result\(^77\). The mean artefact densities of the elevated and low-lying units are very similar, suggesting that in most cases, elevation or landform played only minor roles in site selection.

Artefact density and distance to water

When artefact densities were compared on the basis of the distance of excavation trenches to water, a non-significant result was returned. A Kruskal-Wallis Test comparing artefact densities of trenches in the categories 0-100m, 101-200m, 201-300m and 301m+ from a water source returned an ambiguous

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\(^{74}\) The Kruskal-Wallis test is a non-parametric test that compares the median of three or more data sets that are not normally distributed.  
\(^{75}\) The test returned a P value of 0.2015, indicating that there is a 80% probability that the differences in artefact density between landforms are not due to chance (KW: 4.624).  
\(^{76}\) The Mann-Whitney test is a non-parametric test that compares two data sets that are not normally distributed.  
\(^{77}\) This test returned a two tailed P value of 0.1021, indicating that there is a 90% probability that the differences in artefact density between elevated and low-lying landforms are not due to chance (U: 559.5). A P value of <0.05 is usually considered statistically significant.
result. This may be due to the occurrence of multiple low-order streams throughout the landscape under investigation. The maximum distance of any part of the activity areas from a low or high-order stream is 800m. During periods where fresh-water was available from each of these sources, this distance may not have been significant.

Table 11 - Comparing artefact densities of trenches in differing ‘distance to water’ categories

<table>
<thead>
<tr>
<th>Trench distance to water</th>
<th>Number trenches</th>
<th>Mean number of artefacts</th>
<th>Standard Deviation</th>
<th>Minimum number of artefacts</th>
<th>Maximum number of artefacts</th>
<th>Median number of artefacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-100m</td>
<td>37</td>
<td>2.49</td>
<td>9.92</td>
<td>0</td>
<td>55</td>
<td>0</td>
</tr>
<tr>
<td>101-200m</td>
<td>22</td>
<td>1.87</td>
<td>8.10</td>
<td>0</td>
<td>38</td>
<td>0</td>
</tr>
<tr>
<td>201-300m</td>
<td>10</td>
<td>0.3</td>
<td>0.48</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>301-400m</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>&gt;400m</td>
<td>7</td>
<td>0.33</td>
<td>0.52</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>1.7</td>
<td>7.95</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A Kruskal-Wallis test comparing artefact densities to the distance from the closest high order stream (Clyde Creek) also returned a result that is not statistically significant.

Artefact density and soil profile

Soils described during the complex assessment have been ascribed a soil profile according to colour, sediment composition and inclusion. The Sargeants soil classification scheme was used and four different soil profiles were identified: Bittern, Cranbourne, Narre and Toomuc (described in the Desktop Assessment).

A fifth category has been included in the analysis, “Disturbed” which removes trenches from the sample with clear evidence of soil truncation, reworking or stripping. This is usually associated with market gardening, the importation of fill and/or infrastructure installation.

Statistical analysis would suggest that no correlation exists between soil type and artefact count. A Kruskal-Wallis Test comparing artefact counts from different soil profiles produced a result which was not significant.

Table 12 - Comparing artefact counts in trenches located on varying soil profiles

<table>
<thead>
<tr>
<th>Trench location</th>
<th>Number trenches</th>
<th>Mean number of artefacts</th>
<th>Standard Deviation</th>
<th>Minimum number of artefacts</th>
<th>Maximum number of artefacts</th>
<th>Median number of artefacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bittern</td>
<td>17</td>
<td>2.41</td>
<td>9.18</td>
<td>0</td>
<td>38</td>
<td>0</td>
</tr>
</tbody>
</table>

78 The test returned a P value of 0.6234 suggesting that there is a 62% chance that the differences are due to chance (KW: 1.761).
79 The Kruskal Wallis test returned a P value of 0.9405, suggesting a 94% probability that the relationship between artefact density and proximity to Clyde Creek is due to chance.
80 The test returned a P value of 0.6464 which is not considered to be significant (KW: 2.490).
Artefact density and soil disturbance.

The above results seem to suggest that artefact discard rates across the landscape do not conform to typical site patterning models.

However, disturbance across the landscape, particularly in the form of market gardening, is likely to have reduced the potential for discovering intact artefact deposits. Active market gardening was described during the complex assessment as having affected 19 (24%) excavated trenches, with a further 11 (13%) trenches being located within paddocks that were observed to have been subject to past market gardening practices (i.e. ridge and furrows still evident in the landscape). A Mann-Whitney test comparing artefact densities from these disturbed contexts with trenches located in areas disturbed by less obtrusive farming practices (shallow ploughing and stock grazing) returned a highly significant result\(^8\).

Artefacts recovered from disturbed market gardening contexts will henceforth be discounted from the analysis.

**Table 13 - Comparing artefact counts from trenches located within disturbed contexts**

<table>
<thead>
<tr>
<th>Trench location</th>
<th>Number trenches</th>
<th>Mean number of artefacts</th>
<th>Standard Deviation</th>
<th>Minimum number of artefacts</th>
<th>Maximum number of artefacts</th>
<th>Median number of artefacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Garden/ Ridge and Furrow</td>
<td>30</td>
<td>0.03</td>
<td>0.1826</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Shallow ploughing/ Stock grazing</td>
<td>50</td>
<td>2.74</td>
<td>9.95</td>
<td>0</td>
<td>55</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>1.73</td>
<td>7.95</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^8\) A two-tailed P value of 0.0226 was obtained from the Mann-Whitney test, a highly significant result (U: 607.00)
Figure 24 - Box whisker plot displaying artefact density by disturbance type

Horizontal variation in artefact raw materials

A comparison of artefact raw materials present in trenches located less than 300m from Clyde Creek, with those present in trenches located over 300m from Clyde Creek shows a contrast in the quantities of silcrete and non-silcrete artefacts present in the two areas\(^{82}\) (Figure 25). A Fisher’s Exact test comparing the number of quartz/quartzite and silcrete artefacts in the two areas suggests that there is a statistically significant association between material quantities and ‘distance to water’ category\(^{83}\). A Chi-squared test applied to raw material densities and landform was found to be not quite statistically significant\(^{84}\).

---

82 Excluding artefact recovered from fill layer (Schreurs property Trench 14)
83 The Fisher’s Exact test returned a two-sided P value of 0.0023 which is considered to be very significant.
84 A Chi-squared test between silcrete and non-silcrete artefacts between different landforms returned a P value of 0.0673, only slightly higher than the recommended significance level of 0.05.
### Figure 25 - Proportions of raw material types found in trenches located under and over 300m from a water source

<table>
<thead>
<tr>
<th></th>
<th>Quartz</th>
<th>Quartzite</th>
<th>Silcrete</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 300m</td>
<td>4</td>
<td>1</td>
<td>130</td>
<td>135</td>
</tr>
<tr>
<td>Over 300m</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>1</td>
<td>130</td>
<td>137</td>
</tr>
</tbody>
</table>

**Legend**
- Blue: Quartz
- Red: Quartzite
- Green: Silcrete
Horizontal variation in artefact types

A slight difference in proportions of artefact type categories is apparent when the two distance to water categories are compared. For example, complete flakes were the only artefact type retrieved from trenches located greater than 300m from Clyde Creek and the ‘under 300m from Clyde Creek’ category contained a wider variety of types including a core and several retouched items.
Figure 27 - Comparing proportions of artefact types found in trenches located within 300m of Clyde Creek with those found in other trenches

Figure 28 - Comparing proportions of artefact types found in trenches located within 300m of a water course with those found in other trenches
Lateral displacement by ploughing\textsuperscript{85} may account for the distribution of artefact densities across all landform types, and the non-significant result when densities were analysed statistically. Ploughing may also be attributed to the high breakage rates\textsuperscript{86} although some backing located on the broken faces of blade segments suggests that blades were being deliberately snapped.

**Vertical Distribution**

Figure 29 provides an indication of the vertical distribution of artefacts in the four highest artefact density trenches (195 Tuckers Rd T12, T13, T14 and T17). In each case artefacts are clearly concentrated in spit 3 (20-30cm below the current ground surface), although lower densities of artefacts were found in other spits.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{vertical_distribution}
\caption{Vertical artefact distribution, 195 Tuckers Rd T12, T13, T14 and T17}
\end{figure}

There are two possible explanations for this uneven vertical distribution of artefacts – that the distribution is the result of cultural and chronological factors (i.e. that the vertical distribution of artefacts is the result of artefacts being deposited at different times with the deepest artefacts being the oldest), or that the present distribution of artefacts is the result of post-depositional processes (i.e. vertical artefact movement resulting from natural soil processes, like bioturbation, or from post-contact land use/ploughing).

Studies have suggested that bioturbation and other post-depositional processes often result in artefact size-sorting, but the artefact size-classes influenced by these processes will vary according to the main agent of disturbance. The upward displacement of smaller objects and the downward displacement of larger ones appears to be the common result of disturbance caused by burrowing fauna, but the type of fauna, and most importantly the size of its burrows will decide the difference between ‘smaller’ and ‘larger’ artefacts\textsuperscript{87}.

\textsuperscript{85} Roper 1976
\textsuperscript{86} Hiscock 1985; Dunnell & Simek 1995
\textsuperscript{87} e.g. Armour-Chou and Andrews 1994; Bocek 1986; Erlandson 1984; Balek 2002: 46
A further consideration is the impact of ploughing on both artefact size and artefact displacement. Repeated ploughing can lead to the reduction in size of artefacts as they become broken\textsuperscript{88}, and also in the lifting of larger artefacts to the surface\textsuperscript{89}.

The artefacts from 195 Tuckers Rd do not show any apparent size sorting relative to depth, with the widest range of artefact sizes occurring in Spit 3, the unit from which the majority of artefacts have been recovered. However, as Figure 30 shows, there is a very low range represented in artefact size, with 97% of all artefacts measuring less than 30mm in maximum dimension. The location of these similarly-sized artefacts predominantly within the ploughzone suggests that the assemblage has suffered considerable artefact breakage due to ploughing, and that artefacts have been spread both vertically and horizontally in this area. There is therefore insufficient resolution to imply that the deeper artefacts are any older than those in the higher spits.

![Figure 30 - Graph showing the cumulative frequency of the maximum dimensions of artefacts found in 195 Tuckers Rd spits](image)

8.2.3 Landscape Patterning Conclusions

The combined analyses of the results from complex testing in five CHMP activity areas, all located within the Clyde North area, raises several interesting points relevant to future work and management.

A significant part of archaeological assessment relies on the use of desktop research and predictive modeling to locate archaeologically sensitive areas. According to the majority of site distribution models, elevated landforms, (especially those within 200m of waterways) such as crests and sandy rises would have provided ideal locations for past Aboriginal occupation. However, the pattern of artefact recovery from the complex testing demonstrates that neither the ‘crest’ landform nor the ‘Cranbourne sands’ soil profile were yielding significantly higher artefact densities than any other landform. In fact the reverse was true, that excavation of Cranbourne sands and crests were just as likely to yield an artefact count of zero.

A similar pattern (or lack thereof) was indicated for distance to water, with there being no significant correlation identified between artefact density and proximity to either low or high order streams.

\textsuperscript{88} Odell & Cowan 1987
\textsuperscript{89} Dunnell & Simek 1995
There appear to be two pertinent factors relating to local site distribution:

a) Market gardening in the past and present has significantly altered the landscape so that not only can pre-existing landforms no longer be accurately identified, but that cut, fill and soil reworking associated with the creation of garden beds and affiliated irrigation pipelines has removed the archaeological traces of past Aboriginal occupation.

A highly significant correlation between artefact density and degree of disturbance was identified for the properties under investigation. Market gardens tend to be located on sandy soil profiles such as ‘Cranbourne Sand’, and involve the substantial modification of existing watercourses for drainage. This result highlights the very high level of impact caused by market gardening on areas of cultural heritage sensitivity.

b) In those areas not disturbed by market gardening, an analysis of artefact attributes indicated the local landscape may not have been occupied intensively for long duration stays. The discovery of only four trenches with high artefact densities amongst 50 trenches within the ‘minimal disturbance’ category, suggest potential marginal exploitation of the area within the mid-late Holocene.

A high proportion of artefacts had small amounts of retouch, mainly backing, and there were no finished tools. The artefacts were primarily manufactured from high quality microcrystalline silcrete. Variability in raw materials present, and tool type discard is usually regarded as indicating long term occupation. The high density of artefacts from the 195 Tuckers Rd site seem to indicate ephemeral site use, with the main site function being the maintenance and creation of replacement backed blades as for a multicomponent hafted technology.

In this scenario, the recovery of low density or isolated artefact occurrences from sporadic locations may reflect the ‘visiting cards’ of people moving through a landscape for hunting and foraging, but not settling there. However, these theories require further testing and more research before they can replace traditional models in this region, especially because of the constraints imposed by the market garden disturbance mentioned above, which has undoubtedly distorted patterns in the local archaeological record.

Therefore in conclusion:

- Market gardening has clearly had a significant impact on archaeological deposits across the local landscape. Where market gardening has occurred there is a significantly lower density and frequency of archaeological deposits;

- Artefact densities are generally low and sporadic across the landscape with unclear landform or environmental patterning. The relationship between artefact density and elevated landforms as well as the differences in raw materials related to distance from water are suggested as future lines of research; and

- Lastly, it is proposed that past use of this landscape was probably transitory and sporadic, reflecting a marginal zone where foraging and associated tool maintenance occurred but where longer stay use/occupation was not common.
9 SIGNIFICANCE ASSESSMENT

Aboriginal sites are assessed in terms of three significance criteria: Archaeological (scientific), Cultural (Aboriginal) and Public Significance. These criteria recognise that Aboriginal sites are valuable in a number of ways, namely:

- To the Aboriginal community as an aspect of their cultural heritage and as part of continuing traditions;
- To the broader community, for educational, historical and cultural enrichment values; and
- To the scientific community for potential research value.

This chapter includes an evaluation of significance to gauge the relative scientific and cultural (social) importance of Aboriginal sites and cultural deposits within the activity area in order to inform appropriate management of those values before, during and after proposed development.

9.1 Principles & Evaluation Criteria

“Heritage significance” and “cultural significance” are terms used to describe an item’s value or importance to our society. The Australian ICOMOS Burra Charter (1988) defines cultural significance as:

“Aesthetic, historic, scientific or social value for past, present or future generations”

This value may be contained in the fabric of the item, its setting and relationship to other items, the response that the item stimulates in those who value it now, or the meaning of that item to contemporary society.

The cultural significance of Aboriginal archaeological sites can only be assessed in consultation with the relevant Aboriginal community or communities.

The archaeological significance of a site is generally seen as being directly linked to its scientific or research value. In general this refers to the ability of the contents of a location to enable investigation of research questions, present and future. As future research questions and capabilities cannot always be predicted, archaeological significance is most often assessed in terms of the condition or integrity of deposits present at the location, and their representativeness and/or rarity.\(^{90}\)

In Australia the concept of archaeological significance is commonly defined as a set of questions, originally proposed by Bickford and Sullivan in 1984\(^{91}\) that are used as a means of assessing the significance of an archaeological site. These questions ask whether a site:

- Can provide information not available from other sources;
- Can provide information not available from other sites; and
- Can answer pertinent research questions.

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\(^{91}\) ibid., 2004:250. See also Bickford, A & Sullivan, S. Assessing the Research significance of Historic Sites, in, S. Sullivan & S. Bowdler (eds), Site Surveys and Significance Assessment in Australian Archaeology, Department of Prehistory, Australian National University, 1984:23-24
9.2 Evaluation of Aboriginal Cultural Significance

This area of assessment concerns the relationship and importance of sites to the Aboriginal community. Aspects of cultural significance include both people’s traditional and contemporary links with a given site or landscape as well as an overall concern by Aboriginal people for sites and their continued protection.

Unmodified natural features in the landscape can signify sacred sites/places of significance. As such they are archaeologically invisible and can only be identified with the aid of Aboriginal interpretation. If such sites are known they may hold particular cultural significance to contemporary Aboriginal communities. Furthermore, sites of significance are not restricted to the period prior to contact with Europeans. Often events related to the contact-period may be so important to local Aboriginal communities that they have become significant. If these events relate to a specific place in the landscape, then that place may become sacred or highly significant to the local Aboriginal communities.

The cultural (Aboriginal) significance is a matter for the local Aboriginal community. No comments by the Aboriginal community concerning the Aboriginal cultural significance of VAHR 7921-1130 were documented in the relevant CHMP report or on the site card held by VAHR.

9.3 Evaluation of Public Significance.

This category concerns a site’s potential to educate people about the past. It also relates to the heritage value of particular sites as being representative examples of past lifestyles, why they are important, and why they should be preserved.

An assessment of public significance in part considers the ability of an archaeological deposit found during excavation to demonstrate aspects of past Aboriginal life, therefore a whole range of issues need to be considered including rarity (i.e. are there other resources that can demonstrate these aspects of Aboriginal life?), aesthetics, potential for conservation and potential for interpretation. VAHR 7921-1130 has a very low level of public significance as the Aboriginal place can only provide very limited information concerning Aboriginal use and occupation of the landscape. It is located in a highly disturbed part of the activity area, which significantly detracts from any public values the place may have had.

9.4 Evaluation of Scientific Significance

The objective of undertaking scientific significance assessment for a site is to determine its research potential in terms of contribution to knowledge about the past. Criteria used to evaluate scientific potential include condition/integrity, representativeness and rarity.

Aboriginal Place 7921-1130 is considered to have a very low level of scientific significance. The place comprised a relatively low density artefact scatter of nine artefacts found within a relatively undisturbed context. No suitable material was present for dating or environmental analysis, and no diagnostic traits observed on the artefacts were identified that could be used for relative dating. The place is representative of the many low density artefact scatters found within the local and regional study areas. It has a low level of rarity locally and has a low level of integrity as a result of recent disturbance associated with construction of services infrastructure.
10 IMPACT ASSESSMENT (S.61 MATTERS)

10.1 Development Design

Parkworth Pty Ltd (The Sponsor) proposes residential subdivision and development at 1350 Pound Road Clyde. The final development design is subject to completion; however the residential subdivision development works within the activity area will involve substantial cut and fill modification of the natural topography to establish the subdivision, services, residential dwellings and related infrastructure (i.e. roads and drainage).

10.2 Evaluation

Sub-surface archaeological test excavations undertaken across the activity area confirmed that there is a very low probability that any further Aboriginal cultural heritage will be present within the activity area. Therefore, the activity area is unlikely to contain any further Aboriginal cultural heritage deposits and as such no further assessment is considered warranted.

The assessment confirmed that the location of the previously registered Aboriginal place VAHR 7921-1130 has been heavily disturbed by the installation of recent subsurface utility services (fibre optic cabling & high pressure gas pipeline). The complex assessment carried out by ERM in 2009 included testing of VAHR 7921-1130 that confirmed the extent of the place. It is considered very unlikely that any further Aboriginal cultural heritage associated with & 7921-1038 will be extant within the activity area due to recent sub-surface disturbance and removal of artefacts associated with the place as part of the CHMP completed by ERM.

No additional artefacts were located within the activity area during the complex assessment work carried out as part of the current management plan. The assessment found the activity area has been subject to disturbance caused by the installation of utility services and cattle treadage and scuffage.

The assessment also concluded that the activity area is unlikely to contain Aboriginal cultural heritage because of its distance from both local watercourses, thus making it more unfavourable for occupation. Therefore, no further archaeological excavations or mitigation measures are considered to be warranted prior to commencement of development.

However, there always remains the possibility that undetected artefacts may exist in any given area. For this reason contingency plans for dealing with the event of Aboriginal archaeological material or deposits being unearthed during development are provided in the management recommendations section below.
Part 2: Cultural heritage management recommendations

These recommendations become compliance requirements once the CHMP is approved
11 CULTURAL HERITAGE MANAGEMENT RECOMMENDATIONS

11.1 Basis for recommendations

The recommendations of this CHMP are made in accordance with:

- Section 61 of the *Aboriginal Heritage Act 2006*;
- The *Aboriginal Heritage Regulations 2007*;
- The results of desktop, standard and complex assessment documented in this report;
- The impact of proposed development within the activity area; and
- The views of the Aboriginal community represented by the Boon Wurrung, Bunurong, and Wurundjeri.

11.2 Definitions

In the Recommendations and Contingencies included in the following two chapters, the following words have the meanings described below:

- RAP means the Registered Aboriginal Party.
- ‘Aboriginal Stakeholders’ means the RAP, or if no RAP has been appointed, the Wurundjeri Tribe Land Compensation & Cultural Heritage Council, the Boonwurrung Foundation and the Bunurong Land Council Aboriginal Corporation.
- ‘Aboriginal Affairs Victoria’ or ‘AAV’ means Aboriginal Affairs Victoria, Department of Planning and Community Development, or such other government department which has responsibility for the *Aboriginal Heritage Act 2006* from time to time.
- Activity means the activity to which this CHMP relates.
- Cultural Heritage Advisor (or ‘CHA’) has the same meaning as “Cultural Heritage Advisor” in the *Aboriginal Heritage Act 2006*.
- Development Proponent means a person or corporation who has responsibility for implementing the activity.

11.3 Recommendations

These recommendations become compliance requirements once the Cultural Heritage Management Plan is approved.

The following recommendations are made in accordance with Section 61 of the Aboriginal Heritage Act for management of Aboriginal heritage:
**Recommendation 1 – Impact Avoidance and Minimisation.**

No impact avoidance or minimisation measures are required for VAHR 7921-1130. VAHR 7921-1130 is assessed as having very low archaeological significance with little research potential. Furthermore, as a result of recent disturbance caused by the installation of utility services it is considered unlikely that further Aboriginal cultural heritage associated with VAHR 7921-1130 or 7921-1038 will be extant within the activity area.

No further Aboriginal cultural heritage was located during the investigations undertaken for this CHMP. Therefore, specific impact avoidance and minimization measures are not required.

**12 CONTINGENCIES**

The *Aboriginal Heritage Act 2006* requires Cultural Heritage Management Plans (CHMP) to include Contingency Plans for the following:

- Disputes, delays and other obstacles that may affect the conduct of the activity (*Aboriginal Heritage Act 2006*: Section 61(d));

- Custody and management procedures for Aboriginal cultural heritage which will be affected by an activity, for the duration of the activity (*Aboriginal Heritage Act 2006*: Section 61(e));

- The *Aboriginal Heritage Act 2006* also requires Cultural Heritage Management Plans to include Contingency Plans for the following:
  - The matters referred to in Section 61 of the Act (*Aboriginal Heritage Act 2006* 13(1)(a));
  - The resolution of any disputes between the Sponsor and relevant Registered Aboriginal Party(s) (RAP) in relation to the implementation of the plan or the conduct of the activity (*Aboriginal Heritage Act 2006* 13(1)(b));
  - Reviewing compliance with the CHMP and mechanisms for remedying non-compliance (*Aboriginal Heritage Act 2006* 13(1)(c));
  - The management of Aboriginal cultural heritage found during the activity (*Aboriginal Heritage Act 2006* 13(1)(d)); and;
  - The notification, in accordance with the Act, of the discovery of Aboriginal cultural heritage during the carrying out of the activity (*Aboriginal Heritage Act 2006* 13(1)(e)).

**12.1 Matters referred to in Section 61 of the Act.**

Contingency plans refer to the management of unknown Aboriginal cultural heritage found before, during or after the activity described in this CHMP. Paragraph 13 (1) (a) at Schedule 2 of the *Aboriginal Heritage Regulations 2007* requires a CHMP to contain contingency plans about the matters referred to at s.61 (a) - (e) of the *Aboriginal Heritage Act 2006*. Each of these matters (s.61 (a) - (e)) are incorporated and set out below in the contingencies provided for the discovery and management of Aboriginal cultural heritage.
12.2 Contingency planning for discovery and management of Aboriginal cultural heritage.

This CHMP has determined that the activity area has a very low potential to contain further unknown Aboriginal cultural heritage. In the event of Aboriginal cultural heritage being discovered the following contingencies provide a list of measures that must be followed:

12.2.1 Discovery

   a) A person who discovers previously unknown Aboriginal cultural heritage will immediately notify the person in charge of the Activity and the Sponsor;

   b) The person in charge of the Activity must then immediately cease work in the location of the discovery and within a buffer zone of 5 meters from the suspected Aboriginal cultural heritage (work outside of this zone may continue);

   c) Within a period of two working days the person in charge of the Activity and the Sponsor must contact and engage an appropriately qualified Cultural Heritage Advisor to record the Aboriginal cultural heritage. The Sponsor must also invite the Aboriginal Stakeholders to investigate the discovery in conjunction with the Cultural Heritage Advisor;

   d) The Cultural Heritage Advisor (in consultation with the Aboriginal Stakeholders and the Sponsor) must determine whether the discovered Aboriginal Cultural Heritage falls into category i. or ii. below:

      i. isolated or dispersed scatters of less than 10 stone artefacts over a 10 square meter area – Section 12.2.2 applies; or

      ii. other Aboriginal Cultural Heritage – Section 12.2.3 applies.

12.2.2 Isolated or dispersed scatters of less than 10 stone artefacts over 10 square meters

If the cultural heritage adviser determines that the discovered Aboriginal Cultural Heritage consists of isolated or dispersed scatters of less than ten stone artefacts over a 10 square meter area, the following applies:

   a) The Sponsor must consider if the activity can be conducted in a way that avoids or minimises harm to the Aboriginal cultural heritage. If the activity cannot be conducted in a way that avoids harm to Aboriginal cultural heritage no further specific measures for the management of Aboriginal cultural heritage are required other than the completion of all necessary documentation (see 12.2.2 (b) below);

   b) The Cultural Heritage Advisor must update and/or complete site records, provide management advice and liaise with AAV if deemed necessary. The Aboriginal site must be recorded and documented in accordance with all relevant AAV standards and guidelines and any artefacts must be managed in accordance with the curation procedures described in Contingency 12.4.

12.2.3 Other Aboriginal cultural heritage

If before, during or after the activity any unexpected Aboriginal cultural heritage is discovered that does not constitute isolated or dispersed scatters of 10 stone artefacts or less the following contingencies provide a list of measures that must be followed:
a) The Sponsor must first consider if the activity can be conducted in a way that avoids or minimises harm to the Aboriginal cultural heritage. If harm can be avoided no further action is required except for completion of all necessary documentation (see 12.2.3 d below).

b) If the Cultural Heritage Advisor, in consultation with the Aboriginal Stakeholders, assesses the Aboriginal cultural heritage as having low or very low scientific significance then, after recording procedures are completed, works may continue within the activity area without any further specific action except for completion of all necessary documentation (see 12.2.3 d below).

c) If the Cultural Heritage Advisor, in consultation with the Aboriginal stakeholders, assesses the Aboriginal cultural heritage as having moderate or high scientific significance and if harm cannot be avoided or minimised then salvage excavation of the Aboriginal cultural heritage should be considered. Any salvage excavation must be carried out in accordance with proper archaeological practice (r.61 - Aboriginal Heritage Regulations 2007) and undertaken by an appropriately qualified archaeologist. Salvage excavation must also comply with the criteria outlined below in section 12.2.4. If salvage excavation is undertaken, a report on the results of the salvage excavation must also be prepared and lodged with AAV. After the Aboriginal cultural heritage has been recorded, works may proceed.

d) The Cultural Heritage Advisor must update and/or complete site records, provide management advice and liaise with AAV if deemed necessary. The Aboriginal site must be recorded and documented in accordance with all relevant AAV standards and guidelines and any artefacts must be managed in accordance with the curation procedures described in Contingency 12.4.

12.2.4 Salvage Methodology

If salvage excavation is deemed necessary in accordance with contingency 12.2.3 outlined above, the following salvage methodology must be followed:

a) A programme of controlled manual excavation will be conducted within the vicinity of the discovery at a location determined by the Cultural Heritage Advisor in consultation with the Aboriginal Stakeholders and the Sponsor. The excavation should be no larger than 9 square meters in area.

b) Prior to commencement of the salvage excavation, a suitably qualified archaeologist or archaeological consultancy must be engaged to prepare a research design and methodology and then undertake the excavation, post excavation analysis and reporting. Representatives of the Aboriginal stakeholders must be invited to participate in the field work and be given an opportunity to review and comment on the excavation report.

c) The salvage will employ controlled manual excavation in 1m² spatial units and 100mm vertical units (spits). A-horizon topsoil units will be excavated and sieved through a 5mm screen. Any artefacts shall be collected off the screen, will be stored in plastic clip lock bags with the unit provenance details clearly marked on the bag.

d) Flexibility will be allowed to vary the shape of the open-area in order to follow the extent of high-density deposits or discrete cultural features, such as hearths or knapping floors, however the initial set-out should be 3m by 3m.
The artefacts recovered from the controlled manual salvage shall be analysed and catalogued by a stone artefact specialist and a post-excavation analysis report shall be prepared that specifically addresses the local and regional research questions. The analysis and report should be completed within 12 months of the completion of the salvage excavation. The analysis will aim to determine the following:

i. Suspected origin of the stone (whether from quarries where the rock is in place, or dispersed along riverbeds);
ii. Quantity of stone, by counts and weight;
iii. Identification of the artefacts;
iv. Interpretation of finished implements among the artefacts, including function of the implements and what they indicate about how the makers lived;
v. Patterns in spatial and chronological distributions of the artefacts;
vi. Age of the artefacts; and
vii. Archaeological research potential and significance of the site.

The aims of the stone artefact analysis will be achieved through analysis of raw material type, core-flake ratio, utilisation, secondary flaking characteristics, reduction sequence, cortex percentage and formal tool/technological identification by a qualified archaeologist(s) who is/are specialized in analysis of Aboriginal stone artefacts.

If use wear evidence is found, use wear analysis of a sample of the recovered assemblage will be undertaken using a x10 stereo microscope with an oblique light. This analysis would examine features on artefacts that may provide evidence of taphonomy or use wear. Such features may include edge wear, edge damage, abrasive striations and silica polish.

If faunal remains are found during the excavations, a faunal (or archaeo-zoology) specialist will be engaged to identify and analyse any shell, fish bone and animal bone recovered during excavation. The analysis will aim to determine:

Suitably qualified specialists will be engaged to undertake analysis of environmental samples, residues and C14 dating if suitable evidence is recovered and considered likely to inform any of the research questions.

The post-excavation analysis should specifically review the evidence found during the salvage excavation and test excavations and consider any evidence of change through time and how it may relate to the geomorphic and environmental history of the subject land.

The results of the salvage excavations will be documented in a detailed excavation report following completion of post-excavation analysis. Reporting will be consistent with best practices and in accordance with all relevant AAV guidelines. The report will specifically address the relevant research questions established in the research design. The excavation and analysis report must be submitted to Aboriginal Affairs Victoria.

The cultural heritage advisor engaged by the Sponsor or the development proponent shall prepare a Place Inspection form documenting the work and lodge the form with Aboriginal Affairs Victoria.
12.3 Discovery of human skeletal remains

If at any time during the activity suspected human skeletal remains are discovered within the activity area, works must cease and the Victoria Police (03 9247 6666) and the State Coroner’s office (1300 309 519) be notified immediately. If there are reasonable grounds to believe that the remains are Aboriginal, the Department of Sustainability and Environment’s Emergency Coordination Centre must be contacted immediately on 1300 888 544. Below is a 5 step contingency plan developed by the Department of Planning and Community Development (DPCD) that must be followed in the event of any such discovery.

Discovery

- If suspected human skeletal remains are discovered at any time during the activity, works in that area must stop to ensure minimal damage is caused to the remains. It is an offence to interfere with a potential crime scene under the Coroners Act 2008 and Crimes Act 1958, unless under the direction of the Coroner and;

- The remains must be left in place and protected from harm or damage.

Notification

- Upon site personnel discovering suspected human skeletal remains, the Coroner’s Office (1300 309 519) and the Victoria Police (03 9247 6666) must be notified immediately;

- If there is reasonable grounds to believe that the remains could be Aboriginal, the Department of Sustainability and Environment’s Emergency Co-ordination Centre must also be contacted on (1300 888 544);

- All details of the location and nature of the human remains must be provided to the relevant authorities; and

- If it is confirmed by these authorities that the discovered remains are Aboriginal skeletal remains, the person responsible for the activity must report the existence of the skeletal remains to the Secretary (DPCD) in accordance with Section 17 of the Aboriginal Heritage Act 2006.
Impact Mitigation or Salvage

- The Secretary (DPCD), after taking reasonable steps to consult with any Aboriginal person or body with an interest in the Aboriginal human remains, will determine the appropriate course of action as required by Section 18(2)(b) of the Aboriginal Heritage Act 2006;

- An appropriate impact mitigation or salvage strategy as determined by the Secretary (DPCD) must be implemented by the sponsor (this will depend on the circumstances in which the remains were found, the number of burials found, the type of burials and the outcome of consultation with any Aboriginal body or person);

- *Note: In consultation with the Aboriginal community(s), the Sponsor may consider incorporating a contingency plan to reserve an appropriate area for reburial of any recovered human skeletal remains that may be discovered during the activity. This may assist the Secretary in determining an appropriate course of action.

12.4 Custody and Management of Aboriginal Cultural Heritage during the course of the activity

The custody of Aboriginal cultural heritage during the course of the Activity will comply with the requirements established by the Aboriginal Heritage Act 2006. Aboriginal cultural heritage will be assigned according to the following order of priority as appropriate and advised by AAV:

- Any relevant RAP that is registered for the land from which the Aboriginal heritage is retrieved;
- Any relevant Native Title Holder over the land from which the Aboriginal heritage is retrieved;
- Any relevant Native Title Party (as defined by the Aboriginal Heritage Act 2006) for the land from which the Aboriginal heritage is retrieved;
- Any relevant Aboriginal person or persons with traditional or familial links with the land from which the Aboriginal heritage is retrieved, as advised by AAV;
- Any relevant Aboriginal body or organisation which has historical or contemporary interests in Aboriginal heritage relating to the land from which the Aboriginal heritage is retrieved, as advised by AAV;
- The owner of the land from which the Aboriginal heritage is retrieved; and
- The Museum of Victoria.

Resolution of disputes

Where the Secretary (DPCD) is evaluating the CHMP, this requirement has no application.
12.5 Compliance and mechanisms for non-compliance

Review of this CHMP must be undertaken by the Sponsor or Sponsor’s delegate to ensure compliance with the Recommendations and Contingencies detailed above. This shall ensure the Activity is undertaken in accordance with this CHMP. For convenience, a concise checklist of CHMP requirements is included in the table below. The checklist should be progressively signed off by the Sponsor or Sponsor’s delegate.

<table>
<thead>
<tr>
<th>COMPLIANCE CHECKLIST TABLE</th>
<th>COMPLETED YES / NO?</th>
<th>SIGNATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEFORE COMMENCEMENT OF ACTIVITY</td>
<td>Has the proponent and/or relevant contractors been made aware of the contingency requirements of the management plan and provided with a copy of the approved CHMP?</td>
<td></td>
</tr>
<tr>
<td>AFTER COMMENCEMENT OF ACTIVITY – On identification of unknown Aboriginal cultural heritage (isolated and dispersed stone artefacts, less than 10 artefacts over 10 m² area) were the following steps undertaken?</td>
<td>Person in charge of the activity and sponsor notified</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Works ceased within 5m buffer zone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Within two working days, a CHA engaged to investigate and assess the discovery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Within two working days, Aboriginal stakeholders notified and invited to investigate discovery in conjunction with CHA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHA completed and updated VAHR place recording forms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artefacts managed in accordance with Contingency 12.4</td>
<td></td>
</tr>
<tr>
<td>On identification of unknown Aboriginal cultural heritage (Other Aboriginal cultural heritage, greater than 10 artefacts in a 10m² area) were the following steps undertaken?</td>
<td>Person in charge and sponsor notified</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Works ceased within 50m buffer zone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Within two working days, a CHA engaged to investigate and assess discovery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Within two working days, Aboriginal stakeholders notified and invited to investigate discovery in conjunction with CHA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHA completed and updated place cards. CHA, in conjunction with Aboriginal stakeholders assess significance of Aboriginal cultural heritage and consider whether harm</td>
<td></td>
</tr>
</tbody>
</table>
**Avoidance/Minimisation is Feasible**

If CHA assesses the cultural heritage as having moderate or high significance, salvage excavation considered and implemented in accordance with Contingency 12.2.4

Artefacts managed in accordance with curation procedures described in Contingency 12.4

**On identification of unknown Aboriginal cultural heritage (human skeletal remains) were the following steps undertaken?**

Person in charge and sponsor notified

Works ceased within 50m buffer zone

State Coroner’s office, Victoria Police notified and Department of Sustainability and Environment’s Emergency Coordination Centre notified

Contingency 12.3 followed

**Please Note:**

Causing harm to Aboriginal cultural heritage is an offence under the *Aboriginal Heritage Act 2006.*

The Minister for Aboriginal Affairs or an inspector under the *Aboriginal Heritage Act 2006* may issue a stop order if there is reasonable grounds for believing that the carrying out of an activity is harming or likely to harm Aboriginal cultural heritage.

The Minister, on the advice of the Secretary, the Aboriginal Heritage Council or an inspector may also order a cultural heritage audit if the Minister reasonably believes that –

- The sponsor of an approved cultural heritage management plan has contravened, or is likely to contravene, the recommendations in the plan; or

- The impact on Aboriginal cultural heritage of an activity to which an approved cultural heritage management plan applies will be greater than that determined at the time the plan was approved or the permit was granted;

- If the Minister orders a cultural heritage audit, a stop order must also be issued to the sponsor requiring the sponsor to stop the activity immediately.

A cultural heritage audit must be conducted by or under the supervision of an inspector appointed under the *Aboriginal Heritage Act 2006.* The Secretary may, however, direct the sponsor of a cultural heritage management plan to which an audit relates to engage a cultural heritage advisor to conduct the audit. If the Secretary directs the Sponsor to engage a cultural heritage advisor to conduct an audit the sponsor must comply with the direction (penalties do apply).
An inspector who conducts or supervises the conduct of a cultural heritage must provide a written report of the findings of the cultural heritage audit to the Minister. The report may identify any apparent contravention of the approved cultural heritage management plan and recommend amendments to the approved cultural heritage management plan.

The Minister may then approve the report of the cultural heritage audit if they are satisfied with all matters. If the audit applied to an approved cultural heritage management plan and the audit report recommended changes to the recommendations of the plan; the Minister may amend the plan in accordance with the recommendations and the plan as amended becomes the approved cultural heritage management plan in accordance with the *Aboriginal Heritage Act 2006*. 
REFERENCES


Bocek, B. 1986 ‘Rodent ecology and burrowing behaviour: predicted effects on archaeological site formation’ American Antiquity 51(3): 589-603


Hiscock, P. 1985. The need for a taphonomic perspective in stone artefact analysis. Queensland Archaeological Research, 2, 82-97


Kennedy, S, Burrow, A & Foley, L 2012 Clyde Creek (PSP53) and Thompsons Road (PSP54) Cultural Heritage Management Plan (AAV#12083) Report for The Growth Areas Authority.


Thomas Journal 1840 ZML MSS 214 Item 22 (28) fol 533.


Appendix 1 Notice of Intent
Notice of Intent to prepare a Cultural Heritage Management Plan for the purposes of the Aboriginal Heritage Act 2006

This form can be used by the Sponsor of a Cultural Heritage Management Plan to complete the notification provisions pursuant to s.54 of the Aboriginal Heritage Act 2006 (the “Act”).

For clarification on any of the following please contact Victorian Aboriginal Heritage Register (VAHR) enquiries on 1800-726-003.

SECTION 1 - Sponsor information

<table>
<thead>
<tr>
<th>Sponsor:</th>
<th>Parkworth Pty Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABN/ACN:</td>
<td>29 007 061 896</td>
</tr>
<tr>
<td>Contact Name:</td>
<td>John Eisner</td>
</tr>
<tr>
<td>Postal Address:</td>
<td>PO Box 2071, Camberwell West, Vic, 3124</td>
</tr>
<tr>
<td>Business Number:</td>
<td>(03) 9822 2220 Mobile: 0408 358 929</td>
</tr>
<tr>
<td>Email Address:</td>
<td><a href="mailto:wifriel@bevwill.com.au">wifriel@bevwill.com.au</a></td>
</tr>
</tbody>
</table>

Sponsor’s agent (if relevant)

<table>
<thead>
<tr>
<th>Company:</th>
<th>Beveridge Williams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Name:</td>
<td>Fiona Wifriel</td>
</tr>
<tr>
<td>Postal Address</td>
<td></td>
</tr>
<tr>
<td>Business Number:</td>
<td>(03) 9524 8888 Mobile:</td>
</tr>
<tr>
<td>Email Address:</td>
<td><a href="mailto:wifriel@bevwill.com.au">wifriel@bevwill.com.au</a></td>
</tr>
</tbody>
</table>

SECTION 2 - Description of proposed activity and location

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>1350 Pound Road, Clyde North</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal district</td>
<td>Casey City Council</td>
</tr>
</tbody>
</table>

Clearly identify the proposed activity for which the cultural heritage management plan is to be prepared (ie. Mining, road construction, housing subdivision)

Subdivision

SECTION 3 - Cultural Heritage Advisor

<table>
<thead>
<tr>
<th>Name</th>
<th>Stacey Kennedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>AHMS (Archaeological &amp; Heritage Management Solutions Pty Ltd)</td>
</tr>
<tr>
<td>Email address</td>
<td><a href="mailto:Skennedy@ahms.com.au">Skennedy@ahms.com.au</a></td>
</tr>
</tbody>
</table>

SECTION 4 - Expected start and finish date for the cultural heritage management plan

| Start Date:       | 31-Jul-2013 | Finish Date: | 31-Jul-2014 |

Submitted on: 31 Jul 2013
SECTION 5 - Why are you preparing this cultural heritage management plan?

☑ A cultural heritage management Plan is required by the Aboriginal Heritage Regulations 2007.  
What is the high impact Activity as it is listed in the regulations?
Subdivision
Is any part of the activity an area of cultural heritage sensitivity, as listed in the regulations? Yes
☐ Other Reasons (Voluntary)
☐ An Environmental Effects Statement is required
☐ A Cultural Heritage Management Plan is required by the Minister for Aboriginal Affairs.

SECTION 6 - List the relevant registered Aboriginal parties (if any)

This section is to be completed where there are registered Aboriginal parties in relation to the management plan.

SECTION 7 - Notification checklist

Ensure that any relevant registered Aboriginal party’s is also notified. A copy of this notice with a map attached may be used for this purpose.
(A registered Aboriginal party is allowed up to 14 days to provide a written response to a notification specifying whether or not it intends to evaluate the management plan.)

In addition to notifying the Deputy Director and any relevant registered Aboriginal party’s, a Sponsor must also notify any owner and/or occupier of any land within the area to which the management plan relates. A copy of this notice with a map attached may be used for this purpose.

Submitted on: 31 Jul 2013
Appendix 2 Planning Scheme 37.07 (Urban Growth Zone).
37.07  URBAN GROWTH ZONE

Shown on the planning scheme map as UGZ with a number.

Purpose

To implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.

To manage the transition of non-urban land into urban land in accordance with a precinct structure plan.

To provide for a range of uses and the development of land in accordance with a precinct structure plan.

To contain urban use and development to areas identified for urban development in a precinct structure plan.

To provide for the continued non-urban use of the land until urban development in accordance with a precinct structure plan occurs.

To ensure that, before a precinct structure plan is applied, the use and development of land does not prejudice the future urban use and development of the land.

Application of provisions

Part A – No precinct structure plan applies

The provisions of clauses 37.07-1 to 37.07-8 apply if no precinct structure plan applies to the land.

Part B – Precinct structure plan applies

The provisions of clauses 37.07-9 to 37.07-16 apply if a precinct structure plan applies to the land.

Precinct structure plan provisions

A precinct structure plan applies to land when the precinct structure plan is incorporated in this scheme.

PART A - PROVISIONS FOR LAND WHERE NO PRECINCT STRUCTURE PLAN APPLIES

Table of uses

Section 1 – Permit not required

<table>
<thead>
<tr>
<th>Use</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture (other than Animal keeping, Apiculture, Intensive animal husbandry, Rice growing and Timber production)</td>
<td>No more than 6 persons may be accommodated away from their normal place of residence. At least 1 car parking space must be provided for each 2 persons able to be accommodated away from their normal place of residence.</td>
</tr>
<tr>
<td>Bed and breakfast</td>
<td></td>
</tr>
<tr>
<td>Dependent person’s unit</td>
<td>Must be the only dependent person’s unit on the lot.</td>
</tr>
<tr>
<td></td>
<td>Must meet the requirements of Clause 37.07-2.</td>
</tr>
</tbody>
</table>
### Use | Condition
---|---
Dwelling (other than Bed and breakfast) | Must be the only dwelling on the lot. The lot must be at least 40 hectares. Must meet the requirements of Clause 37.07-2.
Home occupation |  
Informal outdoor recreation |  
Minor utility installation |  
Railway |  
Tramway |  
Any use listed in Clause 62.01 | Must meet the requirements of Clause 62.01

#### Section 2 – Permit required

<table>
<thead>
<tr>
<th>Use</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal boarding</td>
<td></td>
</tr>
<tr>
<td>Animal keeping (other than Animal boarding)</td>
<td>Must be no more than 5 animals.</td>
</tr>
<tr>
<td>Car park</td>
<td>Must be used in conjunction with another use in Section 1 or 2.</td>
</tr>
<tr>
<td>Cemetery</td>
<td></td>
</tr>
<tr>
<td>Community market</td>
<td></td>
</tr>
<tr>
<td>Crematorium</td>
<td></td>
</tr>
<tr>
<td>Dependent person’s unit – if the Section 1 condition is not met</td>
<td>Must meet the requirements of Clause 37.07-2.</td>
</tr>
<tr>
<td>Display home</td>
<td></td>
</tr>
<tr>
<td>Dwelling (other than Bed and breakfast) – if the Section 1 conditions are not met</td>
<td>Must be no more than two dwellings on the lot. Must meet the requirements of Clause 37.07-2.</td>
</tr>
<tr>
<td>Education centre</td>
<td></td>
</tr>
<tr>
<td>Emergency services facility</td>
<td></td>
</tr>
<tr>
<td>Freeway service centre</td>
<td>Must meet the requirements of Clause 52.30.</td>
</tr>
<tr>
<td>Freezing and cool storage</td>
<td></td>
</tr>
<tr>
<td>Group accommodation</td>
<td>Must be used in conjunction with Agriculture, Outdoor recreation facility, Rural industry, or Winery. Must be no more than 6 dwellings.</td>
</tr>
<tr>
<td>Hospital</td>
<td></td>
</tr>
<tr>
<td>Host farm</td>
<td></td>
</tr>
<tr>
<td>Interpretation centre</td>
<td></td>
</tr>
<tr>
<td>Leisure and recreation (other than Informal outdoor recreation and Motor racing track)</td>
<td></td>
</tr>
<tr>
<td>Manufacturing sales</td>
<td></td>
</tr>
<tr>
<td>Medical centre</td>
<td></td>
</tr>
<tr>
<td>Nursing home</td>
<td></td>
</tr>
<tr>
<td>Place of assembly (other than Carnival, Circus, and Place of worship)</td>
<td>Must not be used for more than 10 days in a calendar year.</td>
</tr>
<tr>
<td>Place of worship</td>
<td></td>
</tr>
<tr>
<td>Primary produce sales</td>
<td></td>
</tr>
<tr>
<td>Real estate agency</td>
<td></td>
</tr>
</tbody>
</table>
Use | Condition
---|---
Residential hotel | Must be used in conjunction with Agriculture, Outdoor recreation facility, Rural industry, or Winery.
Restaurant | 
Rice growing | 
Rural industry | 
Rural store | 
Store (other than Freezing and cool storage and Rural store) | Must be in a building, not a dwelling, and used to store equipment, goods, or motor vehicles used in conjunction with the occupation of a resident of a dwelling on the lot.
Utility installation (other than Minor utility installation and Telecommunications facility) | 
Veterinary centre | 
Winery | 
Any use listed in Clause 62.01 if any requirement is not met

Section 3 - Prohibited

Use
- Accommodation (other than Dependent person's unit, Dwelling, Group accommodation, Host farm, Nursing home, and Residential hotel)
- Industry (other than Rural industry)
- Intensive animal husbandry
- Motor racing track
- Office (other than Medical centre and Real estate agency)
- Retail premises (other than Community market, Manufacturing sales, Primary produce sales and Restaurant)
- Saleyard
- Warehouse (other than Store)
- Wind energy facility
- Any other use not in Section 1 or 2

37.07.2 Use of land for a dwelling

A lot used for a dwelling must meet the following requirements:
- Access to the dwelling must be provided via an all-weather road with dimensions adequate to accommodate emergency vehicles.
- The dwelling must be connected to a reticulated sewerage system or if not available, the waste water must be treated and retained on-site in accordance with the State Environment Protection Policy (Waters of Victoria) under the Environment Protection Act 1970.
- The dwelling must be connected to a reticulated potable water supply or have an alternative potable water supply with adequate storage for domestic use as well as for fire fighting purposes.
- The dwelling must be connected to a reticulated electricity supply or have an alternative energy source.

These requirements also apply to a dependent person's unit.

37.07.3 Subdivision of land

A permit is required to subdivide land.
Each lot must be at least 40 hectares.

A permit may be granted to create smaller lots if any of the following apply:

- The subdivision is to create a lot for an existing dwelling. The subdivision must be a two lot subdivision. An agreement under section 173 of the Act must be entered into with the owner of each lot created which ensures that the land may not be further subdivided so as to create a smaller lot for an existing dwelling. The agreement must be registered on title.
- The subdivision is the re-subdivision of existing lots and the number of lots is not increased. An agreement under section 173 of the Act must be entered into with the owner of each lot created which ensures that the land may not be further subdivided so as to increase the number of lots. The agreement must be registered on title.
- The subdivision is by a public authority or utility service provider to create a lot for a utility installation.

### 37.07-4 Buildings and works

A permit is required to construct or carry out any of the following:

- A building or works associated with a use in Section 2 of Clause 37.07-1. This does not apply to:
  - An alteration or extension to an existing dwelling provided the floor area of the alteration or extension is no more than 50 square metres.
  - An alteration or extension to an existing building used for agriculture provided the floor area of the alteration or extension is no more than 100 square metres. The building must not be used to keep, board, breed or train animals.
  - Earthworks which change the rate of flow or the discharge point of water across a property boundary.
  - Earthworks which increase the discharge of saline water.
- A building which is within any of the following setbacks:
  - 100 metres from a Road Zone Category 1 or land in a Public Acquisition Overlay to be acquired for a road, Category 1.
  - 40 metres from a Road Zone Category 2 or land in a Public Acquisition Overlay to be acquired for a road, Category 2.
  - 20 metres from any other road.
  - 5 metres from any other boundary.
  - 100 metres from a dwelling not in the same ownership.
  - 100 metres from a waterway, wetlands or designated flood plain.

### 37.07-5 Referral of applications

An application of the kind listed below must be referred in accordance with section 55 of the Act to the referral authority specified in Clause 66.03.

- An application to use or develop land for any of the following:
  - Display home
  - Education centre
  - Hospital
  - Medical centre
  - Nursing home
  - Place of worship
  - Real estate agency.
- An application to subdivide land to create a lot smaller than 40 hectares in area.
Environmental audit

Before a nursing home, pre-school centre or primary school commences on potentially contaminated land, or before the construction or carrying out of buildings and works in association with a nursing home, pre-school centre or primary school commences on potentially contaminated land, either:

- A certificate of environmental audit must be issued for the land in accordance with Part I.D. of the Environment Protection Act 1970, or
- An environmental auditor appointed under the Environment Protection Act 1970 must make a statement in accordance with Part I.D. of that Act that the environmental conditions of the land are suitable for the sensitive use.

In this clause, “potentially contaminated land” means land used or known to have been used for industry, mining, or the storage of chemicals, gas, wastes or liquid fuel (if not ancillary to another use of the land).

Decision guidelines

Before deciding on an application to use or subdivide land, construct a building or construct or carry out works, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

- The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- The effect on the future urban development and use of the land, and adjacent or nearby land, having regard to:
  - Any relevant Growth Area Framework Plan.
  - Any precinct structure plan being prepared for the area.
  - Any comments or directions of the referral authority.
- Whether the proposal will prejudice the logical, efficient and orderly future urban development of the land, including the development of roads, public transport and other infrastructure.
- The capability of the land to accommodate the proposed use or development, including the disposal of effluent.
- How the use or development relates to sustainable land management.
- Whether the site is suitable for the use or development.
- The impact of the siting, design, height, bulk, colours and materials to be used on the natural environment, major roads, vistas and water features, future urban use of the land, and the measures to be undertaken to minimise any adverse impacts.
- The impact on the character and appearance of the area or features of architectural, historic or scientific significance or of natural scenic beauty or importance.
- The location and design of existing and proposed infrastructure including roads, public transport, walking and cycling networks, gas, water, drainage, telecommunications and sewage facilities.
- Whether the proposed use and development will require new or upgraded infrastructure, including traffic management measures.

Advertising signs

Advertising sign requirements are at Clause 52.05. The zone is in Category 3.

Despite the provisions of Clause 52.05-9, a permit may be granted, for a period of not more than 5 years, to display an advertising sign that promotes the sale of land or dwellings.

PART B - PROVISIONS FOR LAND WHERE A PRECINCT STRUCTURE PLAN APPLIES
Use of land

Any requirement in the Table of uses and any requirement specified in the schedule to this zone must be met.

A permit granted must be generally in accordance with the precinct structure plan applying to the land.

Table of uses

<table>
<thead>
<tr>
<th>Section 1 – Permit not required</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any use in Section 1 of a zone applied by the schedule to this zone</td>
<td>Must comply with any condition opposite the use in Section 1 of the applied zone</td>
</tr>
<tr>
<td></td>
<td>Must comply with any condition or requirement specified in the schedule to this zone or in the precinct structure plan</td>
</tr>
</tbody>
</table>

| Any use specified in the schedule to this zone as a use for which a permit is not required | Must comply with any condition or requirement specified in the schedule to this zone or in the precinct structure plan |

<table>
<thead>
<tr>
<th>Section 2 – Permit required</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any use in Section 2 of a zone applied by the schedule to this zone</td>
<td>Must comply with any condition opposite the use in Section 2 of the applied zone</td>
</tr>
<tr>
<td></td>
<td>Must comply with any condition or requirement specified in the schedule to this zone or in the precinct structure plan</td>
</tr>
</tbody>
</table>

| Any use specified in the schedule to this zone as a use for which a permit is required | Must comply with any condition or requirement specified in the schedule to this zone or in the precinct structure plan |

| Any other use not in Section 1 or 3 | |

<table>
<thead>
<tr>
<th>Section 3 - Prohibited</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any use in Section 3 of a zone applied by the schedule to this zone</td>
<td></td>
</tr>
<tr>
<td>Any use specified in the schedule to this zone</td>
<td></td>
</tr>
</tbody>
</table>

Subdivision of land

A permit is required to subdivide land. Any requirement in the schedule to this zone or the precinct structure plan must be met.

A permit granted must:
• Be generally in accordance with the precinct structure plan applying to the land.
• Include any conditions or requirements specified in the schedule to this zone or the precinct structure plan.

Buildings and works

If the schedule to this zone specifies:
• That the provisions of a zone apply to the development of land, the provisions of the zone apply to land in the circumstances specified in the schedule.
• Provisions relating to the development of land, those provisions apply to land in the circumstances specified in the schedule.
If the schedule to this zone specifies that a permit is required to construct a building or carry out works, a permit granted must:

- Be generally in accordance with the precinct structure plan applying to the land.
- Include any conditions or requirements specified in the schedule to this zone or the precinct structure plan.

**37.07-12 Application requirements**

An application to use or subdivide land, construct a building or carry out works, must be accompanied by any information specified in the schedule to this zone.

**37.07-13 Exemption from notice and review**

An application under clause any provision of this scheme which is generally in accordance with the precinct structure plan applying to the land is exempt from the notice requirements of section 52(1)(a), (b) and (d), the decision requirements of section 64(1), (2) and (3) and the review rights of section 82(1) of the Act, unless the schedule to this zone specifies otherwise.

**37.07-14 Decision guidelines**

Before deciding on an application to use or subdivide land, construct a building or carry out works, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

- The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- Any relevant Growth Area Framework Plan.
- The precinct structure plan applying to the land, including the vision and objectives of the precinct structure plan.
- Any guidelines in the schedule to this zone.

**37.07-15 Inconsistencies between specific and applied zone provisions**

If there is an inconsistency between the specific provisions specified in the schedule to this zone and the provisions of a zone applied by the schedule to this zone, the specific provisions prevail to the extent of any inconsistency.

**37.07-16 Advertising signs**

Advertising sign requirements are at Clause 52.05. This zone is in the category specified in the schedule to this zone or, if no category is specified, Category 3.

**Notes:**

Refer to the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement, for strategies and policies which may affect the use and development of land.

Check whether an overlay also applies to the land.

Other requirements may also apply. These can be found at Particular Provisions.
Appendix 3 Glossary of Technical Terms
Aeolian Wind generated geological processes. In an archaeological context it usually refers to wind blown deposits and sands.

Backed Artefact / Backing A retouched tool (maybe a complete, distal, medial or proximal flake) that displays evidence of backing along one lateral margin. This backing may be initiated from the ventral surfaces or alternately may be an example of bidirectional backing initiated from both surfaces (Holdaway and Stern 2004:259). There are four main types of commonly recognised backed artefacts, which include ‘Bondi Points; geometric microliths (or ‘Backed Blades’), Juan Knives and Eloueras’.

Bipolar A method of removing flakes from a core, by striking a core against an anvil (Holdaway and Stern 2004:11). This is often evidenced by crushing at the platform and/or at the termination of the flake; Bipolar flaking is also evidenced as crushing at the base (end opposite the platform) of a core.

Blade A flake that is twice as long as its width.

Bulbar Refers to a bulb of percussion produced during a conchoidal fracture

Chert ‘a dense, extremely hard, microcrystalline or cryptocrystalline, siliceous sedimentary rock, consisting mainly of interlocking quartz crystals, submicroscopic and sometimes containing opal (amorphous silica). It is typically white, black or grey, and has an even to flat fracture. Chert occurs mainly as nodular or concretionary aggregations in limestone and dolomite, and less frequently as layered deposits (banded chert). It may be an organic deposit (radiolarian chert), an inorganic precipitate (the primary deposit of colloidal silica), or a siliceous replacement of pre-existing rocks’ (Lapidus 1990:102).

Conchoidal Where a force strikes the surface of a core forming a circular or ‘ring’ crack that bends back towards the surface of the core, forming a partial bulb of percussion. The fracture frequently moves towards the exterior surface of the core, detaching a flake (Holdaway and Stern 2004:34).

Core Andrefsky (1998:80-81) states a core can be understood as ‘an objective piece that has had flakes removed from its surface’; Holdaway and Stern (2004:37; 5-8) provide further clarification ‘artefacts that retain the negative flake scars of previous flake removals’.

Cortex The outer layer of patination of rock is known as cortex. It is found on weathered stone (Holdaway & Stern 2004: 26-27). Cortex types (mostly rough, water worn or pebble) can indicate the source that stone material was obtained from.

Debitage Small spalls and flakes produced during percussion, bipolar and pressure flaking.

Fine Grained Basalt Basalt is a volcanic rock. See Volcanic below.

Flake Depending on the completeness of the flake, a flake may have a number of common characteristics which may include: a platform, bulb of percussion, errailure (or bulbar) scar, point of force impact (PFI or umbo), dorsal ridge and ventral surface, fissures (or indentations), ripple marks
(which radiate away from the point of force impact/umbbo) and a termination. Not all of these features are typically found on every flake, however they are attributes likely to be present from conchoidal fracture.

**Negative Flake Scar**

The negative indentation or scar left behind on a flake, core or tool when a flake is removed. The presence and abundance of negative flake scars can reveal information about the process of flaking. For example negative flake scars on a) cores can provide information on how intensely the core has been used, b) on the dorsal surface of a flake can indicate how intensely the core was flaked before this flakes was removed and/or that the core platform was cleaned off to start flaking again (platform rejuvenation), c) along the edge of a flake can indicate retouch/backing (Holdaway and Stern 2004:184).

**Point**

A term applied to certain formal types such as Bondi Points.

**Platform**

A striking platform or a platform is the surface from which a flake is struck from a Core (Holdaway and Stern 2004:5); flakes retain part of the platform on their proximal end.

**Quartz**

‘crystalline silica, SiO2. It crystallizes in the trigonal system, commonly forming hexagonal prisms. For cryptocrystalline varieties of silica see Chalcedony. Colourless and transparent quartz, is found in good crystals, is known as rock crystal. Varieties that are colours due to the presence of impurities may be used as gemstones, amethyst, purple to blue-violet, rose quartz, pink; citrine, orange-brown; smoky quartz, pale yellow to deep brown’ (Lapidus 1990:429).

**Quartzite**

‘a metamorphic rock consisting primarily of quartz grains, formed by the recrystallization of sandstone by thermal or regional metamorphism; a metaquartzite and a sandstone composed of quartz grains cemented by silica; an orthoquartzite’ (Lapidus 1990:430).

**Retouch**

Modification of a flake or core prior to use. Retouch is the ‘removal of a series of small, contiguous flakes’ from the edges of the artefact (Holdaway and Stern 2004:33). There are several different types of retouch which are identified as backing; stepped; scalar; invasive; notched and serrated retouch.

**Reduction**

By definition stone material is made smaller when it is struck to produce stone flakes and tools. This process is known as stone reduction.

‘Modern stone artefact analyses use the reductive nature of stone artefact manufacture as the basis for reconstructing the processes by which artefacts were made. By analysing the size and form of artefacts, archaeologists can obtain information about how stone was acquired from its source, the form in which the stone was transported to campsites, how it was worked, and the way stone artefacts were use until discarded’ (Holdaway and Stern 2004:3).

**Scarred Tree**

A tree that has been marked as a result of bark being removed by Aboriginal people for cultural reasons or for use in making shields, containers, canoes etc. Some trees may also have marks caused by
making toe holds for climbing up trees.

**Scraper**

‘A minimal definition of a scraper is that it is a flake with one or more margins of continuous retouch’. It also indicates the stage of reduction the flake has reached (see Holdaway and Stern 2004:227).

**Silcrete**

‘a hard surface deposit composed of sand and gravel cemented by opal, chert and quartz, formed by chemical weathering and water evaporation in semi-arid climate. Extensive deposits of silcrete are found in S. Africa and Australia. Silcrete is a siliceous duricrust’ (Lapidus 1990:472).

**Termination**

There are a number of different flake terminations (or ends of a flake) which are possible through flaking stone material. The main types of flake terminations include step, hinge, feather and plunging. Flake terminations can provide information about how the flake was removed.

**Tool**

A tool is an artefact which shows evidence of modification (i.e. by retouch) or without modification (i.e. show signs of usewear) (Holdaway and Stern 2004:33; 39).

**Tuff**

‘pyroclastic rock composed mainly of volcanic ash (fragments <2mm in diameter). Tuffs may be classified as crystal tuff if they contain a large proportion of crystal fragments, vitric tuff composed mainly of glass and pumice fragments and lithic tuff, containing mainly rock fragments. A consolidated mixture of lapilli and ash is a lapilli tuff’ (Lapidus 1990:519-520).

**Usewear**

‘Evidence of distinctive patterns of wear [which is] sometimes found on the edges of artefacts that were believed to have been used for specific purposes’ (Holdaway and Stern 2004:41). Several types of usewear can be observed. Holdaway and Stern (2004:41; 167) identify ‘chattering’ and ‘edge damage’ as one form of usewear.

**Volcanic**

‘All extrusive rocks and associated high-level intrusive ones. The group is entirely magmatic and dominantly basic. Igneous lithic material generally dark in colour and may be glassy (like obsidian) or very fine-grained or glassy igneous rock produced by volcanic action at or near the Earth’s surface, either extruded as lava (e.g. basalt) or expelled explosively’ (Lapidus 1990:535).
<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T1</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355460.86  
N 5781974.08  
ASL: 49. |
| Landform | Slope |
| Profile Description | Unit 1: A1 Horizon. 0-21cm. Grey-brown silt loam: moist, medium grain, soft/friable, weakly cemented. pH6.5  
Unit 2: A2 Horizon. 22-43cm. Gravelly silty clay, moist, medium-coarse grained, soft/friable, weakly cemented. pH6.5  
Unit 3: B Horizon. 15cm+. Orange clay: moist, medium grained, hard/firm, strongly cemented. |
| Stratigraphic Profile |

![Stratigraphic Profile](10 cm increments, horizontal scale 10 cm increments)
<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T2</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355474.87  
          N 5782105.45  
          ASL: 46m |
| Landform | Slope |
| Profile Description | Unit 1: A1 Horizon, 0-14cm. Dark brown clayey loam, moist, fine grained, soft/friable, weakly cemented, pH6.5  
          Unit 2: A2 Horizon, 15-22cm. Silty clay, moist, fine grained, hard/firm, weakly cemented.  
          Unit 3: B Horizon, 22cm+. Mottled grey orange brown clay, moist, fine grained, hard/firm, strongly cemented. |

Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments)
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<thead>
<tr>
<th>Trench Name</th>
<th>T3</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355487.13  
N 5782225.65  
ASL: 43m |
| Landform | Slope |
| Profile Description | Unit 1: A1 Horizon. 0-19cm. Brown-grey silty loam, moist, fine grained, soft/friable, weakly cemented. Disturbance to profile caused by cattle treadage. pH6.5  
Unit 3: B Horizon. 34-35cm+. Clay: moist, medium grained, soft/friable, strongly cemented. pH6.5 |
| Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments) | ![Section Photo](image.png) |

<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T4</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355502.36  
N 5782350.43  
ASL: 36m |
| Landform | Slope |
| Profile Description | Unit 1: A1 Horizon. 0-10cm. Dark brown clayey loam: moist, fine grained, soft/friable, weakly cemented. pH6.5  
Unit 2: A2 Horizon. 11-25cm. Brown silty clay: moist, fine grained, hard/firm, weakly cemented. pH6.5  
Unit 3: B Horizon. 26cm+. Mottled grey orange brown clay: moist, fine grained, hard/firm, strongly cemented. pH6.5 |
<p>| Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments) | <img src="image.png" alt="Section Photo" /> |</p>
<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trench Location (GDA 94 Zone 55)</td>
<td>E 355514.27 N 5782454.24 ASL: 33m</td>
</tr>
<tr>
<td>Landform</td>
<td>Flat</td>
</tr>
</tbody>
</table>

**Section Photo** (East, vertical scale 10 cm increments, horizontal scale 10 cm increments)

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<thead>
<tr>
<th>Trench Name</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trench Location (GDA 94 Zone 55)</td>
<td>E 355521.01 N 5782541.95 ASL: 31m</td>
</tr>
<tr>
<td>Landform</td>
<td>Flat</td>
</tr>
</tbody>
</table>

**Section Photo** (East, vertical scale 10 cm increments, horizontal scale 10 cm increments)
<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T7</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355587.82  
N 5782132.54  
ASL: 41m |
| Landform | Slope |
| Profile Description | Unit 1: A1 Horizon. 0-8cm. Dark brown clayey loam: wet, very fine, hard/firm, weakly cemented. pH.7.  
| Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments) |

<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T8</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355389.34  
N 5782141.52  
ASL: 45m |
<p>| Landform | Slope |
| Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments) |</p>
<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T9</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355194.20  
N 5782005.14  
ASL: 41m |
| Landform | Slope |
| Profile Description | Unit 1: A1 Horizon. 0-9cm. Dark brown clayey loam: wet, very fine, hard/firm, weakly cemented. pH 7.  
Unit 2: B Horizon. 28cm+. Greyish orange clay: wet, medium grained, hard/firm, strongly cemented. pH 7. |
| Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments) | ![Section Photo](image_url) |
Trench Name | T10
---|---
Trench Location (GDA 94 Zone 55) | E 356048.52  
| N 5781902.27  
| ASL: 38m
Landform | Crest of Low Rise

Profile Description


Unit 2: A2 Horizon. 26-55cm. Natural compact silty profile underlying fill deposit: wet, fine grained, hard/firm, strongly cemented. pH 6.5.

<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T11</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355991.21  
N 5781899.43  
ASL: 40m |
| Landform | Crest of Low Rise |
| Profile Description | Unit 1: Fill deposit. 0-47cm. Fill clay-silt mottled brown-orange clay: contained small bits of rubble, moist, medium grained, hard/firm, strongly cemented.  

<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T12</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355924.77  
N 5781917.50  
ASL: 37m |
| Landform | Crest of Low Rise |
| Profile Description | Unit 1: A1 Horizon. 0-12cm. Dark brown sandy silty loam: moist, fine grained, soft/friable, weakly cemented pH.6.5.  

Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments)
<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T13</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355375.73  
N 5781982.84  
ASL: 48m |
| Landform | Crest of Low Rise |
Unit 2: B Horizon. 20cm+. Orange mottled grey clay: moist, medium grained, hard/firm, strongly cemented. pH 7. |
| Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments) | ![Section Photo] |

<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T14</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355475.00  
N 5781969.00  
ASL: 49m |
| Landform | Slope |
| Profile Description | Unit 1: A1 Horizon. 0-10cm. Dark brown sandy silty loam: moist, fine grained, soft/friable, weakly cemented pH 6.5.  
Unit 2: A2 Horizon. 11-34cm. Orange mottled grey silty-clay: moist, medium grained, hard/firm, strongly cemented, pH 6.5.  
<p>| Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments) | ![Section Photo] |</p>
<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T15</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355288.30  
N 5782249.95  
ASL: 40m |
| Landform | Slope |
| Profile Description | Unit 1: A1 Horizon. 0-21cm. Brown, silty-loam: wet, fine grained, soft, weakly cemented. Disturbance to upper profile from cattle treadage. pH.6.5.  
| Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments) | ![Section Photo](image1) |

<table>
<thead>
<tr>
<th>Trench Name</th>
<th>T16</th>
</tr>
</thead>
</table>
| Trench Location (GDA 94 Zone 55) | E 355349.26  
N 5782509.65  
ASL: 34m |
| Landform | Flat |
| Profile Description | Unit 1: A1 Horizon. 0-10cm. Dark brown clayey loam, moist, very fine grained, soft/friable, weakly cemented. Disturbance to upper profile from cattle treadage. pH.6.5.  
Unit 2: A2 Horizon. 11-19cm. Brown silty clay, moist, very fine grained, hard/firm, weakly cemented. pH.6.5.  
| Section Photo (East, vertical scale 10 cm increments, horizontal scale 10 cm increments) | ![Section Photo](image2) |