CULTURAL HERITAGE MANAGEMENT PLAN 10656

CARDINIA ROAD EMPLOYMENT PRECINCT STRUCTURE PLAN, OFFICER SOUTH

Sponsored by Cardinia Shire Council

Completed 09 November 2012

Prepared by Heritage Advisors
Andrea Murphy & Andrew Morris

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CARDINIA ROAD EMPLOYMENT PRECINCT, OFFICER SOUTH, STRUCTURE PLAN CULTURAL HERITAGE MANAGEMENT PLAN

AAV Management Plan Identifier:	10656
Activity Size:	Large (r.68 *Aboriginal Heritage Regulations 2007*)
Assessment Type:	Desktop, Standard & Complex (r.56 *Aboriginal Heritage Regulations 2007*)
Sponsor:	Cardinia Shire Council ABN 32 210 906 807
Heritage Advisors:	Andrea Murphy & Andrew Morris (Archaeology At Tardis Pty Ltd)
CHMP Authors:	Andrea Murphy & Andrew Morris
Completed:	9th November, 2012

Aboriginal Heritage Act 2006
Section 65

Cultural Heritage Management Plan – Notice of Approval

CHMP NAME:	**Cardinia Road Employment Precinct Structure Plan, Officer South**	
CHMP NUMBER:	10656	
SPONSOR:	Cardinia Shire Council	*ACN/ABN:*
Cultural Heritage Advisor(s):	Andrea Murphy and Andrew Morris	
Author(s):	Andrea Murphy and Andrew Morris	
Cover date:	9 November 2012	*Pages:* xi + 148
Received for approval:	12 November 2012	

TO BE COMPLETED BY THE SECRETARY (OR DELEGATE) **I have considered the Evaluation Report for this CHMP and:**	**Yes**	**No**
I am satisfied that the CHMP has been prepared in accordance with the standards prescribed for the purposes of section 53 (in the Aboriginal Heritage Regulations 2007 and the Approved Form).	✓	
I am satisfied that the CHMP adequately addresses the matters set out in section 61.	✓	
In considering this application, I consulted with and considered the views of Aboriginal persons or bodies I considered relevant to the application.	✓	
I have given proper consideration to any relevant human rights	✓	

I, Jason Taylor, Acting Deputy Director, Aboriginal Affairs Victoria, acting under authority delegated to me by the Secretary, Department of Planning and Community Development, and pursuant to section 65(2) of the *Aboriginal Heritage Act 2006* hereby **approve / refuse to approve** this cultural heritage management plan:

Signed: .....

JASON TAYLOR

Dated: 13 / 12 / 2012

- **This notice of approval should be inserted after the title page and bound with the body of the management plan.**
- **The recommendations in this management plan are now compliance requirements. Officers from the Department of Planning and Community Development may attend the subject land to monitor compliance with the recommendations.**

PART 1 – ASSESSMENT

This mandatory Cultural Heritage Management Plan (CHMP) has been carried out for the Cardinia Road Employment Precinct (CREP), south of the Pakenham Bypass in Pakenham, and has been sponsored by the Cardinia Shire Council (ABN 32 210 906 807). The CREP will be a high impact activity (R46 - subdivision of land), and the activity area includes areas of cultural heritage sensitivity (R. 23 – waterways), thereby triggering a mandatory CHMP.

The activity area is a 590ha (approx.) parcel of land located in Officer South, approximately 55km south-east of Melbourne in the City of Cardinia (Map 1). The land is owned and managed by both private and corporate stakeholders (Appendix 1 – landowners/occupiers and LP numbers), who were notified by mail on 17th December, 2008 of Cardinia Shire Council's intentions to carry out a CHMP (example letter provided in Appendix 1). There are two areas of legislated cultural heritage sensitivity within the activity area; land 200m east of Gum Scrub Creek and land 200m west of Toomuc Creek (Regulation 23). No Aboriginal cultural heritage sites have been previously registered within the activity area. While the implementation of a structure plan is not a high impact activity, and does not in itself involve ground disturbance activities, subsequent long term development will include roads, industrial structures, and utilities. The CHMP will inform the structure plan of the heritage values present within the activity area, and provide suitable management recommendations for such heritage.

Andrea Murphy and Andrew Morris (Archaeology At Tardis Pty Ltd) are the cultural heritage advisors and authors of this plan. Andrea Murphy holds an Honours degree in archaeology and has over twenty years experience in all facets of cultural heritage management. Andrew Morris holds an Honours degree in archaeology and has five years experience in cultural heritage management (see Appendix 8).

At the commencement of the project, the WTLCCHC, the BLCAC, and the BWFL all had RAP applications pending which included the activity area. As the BLCAC and BWFL have traditionally been responsible for the administration of the activity area, these groups were considered to be the major stakeholders, and were given priority consultation. The BWFL and the BLCAC applications were rejected by the Victorian Aboriginal Heritage Council (VAHC) on the 27th August, 2009 and 1st September, 2011 respectively.

The current RAP applicant for the activity area is the WTLCCHC. The VAHC considers all three groups to represent traditional owners (TOGs) in the region, therefore all three groups were consulted throughout the project.

A *Notice of Intent to Prepare a Cultural Heritage Management Plan* (NOI) was submitted to Aboriginal Affairs Victoria (AAV) on 12th July, 2011. AAV notified the sponsor on 15th July, 2011, that they have allocated this CHMP the number 10656 (Appendix 1 – CHMP Documentation & Appendix 9 – Correspondence Log).

This CHMP is a *large project* as defined by the *Aboriginal Heritage Regulations 2007*, and comprises a desktop, standard and complex assessment.

DESKTOP ASSESSMENT (SECTION 5)

- The activity area includes areas of cultural heritage sensitivity as defined in the *Aboriginal Heritage Regulations 2007* (Regulation 23 – land within 200m of a named waterway);
- There are no previously registered Aboriginal heritage places within the activity area;
- There are 113 previously registered Aboriginal heritage places within the geographic region (Table 1);
- Site types which have been previously found throughout the geographic region are: stone artefact scatters (n=95 (84%)), 16 object collections (14%) and 2 earth features (2%);
- Soil profiles within the activity area will likely be shallow (≈50cm) in the plains and floodplains;
- Deeper soil profiles will exist in sandy rises and alluvial terrace landforms;
- The most likely site type within the activity area will be low density stone artefact scatters in a surface context, and will be composed of silcrete, quartz and quartzite;
- The activity area has suffered disturbance via historic clearing of trees, repeated ploughing and cropping, grazing and erosion, therefore the integrity of any archaeological material within the activity area will be poor.

Aboriginal Cultural Heritage Prediction Model for the Activity Area and Implications for this Investigation

The results of the desktop assessment have been used to assess the likelihood of the activity area to contain Aboriginal cultural heritage. The most likely site types to occur within the activity area are stone artefact scatters. Table 3 assesses the potential of the activity area to contain Aboriginal cultural heritage.

Table 3 Site Prediction Model for the Activity Area

Site Type	Reasonably Possible?	Evidence
Stone artefact scatter	Yes	There is potential for low density stone artefact scatters in surface or sub-surface contexts to occur within the activity area. Further standard assessment is warranted.
Scarred Trees	Yes	A 2006 aerial photograph of the activity area (Map 2) shows that the activity area has been cleared of the majority of vegetation. Most mature vegetation within the activity area will likely comprise planted windbreaks or regrowth. There remains however, a low possibility that Aboriginal scarred trees remain within the activity area.

STANDARD ASSESSMENT (SECTION 6)

The desktop assessment (Section 5) has shown that it is reasonably possible that Aboriginal cultural heritage is present in the activity area, and therefore a standard assessment is required.

- The activity area was subject to an opportunistic (judgement) survey of stratified units selected upon levels of good visibility (Burke & Smith 2004: 66-68; Banning 2002: 115-116; Richards 2008: 555).

- No obstacles physical or otherwise constrained the effectiveness of the standard assessment.

- For the majority of the activity area (Survey Unit 1), ground surface visibility was very poor (<1%), and total effective survey coverage was <1% (Map 10).

- Aboriginal cultural heritage was identified within the activity area (VAHR7921-1205). Two silcrete artefacts were located on the banks of a farm dam in the southeast of the activity area.

- No caves, rockshelters, grinding grooves, quarry sites or shell middens were identified during the ground surface survey of the activity area. No mature old growth native vegetation which had the potential to exhibit cultural scarring was located within the activity area.

- The ground surface survey revealed three landforms within the activity area; low lying gently undulating floodplains (Survey Unit 1), low lying gently undulating land within 200m of watercourses and former watercourses (Survey Unit 2), and developed land (Survey Unit 3);

- Areas of archaeological potential include slightly elevated land within the low lying gently undulating floodplains (Survey Unit 1), and low lying gently undulating land within 200m of watercourses and former watercourses (Survey Unit 2) (Map 11).

- The desktop and standard assessments have shown that Aboriginal cultural heritage is likely within the activity area, and that its nature extent and significance cannot be determined without carrying out a complex assessment.

COMPLEX ASSESSMENT (SECTION 7)

- A complex assessment was carried out to test the site prediction model and determine the extent of known Aboriginal cultural heritage within the activity area.

- The complex assessment has comprehensively investigated the area considered likely to contain Aboriginal cultural heritage within the activity area (Map 12 a & b).

- Two new Aboriginal cultural heritage places (stone artefact scatters VAHR7921-1204 & 1205) were located within the activity area (Map 16).

- The results of the complex assessment indicate that apart from known locations, Aboriginal cultural heritage is unlikely to be present within the remainder of the activity area.

- No organic material with cultural association was identified during the sub-surface testing.

RECOMMENDATIONS (Section 11)

RECOMMENDATIONS

The activity will harm places VAHR7921-1204 and 1205 as earthworks will occur in these sections of the activity area (Map 16). Based on lack of research potential or likelihood of additional material, no management measures are required. No harm avoidance, minimisation or management measures are required prior to the activity commencing.

Prior to Activity:

Recommendation 1: Stone Artefact Scatter VAHR7822-1204

Stone artefact scatter VAHR7921-1204 will be impacted by the activity (Map 16). The place has extremely low scientific significance and only general cultural significance. The artefacts have been collected and recorded and a site card for the place submitted to the VAHR. Any scientific data which can be derived from the place has been recorded in the VAHR and in this CHMP.

No specific management requirements for this place apply.

Recommendation 2: Stone Artefact Scatter VAHR7822-1205

Stone artefact scatter VAHR7921-1205 will be impacted by the activity (Map 16). The place has extremely low scientific significance and only general cultural significance. The artefacts have been collected and recorded and a site card for the place submitted to the VAHR. Any scientific data which can be derived from the place has been recorded in the VAHR and in this CHMP.

No specific management requirements for this place apply.

Recommendation 3: Custody and Management of Aboriginal Cultural Heritage

The contingency plan presents the custody and management procedures in the unlikely event Aboriginal cultural heritage is found during the conduct of the activity.

For the Aboriginal cultural heritage located during this assessment, upon approval of this CHMP, the custody arrangements detailed in Contingency 1 will be adopted.

Recommendation 4: Aboriginal Heritage Information

Prior to commencing the activity, workers involved in ground disturbance activities must be provided with Aboriginal heritage information by the sponsor in the form of a booklet or induction. The AAV website (http://www.dpcd.vic.gov.au/indigenous/) contains useful heritage information, including Aboriginal heritage mini-posters which must be distributed as a booklet or during an induction.

During the Activity

Recommendation 5: Contingency Plan

During the activity, unexpected Aboriginal cultural heritage may be discovered. If any Aboriginal cultural material is identified, the appropriate contingency plan(s) must be adopted (Section 12).

Post Activity

There are no post activity recommendations.

CONTENTS **PAGE**

PART 1 – ASSESSMENT

FIGURES (IN TEXT)

PLATES (IN TEXT)

APPENDICES

ACKNOWLEDGEMENTS

Archaeology At Tardis Pty Ltd would like to thank the following people for their assistance:

John Holland	Cardinia Shire Council
Hilary Rutledge	Cardinia Shire Council
Steven Compton	Bunurong Land Council Aboriginal Corporation
Izzy Pepper	Bunurong Land Council Aboriginal Corporation
Darren Symington	Bunurong Land Council Aboriginal Corporation
Chris Hoskins	Bunurong Land Council Aboriginal Corporation
Sean Kelly	Bunurong Land Council Aboriginal Corporation
Tony Daw	Boonwurrung Foundation Ltd
Jamie Thomas	Boonwurrung Foundation Ltd

ABBREVIATIONS

AAV	Heritage Services Branch, Aboriginal Affairs Victoria
ACHRIS	Aboriginal Cultural Heritage Register and Information Services
AHD	Australian Height Datum
asl	Above Sea Level
ASTT	Australian Small Tool Tradition
BLCAC	Bunurong Land Council Aboriginal Corporation
BP	Years Before Present (1950)
BWFL	Boonwurrung Foundation Ltd
CHMP	Cultural Heritage Management Plan
CREP	Cardinia Road Employment Precinct
dGPS	Differential Global Positioning System
DPCD	Department of Planning and Community Development
DSE	Department of Sustainability and Environment
ESC	Effective Survey Coverage
EVC	Ecological Vegetation Classes
Ka	Thousand years ago
LGM	Last Glacial Maximum
Mya	Million years ago
NoI	Notice of Intent to Prepare a Cultural Heritage Management Plan
RAP	Registered Aboriginal Party
TOG	Traditional Owners Group
TP	Test Pit
VAHC	Victorian Aboriginal Heritage Council
VAHR	Victorian Aboriginal Heritage Register
WTLCCHC	Wurundjeri Tribe Land and Compensation Cultural Heritage Council

**Throughout this report several technical terms are used that may not be familiar to some readers. An extensive glossary has been included as Appendix 7 and should be referenced for an explanation of terms.*

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1 INTRODUCTION

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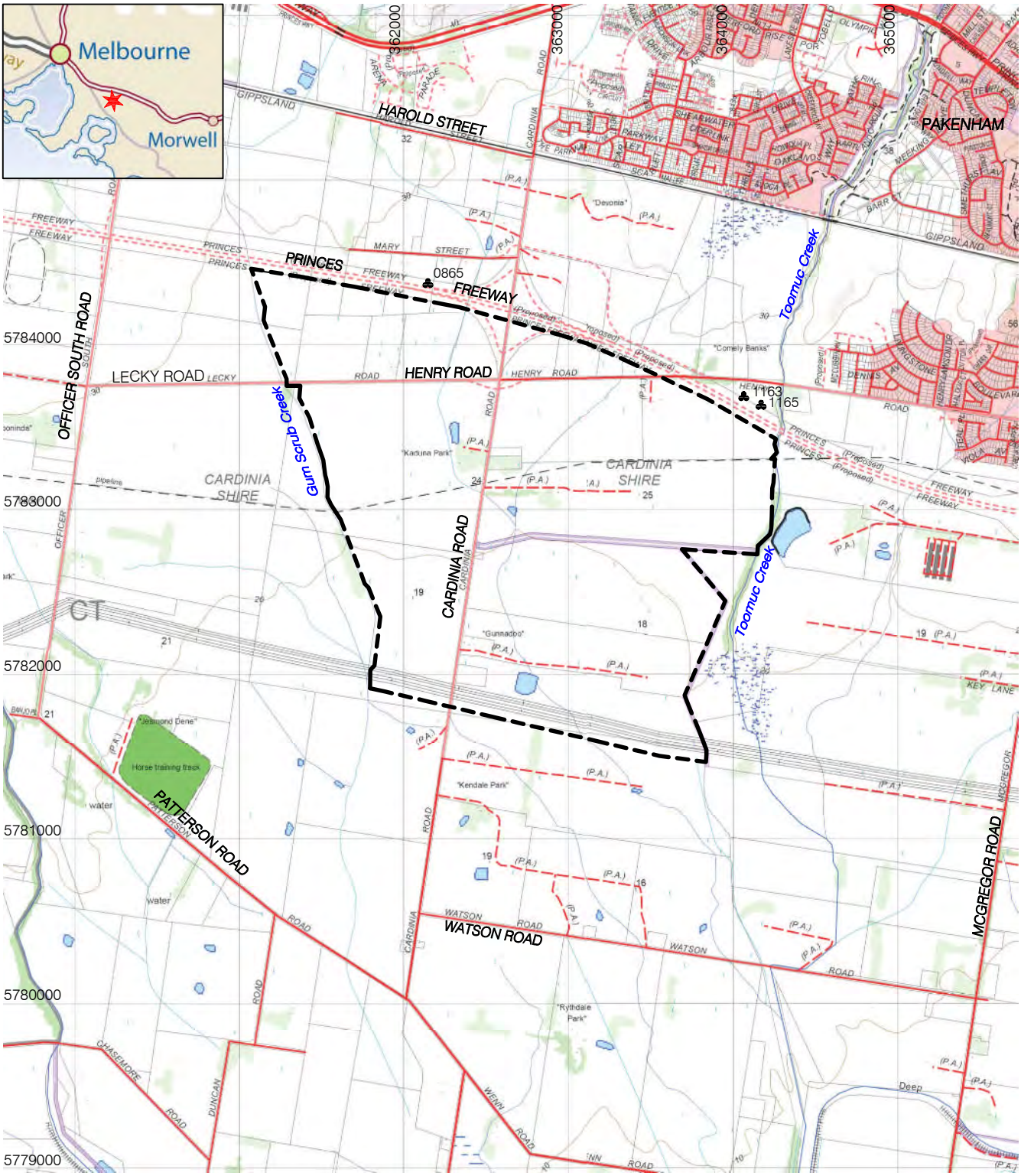


Topographic map used for Location Plan: 1:30,000 Number T7921-1-1-2 & -1-1-3

0 500 1000
Scale of Metres

Legend:

Activity Area Location (Inset)
Activity Area Boundary
590 hectares (approx)

Parish: *Pakenham*
LGA: *Cardinia*

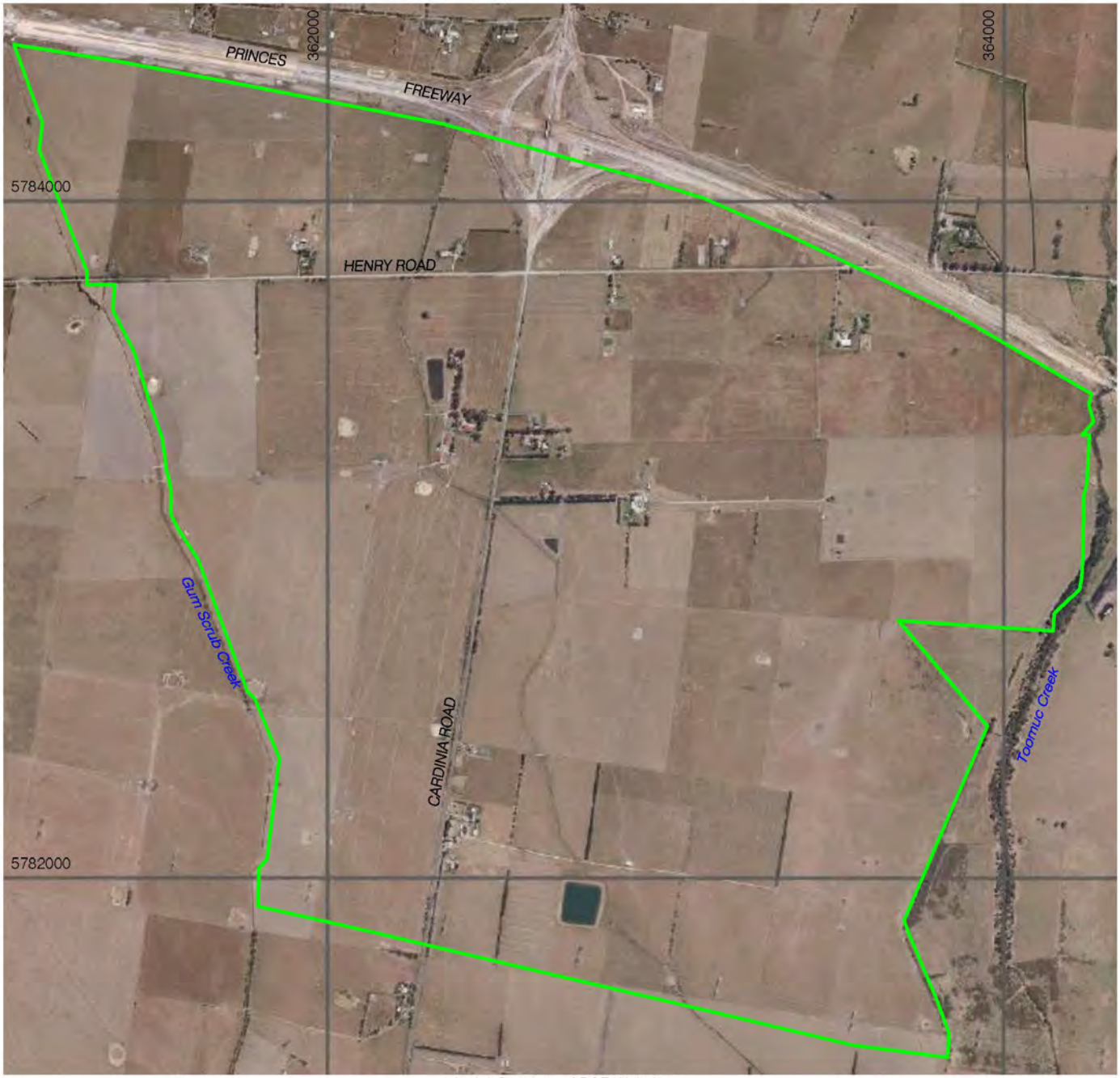
xxxx Artefact Scatter
VAHR Site number 7921-xxxx

N

GDA
Zone 55

Map 1 Activity Area Location

(Melway Ref: 214 C10)



Aerial Courtesy of DSE Website

0 250 500
Scale of Metres

Legend:

Denotes Activity Area
590 hectares (approx)

Parish: *Pakenham*
LGA: *Cardinia*

N

GDA
Zone 55

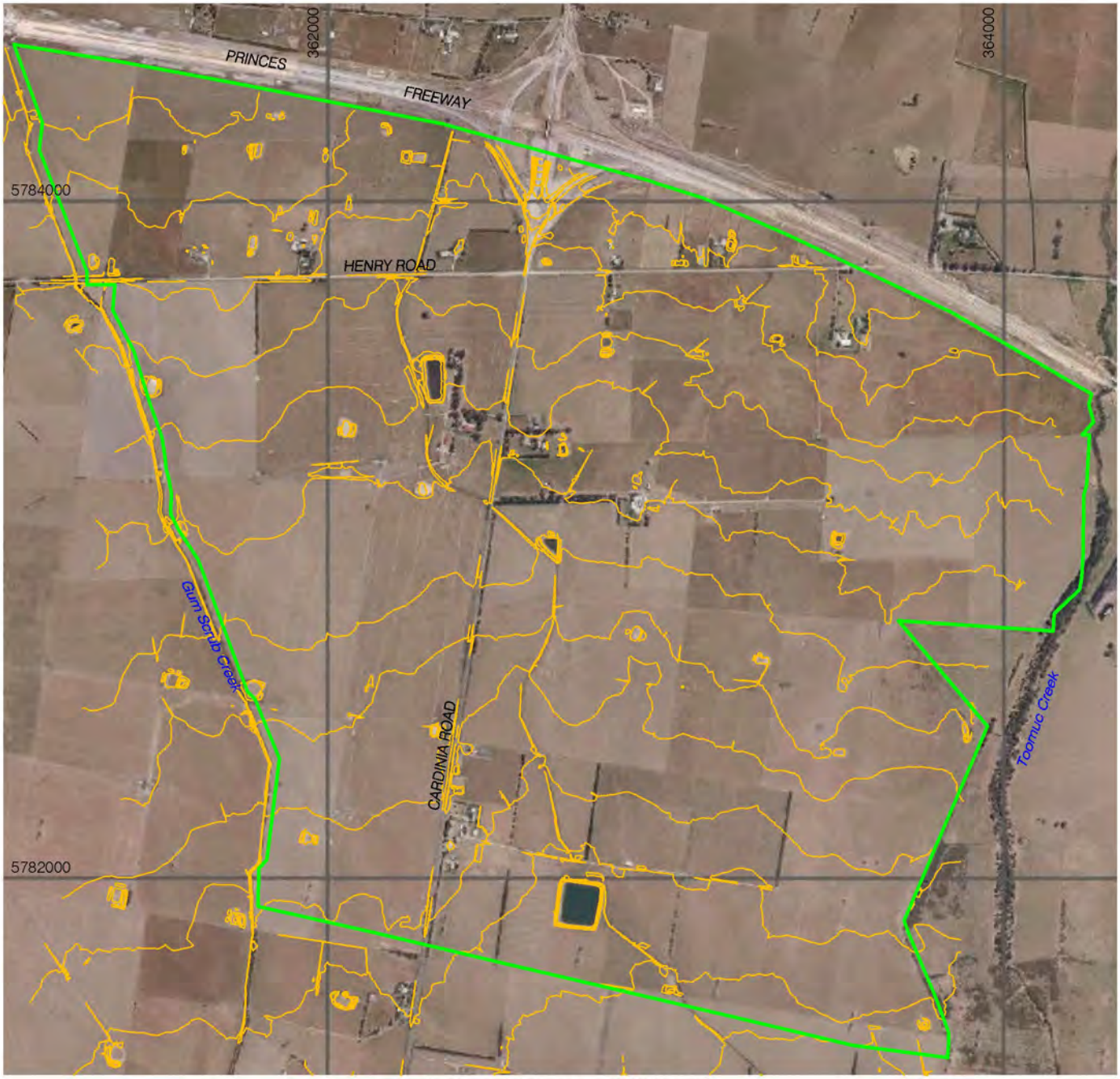
Map 2 2006 Aerial Photograph of Activity Area

(Melway Ref: 214 C10)

Map Courtesy of Client

Map 3 Development Plan

Archaeology At Tardis Pty Ltd, *cultural heritage advisors*



Aerial Photograph Courtesy of DSE Website

0 250 500
Scale of Metres

Legend:

Denotes Activity Area
590 hectares (approx)

Major Contour line

N

GDA
Zone 55

Parish: *Pakenham*
LGA: *Cardinia*

Map 4 Contour Plan

(Melway Ref: 214 C10)

2 ACTIVITY DESCRIPTION

The activity area is currently zoned Urban Growth Zone 2 (Planning Schemes Online website). The Cardinia Road Employment Precinct Structure Plan was incorporated into the Cardinia Planning Scheme in November 2011 applies to and permits urban development in the activity area.

The role of the Cardinia Road Employment Precinct Structure Plan is to:

- Provide a framework, conditions and requirements for the consideration of planning permits that provide for employment and urban development under the provisions of the Cardinia Planning Scheme, including the provisions of the Urban Growth Zone;

- Plan for the creation of an urban structure that implements the principles as stated in Melbourne 2030;

- Ensure the future community within the Cardinia Road Employment Precinct has access to a range of services and facilities to support an integrated land use outcome; and

- Provide developers, investors and local communities with certainty regarding the nature of future development within the Cardinia Road Employment Precinct Structure Plan area.

The Precinct Structure Plan sets out a framework for development of the Precinct, including objectives and planning and design guidelines. The Precinct Structure Plan (refer Map 3) provides for their implementation in relation to:

- Land uses (such as employment, retail and commercial, residential development at varying densities, open space, heritage and community infrastructure),

- Transport (such as primary arterial and local arterial road networks, collector roads and public transport), and

- Open space both unencumbered (passive and active) and encumbered (waterways and biodiversity/environmentally sensitive areas).

Specifically, Schedule 2 to the Urban Growth Zone sets out the use and development rights under the Precinct Structure Plan and requires development must be generally in accordance with the Precinct Structure Plan. As a result any detailed concept plans for subdivision, buildings and works will need to be generally consistent with the spatial framework set out in the Precinct Structure Plan and reflect the planning and design guidelines for the form of development.

It is anticipated that subdivision, buildings and works to implement the Cardinia Road Employment Precinct Structure Plan will result in the construction of:

- Dwellings, ranging from single level houses to multi-storey apartments;
- Commercial buildings of over four storeys, including offices, education facilities, health services and hospitals, hotel/conference venues, etc;
- Activity Centre, predominantly characterised by shops which may be in excess of 3000 square metres of floorspace per tenancy;
- Service Business, comprising showrooms, offices and light industrial premises of approximately 2000 square metres;
- Industrial premises, which may exceed 10,000 square metres of floorspace;
- Community facilities such as community centres;
- Roads, paths, bridges, creek crossings, drains, gas main works, sewer delivery, pumping stations, telecommunications infrastructure and all other services associated with urban development;
- Drainage channels, waterways, waterbodies and other works associated with the implementation of the Melbourne Water Development Services Scheme;
- Waterbodies, dedicated Growling Grass Frog Ponds and other landscape works to provide for an attractive urban environment, enable revegetation with native flora and create habitat for native fauna.

Other than where land is developed for dwellings, the footprint of buildings is likely to occupy up to 50% of the site area of any individual lot. The balance of sites will generally be constructed for carparking or to provide landscape amenity, modifying the landform. The building footprint of dwellings will occupy a more substantial proportion of the site. For example, an apartment building or townhouse may occupy 100% of the site area and provide a basement carpark.

Where basement carparks are constructed, in conjunction with excavation for the footings of buildings it is expected that disturbance may occur to 20 metres below natural surface level.

Following completion of waterway and drainage works (including ponds for Growling Grass Frog) associated with the development, a range of activities will be undertaken to maintain the areas shown as encumbered open space in the Precinct Structure Plan. Council and Melbourne Water will have responsibilities to manage and maintain waterways, waterway structures, vehicle and pedestrian crossings (culverts and bridges), in addition to sections of the waterway reserves.

Access will be required along the length of the waterways with vehicle access necessary to key points (such as sediment traps, culverts etc). Access tracks will be constructed to facilitate mechanical/vehicle access as required. Maintenance activities with potentially high impact generally will occur around built assets. However, there may be the need for some channel stabilisation works if the waterway becomes unstable and it is deemed necessary to intervene. Low impact activities such as revegetation may occur throughout the waterway reserves. Table 1 sets out the range of activities that would normally occur as part of waterway corridor maintenance.

Table 1: Listed areas of Melbourne Water Specific Impact are:

High Impact	Medium Impact	Low Impact	Exempt Activities (Maintenance Operations)
Includes all Listed High Impact Activities within the Regulations (as per table 2) Some Melbourne Water examples are: • Construction of levees & drainage channels • Waterway stabilisation or channel form modification: earth & rock works within bed & banks • Wetlands – earthworks and civil assets • Construction of temporary access tracks (greater than 150m) • Vermin control (rabbit warren – deep ripping of 60+cm) • Mechanical planting and seeding	• Pool and riffle works • Bed or bank earthworks • Fish ways/habitat improvement earthworks • Fencing works (Cyclone Mesh or Security or cable fencing etc) • Cultivation (ripping, harrowing less than 60cm) • Maintenance (if disturbing new areas) of bridges, pipe crossings, stormwater connections, fire breaks (dozer lines), water, sewer and drainage pipelines (less than150m in length), pump stations and retarding basins and/or holding dams • Geotechnical works • Construction of Sediment traps • Drilling • Trenching (less than 100m), Soil levelling (less than 60cm deep) or Pad construction (less than 25m2 for whole activity) • Earthworks within undisturbed areas or areas of sensitivity	• Litter/debris removal • Environmental burns, grass cutting • Mechanical/vehicular access to site on established access tracks/roads • Vermin control (warren fumigation, netting and all other techniques except warren ripping or ground surface impacting works) • Planting via manual methods • Willow/tree removal via excavator leaving root balls in situ • Manual methods of control and removal (i.e. hand pulling, cutting spraying via back pack) • High pressure spraying – hose and rig • Brush cutting, grooming or mechanical slashing (no excavation and use of established tracks or SGD areas) • Burning in situ, cut and burn, poison	• Using existing tracks to access site via light vehicles (LVs or similar) to undertake low impact activities (proof of SGD required as per r.4) • Manual works (not using LVs unless LVs only utilised on existing tracks) (proof of SGD required as per r.4) • Pit runs utilising existing access tracks on "previously constructed" drainage systems (proof of SGD required as per r.4) • Emptying/maintenance on previously constructed GPT/culverts utilising existing access tracks (proof of SGD required as per r.4) • Desilting of previously constructed sediment traps (proof of SGD required as per r.4) • Low impact works on previously constructed waterways/concrete channels/levies (proof of SGD required as per r.4)

techniques ripping of top soil, scalping or other cultivation (60cm+ depth) • Construction and laying of water, sewer and drainage pipelines (greater than150m in length) • Construction of pump stations • Construction of retarding basins and/or holding dams • Construction of bridges/culverts • Construction of pipe crossings • Construction of stormwater connections • Construction of fire breaks - dozer lines (greater than 150m)	• Vermin control by warren ripping or ground surface impacting works • Direct/machine seeding techniques via ripping or ground surface impacting works • Utility or IPCC works (with activity area less than 25m2 and not excavations deeper than 60cm)	application • Use of excavator grab for removal of debris (no excavation and use of established tracks or SGD areas) • Mulching (no excavation and use of established tracks or SGD areas) • Low Impact Fencing works (fencing of existing assets - vermin fencing via pinning, post and rail, farm fencing and wallaby exclusion fencing (proof of SGD required as per r.4 and utilising established tracks) NB: **Grants program – off stream water systems: as MW will not be undertaking the works only providing advice**	• Maintenance/Low impact works on previously constructed wetlands (proof of SGD required as per r.4) • Emergency works (as per r.19), being: (1) The construction or carrying out in an emergency of works reasonably necessary to protect the health or safety of a person, to protect property or to protect the environment is an exempt activity (2) In this regulation, emergency has the same meaning as in the Emergency Management Act 1986. • Grass cutting (with blade off ground surface, use of established tracks and proof of SGD required as per r.4) • Maintenance/operational activities on existing assets includes utilising existing access tracks without excavation and construction works(proof of SGD required as per r.4)

3 EXTENT OF THE ACTIVITY AREA

The activity area is a 590ha (approx.) parcel of land located in Officer South, approximately 55km south-east of Melbourne in the City of Cardinia (Pakenham Parish) (Map 1). The activity area is bound by Gum Scrub Creek in the west, Toomuc Creek in the east, the Pakenham Bypass in the north, and the existing 500KV overhead transmission line electricity easement in the south. The landscape of the activity area is flat to slightly undulating, and falls gently to the south (Map 4). The activity area consists predominantly of grazing land, with several residential dwellings located along Cardinia, Lecky and Enterprise Roads. The activity area is currently zoned Urban Growth Zone 2 (Planning

Schemes Online website). Cadastral descriptions and the names of landowners/occupiers that are included in the activity area are tabulated in Appendix 1.

Salient features of the activity area include:

- Predominantly flat or slightly undulating ground;
- East bank of Gum Scrub Creek on the western activity area boundary;
- West bank of Toomuc Creek on the eastern activity area boundary;
- Occasional dams and drains;
- Occasional rural dwellings and utilitarian structures;
- Post and wire fencing delineating paddock and property boundaries.

4 DOCUMENTATION OF CONSULTATION

4. 1 Consultation in Relation to the Assessment

At the commencement of the project, the WTLCCHC, the BLCAC, and the BWFL all had RAP applications pending which included the activity area. As the BLCAC and BWFL have traditionally been responsible for the administration of the activity area, these groups were considered to be the major stakeholders, and were given priority consultation. The BWFL and the BLCAC applications were rejected by the Victorian Aboriginal Heritage Council (VAHC) on the 27th August, 2009 and 1st September, 2011 respectively.

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Following initial submission of the CHMP (6th April, 2010), Alex Cowled (AAV) informed the sponsor that the CHMP would not be approved and requested a meeting to discuss the assessment.

An on-site meeting was held on 12th May, 2010. Present were David Clark and Alex Cowled (AAV), Hilary Rutledge (Cardinia Shire Council, and Andrea Murphy and Andrew Morris (Archaeology At Tardis Pty Ltd). At this meeting, a brief drive through of available roads within the activity area was carried out, and the sensitivity of the activity area for Aboriginal cultural heritage was discussed. Following the drive through, parties attended a sit down meeting at Council offices and the following was discussed and agreed to:

- Cardinia Shire Council (in consultation with the Growth Areas Authority and Melbourne Water) would provide a more comprehensive list of activities to be included in the CHMP.

- Archaeology At Tardis Pty Ltd would carry out additional investigation in areas where Aboriginal cultural heritage had been discovered. This was to comprise two additional 75m long transects excavated by a 3.5 ton excavator with a 450mm trimming bucket.

- On 17th May, 2012, Andrew Morris (Archaeology at Tardis Pty Ltd) requested confirmation of the above testing methodology, and this was confirmed for by Brad Duncan for David Clarke (AAV) by email on 26th May, 2010.

On 26th May, 2010 Hilary Rutledge (Cardinia Shire Council) contacted David Clark by phone to confirm:

- Location/extent of mechanical trenching;

- Affirmation that this additional testing would satisfy his concerns raised at the previous on-site meeting (12th May, 2010), and that no further testing would be required.

David Clark (AAV) stated that this was acceptable (email from Hilary Rutledge 26th May, 2010), however:

- noted that if any cultural heritage was identified in the mechanical trenches, then controlled excavation should be utilised to determine its extent;

- noted that although not normally in favour of sample sieving, that in this case it was appropriate; and,

- that if any significant deposits or features were found, then additional trenching should occur

4. 2 Participation in the Conduct of the Assessment

Persons listed below participated in the preparation of this plan in the following capacities:

- Andrea Murphy (principal, Archaeology At Tardis Pty Ltd): project management, survey and report editing;

- Andrew Morris (archaeologist, Archaeology At Tardis Pty Ltd): project archaeologist, survey, sub-surface testing supervisor and report writing;

- Stacey Kennedy (archaeologist, Archaeology At Tardis Pty Ltd): stone tool analysis and background research;

- Jaclyn Ward, Chloe Benincasa, Barry Bardoe, Alana Doyle, Barry Green (archaeologists, Archaeology At Tardis Pty Ltd): sub-surface testing;

- Murray Ellis (draftsman, Archaeology At Tardis Pty Ltd): maps;

- Richard Symons (auger operator, Archaeology At Tardis Pty Ltd); sub-surface testing;

- Steven Compton, Darren Symington, Izzy Pepper, Sean Kelly, Chris Hoskins (Aboriginal community representative, Bunurong Land Council Aboriginal Corporation): ground surface survey and sub-surface testing;

- Sam Pender, Jamie Thomas, Tony Daw (Aboriginal community representative, Boon Wurrung Foundation Ltd): ground surface survey and sub-surface testing.

Archaeology At Tardis Pty Ltd key personnel (project managers and supervisors) qualifications and experience are detailed in Appendix 8.

The WTLCCHC, BWFL and BLCAC were requested to supply any relevant information regarding oral tradition, Aboriginal cultural heritage or specific cultural significance, relevant to the activity area (Appendix 9 – Correspondence Log). At the time of report finalisation, no response had been received. The Wurundjeri General Statement of Significance has been provided in section 5.9.

4. 3 Consultation in Relation to the Recommendations

A draft of the management recommendations for this CHMP was provided to the WTLCCHC, BLCAC and BWFL for comment (Appendix 9 – Correspondence Log). At the time of report finalisation only the WTLCCHC had responded.

Darren Griffin (Manager – Cultural Heritage; WTLCCHC) requested (email 27th September, 2012):

- that the WTLCCHC General Statement of Significance be included in the CHMP (Section 5.9);

- that due to WTLCCHC concerns regarding the amount of sub-surface investigation carried out, that a clear rationale behind the methodology be supplied in the CHMP to allow informed comment post submission to AAV;

- an amendment to an erroneous statement contained in the Draft Executive Summary (incorrectly stated that no RAP applicant existed for the activity area).

4. 4 Summary of Outcomes of Consultation

As a result of consultation undertaken as part of this CHMP, the following outcomes were achieved:

- Steven Compton, Darren Symington, Izzy Pepper, Sean Kelly and Chris Hoskins (BLCAC), and Sam Pender, Jamie Thomas, Tony Daw (BWFL) participated in the field assessments for this CHMP;

- The WTLCCHC requested that their general statement of Aboriginal Cultural Significance be included in all CHMPs within their RAP or RAP Application areas (Section 5.9);

- The WTLCCHC raised concerns regarding the amount of sub-surface investigation carried out, requesting a clear rationale behind the methodology be supplied in the;

- The BLCAC and BWFL have not provided any statement of cultural significance specific to the activity area;

- Response to Draft Recommendations not yet received from BLCAC or BWFL.

5 DESKTOP ASSESSMENT

5. 1 Search of the Victorian Aboriginal Heritage Register (VAHR)

The VAHR was accessed on numerous occasions between 29th December, 2008 and 21st September 2012.

There are no previously registered Aboriginal heritage places within the activity area.

There are 3 Aboriginal cultural heritage places within 200m of the activity area (Map 1, Table 2).

Table 2 Previously Registered Aboriginal Heritage Places within 200m of the Activity Area

VAHR #	Site Type
7921-0865	Stone Artefact Scatter
7921-1163	Stone Artefact Scatter
7921-1165	Stone Artefact Scatter

These places comprise sub-surface isolated stone artefact (VAHR7921-0865) and low density stone artefact scatters (VAHR7921-1163 & 1165) composed of silcrete, quartz and quartzite artefacts. Two of these places are located within 250m of potable water (Toomuc Creek), however one lies in excess of 1000m from any permanent water source.

There are a total of 113 previously registered Aboriginal heritage places within the geographic region (Appendix 2). These places are discussed in section 5.3.

5. 2 The Geographic Region

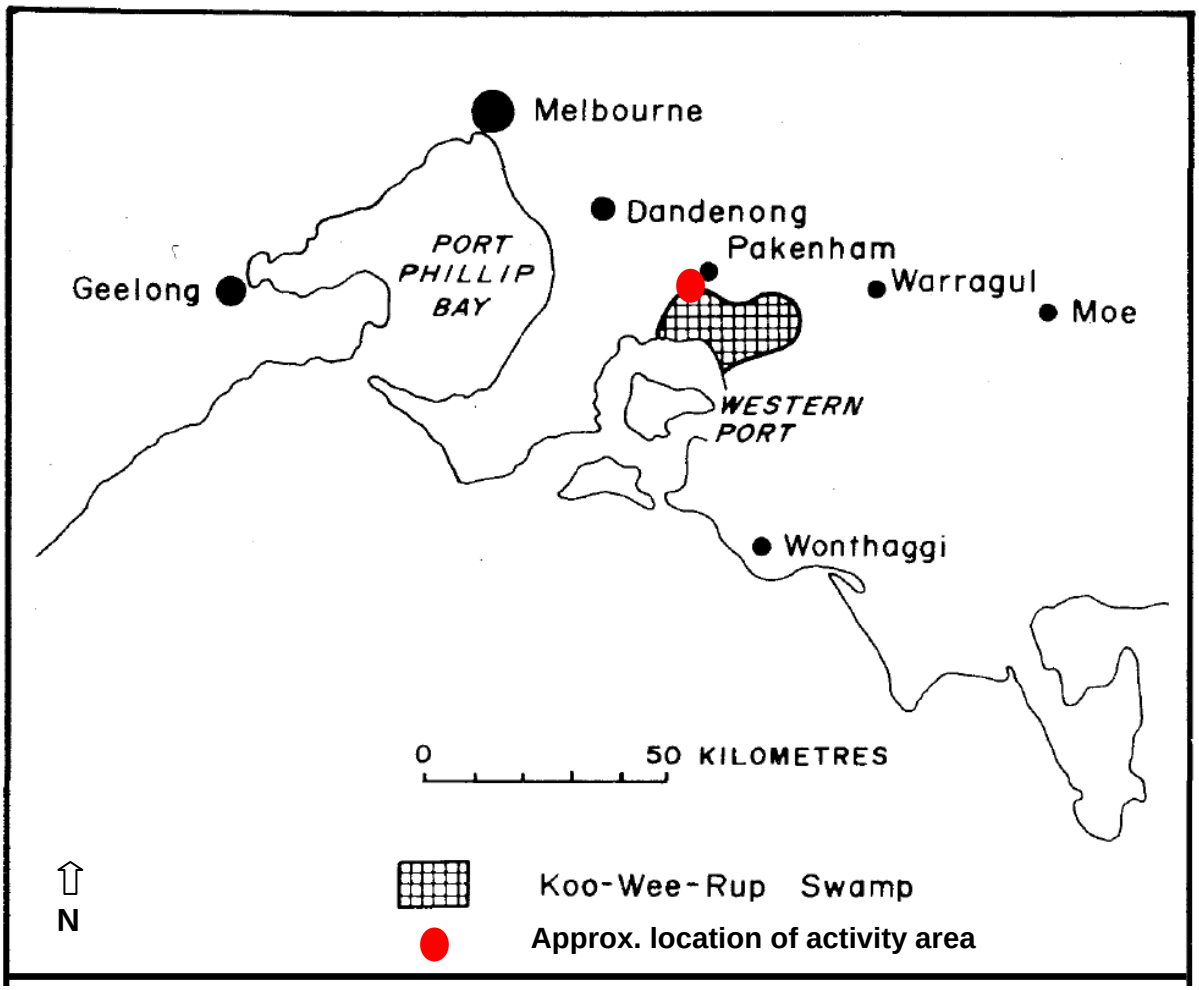
The activity area is located in Cardinia, approximately 55km southeast of Melbourne (Map 1).

The geographic region relevant to this investigation is land within 2km of the activity area (Map 6). This land comprises a range of landforms including the alluvial floodplains associated with the former Koo Wee Rup Swamp. Prominent waterways within the geographic region are Toomuc Creek (5.6km) and Gum Scrub Creek (6.5km), and a man-made channel runs through the western section of the region. This area is considered to contain a large enough sample of landforms, features and associated cultural heritage in order to produce an Aboriginal cultural heritage archaeological model.

For further detailed information on the landforms/geomorphology, geography and environmental background of the geographic region refer to Section 5.6.

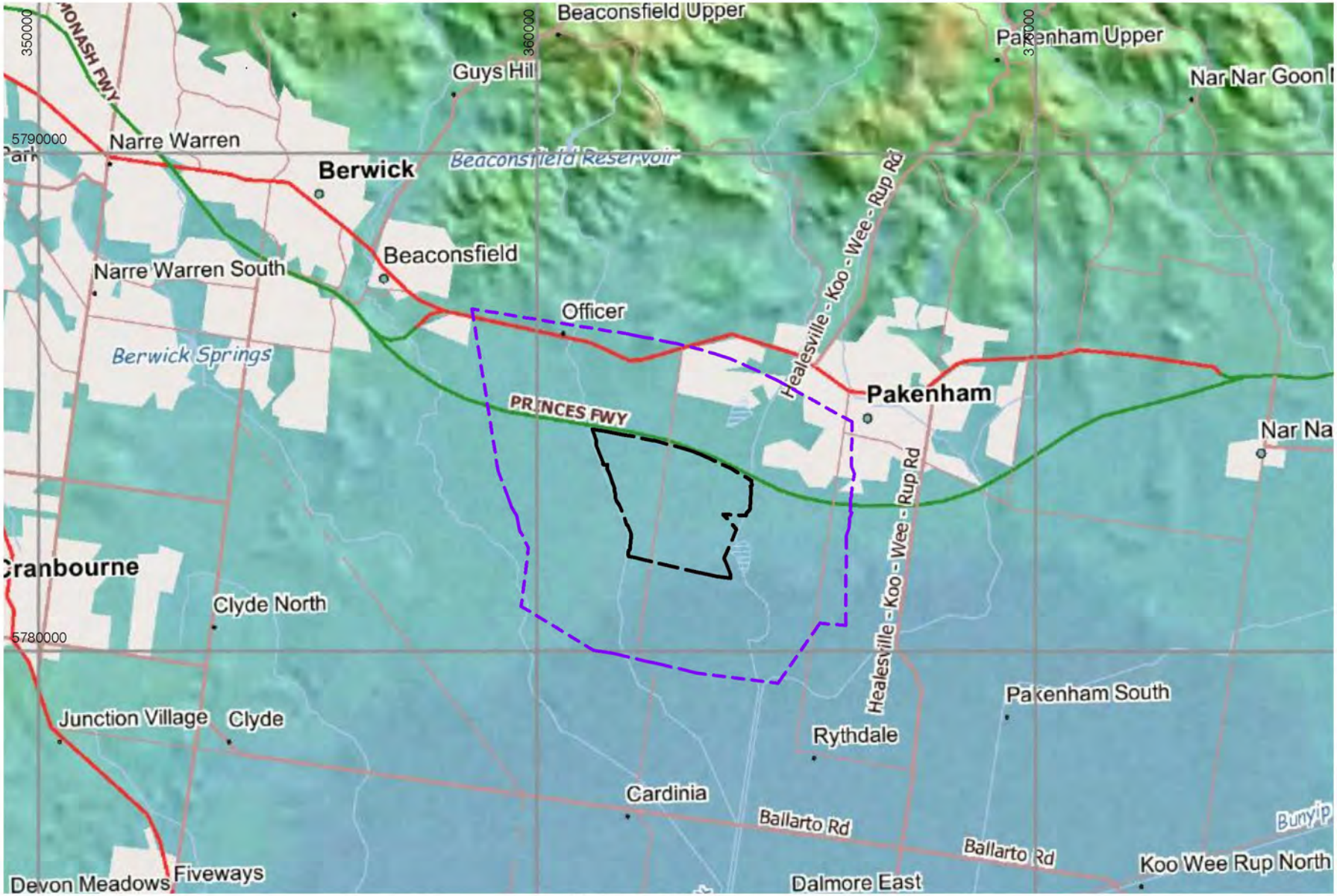
The activity area lies on the northern margin of the former Koo Wee Rup Swamp (Map 5) and would have been subject to seasonal inundation. Landform and geology of the activity area, and their implications upon past Aboriginal habitation and resource exploitation of the activity area discussed further in Section 5.6.

The activity area lies on the low lying alluvial floodplains associated with local waterways such as the Toomuc and Gum Scrub Creeks (which border the activity area to the east and west) and their seasonal tributaries. The activity area is traversed north-south by Cardinia Road, and east-west by Lecky-Enterprise Road.



Map 5 Original location of the Koo Wee Rup Swamp (Roberts 1985: 1)

The distance to rich resource zones such as the coast line and large areas of swampland is relevant to this assessment as it provides an indicator of potential Aboriginal archaeological site-types, location and antiquity. For example, larger, denser, more complex and important sites are generally located in close proximity to rich resources zones in the activity area region, but which are located outside the current activity area itself (eg, Bass Strait coastline, Red Gum woodland). The activity area is closely associated with the former Koo Wee Rup Swamp, however, its situation within the alluvial floodplains suggests that it would have been seasonally waterlogged, and not particularly suitable for a long time campsite. Strategic values of the activity area are discussed further in Section 5.7.



Map Courtesy of DSE Website

Legend:

Activity Area Boundary

Geographic Region Boundary

0 2500 5000

Scale of Metres

Map 6 Geographic Region

Archaeology At Tardis Pty Ltd, *cultural heritage advisors*

5. 3 Aboriginal Places in the Geographic Region

Evidence of pre and post-Contact Aboriginal occupation may be found throughout the Victorian landscape in a variety of different forms and condition. What remains of this evidence comprises archaeological sites or Aboriginal cultural heritage places. These sites have been classified into different 'types' usually based on a set of consistent characteristics. These characteristics can relate to: the type of artefact found at the site (i.e. stone artefact), what function the site itself may have served (i.e. quarry site) or they may be utilitarian (i.e. rock-well) or ceremonial in nature (i.e. stone arrangement). Most sites represent evidence or the remains of the exploitation of a particular resource therefore they are often associated with the surrounding environment and landform. The association between environment/landform and site type is used to create predictive models to assess the likelihood of a particular landform to contain specific site types or Aboriginal cultural heritage.

- There are a total of 113 previously registered Aboriginal heritage places within the geographic region (Appendix 2). These include 95 stone artefact scatters (84%), 16 object collections (14%) and 2 earth features (2%). The majority of these places are located on plains and floodplains landforms, with the remainder of places located on creek banks.

- Of the stone artefact scatters, the majority are located on elevated land within floodplains (n=58 (52%)) or plains (n=17 (15%)), with other places located on alluvial terraces, creek banks, swamp margins and creek lines.

- The average distance of places from significant waterways (Toomuc and Gum Scrub Creeks) is 768m, however the current course of local waterways may not reflect past conditions.

- Isolated stone artefacts (n=36 (32%)), and places with 2-5 artefacts (n=19 (17%)) are common, with places with higher densities being relatively rare.

- There are four places (4%) in the geographic region with more than 100 stone artefacts.

- The average place extents recorded within the geographic region (excluding isolated stone artefacts) is 4249m^2.

- Silcrete is the most commonly recorded raw material type, being present in 59% of the stone artefact scatters (n=66), followed by quartz (n=31 (28%)), quartzite and flint/chert (n=10 (9%)), and minor components of hornfels, mudstone, sandstone and basalt.

- Recorded artefact depth is relatively evenly distributed between surface finds and 100cm.

- Flakes (complete, proximal, medial distal and split) are the most commonly recorded stone artefact (n=66 (59%)), followed by cores (n=22 (20%)), formal tools (n=23 (21%)), angular fragments (n=17 (15%)) and axes (n=2 (2%)).

Dated sites within the broader region

The nearest dated Aboriginal sites are located immediately north of the activity area, at Edenbrook and Lakeside Estates in Pakenham. VAHR7921-0200 and VAHR7921-0769 at Edenbrook date to the last 4,000 years during the Late Holocene (Murphy & Rymer 2008a) while VAHR7921-0510 & VAHR7921-0511 at Lakeside, immediately to the north dates to the Late Pleistocene (24,000 years BP) (Rhodes 2004).

Matic and Schlitz (2009) recorded dates at Lakeside (Stage 2) of 364±36, 2526±53 and 7113±35BP for VAHR7921-0780.The earliest date however, was derived from charcoal material that is not clearly demonstrated to be a feature (Plate 17) and is dubiously associated with 2 stone artefacts within 1m.

Stone artefact scatter VAHR7921-0510/0511 (Rhodes 2004), found during subsurface testing. Charcoal was dated at 24,168±268 years BP and, if valid, provides the first potential evidence for Pleistocene Aboriginal occupation of the Pakenham area. It would also be the second earliest occupation place in the Melbourne area. However, because there is a lack of convergent supporting archaeological evidence from adjacent cultural heritage investigations (radiometric dates, artefact assemblages, etc), published geomorphologic evidence, the absence of publication of excavation results to an appropriate archaeological standard, or peer review of evidence for the Pleistocene antiquity of the place in an appropriate journal, the purported antiquity cannot be accepted at this time.

While slightly higher in elevation than the activity area, Edenbrook exhibits comparable geomorphologic development to the activity area, ie Quaternary alluvial deposition of displaced Silurian sediments from the northern hills. Based on this information, the most likely dates for Aboriginal occupation of the activity area will fall within the last 4,000 years.

5.4 Previous Work in the Geographic Region

Previous Aboriginal cultural heritage investigations provide relevant information regarding the relationship of archaeological sites and landforms. These investigations also provide insight into site patterning and are therefore a mandatory component in desktop assessments. Below is a summary of those considered relevant to the activity area.

Regional Assessments

Smith (1991) undertook a regional Aboriginal archaeological investigation of the Berwick to Bunyip Corridor. The present activity area lies in the center of this corridor. Smith recorded a total of 62 Aboriginal archaeological sites during this study including: 32 surface scatters of stone artefacts, 15 scarred tree sites, and 15 isolated artefact occurrences.

The present activity area conforms to Smith's landscape unit 'Lowland Plains' (1989: 12; Figure 2). The site prediction model formulated for this landscape unit by Smith is applicable to the present activity area and concludes that:

- Artefact scatters are the most likely site type to occur in this unit.

- In landscape Unit 2 sites are most likely to occur within 60m of creek lines and other water sources and most likely to occur along the banks of permanent creek lines, such as Toomuc and Ararat Creeks.

- A high number and density of sites occurs along Cardinia Creek. Sites along Cardinia Creek will, in general, occur within 150m of the creek and the majority (91%) will occur within 50m.

- Scarred tree sites are not expected to occur more than 50m from creek lines.

- Artefact scatters in this unit are likely to be dominated either by quartz, chert or silcrete with former site type being the most common.

- A wider variety of stone raw materials occurs in artefact sites along Cardinia Creek and it is possible that this creek line was used as a path between the coast and the corridor.

- Artefact scatters in this unit are likely to occur as sub-surface deposits and site densities are therefore likely to be higher than recorded during the present field survey (Smith 1989: 60-61).

Smith (1991: 61) concluded that poor surface visibility within the Berwick-Pakenham Corridor meant that many more sites occur than those recorded during the site survey. Furthermore, that since there is some degree of disturbance within the landscape through much of the corridor most of sites will be disturbed to some extent.

Murphy (1997) undertook a desktop Aboriginal archaeological investigation of an area described by the City of Casey as the 'Foreshore & Non-Urban Foreshore', an area that stretches from Cranbourne to Western Port. The predictive archaeological model generated by this study concluded that surface scatters and isolated artefact occurrences are the most likely site types to occur within the study area, and that the majority of these sites will be located within 100m of a past or present water supply. The highest archaeological site densities will be found within the Cranbourne Sand, ridges and hummocks landform unit (Murphy 1997: 19; Figure 3). It was also concluded that the sites located within Cranbourne Sands, ridges and hummocks landform unit may possibly be much older than those identified on the present coast line. Aboriginal quarry sites and scarred trees were considered to be a rare site type within this study area due to lack of suitable resources.

More recently, the Urban Growth Corridor within the Shire of Cardinia has been reviewed for Aboriginal cultural heritage values (Rhodes & Bell 2004). This study has resulted in a significant refinement of previous Aboriginal site distribution models for this area. During this assessment Rhodes examined early soil mapping information (Holmes *et al* 1940 in Rhodes & Bell 2004), and results of recent subsurface excavations within the Urban Growth Corridor. Of relevance to the present investigation Rhodes (2004: iii) comments:

'Recent archaeological evidence gained from sub-surface testing carried out on the

> Lakeside Estate at Pakenham, indicates that Aboriginal people may have camped along the changing water courses and wetlands on the Koo Wee Rup plain for at least the past 5,000 years. Because of the repeated cycles of flooding, sedimentation and migration of stream channels, Aboriginal archaeological sites have been found in locations over 1.5 km from existing water courses, and at depths of between 400-800mm below the surface'.

Rhodes and Bell devised a site prediction model that is based on soil types (2004: 69):

> 1) On deep alluvial sandy soils….Aboriginal archaeological sites are likely to be found on the surface, particularly within 500 metres of existing water courses, but may also occur at some depth. Buried archaeological sites may be found at any depth in alluvial sand and soil above the clay, but layers of stone artefacts have most commonly been found to occur at depths of between 400 – 800mm below the surface at a number of locations. There is less probability of Aboriginal cultural material occurring in the heavy clay layer below the sandy alluvium.
>
> 2) On heavy clay soils derived from weathering of Silurian rocks or erosion of soil on the hills landform, archaeological sites are more likely to be located close to the surface (within approximately 300mm or less). This encompasses much of the land within the study corridor, particularly in the hills landform.
>
> 3) There is no specific distance from major water courses at which sub-surface Aboriginal archaeological sites may be found. Archaeological sites on both landforms have been found at distances greater than 1.5 km from existing water courses. It is suggested that on the Koo Wee Rup plain, this site dispersal could be related to (a) migration of creek channels, (b) resulting changes in the environment of the plain (c) changes in Aboriginal use of the environmental resources and routes of movement over time and (d) natural processes of erosion and alluvial deposition on the floodplain.
>
> 4) Archaeological sites on all landforms are less likely to be found by ground survey and more likely to be found by sub-surface testing, even in shallow soils. This is partly because of the poor ground surface visibility that prevails over most of the study area. On sandy alluvial soils and particularly areas removed from the creek banks and on alluvial terraces, sub-surface testing will be required to the surface of the underlying clay.
>
> 5) Surface archaeological sites within the study area are likely to be heavily disturbed and not contain complex stone assemblages. This is partly because the sites have been collected in the past and partly because historical land – use since European settlement.
>
> 6) Deeply buried Aboriginal archaeological sites on the floodplain are likely to contain more complex and diverse stone assemblages and *in situ* features such as workshop floors and hearths. However, the survival of organic material on the sandy alluvial soils of the floodplain may vary, depending on soil acidity and past hydrological processes.

7) Human burials are more likely to be found on the sandy alluvial soils of the floodplain than on shallow Silurian soils.

8) Aboriginal archaeological sites on the hills landform in general are likely to be more highly disturbed than many sites on the floodplain. This is because the sites are located on an erosional land surface, in shallow soils and in an area which has been cleared for logging and agriculture in the past, even in areas where there is some forest.

Small Scale Assessments

A moderate amount of local Aboriginal archaeological investigation has been undertaken within the geographic region. Such investigations were conducted prior to the introduction of the *Aboriginal Heritage Act 2006* and therefore have limited comparative value. The great majority of reports identified elevated land adjacent to permanent potable water as having Aboriginal cultural heritage sensitivity, or for those which located Aboriginal cultural heritage, noted a correlation between such landforms. Relevant investigations are presented below.

Murphy (2004) carried out a cultural heritage assessment including ground surface survey of a proposed golf course on McGregor Road, Pakenham, 2km east of the activity area. The ground surface survey failed to locate any sites of Aboriginal cultural heritage, however, land within 50m of the original course of Toomuc Creek was identified as having moderate to high potential, and the remaining land low to moderate potential to contain Aboriginal Heritage values.

Rhodes (2003) carried out a sub-surface testing and monitoring program at the Lakeside Estate in Pakenham, approximately 2km east of the activity area. Eighteen sites were identified, including two expansive sites (VAHR7921-0471 & 0473) which were interpreted as campsites. Stone artefact scatter sites were located both in low hills and low lying former floodplains. Rhodes suggests two possible explanations for this site distribution; firstly, the floodplains may have been occupied during the hot summer months while the hills were utilised during the winter, or secondly, the floodplain sites may be older than the sites in elevated positions, and may be associated with former stream courses.

Rhodes (2004) carried out further sub-surface investigations at Lakeside Estate, Pakenham. The excavation of previously recorded stone artefact scatter sites VAHR7921-0510 and 0511 revealed three layers of soil deposition which contained a stone artefact assemblage and hearth. Radiocarbon dating of charcoal from the hearth located in the lowest layer of soil deposition revealed a date of 24, 168±BP, while the associated stone artefact assemblage possessed characteristics of a site utilised for small scale stone working (implications of the this date are discussed in Section 2.5). The author interpreted the site as a short-term campsite, probably located on the banks of a former watercourse. Based on the antiquity and location of the site, Rhodes suggests that the archaeological potential of the Koo Wee Rup Plain be re-assessed, and that any sites of antiquity should be considered to be of very high potential significance.

Rhodes (2006) carried out a sub-surface investigation at the Greenhills Property, Pakenham, approximately 2km east of the activity area. This study area includes the northern section of Green Hill. Machine dug transects revealed two stone artefact scatter sites (VAHR7921-0601 & 0602), one located on the crest and mid-slope of Green Hill, and the other at the base of the northern slope of Green Hill. Rhodes attributed the sites high significance based upon their considerable size. Tools identified within the artefact assemblage suggest a date of within the last 6,000-8,000 BP. Rhodes considers the study area to be of considerable significance to the interpretation of past landuse in the region. Green Hill was interpreted as a likely campsite location, with a sheltered position on the northern slope and expansive views of the surrounding countryside. A subsequent program of sub-surface testing at Green Hill by Rhodes (2007a) sought to clarify the extent, nature and significance of sites VAHR7921-0601 and 0602. Excavations confirmed the sites were individual occurrences, and resulted in the recommendation that site VAHR7921-0602 be monitored during earthworks, and site VAHR7921-0601 be conserved within reserved land. These works are still in progress, and the results of radiocarbon dating on a hearth associated with the site are pending (D. Rhodes, pers. comm. 11/05/09).

An Aboriginal heritage study of the Pakenham Employment Precinct was carried out by Rhodes (2007) to inform the Cardinia Council of areas or landforms of high archaeological potential, and to provide recommendations for further heritage investigation. The report incorporated information from an associated soil investigation carried out by Allan and van de Graaff (2007). The soil investigation showed that soils within the activity area were derived from their parent materials and not alluvial redeposition, indicating that any artefacts below the plough zone would be *in-situ*. In addition, the soil investigation identified several soaks and springs in the activity area which would have provided fresh water to prehistoric Aborigines. Subsequently Rhodes (2007b) produced an archaeological site prediction model for the activity area. The prediction model utilised a combination of digital terrain profiling to develop a model of soils and landforms; archaeological data from the South East Business Park, and ethnographic and environmental data. Landform elements and features were identified having *very high*, *high* and *low* potential archaeological sensitivity.

Areas of very high potential sensitivity are within 200m of freshwater soaks situated on dry soils (at the location of present dams). The predicted archaeological signature includes intact archaeological features and deposits of stone artefacts with a density of >5 per m^2. Sites are likely to be below depths of 20cm.

- Areas of high potential are dry landforms more than 200m from freshwater soaks. There is some potential for isolated intact features and deposits of stone artefacts with densities up to 5 per m^2.

- Areas of low potential sensitivity are on paludal or floodplain soils, likely unsuitable for Aboriginal campsites, and a low probability of locating Aboriginal campsites.

Thomson and Nicholson (2005) carried out a ground surface survey for a proposed development in Officer, immediately north and east of the activity area, and including a small portion of land (approx 15.3ha) in the northwest corner of the activity area. The ground surface survey identified two previously unrecorded Aboriginal cultural heritage

sites (VAHR7921-0603, and 0604), and failed to relocate previously registered site VAHR7921-0590. None of these sites fall within the activity area.

The authors noted poor ground surface visibility, and it is unclear how much of the present activity area was surveyed, however, the surveyed land within the present activity area (east of Gum Scrub Creek and in between the Pakenham Bypass and Lecky Road) was identified as having high potential for Aboriginal cultural heritage. Despite this, the subsequent sub-surface testing program failed to investigate the area, instead focussing upon land north of the Pakenham Bypass. Ten new Aboriginal archaeological sites were recorded during the sub-surface investigation, comprising nine isolated artefacts (VAHR7921-0630, 0632-0638) and one artefact scatter (VAHR7921-0629).

The authors found that the results of the sub-surface testing program conformed to the site prediction model arrived at during the desktop assessment and ground surface survey, noting that rises and ridgelines possessed high and moderate archaeological potential, and remaining areas low potential. The authors point to the low lying alluvial floodplain being too boggy, and lacking in permanent running water to provide comfortable campsite areas.

Cultural Heritage Management Plans

CHMPs have been required since the introduction of the *Aboriginal Heritage Act* 2006. Therefore the methodologies and analysis employed of CHMPs within the geographic region are directly relevant to this plan.

Toscano et al (2011) carried out a CHMP (11555) for the Edenbrook Estate (Part 2), in Pakenham, immediately north and northeast of the activity area. The desktop assessment suggested that land within 100m of Toomuc Creek had high potential to contain Aboriginal heritage places, that the floodplains had low to moderate potential for highly dispersed stone artefact scatters, and that low rises/old levee banks had high potential to contain stone artefact scatters of high significance. The standard assessment was constrained by poor ground surface visibility, and failed to identify any Aboriginal cultural heritage, however facilitated the identification landforms within the activity area. The dominant landform was the low lying floodplain, however a low rise was also located within the activity area. The complex assessment comprised six 1m x 1m and sixty-nine 0.4m x 0.4m hand excavated test pits across both landforms, and revealed two stone artefact scatters (VAHR7921-1306 & 1307). Both places were located on the rise, and no Aboriginal cultural heritage was located on the floodplains. Both places were attributed low scientific significance, and harm was permitted to both places.

Stevens and Vines (2011) carried out a CHMP (11091) for the VicUrban@Officer Mixed Use Development, which is located immediately west and northwest of the activity area. The desktop assessment identified the most likely site type to be encountered in the activity area to be stone artefact scatters. The standard assessment failed to identify any Aboriginal cultural heritage, however did identify areas of Aboriginal cultural heritage sensitivity. The complex assessment incorporated grader scrapes, mechanical trenching, controlled hand excavation and uncontrolled shovel probes. Sever Aboriginal cultural heritage places were identified during the complex assessment. These were stone artefact scatters VAHR7921-0590, 0630, 0637 and 1225 to 1227. All of these places were

attributed low scientific significance due to their low artefact densities, and only one place (VAHR7921-1226) will be subject to salvage.

Patton (2011) carried out a CHMP (11684) for the construction of a retarding basin and wetland at 15 and 33 Mary Street, Officer, approximately 500m north of the activity area. The desktop assessment failed to identify any areas of archaeological potential, however noted that it was reasonably possible that Aboriginal cultural heritage existed within the activity area. The standard assessment was constrained by poor ground surface visibility, and failed to identify any Aboriginal cultural heritage. Although the activity area was noted as being in a low lying former swamp, with low likelihood for Aboriginal cultural heritage places, a complex assessment was carried out as a risk management measure. The complex assessment included the excavation of two controlled 0.5 x 0.5m test pits and twenty-six uncontrolled shovel probes. No Aboriginal cultural heritage was identified, and the test pits revealed soil conditions typical of swamp/floodplain landforms; ie thin layers of silty clay deposits overlying sterile clays.

Young and Rhodes (2010) carried out a CHMP (10916) for a residential development at Lot 1 Henry Road, Pakenham, approximately 100m northeast of the activity area. While no Aboriginal heritage places have been previously registered within 50m of the activity area, Toomuc Creek runs along its eastern boundary. The desktop assessment noted that the activity area has high potential to contain Aboriginal cultural heritage due mainly to its proximity to Toomuc Creek, and its associated resource base. The most likely site type will be stone artefact scatters in a surface or sub-surface context, likely associated with elevated land. The standard assessment was constrained by poor ground surface visibility and no Aboriginal cultural heritage was identified. Areas of potential included a centrally located rise. The complex assessment combined controlled hand excavated test pits with machine excavated transects and shovel probe transects. Three Aboriginal cultural heritage places were identified during the complex assessment (stone artefact scatters VAHR7921-1163 to 1165), and all were located on the centrally located rise. Artefacts were located at a variety of depths and in association with a range of soil types. Places VAHR7921-1163 and 1165 were attributed moderate scientific significance, due largely to a high proportion of formal tools or flaked pieces in the assemblages, while VAHR7921-1164 was attributed low scientific significance. Recommendations included the establishment of a cultural heritage reserve within the boundaries of VAHR7921-1163, and salvage of VASHR7921-1165. No specific management recommendations were forthcoming for VAHR78921-1164.

Ricardi, McMillan and Thiele (2010) carried out a CHMP (11128) for the Growth Area Stations Project, Cardinia Road, Pakenham, approximately 1km north of the activity area. The activity was the construction of a new railway station. One Aboriginal cultural heritage place (stone artefact scatter VAHR7921-0779) was located within 50m of the activity area. The site prediction model for the activity area identified stone artefact scatters as the most likely site type in the area. The standard assessment was constrained by poor ground surface visibility throughout the majority of the activity area, and failed to identify any Aboriginal cultural heritage. Significant amounts of disturbance were identified during the survey, resulting from previous construction of adjacent residential developments, the railway line, and a sewer main. The authors found that there was unlikely that Aboriginal cultural heritage would be located in the activity area and no complex assessment was carried out.

Murphy and Owen (2010) carried out a CHMP (11147) for the Cardinia Motor Recreation and Education Park in Pakenham, approximately 500m east of the activity area. The desktop assessment identified the activity area as being on the northern edge of the former Koo Wee Rup Swamp. The review of previously registered sites noted that stone artefact scatters were the most likely site type in the region, and that these will be focussed on raised land between the foothills to the Central Highlands and the seasonal floodplains north of the former swamp. The standard assessment was constrained by very poor ground surface visibility and no Aboriginal cultural heritage was identified. The complex assessment included the excavation of one 1m x 1m, two 0.5m x 0.5m controlled test pits, and two 50m machine excavated transects. No Aboriginal cultural heritage was identified, and no specific management recommendations were forthcoming.

Rhodes et al (2010) carried out a CHMP (11081) for a multi-lot residential development at Henry Road, Pakenham, approximately 300m north of the activity area. The desktop assessment found that while Aboriginal heritage places may tend to cluster near waterways, geomorphological evidence suggests that ancient and ephemeral waterways once crossed the floodplains and that Aboriginal heritage places away from the current streams can be expected. The standard assessment was constrained by extremely poor ground surface visibility, and no Aboriginal cultural heritage was identified. One elevated sandy rise was located in the activity area. The complex assessment excavated 17.02m^2 of the activity area, using a combination of hand and machine excavated test pits, and located two Aboriginal heritage places. VAHR7921-1234 was an isolated silcrete artefact, and VAHR7921-0001 was a stone artefact scatter comprising 640 stone artefacts. Place VAHR7921-0001 was attributed high scientific significance and retention of part of the place as well as archaeological salvage was recommended. VAHR7921-1234 was attributed low scientific significance and harm was permitted to this place.

Schlitz and Matic (2009) prepared a CHMP (10813) for the Lakeside Extension Structure Plan (Stage 2) in Pakenham, approximately 1km north of the activity area. The desktop and standard assessment identified one previously registered stone artefact scatter, VAHR7921-0571, in the activity area. During the complex assessment two additional stone artefact scatters were identified; VAHR 7921-0780 and 7921-0781. Each place was assessed having low, high and moderate scientific significance respectively. Parts of both latter places will be preserved in open space. Salvage was recommended at VAHR 7921-0780 in areas unable to be preserved. Dates obtained from the excavations ranged between 2526±53. and 7113±35. The implications of these dates upon the current CHMP are discussed in Section 2.5, however the results of the CHMP support the conclusion in Murphy & Rymer (2008a) and Patterson & Jenkins (2009) (both discussed below) that the land west of Toomuc Creek and along Henry Road is unlikely to have any significant cultural heritage values with such values demonstrated to be located to the north closer to Pakenham and the railway line on gently rises or terraces of former watercourses (eg VAHR 7921-0780 and 7921-0769); none of which are present in the current activity area.

Jenkins and Paterson (2009) carried out a CHMP (10636) for the Pakenham – Narre Warren Sewerage Transfer Scheme, which runs immediately north of the activity area, from Officer South Rd to Green Hill. Four areas were subject to sub-surface investigation, including locations within the freeway reserve immediately north of the activity area at Gum Scrub Creek and Toomuc Creek, and 2km west of the activity area in the road reserve at Green Hills Rd. While Aboriginal stone tools were recovered at Green Hill, and found to be

part of previously recorded site VAHR7921-0603), the authors found that land around the creeks had been significantly disturbed by construction of the Pakenham Bypass. An additional testpit located in the low lying former floodplains revealed no artefacts, and the authors found this landform to be very unlikely to contain Aboriginal cultural heritage due to shallow nature of its soil deposits, and its distance from any water source.

Allia and Vines (2009) carried out a CHMP (10982) for Gum Scrub Creek Frog Pond in Officer, approximately 1km north of the activity area. The desktop assessment determined that the most likely site type in the geographic region was stone artefact scatters associated with elevated land, and that no such land existed in the activity area. The standard assessment was constrained by poor ground surface visibility, and no Aboriginal cultural heritage or areas of archaeological sensitivity were identified. The complex assessment, which was carried out as a risk management measure, failed to identify any Aboriginal cultural heritage.

Parmington (2008) carried out a CHMP (10386) for a residential subdivision at 625 Princes Highway, Officer and 707 Princes Highway, Pakenham, approximately 1.8km north of the activity area. The desktop assessment identified four previously registered Aboriginal heritage places within the activity area. These were stone artefact scatters VAHR7921-0826 to 0829. The complex assessment included the excavation of eight 1m x 1m test pits and 411 probe holes, and identified a further two Aboriginal heritage places (stone artefact scatters VAHR7921-0932 to 0933). All but one of these places were located along ridgelines within the activity area. Places VAHR7921-0826 to 0829 and 0932 were attributed low to moderate scientific significance, while VAHR 7921-0933 was attributed moderate significance. Places VAHR7921-0826 and 0933 were retained in open space while VAHR7921-0827 and 0828 were to be subject to archaeological salvage.

Vines et al (2008), carried out a CHMP (10130) for VicUrban's Residential Subdivision Project at Officer, immediately northwest of the activity area. The standard assessment revealed three Aboriginal stone artefact scatters (VAHR7921-0603, 0604 & 0876). Subsequent complex assessment revealed a further seven Aboriginal stone artefact scatters (VAHR7921- 0629, 0632 - 0636, & 0638). All but one of the sites located during the CHMP were attributed low scientific significance by the authors. VAHR7921-0629 was attributed low to moderate scientific significance due to its higher artefact density. The authors noted that excavations contained little alluvial material, and interpreted the dominant landform as a decomposed pre-Pleistocene sediment. A total of 50 stone artefacts were recovered from the 10 sites comprising flakes (n=31), blade flakes (n=5), backed blades (n=1), flaked pieces (n=12) and one core made from silcrete (n=24), quartz (n=12), quartzite (n=2), basalt (n=9) and chert (n=1). Usewear was present on three blades flakes and one backed blade. Each site was dated to the Late Holocene on the basis of the stone artefact assemblage. Larger sites with higher artefact densities (albeit still very low) were associated with the gentle rise and ridgelines.

Schlitz (2008) carried out a CHMP (10065) for Lakeside Extension Masterplan (Stage 1), approximately 2km north of the activity area. Three stone artefacts scatter sites (VAHR 7921-0779, 7921-0782 & 7921-0783) were recorded on small rises. VAHR 7921-0779 comprised 33 stone artefacts with an artefact density <1 per m^2 and one potential hearth. VAHR 7921-0782 comprised three stone artefacts with a density <1 per m^2. VAHR 7921-0783 comprised 163 stone artefacts with a density <1 per m^2. A high density cluster was

reported in one excavation area. They were assessed having moderate, low and high scientific significance respectively. Based on ASTT assemblage characteristics the sites were likely dated to the within the last 5,000 years, although earlier occupation was hypothesised (p84). Activities conducted in the activity area included tool manufacture, processing of wood and animal products, piercing, cutting and skinning (p83). Archaeologically sensitive landforms were gentle rises (even well away from potable water) and relict banks of older stream courses (p83). Salvage of parts of VAHR7921-0779 and 7921-783 subject to harm was recommended.

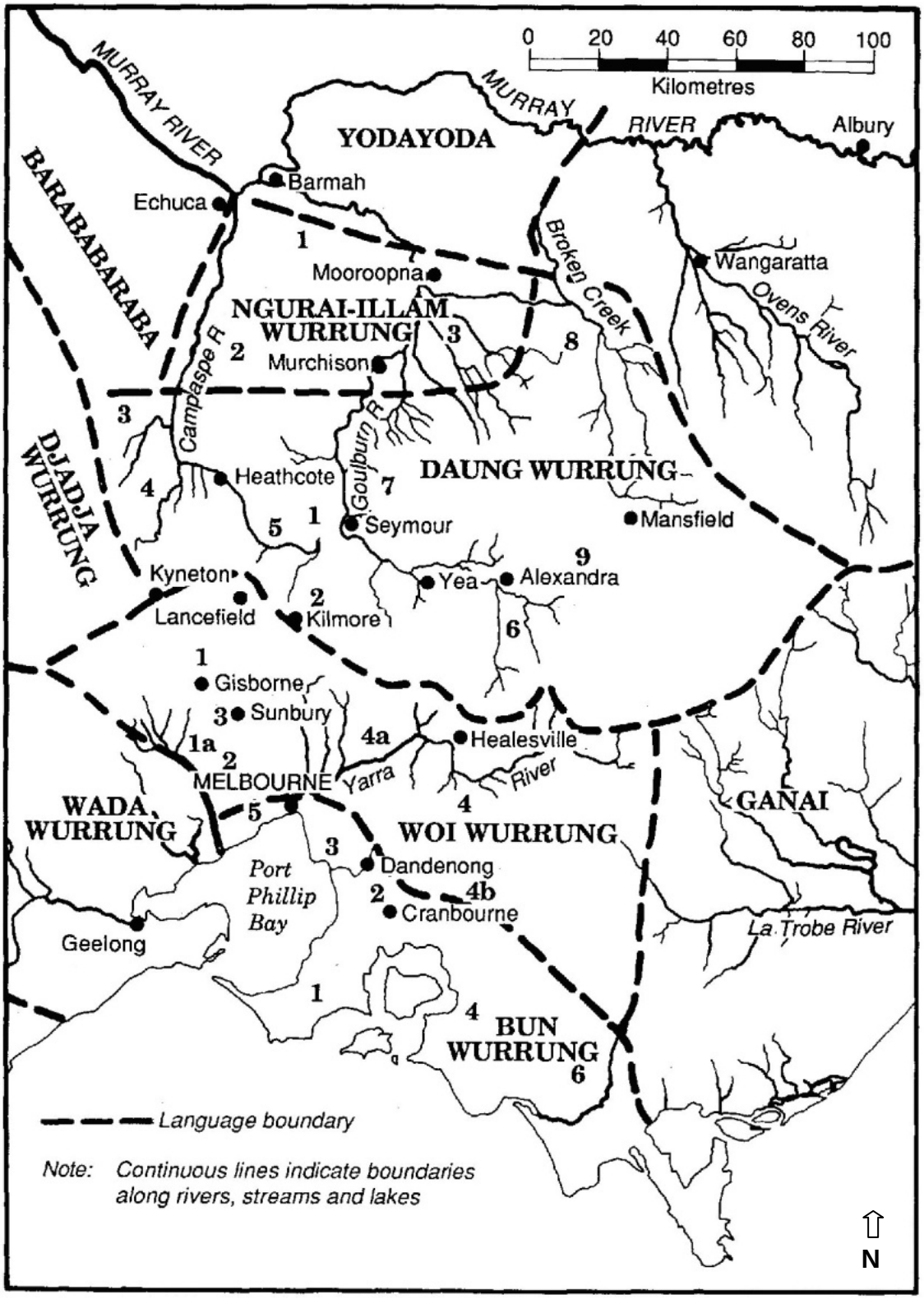
Murphy and Rymer (2008a) carried out a CHMP (10161) at Edenbrook Residential Estate Henry Road, approximately 0.5km north-east of the activity area. Twelve stone artefact scatters were identified during the complex assessment VAHR7921-0200, 0769, 0816 to 0820, 0835-0837 & 0923 to 0924). Of these sites, one (VAHR7921-0769) was attributed high scientific significance, one (VAHR7921-0200) was attributed low scientific significance, and the remaining sites attributed very low scientific significance. Salvage and site preservation was recommended for sites VAHR7921-0200 and 0769.

The implications drawn by the authors have direct relevance to this CHMP. Three artefact horizons were identified during the complex assessment, the earliest of which yielded OSL dates of 5,200±400 years BP, a date confirmed by typical Holocene artefact typology, and by subsequent salvage excavation. Further, the authors identified a trend whereby Aboriginal cultural heritage values decreased from the north to the south; their explanation being that waterways dominant in the north, became more ephemeral as they left the foothills and dispersed into the low gradient alluvial plains which fed the Swamp.

Murphy and Rymer (2008b) carried out a CHMP (10045) for the Officer South Rising Main, located approximately 3km west of the activity area. Excavations yielded three stone artefact scatter sites (VAHR 7921-0739, 0866 & 0867). The authors identified the excavated landform as Rhodes' and Bell's (2004) Toomuc sandy loam; a landform composed of consolidated Cranbourne Sands.

5. 5 Historical and Ethno-Historical Accounts in the Geographic Region

Ethnohistorical information used to establish pre-settlement Aboriginal spatial organisation is mostly based on observations made by Europeans during the initial period of Contact and subsequent settlement of the activity area. Early historical accounts of Aboriginal land use within and surrounding the activity area are scant, with information provided by the Assistant Aboriginal Protector William Thomas (Thomas Journals 1840-1843) and early European landowners of the area. It was William Thomas who saw the need to provide a settled life for the Aborigines and established protectorate stations, first at Arthur's Seat (1839-40) and then at *Narre Narre Warren* (1840-43).



Map 7 East Kulin Language Areas & Clans (from Clark 1990: 364)

The activity area lies within the traditional lands of the *Bunurong/Boon wurrung* tribe. The *Bunurong/Boon wurrung* (Western Port) tribe belonged to the inter-marriage network and language ties group known as the *Kulin* that inhabited areas around Melbourne. At the time of contact the *Kulin* nation was made up of the *Bunurong/Boon wurrung*, *Woiworung*, *Jajowrong*, *Taunguong* and *Wathaurong* (Presland 1994: 40). The *Bunurong/Boon*

wurrung clan whose estate included the activity area were the *Mayone buluk* meaning people of the swamp (Clan 2, Map 7). Their territory is thought to have been 'Carrum Swamp, the coastal strip at the head of Western Port, and the upper portion of the Mornington Peninsular' (Barwick 1984: 177). The clan was patrilineal and belonged to the *bunjil* moiety system. Clan leaders were known as *arweet*, and the leader at the time of European contact was *Mortrungo* (1797/8 – 1848), his heir was *Buggup* (1820 – 1848), who was a corporal in the Native Police Corps. A Dr Bailey also recorded much ethnographic information during the 1840s cites clan member *Manmangenur* (ca 1821 – 1845) as a recognised authority within this group (Barwick 1984: 117).

There is little specific ethnographic information of the lifestyles of the *Mayone buluk* clan at the time of European settlement. The few instances and recollections cited by early residents make no reference to clans or clan estates, movements or names. However, snippets of information cited within local histories can be assumed to be that of *Mayone buluk* clan members.

Thomas was appointed Assistant Protector in 1839, in charge of the welfare of Aboriginal people in the Western Port and Gippsland districts. From 1839 to 1841 Thomas worked from a hut near Arthur's Seat. Thomas saw the demise of the Aboriginal people once they moved to Melbourne and made concerted efforts to encourage them to settle in agricultural areas. However, this attempt to keep Aboriginal people out of Melbourne was a failure, and by 1843 Thomas was totally preoccupied with keeping order in the Aboriginal camps around Melbourne and visiting Aboriginal people in jail. In 1850, the Protectorate system was abolished (Sullivan 1981: 15).

The journals Thomas kept during his period at Arthur's Seat are of particular interest as the Aboriginal people in this area were then still practising aspects of their traditional lifestyle. In 1839, European settlement had already severely affected the Aboriginal population as Thomas counted only 83 members of the *Bunurong|Boon wurrung* tribe remaining (Sullivan 1981: 17). As a result of granting grazing licenses, Aboriginal people became dispossessed of their land and were forced to rely on handouts of food from Thomas and other settlers.

The *Bunurong|Boon wurrung* was one of the first groups of Aboriginal people to feel the full impact of European settlement. Aboriginal population numbers decreased rapidly after European settlement of the Mornington Peninsula due to dispossession of land and associated resources, and the spread of diseases brought into the area by European settlers. Thomas notes that their mortality rates were dramatic, with numbers declining to 28 in 1850 (Sullivan 1981: 18). The major causes of this high death rate were venereal disease, intemperance, murder, shooting by the authorities and death in jail. Several hostilities occurred during the early period of European contact and contributed to the decline in *Bunurong|Boon wurrung* population. The *Bunurong|Boon wurrung* were last seen on the southern Peninsula in 1856 (Byrne 1932: 183). The remaining mainland members then moved to a small reserve at Mordialloc. By 1856, the remaining *Bunurong|Boon wurrung* lived mostly at 'Moody Yallock' (Mordialloc), exploiting the resources of the swamp and adjacent coastline.

Thomas and early settlers in the Western Port region have recorded aspects of the seasonal movements by the *Bunurong|Boon wurrung* through their territory. Gaughwin (1981: 75) considers that the *Bunurong|Boon wurrung* continued their seasonal exploitation in a circular pattern from Melbourne to the Mornington Peninsula. This trip was thought to take about one month with an average stay of one to two nights at each campsite while the resources within a 10 kilometre radius were exploited (Sullivan 1981: 37). It appears from Thomas' descriptions that larger base camps utilised during this route were located roughly 5 kilometres inland, suggesting that coastal, wetland and hinterland forest could be readily exploited from these base camps. Base camps consisted of six to eight huts made from a lean-to of bark sheets.

Apart from the above information, there is no readily available ethnographic information that relates specifically to the activity area. The Traditional Owners Groups did not provide any additional historic, traditional or contemporary information specific to the activity area.

5. 6 Landforms, Geomorphology and Geology

The importance of understanding the past and present environment is two-fold. Firstly, it is the pre-European environment that was the evolving context for Aboriginal land use in the region. Secondly, to understand the changes in the environment since European settlement is to bring an understanding of what type of Aboriginal archaeological sites may have survived and their potential location.

The Pleistocene and early Holocene environment within the geographic region was one of gradual and continuous change. Aboriginal people are known to have occupied south-eastern Australia during the late Pleistocene (c 30,000 – 10,000 years BP) from archaeological evidence found at Keilor (Coutts 1977, 1978, 1980), Hunter Island (Bowdler 1984), Bend Road 1 (VAHR7921-0735) and Bend Road 2 (VAHR7921-0736), Keysborough (Hewitt & De Lange 2007). The changing environmental conditions provided different sets of resources for the human populations inhabiting the area. During the Pleistocene, sea levels were in general much lower than present.

A broad model of climatic change in the region is as follows (Dodson, Fullager & Head 1992):

- 20,000 – 15,000 years ago the climate was cooler, drier and windier than present. There was reduced vegetation and less water;
- 15,000 – 12,000 years ago the climate was more arid, but temperatures were warmer;
- 12,000 – 8,000 years ago the climate was becoming wetter and milder;
- 8,000 – 5,000 years ago the climate was warmer and moister than present;
- 5,000 years ago to present, the temperatures have cooled and conditions are drier.

Landforms and Geomorphology

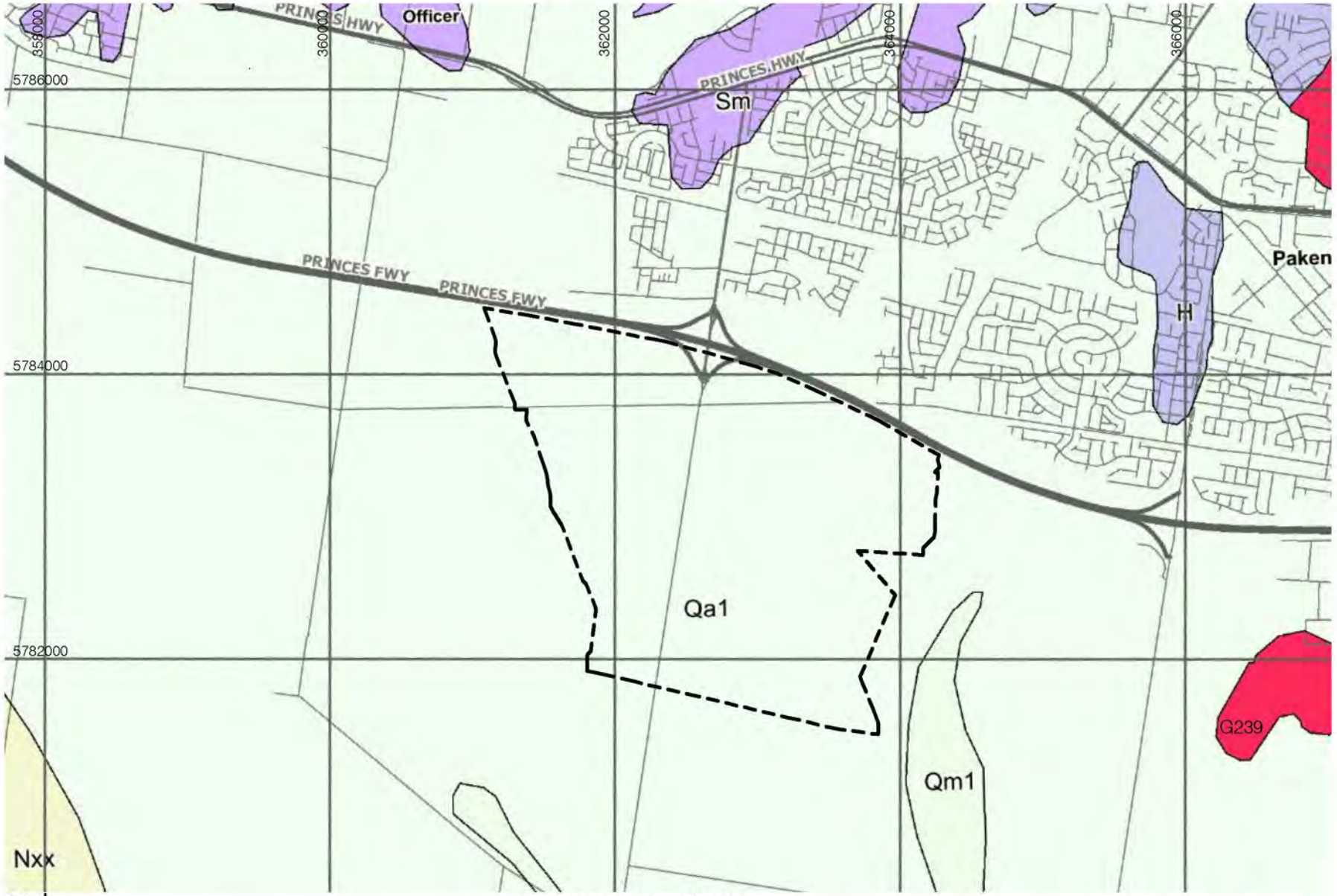
The activity area is located on the boundary of the Eastern Uplands and the broad, flat alluvial plains of the Koo Wee Rup Swamp in the Eastern Plains geomorphic division of Victoria (Joyce et al 2003). These landscapes are characterised by dissected lithologies of Devonian granite and Silurian sandstones and mudstones to the north and the flat, undulating fluvial- and swamp-dominated plains of the Koo Wee Rup Swamp to the south (Joyce et al 2003). The plains landscapes have a natural elevation of between 3-30m, with some low sand ridges (~8m) present as source-bordering dunes and aeolian deposits (Jenkin 1976).

Within the activity area, the landscape comprises of a large floodplain which is characterised by flood and fluvial processes that characterise the boundary of the Koo Wee Rup Swamp (Hills 1942). These landscapes have been influenced by a long history of fluvial activity as well as fault action that created the greater Westernport Basin (Hills 1942; Wallbrink & Hancock 2003). The combined processes of flood action, channel migration and alluvial fan deposition make the geomorphological site history a complex one. Toomuc Creek to the east of the site, for example, has slipped off the crest of its alluvial fan, having moved to the west and incised 3-5m into the sediment (Van de Graaff & Allen 2009). Currently, the plain is no longer being built upon by streams due to the post-European draining of the swamps by channel modification. Before human influence, the natural environment of the flood plain was both destructive and constructive. Material was constantly being deposited and removed with each successive flood event, period of higher precipitation, marine incursion and transgression.

Watercourses in the region include the man made Cardinia Road Drain, which flows through the activity area, and was created to better drain the landscape. Other streams are Toomuc Creek to the east and Lower Gum Scrub Creek to the west. These streams flow along the eastern and western borders of the activity area respectively, and are both natural streams with modified lower reaches to the south. The natural streams of the region are responsible for the deposition of the alluvial/outwash fans of the floodplain and the point-bar sediments in complex and overlapping sequences across the activity area.

Geology (Map 8)

The activity area lies on Quaternary age fluvial, unconsolidated sediments arranged in low-gradient outwash fans stretching south from the Victorian highlands to the north (Geological Survey of Victoria 1967; Bowler 2008). These sediments are comprised of interbedded shoestring sands, silt, clay and occasional gravel (Geological Survey of Victoria 1967). This unit is primarily derived from weathering and subsequent erosion of Palaeozoic bedrock to the north, having been transported by south-flowing streams in periods of high flow output such as periodic flooding and/or increased precipitation over a substantial period of time, and can reach depths of up to 30m (Hills 1942; Department of Sustainability and Environment 2012). This depositional environment has created a gradational soil profile with a base of mottled sandy clays overlain by brown silty sands and a sandy silt topsoil. In some locations, stratigraphic profiles show rippled bedding with alternating clay and sand facies mirroring the properties of mid-lower outwash/alluvial fan depositional environments, overbank and point-bar deposits (Boggs 1987; Conybeare & Crook 1982).



N

GDA
Zone 55

Map Courtesy of DSE Website

Legend:

Activity Area Boundary

Qa1	Unnamed Alluvium	Qm1	Unnamed Swamp & Lake Deposits
Sm	Murrindindi Supergroup	H	unnamed hornfels
G239	Tynong Granite		

0 1000 2000
Scale of Metres

Map 8 Activity Area Geology

Archaeology At Tardis Pty Ltd, *cultural heritage advisors*

Geological & Geomorphological History

The pre-Contact geomorphological history of the region as it is expressed today effectively began in the early Tertiary with the initial formation of the Western Port Sunkland in the Paleocene (Wallbrink & Hancock 2003). This occurred by lowering the levels of the basin in comparison to the Mornington Peninsula and the Eastern Uplands to the north and east through tectonic movement along the bordering faults such as the Tyabb Fault/Clyde Monocline complex to the southwest and the Heath Hill Fault in the east (Wallbrink & Hancock 2003; Jenkin 1974). During the Paleocene and Eocene (59-30 Ma BP), basic igneous activity was occurring along the southern edges of eastern Victoria in the form of the voluminous extrusion of the Older Volcanics Flinders Field basalt unit (Day 1989). During the Miocene marine transgression (11-4 Ma BP), deposition of the Baxter Sandstone occurred across the Mornington Peninsula and in the Western Port Basin by rivers flowing into lagoonal environments (Jenkin 1988; Holdgate & Gallagher 2003; Abele 1988).

Sea level from the Miocene onwards fluctuated, and by the Early Pleistocene, began an overall gradual retreat up until the Last Glacial Maximum (LGM) when sea levels were approximately 100 metres lower than present (White & Mitchell 2003). It is likely that during this period of retreat and increasingly lower levels of precipitation, the local streams both laid down sequences of alluvium that had been destabilised from the slopes to the north, as well as incised through the sediment in places as base-level dropped (Wallbrink & Hancock 2003; Jenkin 1974).

After the LGM, climates warmed, and at approximately 10ka BP, Westernport Bay and Port Phillip Bay were flooded by waters from the Bass Strait (Sloss et al 2007; Wallbrink & Hancock 2003). During this period of climatic amelioration, precipitation increased ahead of the lag in vegetation expansion, allowing for a substantial increase in sediment erosion off the slopes of the Palaeozoic metasediments and granites to the north. These conditions allowed for large amounts of fluviatile sediments to be deposited on the land surface of the swamp (Hills 1942). This raised the elevation of the landscape and created the thick (~30m) alluvial fan, outwash fan and point-bar deposits of the floodplains on the northern borders of the swamp (Hills 1942). As vegetation expanded, natural barriers to the south were created, and in conjunction with high groundwater levels, allowed for inundated areas to develop which led to the beginnings of the anaerobic peaty conditions of the Koo Wee Rup Swamp (Longley et al 1978; Hills 1942). During the later period of this change in environmental conditions (8-7ka BP), alluvial deposition decreased and was replaced by an increase in swamp expansion, indicating that both alluvial and swamp depositional processes were driven by climate (Hills 1942).

In the mid-Holocene (Holocene Climatic Optimum), sea level rose to approximately 3 metres above the present level, and was accompanied by deposition of beach ridges, dune fields and deltaic deposition around the lower lying areas of Western Port Bay (Jenkin 1974). In the latter half of the Holocene (5-0ka BP), climates became more arid, and stabilised to those seen today, while streams began to cut down into the courses, entrenching themselves as sea levels dropped (Jenkin 1974). It was during this period of increasing aridity and sea level drop that Toomuc Creek changed course, moving to the west off the crest of its alluvial fan, and incising into its current streambed. Teatree vegetation expanded further to the south of the activity area and stretched to the north in

finger-like patterns along the depressions of the local streams such as Gum Scrub Creek, with inundated land increasing from west to east (Hills 1942; Callanan 1859).

These conditions persisted until European settlement, with early parish maps showing the basic extent of the swamp which lies ~4km from the activity area and the swamp fringe conditions that extended to the north along some of the local streams (Callanan 1859). In an effort to create more productive pasture and agricultural land, the landscape was drained, with the first cut being made in 1876 (Marsden et al 1976). This cut was quickly followed by others, and many streams in the region were extensively modified, particularly in their lower reaches. In response to the draining of the swamp, the land surface began to erode considerably, with the peat surfaces in the south dropping by up to 1m in elevation. Erosion is still the main geomorphic process acting on the landscape at present, with most of the sediment being eroded from the stream banks (Wallbrink & Hancock 2003).

Geomorphological History

1. In the Paleocene, preliminary fault action on the Tyabb Fault/Clyde Monocline complex and the Heath Hill Fault caused the lowering in elevation of the Western Port Sunkland.

2. Basic igneous activity in the Paleocene and Eocene (59-30 Ma BP) extruded the Older Volcanics in large volumes over the southern edges of eastern Victoria.

3. During the Miocene marine incursion and subsequent regression (11-4 Ma BP), the Baxter Sandstone was deposited in marginal marine environments by south-flowing streams over a Tertiary erosional surface of Palaeozoic marine sediments and granitoids.

4. Sea level fluctuated during the Pleistocene, and after the high stand during the Last Interglacial (~120ka BP), began to recede in the lead up to the Last Glacial Maximum (LGM) approximately 20ka BP.

5. During marine transgression and the LGM (60-18ka BP), natural sedimentation and erosion cycles shifted, with increased sediment being eroded and lain down on the plains, while erosion increased in places as streams incised into the landscape.

6. Around 10-9 ka BP, sea level began to increase, flooding Western port Bay and Port Phillip Bay to the west. As precipitation increased ahead of vegetation recovery after the LGM thick sequences of alluvial sediment was washed into the floodplains, forming the alluvial sediments seen today that border and underlie the Koo Wee Rup Swamp.

7. As precipitation increased and vegetation expanded at ~8-7ka BP, swamp sedimentation in Koo Wee Rup Swamp was initiated and increased rapidly, replacing alluvial sedimentation as the main geomorphic process in the region.

8. Climate became wetter and warmer after the LGM until the Holocene Climatic Optimum (HCO) (~6ka BP) when sea levels grew to ~1-2m higher than present.

Sedimentation increased during this period. The increase in base-level promoted an increase in swamp levels due to higher sedimentation and lower stream erosion.

9. Sea level dropped after the HCO as climates became more arid, causing stream incision. Toomuc Creek slid off the crest of its alluvial fan during this period and incised to the west of its original position. Teatree vegetation expanded in the increasingly swampy regions to the south and southwest of the activity area. In some cases, the swampy conditions expanded northward along the main streams.

10. European occupation significantly altered natural erosion and sedimentation cycles due to land clearing, agricultural practices (ploughing etc) and draining of natural swamps, beginning in the late 1800s.

Stone Sources

Silcrete, quartz and hornfels are the main lithic artefacts found around the activity area. Hornfels is the most common source in the area, as the hornfels aureole outcrops to the north of the activity area around the Tynong and Lysterfield granites (VandenBerg 1997; Geological Survey of Victoria 1967). Sources for quartz are likely to originate from the Silurian regionally folded marine sediments, as hydrothermal vein quartz accumulates in the upper points of the folds between rock beds. Erosion of these rocks then would have exposed the quartz to the surface. A possible source for the silcrete is to the north-east around the Older Volcanics basalt flows to the north of the activity area, present as sub-basaltic silcrete boulders that surround the basalt capping along ridgelines. These boulders and smaller rocks were probably washed downstream during periods of high rainfall (Webb 1995). Another source for stone tools is flint, and is present as washed up stones on the coastal regions of Victoria, having been deposited during storms and past marine transgressions from offshore sources (Scott-Virtue 1982).

Bioturbation of Sediments

Most sediment on the surface of the earth has undergone some form of disturbance. Forms of syndepositional and post-depositional disturbance can range from macroscale such as earthquakes and bushfires, to the mesoscale such as slope failure, and to the microscale such as bioturbation of sediments by fauna (Morin 2006). These processes can alter the horizontal and vertical placement and internal structure of artefacts in an assemblage (Morin 2006). Bioturbation is an important factor in nutrient mixing and redistribution in the soil, as well as in the observed arrangement of artefacts in the soil profile, and if not understood properly, can cause a lowering of archaeological importance assigned to artefacts (Peacock & Fant 2002; Pillans et al. 2002; Eggleton & Taylor 2008).

Bioturbation is defined as “The churning and stirring of sediment and regolith by animals and plants” by Eggleton (2001:10), and can be classified into faunalturbation (disturbance attributed to animals) and floralturbation (disturbance attributed to plants) depending on the origin of the disturbance (Wood & Johnson 1978). Faunalturbation by displacing and mixing soil particles through mounding and burrowing usually occurs through the actions of soil biota such as earthworms and ants (Balek 2002). Rates of bioturbation differ according to the climate, landscape, and sediment at each site, with bioturbation rates higher in tropical climates than in temperate climates, and rates can be higher in sand

than in clay sediments (Eggleton & Taylor 2008; Peacock & Fant 2002). In sandy sediments, artefacts have been found to have moved over 1 metre down the soil profile, indicating bioturbation processes in sandy sediments can affect artefact placement to a high degree (Cahen & Moeyersons 1977). For example, Pillans et al (2002) identified an accumulation rate of sediment to be approximately 0.018-0.025mm per year from the erosion of termite mounds in northern Australia.

Bioturbation results in a redistribution of the superposed layers of sediment, and the artefacts associated with each horizon (Cahen & Moeyersons 1977). Movement of artefacts can occur either upwards or downwards, even laterally, through the soil profile, with smaller objects generally moving up and larger objects moving down the profile (Wood & Johnson 1978; Balek 2002; Johnson & Johnson 2010). Uprooting by tree-fall can cause artefacts in the upper soil horizons to be displaced laterally as well as upward in the profile (Eggleton & Taylor 2008; Wood & Johnson 1978). Artefacts can be sorted by size and temporally mixed once buried in the sediment due to soil biota creating voids through which artefacts fall into (Balek 2002).

5. 7 Strategic Values

Ecological Vegetation Classes (EVCs) (Map 9)

The pre-European vegetation regime featured three Ecological Vegetative Classes (EVCs) (Map 8). The Plains Grassland/Plains Grassy Woodland Mosaic bioregion (EVC 55) in the northern two thirds of the activity area would have comprised open, eucalypt woodland dominated by Gippsland Red-gum (*Eucalyptus tereticornis* ssp. *mediana*) and River Red-gum (*Eucalyptus camaldulensis*. The understorey would have consisted of a few sparse shrubs over a species-rich grassy and herbaceous ground layer (DSE 2004a). The southern one third of the activity area comprised the Swampy Riparian Woodland bioregion (EVC 83) which featured woodland to 15m tall, dominated by Swamp Gum (*Eucalyptus ovata*) and Narrow-leaf Peppermint (*Eucalyptus radiata*). Lower storey population were dominated by large and medium shrubs in combination with large tussock grasses and sedges (DSE 2004b). The Swamp Scrub bioregion (EVC 53) would have followed the path of the Toomuc Creek at the east of the activity area. This low dense scrub would have been dominated by Swamp Paperback (*Melaleuca ericifolia*) forming dense thickets at the expense of other species (DSE 2007). North of the activity area, the Swampy Woodland bioregion (EVC 937) featured open eucalypt woodland to 15 m tall with ground-layer dominated by tussock grasses and/or sedges and often rich in herbs (DSE 2004c).

Based upon the vegetative regime, the activity area region would have been one of low to moderate strategic value for Aboriginal people. Areas of high strategic value are those which have several (>5) Ecological Vegetation Classes and permanent potable water within close proximity. It is likely that the activity area would have been utilised more for the range of littoral and avian fauna than for its flora.

It is likely that areas associated with waterways and drainage systems were the focus of exploitation by Aboriginal people near the activity area. Within each ecological zone, there would have been variations in staple species diversity and abundance, and this in turn would have influenced site location (Walsh 1987).

Flora and Fauna

The activity area region would have contained a large number and wide variety of fauna species associated with forests, wetlands and waterways prior to European settlement. With the demise of native habitat, the number and range of species that once existed has been greatly reduced. Arboreal and land mammal species that would have been commonplace throughout the activity area are: brushtail possum, Leadbeaters possum, ringtail possum, horseshoe bat, tiger quoll, native rat, wallaby, kangaroo, echidna and emu. Within wetlands and associated with waterways would have existed: black swam, ducks, ibis, fish and crustacean (LCC 1991: 111). Detailed lists of plants and animal species known to exist within the Western Port and Port Phillip areas can be obtained from Gaughwin (1981), Sullivan (1981), Presland (1994) and Gott (1983).

River Red Gum (*Eucalyptus camaldulensis*) were once more numerous along watercourses and within floodplain areas in the activity area region. Because of their smooth bark and large size, they were commonly used for the manufacture of bark and wooden implements by Aboriginal people (Edwards 1972: 31). Apart from the manufacture of wood and bark implements and access to food resources, the bark from these trees would also have been removed for other non-utilitarian purposed such as ceremonial and social. Austral Bracken was used for medicinal purposes, with the juice from the stem applied to relieve the itching of insect bites, as well as for food. The underground stems of the plant were collected and eaten as a starchy food staple (Lane 1996: 3). The sugary extrusions of sap which formed on the leaf of the Manna Gum were collected and eaten by Aboriginal people, and the smoke of its burning leafs was thought to reduce fever (Lane 1996: 3). It is beyond the scope of this study to reconstruct the resource structure at a local scale; however, some of the food resources that were utilised by Aboriginal people are wetland root crops (such as *Tyhpa*, *Triglochin*) and dry land root crops (such as *Microseris scaigera*).

Summary

In summary the resources potentially available to Aboriginal people in the geographic region included the following:

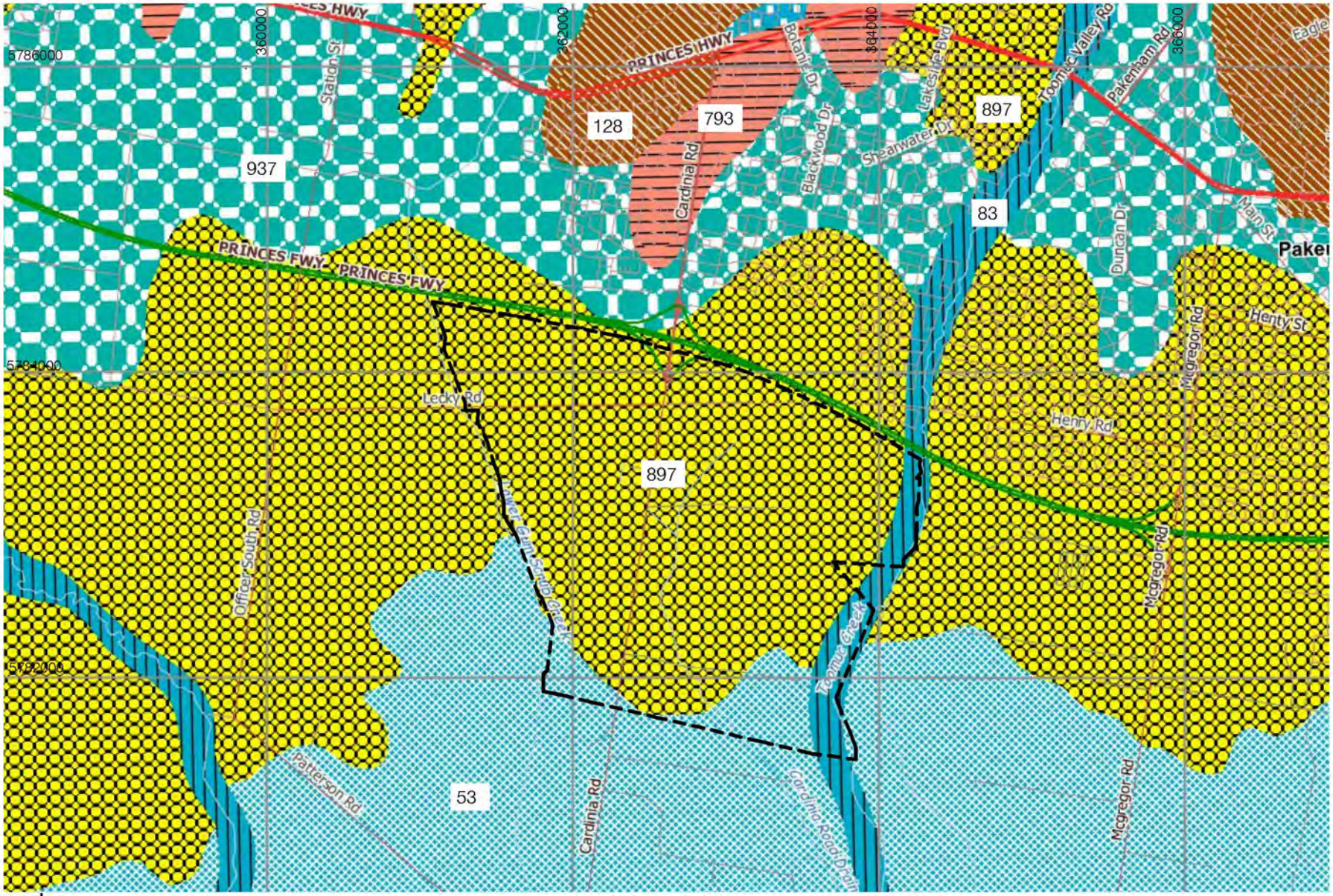
- Red gum and other native eucalypt species occurring within swamp areas: utilised for manufacture of wooden implements also non-utilitarian purposes;

- Creeks and swamp deposits around the creeks: potential exploitation of many different bird species;

The exploitation of these resources may have left the following archaeological remains within the activity area:

- Scarred trees within any remnant stand of Red Gums situated within low-lying floodplain/swamp landforms;

- Low to moderate (1-60/m^2) density stone artefact scatters situated within 250m of creeks and rivers.



Legend:

Activity Area Boundary

53	Plains Grassland/Plains Grassy Woodland Mosaic	793	Damp Heathy Woodland
83	Swampy Riparian Woodland	897	Plains Grassland/Plains Grassy Woodland Mosaic
128	Grassy Forest	937	Swampy Woodland

Map Courtesy of DSE Website

0 1000 2000

Scale of Metres

Map 9 1750 Ecological Vegetation Classes

Archaeology At Tardis Pty Ltd, *cultural heritage advisors*

5. 8 Land Use History of the Activity Area

Since initial European settlement of the Dandenong plains, grazing and cropping has dominated pastoral activities. The first industry for this region was timber collection that was undertaken prior to land sales. The industry flourished during the 1840s when the amount of Red Gum both standing and on the ground seemed inexhaustible and was widely used for housing, fuel, commercial and infrastructure developments and fencing. This activity was responsible for the initial clearing in well-drained areas.

Draining of Carrum Swamp has had the greatest post-Contact impact on the activity area. In 1868 Dandenong Shire Council made channels across the swamp to carry the creek waters to Mordialloc and Kananook Creeks, resulting in some land being taken up for grazing and cultivation. In 1878 Patterson River was cut through the swamp and coastal sand to Port Phillip Bay as a further drainage measure. The river begins roughly where the Dandenong and Eumemmerring Creeks intersect at Bangholme.

Flooding in 1889 overcame the channels and the artificial river, and the Carrum Trust was formed to enlarge all outlets and construct small channels for irrigation during dry periods. Further floods in 1923-4 resulted in enlargement of the drains by the State Rivers and Water Supply Commission, which partly superseded the Trust by 1910.

The Trust was abolished in 1936, and the Dandenong Valley Authority took over responsibility in 1966. The Authority oversaw the construction of the Patterson Lakes water-sport complex near the mouth of the river in the 1980s. These cumulative drainage works resulted in the present activity area changing from intermittent wetlands to dry arable land. Plate 1 presents a 1962 aerial photograph of the activity area (northwest corner is missing). This photograph illustrates the level of tree clearance and subdivision for pastoral use.

Tree clearance and development of land for pastoral and market garden activities would have adversely impacted on any archaeological site that existed. As a result of past land use, cultural material (such as stone tools) would have been disturbed, redeposited, or even destroyed. Many scarred tree sites that existed prior to tree clearance may have been destroyed. Only mature original Red Gum trees that have been retained may still contain evidence of pre-Contact cultural use. Repeated ploughing will have destroyed the spatial and temporal integrity of any site to an average depth of 400-500mm, whilst localised areas of disturbance (such as dams, stock ruts, tree stump removal), may have resulted in significant disturbance to a greater depth.

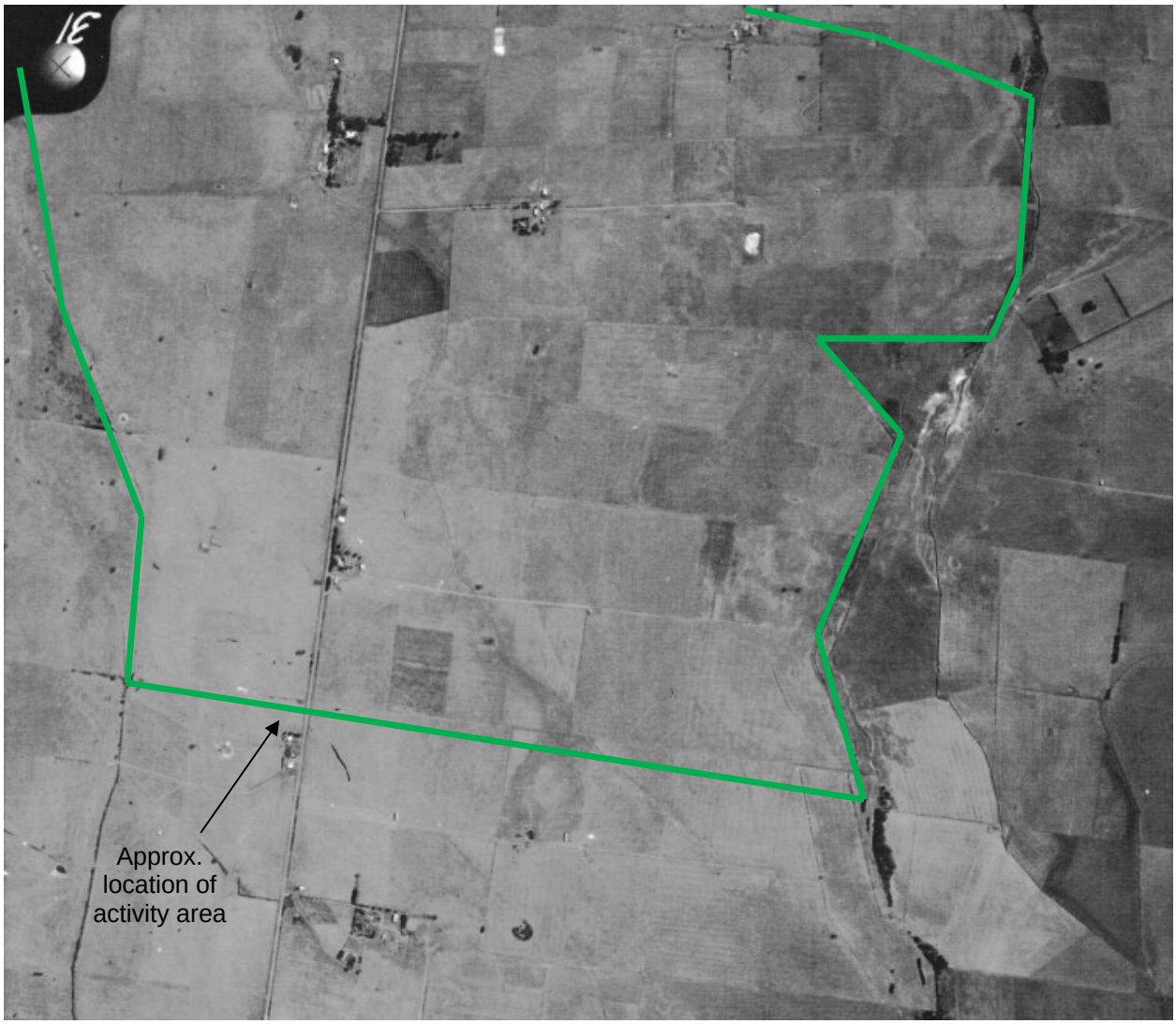


Plate 1 **1962 Aerial Photograph of the activity area (North-west corner missing)**
Project 539, Run 23, Photograph # 31

Over time, all of these historic land-use practices and development activities have the ability to both create and impact on the preservation of historic heritage values. Only areas that are relatively undisturbed by more recent activities will have archaeological values of higher significance.

In summary, activities that may have degraded archaeological values in the area are:

- Initial clearing of vegetation;
- Repeated ploughing/pasture/hay improvement;
- Repeated cropping;
- Long-term grazing;
- Erection and demolition of structures; and,

- Shallow drainage schemes.

Currently, the majority of original large pastoral holdings in Pakenham are being transformed into residential, commercial and industrial estates.

5. 9 Collection and Review of Oral History Relevant to the Activity Area

The WTLCCHC, BLCAC and BWFL were requested to supply any relevant information regarding oral tradition, Aboriginal cultural heritage or specific cultural significance, relevant to the activity area. No such information was provided by the TOGs. While no specific statements regarding the activity area were provided, the WTLCCHC provided a general statement for inclusion in the CHMP:

The process for establishing cultural heritage significance is outlined in the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance, otherwise known as 'The Burra Charter' (Marquis - Kyle & Walker 1992). The Burra Charter is based on preceding international charters formulated by ICOMOS (International Council on Monuments and Sites). The recently revised Burra Charter defines cultural heritage significance as the aesthetic, historic, scientific, social or spiritual value for past, present or future generations.

Therefore in addition to the archaeological (scientific) significance of a site/place, a CHMP must incorporate the aesthetic, historic, social and/or spiritual value of that site/place in order to arrive at an overall statement of significance. These types of intangible values have rarely been incorporated in to the significance assessment of pre-contact Aboriginal sites/places in Victoria, however this is common practice in other parts of Australia. These intangible values should be incorporated as part of the cultural significance of an Aboriginal site/place to Aboriginal peoples.

Section 4 of the Victorian Aboriginal Heritage Act 2006 includes archaeological, anthropological and contemporary values in its definition of cultural heritage significance. When considering the overall Aboriginal cultural heritage significance of pre-contact Aboriginal sites/places in Victoria, it should also include the significance of that site/place in accordance with Aboriginal tradition. It should be noted that Aboriginal tradition is not static and unchanging from a distant 'authentic' past. Tradition is also the handing down of beliefs and stories from one generation to the next, but does not mean that 'significance in accordance with Aboriginal tradition' requires an immutable value from 'time immemorial.' For example, a scatter of discarded waste flakes from a one-off utilitarian task may acquire 'significance in accordance with Aboriginal tradition' with the passage of time and change. Indeed, as has been noted by other heritage advisors in other states of Australia, that the act of handling stone artefacts through the archaeological excavation and sieving process by Aboriginal peoples reconnects those peoples with their past and therefore creates a new cultural significance with those artefacts.

It is part of the process of determining overall cultural heritage significance that heritage advisors endeavour to record all these stories, both traditional and contemporary, and include all the intangible values in the significance assessment of all pre-contact Aboriginal sites/places in Victoria.

Aboriginal sites/places and areas of land under the custodianship of the Wurundjeri have a special significance for the Wurundjeri people. All pre-Contact sites/places in the activity area are considered to have cultural significance to the Wurundjeri. These sites/places are all evidence of past Aboriginal occupation and use of the area, and are now the main source of information about the Aboriginal past in Victoria. Cultural significance is not merely measured by the artefacts themselves, but incorporates the natural and landscape values of the region that the sites/places are located within. Recorded (and unrecorded) pre-contact sites/places also have cultural significance because they are rare or, at least, uncommon site-types. In particular, many sites in the greater Melbourne area have been destroyed by land clearance and land use practices in the historic period that continue to this day. As a result, all Aboriginal sites/places in the greater Melbourne region are a diminishing resource and the Wurundjeri feel strongly that these should all be protected as much as is practicable.

Comment on the cultural values and significance of these sites/places can only be made by the Aboriginal

community. Specific details about cultural significance should be dealt with on a case-by-case basis with the Aboriginal community.

In addition, the statement below is a general statement of cultural significance that the Wurundjeri Council have provided for the activity area.

> *For Aboriginal people, there are many different kinds of cultural values associated with the landscapes that were once lived in by their ancestors. These include the tangible values normally recorded during archaeological investigations, such as artefact scatters and scarred trees. These places are physical reminders of the cultural lives of the Wurundjeri ancestors and a special connection therefore exists between those places and contemporary Wurundjeri people. This special connection underpins the high significance of these places. Once they are destroyed, the connection is largely destroyed.*
>
> *There are other values that the Wurundjeri people connect to in landscapes such as the activity area. The area, adjacent to the Yarra River, was an important place to the Wurundjeri people both before and after European contact. In this instance, the natural values, such as the River and remnant vegetation, are all integral to the cultural landscape in which Wurundjeri ancestors hunted and gathered and in which they lived their lives for many thousands of years. These landscape characteristics are therefore significant in accordance with Aboriginal tradition. Best practice heritage management, in terms of avoidance of harm to cultural heritage and where harm cannot be avoided, proper management of the disturbance of those values, is integral in the management of these significant cultural places.* [Wurundjeri Council]

5. 10 Conclusions from the Desktop Assessment

- The activity area includes areas of cultural heritage sensitivity as defined in the *Aboriginal Heritage Regulations 2007* (Regulation 23 – land within 200m of a named waterway);

- There are no previously registered Aboriginal heritage places within the activity area;

- There are 113 previously registered Aboriginal heritage places within the geographic region (Table 1);

- Site types which have been previously found throughout the geographic region are: stone artefact scatters (n=95 (84%)), 16 object collections (14%) and 2 earth features (2%);

- Soil profiles within the activity area will likely be shallow (≈50cm) in the plains and floodplains;

- Deeper soil profiles will exist in sandy rises and alluvial terrace landforms;

- The most likely site type within the activity area will be low density stone artefact scatters in a surface context, and will be composed of silcrete, quartz and quartzite;

- The activity area has suffered disturbance via historic clearing of trees, repeated ploughing and cropping, grazing and erosion, therefore the integrity of any archaeological material within the activity area will be poor.

Aboriginal Cultural Heritage Prediction Model for the Activity Area and Implications for this Investigation

The results of the desktop assessment have been used to assess the likelihood of the activity area to contain Aboriginal cultural heritage. The most likely site types to occur within the activity area are stone artefact scatters. Table 3 assesses the potential of the activity area to contain Aboriginal cultural heritage.

Table 3 Site Prediction Model for the Activity Area

Site Type	Reasonably Possible?	Evidence
Stone artefact scatter	Yes	There is potential for low density stone artefact scatters in surface or sub-surface contexts to occur within the activity area. Further standard assessment is warranted.
Scarred Trees	Yes	A 2006 aerial photograph of the activity area (Map 2) shows that the activity area has been cleared of the majority of vegetation. Most mature vegetation within the activity area will likely comprise planted windbreaks or regrowth. There remains however, a low possibility that Aboriginal scarred trees remain within the activity area.

6 STANDARD ASSESSMENT

The desktop assessment (Section 5) has shown that it is reasonably possible that Aboriginal cultural heritage is present in the activity area, and therefore a standard assessment is required.

The activity area was subject to ground surface survey in accordance with proper archaeological practice (Burke & Smith 2004). The survey was constrained by poor ground surface visibility (<1%) throughout the majority of the activity area.

6. 1 Standard Assessment Methodology

A ground surface survey was conducted on 14th August, 2008 by Andrew Morris (Project Archaeologist - Archaeology At Tardis Pty Ltd) and Sam Pender (BWFL), and 17th August, 2008 by Andrew Morris (Project Archaeologist - Archaeology At Tardis Pty Ltd), Steven Compton (BLCAC) and Jamie Thomas (BWFL).

Ground surface visibility throughout the majority of the activity area was none (0%) due to thick pasture grasses. Therefore, an opportunistic (judgement) survey of stratified units selected upon levels of good visibility was adopted (Burke & Smith 2004: 66-68; Banning 2002: 115-116; Richards 2008: 555). These areas were then subject to systematic pedestrian survey by between two and three surveyors walking 5m apart (Map 7). This methodology surveyed all bare ground within the activity area, such as creek banks, dams, tracks, land beneath windrows and areas of cattle disturbance. All paddocks within the activity area were inspected via vehicle to identify areas of good visibility and landform.

To identify differing landforms within the activity area a stratified random sample utilising farmers paddocks as sample units was adopted (Burke & Smith 2004: 66-68; Banning 2002: 115-116; Richards 2008: 555). Surveyors either walked or drove across paddocks, identifying survey units which are considered to have archaeological potential. High potential units identified throughout the activity area included low rises within the floodplains, land adjacent to former or extant stream banks. Landforms of low archaeological potential were identified as those low lying floodplain areas. The entire activity area was surveyed for levels of visibility and landform potential.

No mature trees capable of bearing cultural scars were present within the activity area. Detailed notes were taken including description of landform elements, ground surface visibility, ground surface disturbance, geology, geomorphology, vegetation, water sources and potential Aboriginal cultural heritage sensitivity (Burke & Smith 2004: 69-80). Photographs were taken using a standard scale with 20cm divisions.

6.2 Constraints

Archaeological visibility refers to the amount of ground surface that is clearly visible for site inspection. The greater the ground surface visibility, the more effective are surface site surveys. Examples of high surface visibility are vehicular & pedestrian tracks, dune blow outs (100% per m^2); and examples of poor visibility are areas of heavy vegetation cover (0-10% per m^2). Unfortunately, it is often the case that highly visible archaeological sites are also often highly disturbed. High ground surface visibility is therefore often related to the amount of disturbance that has occurred. This disturbance may be manmade (such as

drainage lines, vehicle tracks), by stock (overgrazing, tracks), or due to natural processes (erosion by wind or water).

Introduced pasture grasses covered the majority of the activity area, however, occasional patches of bare ground were observable around dams and fence lines, and resulting from stock movement. In these areas, visibility was excellent, however small and few in number.

No other obstacles, physical or otherwise, were encountered during the standard assessment.

6.3 Results

The ground surface survey revealed that the activity area could be divided into three survey units.

Survey Unit 1 comprises composed of gently undulating low lying former flood plains (Plate 2). This Unit comprised approximately 80% of the activity area.

Plate 2

Survey Unit 1:

Low lying former floodplains.

Survey Unit 2 comprises land within 200m of watercourses. Land adjacent to watercourses is traditionally considered to have higher potential to contain deposits of Aboriginal artefacts. Although it is highly unlikely that Gum Scrub Creek or the Toomuc Creek follow their pre-Contact routes, land within 200m of these watercourses has moderate potential to contain Aboriginal heritage, however, due to levels of previous ground disturbance, the significance of these sites will likely be low. Such land comprises approximately 15% of the total activity area. Plate 3 shows sandy silty soils deposited in former creek beds on the eastern boundary of the activity area, some 100m west of the current course of Toomuc Creek.

Plate 3

Survey Unit 2:

Exposures of coarse grained alluvial sands which indicate former stream courses or alluvial fans.

Survey Unit 3 includes developed land. A range of extant domestic and rural structures exist within the activity area. These include houses, sheds, stables, artificial channels, drains and dams (Plate 4). These comprise approximately 5% of the total activity area and have extremely low potential to contain Aboriginal archaeological heritage, due mainly to massive disturbance and soil removal.

Plate 4

Survey Unit 3:

Farm infrastructure including dams, sheds and houses.

Aboriginal cultural heritage was identified at one location within the activity area (VAHR7921-1205). Two silcrete artefacts (Plate 11) were located on the exposed banks of a dam in the south-eastern corner of the activity area (Lot 2 PS507898). A large amount of disturbance was evident in the area due to the excavation of the dam, and construction of its raised walls.

Table 4 Survey Units & Effective Survey Coverage (Map 10)

Survey Unit	Description	Ground Surface Visibility	Effective Survey Coverage
1. Low lying, gently undulating former floodplains Comprises approximately 80% of the activity area	Land greater than 200m from present or former stream courses, currently utilised for grazing and cropping. Occasional patches of high visibility around dams and windrows and areas of cattle disturbance.	<1%	<1%
2. Low lying gently undulating land within 200m of watercourses and former watercourses Comprises approximately 15% of the activity area	Land less than 200m from present or former stream courses, currently utilised for grazing and cropping. Occasional patches of high visibility around dams and windrows and areas of cattle disturbance.	<1%	<1%
3. Developed Land Comprises approximately 5% of the activity area	Significantly disturbed land associated with residential and pastoral building and infrastructure, eg driveways, artificial channels, dams and sheds. Occasional patches of high visibility around tracks, dams and windrows and areas of cattle disturbance.	<1%	<1%
			Total Effective Survey Coverage <1%

No caves, rockshelters, grinding grooves, quarry sites, shell middens or scarred trees were identified during the ground surface survey of the activity area. No mature old growth native vegetation which had the potential to exhibit cultural scarring was identified within the activity area.

6.4 Aboriginal Cultural Heritage - Discussion

Recorded site density south of the Pakenham Bypass is currently low. This may be due to a number of reasons including past Aboriginal behaviour, the level of post-Contact land modification, and ground surface visibility conditions. Principally, the current recorded site distribution reflects the level of previous systematic survey coverage. The desktop assessment of this plan indicates the broader area has the potential to contain archaeological resources. Sites which have been previously registered are limited to low to moderate density stone artefact scatters.

The search of the VAHR showed that of the 18 registered sites within 1km of the activity area, ten had been subject to significance assessment. Of these ten, eight were attributed low to medium scientific significance and two attributed high scientific significance. Those attributed high scientific significance were associated with Toomuc Creek, while those of low and moderate significance were associated with low lying alluvial floodplains. This evidence correlates with Murphy and Rymer's (2008a) suggestion that archaeological deposition becomes sparser as alluvial deposition fans out to the south, regardless of the vicinity of Toomuc Creek or Gum Scrub Creek.

Aboriginal stone artefact scatter VAHR7921-1205 was located in a farmer's dam in the south east corner of the activity area (Map 10).

6.5 Areas of Aboriginal Cultural Heritage Sensitivity

The activity area has suffered significant ground disturbance via:

- Historic land clearing;
- Repeated ploughing and cattle grazing;
- Possible localised landscape modification;
- Construction of the access tracks and fencing.

Based on the ground surface survey, the activity area contains two landforms of low and moderate sensitivity for low density stone artefact scatter sites (Map 10). These are limited to Survey Units 1 and 2, comprising primarily low lying, gently undulating former floodplains greater than 200m from present or former stream courses, and low lying gently undulating land within 200m of current and former watercourses. This sensitivity was confirmed by the presence of one stone artefact scatter located in the south-east corner of the activity area. It is likely that further low density stone artefacts occur in a subsurface context. Apart from stone artefact scatters, it is not likely that any other site-type occurs within the activity area (Table 5).

Table 5 Aboriginal Cultural Heritage – Archaeological Potential

Site Types	Location	Level of Potential
Low density subsurface stone artefact scatters (<30 artefacts per m^2)	Survey Units 1 & 2	Low to moderate
Aboriginal scarred trees, burials, earth features, quarries, rock art, shell middens, stone features	Entire Activity Area	None to highly unlikely

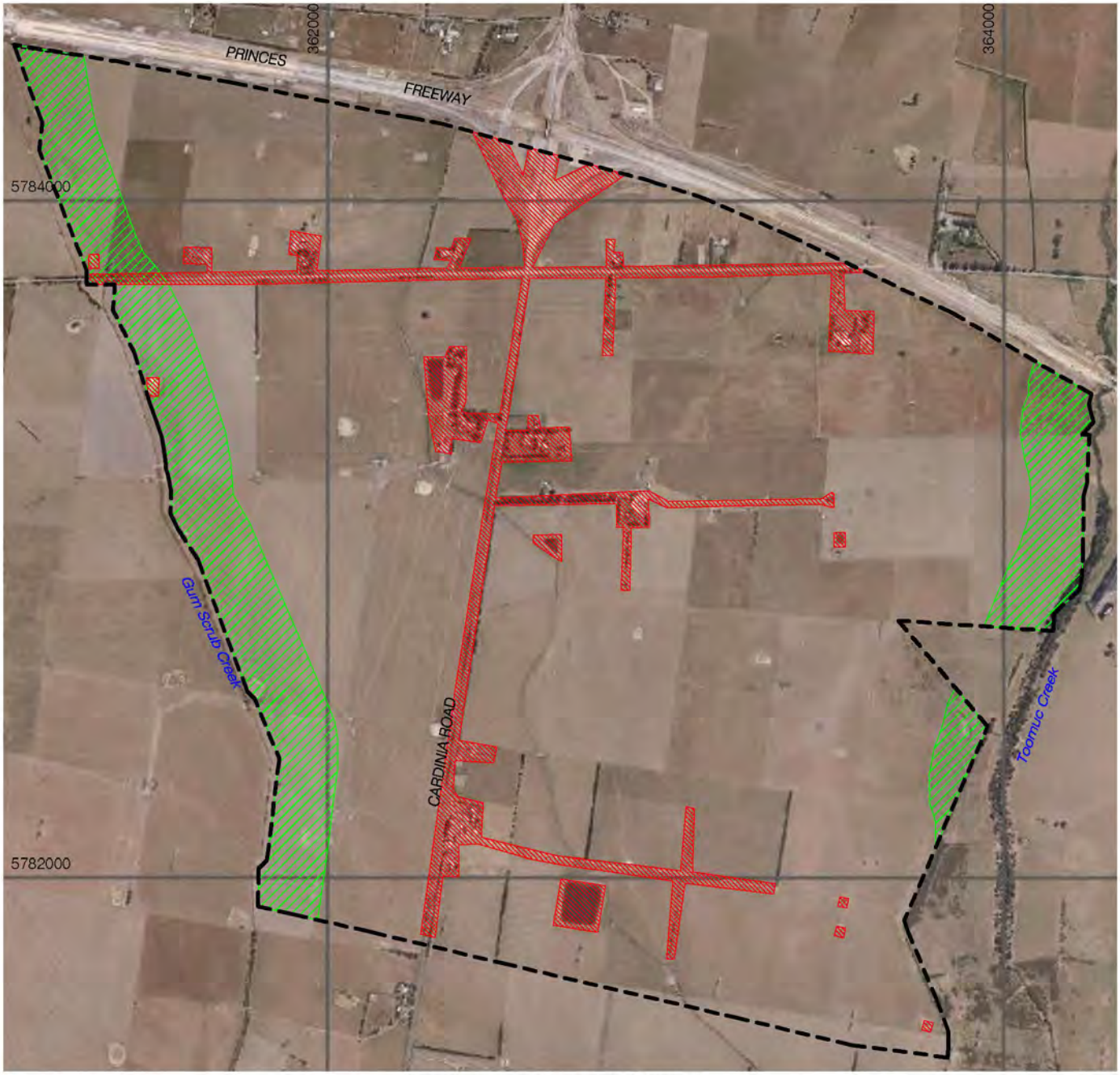
6.6 Aboriginal Cultural Heritage – Consultation with RAP Applicants/Traditional Owners Groups

On 21st May, 2009, Andrew Morris (Archaeology At Tardis Pty Ltd) contacted BLCAC and BWFL by email requesting any known information of Aboriginal cultural heritage in the activity area. At the time of writing, no response had been forthcoming from either group.

During the standard assessment, Andrew Morris (Archaeology At Tardis Pty Ltd) asked Steven Compton (BLCAC) his opinion of the potential Aboriginal cultural heritage values of the activity area. Steven replied that the activity area had two cultural landscapes; a recent Holocene landscape, and an underlying Pleistocene landscape. When asked his opinion on how sub-surface testing could be pursued, Steven suggested that long machine

excavated transects would provide an indication of the Archaeological potential of the Pleistocene layer.

No other Aboriginal representative provided an opinion on the outcome of the standard assessment or the execution of a complex assessment.



Aerial Photograph Courtesy of DSE Website

0 250 500
Scale of Metres

Legend:

Denotes Activity Area
590 hectares (approx)

Balance — Survey Unit 1: unshaded
ESC < 1%

Survey Unit 2
ESC < 1%

Survey Unit 3
ESC < 1%

N

GDA
Zone 55

Map 10 Survey Units and Effective Survey Coverage (ESC)

(Melway Ref: 214 C10)

6. 7 Conclusions from the Ground Survey

- The activity area was subject to an opportunistic (judgement) survey of stratified units selected upon levels of good visibility (Burke & Smith 2004: 66-68; Banning 2002: 115-116; Richards 2008: 555).

- No obstacles physical or otherwise constrained the effectiveness of the standard assessment.

- For the majority of the activity area (Survey Unit 1), ground surface visibility was very poor (<1%), and total effective survey coverage was <1% (Map 10).

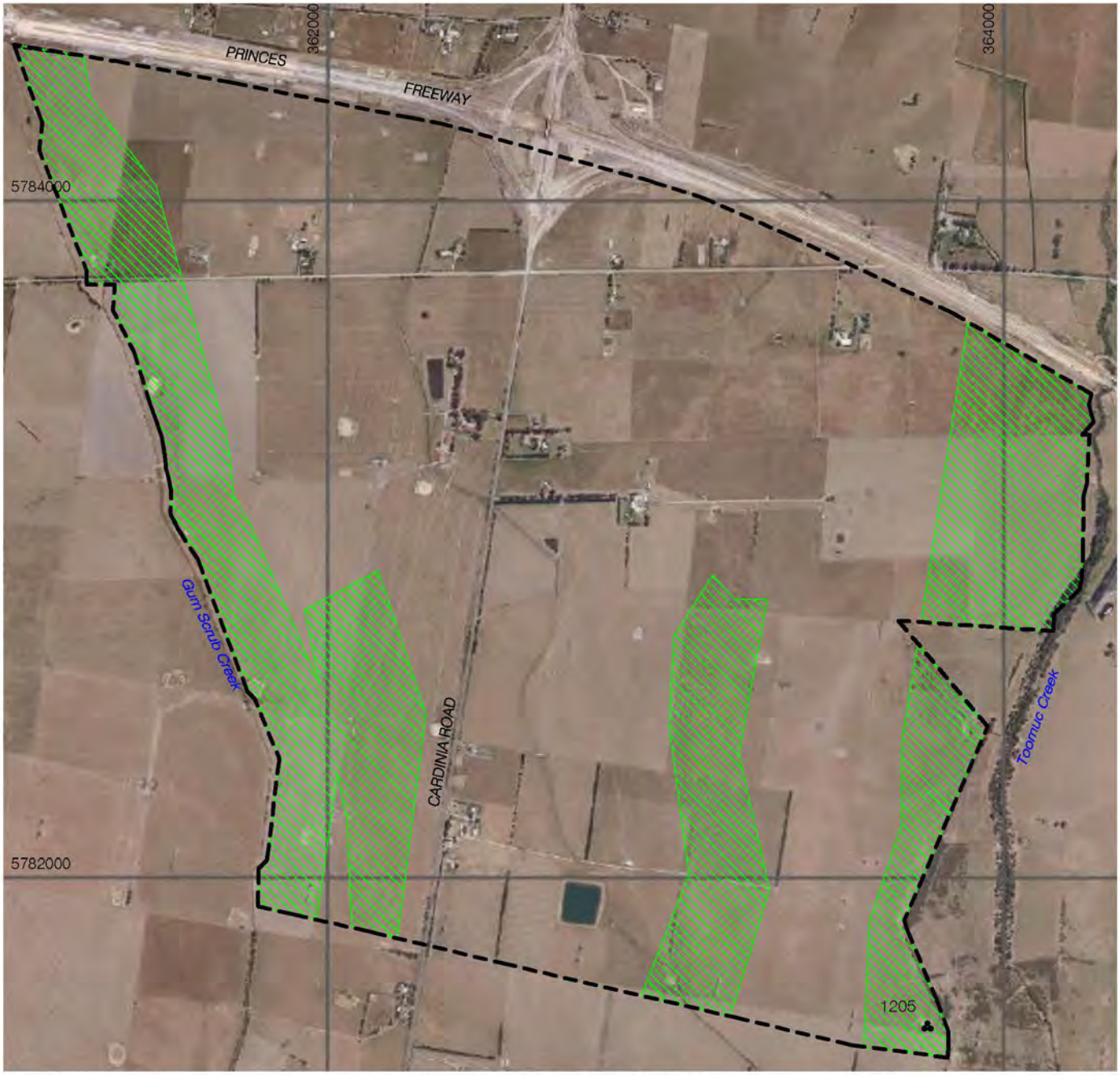
- Aboriginal cultural heritage was identified within the activity area (VAHR7921-1205). Two silcrete artefacts were located on the banks of a farm dam in the southeast of the activity area.

- No caves, rockshelters, grinding grooves, quarry sites or shell middens were identified during the ground surface survey of the activity area. No mature old growth native vegetation which had the potential to exhibit cultural scarring was located within the activity area.

- The ground surface survey revealed three landforms within the activity area; low lying gently undulating floodplains (Survey Unit 1), low lying gently undulating land within 200m of watercourses and former watercourses (Survey Unit 2), and developed land (Survey Unit 3);

- Areas of archaeological potential include slightly elevated land within the low lying gently undulating floodplains (Survey Unit 1), and low lying gently undulating land within 200m of watercourses and former watercourses (Survey Unit 2) (Map 11).

- The desktop and standard assessments have shown that Aboriginal cultural heritage is likely within the activity area, and that its nature extent and significance cannot be determined without carrying out a complex assessment.



Aerial Photograph Courtesy of DSE Website

0 250 500
Scale of Metres

Legend:

Denotes Activity Area
590 hectares (approx)

Area of Archaeological Potential

xxxx Artefact Scatter
Approx. Aboriginal place location
VAHR Site number 7921-xxxx

N

GDA
Zone 55

Map 11 Area of Archaeological Potential

(Melway Ref: 214 C10)

7 COMPLEX ASSESSMENT

The desktop and standard assessments indicated that the activity area was likely to contain Aboriginal cultural heritage, and its nature, extent and significance could not be determined unless a complex assessment was carried.

The complex assessment was conducted on the 9th to the 13th November, 2009, the 7th - 12th December, 2009, and the 11th to the 13th January, 2010, and 16th June to 17th June by Andrew Morris (Project Archaeologist and Field Supervisor, Archaeology At Tardis Pty Ltd), Jaclyn Ward, Chloe Benincasa, Barry Bardoe, Alana Doyle and Barry Green (Archaeologists, Archaeology At Tardis Pty Ltd), Richard Symons (auger operator), Darren Symington, Izzy Pepper, Chris Hoskins and Sean Kelly (Aboriginal community representatives BLCAC), and Tony Daw (Aboriginal community representatives BWFL).

Maps 12a & b present the test pit locations. Test pit co-ordinates, dimensions and logs are presented in Appendix 4.

7. 1 Aims

The aims of the complex assessment were to:

- Determine the nature and stratigraphy of subsurface landforms in the activity area;
- Target landforms identified as having archaeological potential; low rises within the low lying floodplains and undulating land within 200m of watercourses;
- Sample the activity area for the presence or absence of Aboriginal cultural heritage;
- Confirm the nature, extent and significance of any Aboriginal cultural heritage within the activity area;
- Test the site prediction model.

7. 2 Methodology

Five 1m x 1m and eight 0.4m x 0.4m controlled hand excavated test pits were investigated within the activity area.

In addition, forty nine machine excavated test pits were investigated on a stratigraphic basis in 20cm spits (Regulation 61(5)). Excavations were carried out using a tractor-mounted 230mm diameter continuous flight auger, and all soil was sieved through 5mm mesh. It was felt that utilising a mechanical auger would assist in determining the presence of any Aboriginal cultural heritage in the activity area, and that the area was too large to be systematically sampled by hand. Additional factors which led to the adoption of the mechanical auger are presented in Section 4.3 – Constraints, however, in summary, the adoption of the mechanical auger into the methodology was to:

- Minimise disturbance to farmers crops within the activity area,

- Maximise the number of test pits which could be excavated over a large area;

- Complete excavations in a timely fashion so as not to unduly disrupt pastoral and grazing activities.

Following discussions with David Clark (AAV 12th May, 2010) (Section 4.2), it was determined that additional investigation should be carried out in areas where Aboriginal cultural heritage had been discovered. Two additional 75m long transects were excavated by a 3.5 ton excavator with a 450mm trimming bucket.

All test pits were excavated in stratigraphic layers and 5cm spits using standard archaeological equipment (trowels, spades, sieves and brushes). All excavated soil was hand sieved through 5mm mesh. All test pits were photographed with a standard scale with 20cm divisions. All test pits and transects were excavated down to penetrate underlying Silurian clay (age >436-405MYA) to ensure that any possible cultural deposits had been investigated. All soil descriptions were carried out using Munsell colour charts, and pH tests were carried out. Spoil heaps were located a minimum of 1m away from the test pit. Test pit locations were recorded using a GPS (GDA94 datum) (complex assessment pre-dated the requirement for using a dGPS) (Appendix 3).

Subsequent investigation was carried out by Karen Kapteinis (geomorphologist; Archaeology At Tardis Pty Ltd). Eight boreholes were drilled on the 1st November 2012 with an 80mmØ auger (Map 12 a & b). The aim of the geomorphological investigation was to further clarify the sub-surface nature of the activity area. The results of this investigation are presented in Section 7.4.

7. 3 Constraints

Several constraints led to the incorporation of mechanical augering into the testing methodology:

- Excavations revealed extremely hard sub-surface soil conditions, making excavation slow and difficult;

- The activity area comprises working and functioning farms which view soil disruption as a financial issue, often paddocks were under crop, and had to be excluded from the investigation;

- The suggestion was presented to carry out extensive investigation with an excavator, however landowners objected to the amount of ground disturbance which an excavator would create.

Despite these constraints, it is not felt that the effectiveness of the complex assessment has been diminished.

7. 4 Results

The complex assessment revealed two distinct landforms within the activity area, representing alluvial plains and former stream beds.

The great majority of the activity area is composed of grey sandy silty topsoil overlying layers of grey, yellow grey and grey brown alluvial sandy silts (Survey Unit 1). These Holocene alluvial sandy silts continued to depths of between 30 and 50cm, and overlie a layer of brown, mottled yellow, red and grey sandy silty Silurian clay. These clays are the aged approximately 436-405 million years old and predate human occupation of the continent. For this landform, the stratigraphy was relatively consistent across the activity area, varying mainly only in terms of depth and disturbance. Test Pit 1 (Plate 5 & Figure 1) are typical of these soil profiles.

One test pit (Test Pit 2; Plate 6 and Figure 2) was targeted at sandy exposures which had been identified during the standard assessment (Survey Unit 2). This test pit revealed silty sands overlying deposits of coarse grained sands to a depth of 1.4m. Excavations revealed domestic refuse at depths between 90 and 95cm, a clay layer at 15-25cm, and sand layers mixed with occasional mudstone. This sandy exposure has been interpreted as evidence of the repeated deposition of layers of alluvium across the floodplain (Geomorphological Assessment – this Section). Subsequent test pits in the vicinity failed to identify any further sandy locations.

Stratigraphic drawings and photographs representative of the two landforms identified in the complex assessment are presented below.

Plate 5

Survey Unit 1 & Test Pit with artefact.

Test Pit 1

VAHR7921-1204

East face

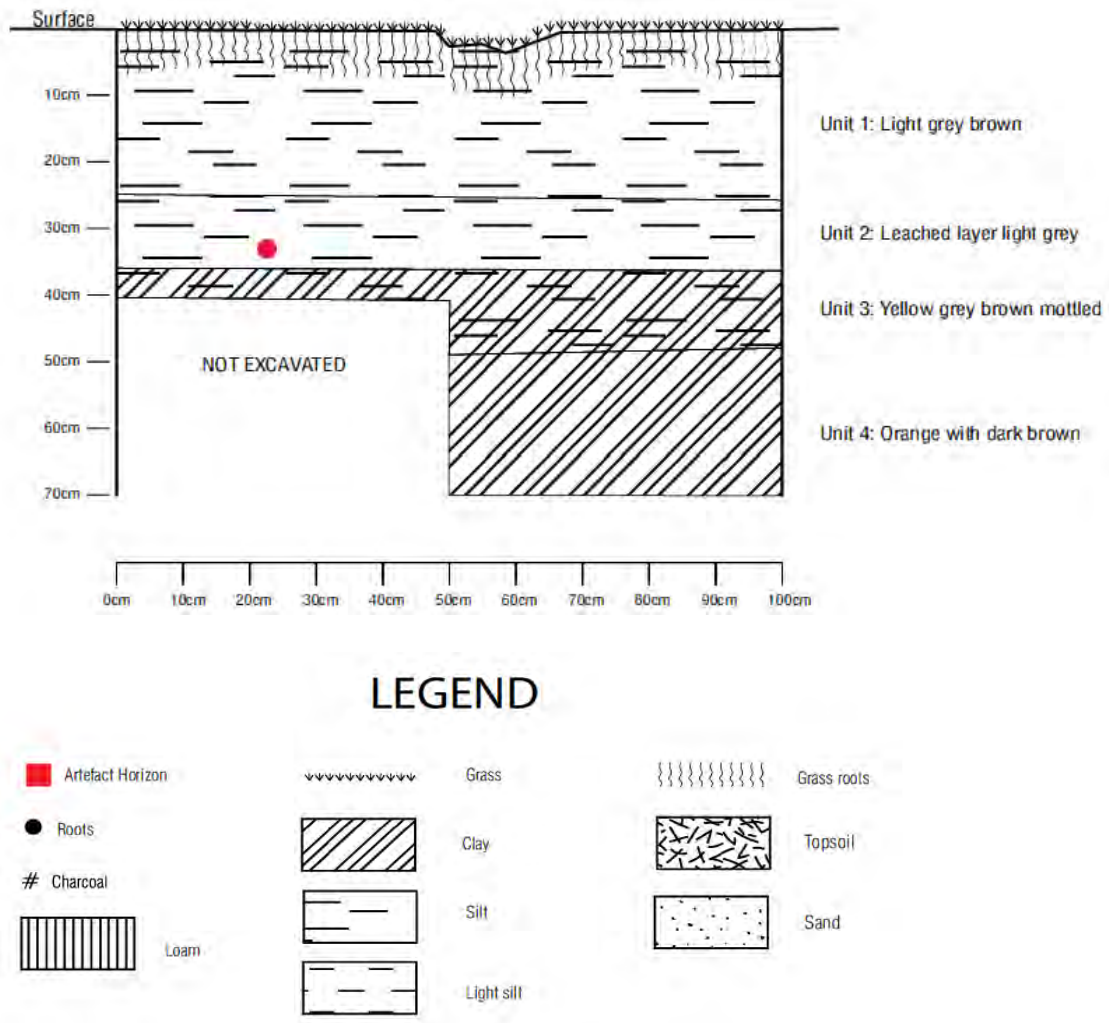


Figure 1 Test Pit 1 Stratigraphic Profile of Survey Unit 1 and Test Pit with artefact

Plate 6

Survey Unit 2

Test Pit 2

West face

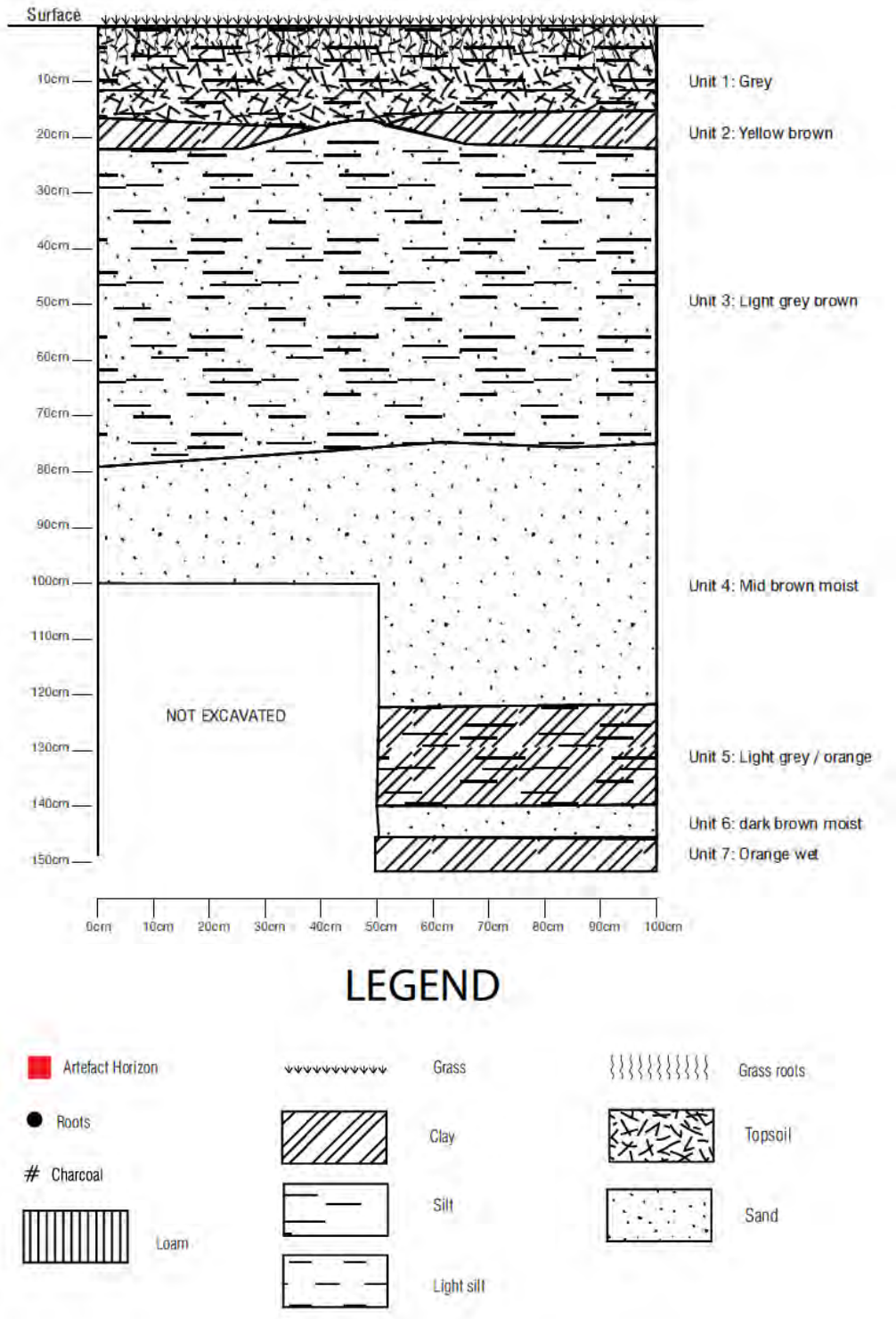


Figure 2 Test Pit 2 Stratigraphic Profile of Survey Unit 2

The machine excavated trenches revealed approximately 20cm of brown sandy silt overlying approximately 20cm of pale yellow and grey silty clay. These deposits were underlain by brown, mottled yellow, red and grey sandy silty Silurian clay (Plates 7 to 9). These machine excavated trenches conformed to the results of test pits and auger probes carried out within the activity area, and confirmed the nature of the subsurface deposits as alluvial floodplain deposits.

Plate 7

Transect 1

Profile

Plate 8

Transect 1

Facing west

Plate 9

Transect 2

Facing west

A total of one stone artefact was recovered from 1 of 62 testholes and two transects. In addition, two stone artefacts were identified during the standard assessment. The results of the complex assessment has confirmed the site prediction models arrived at following the desktop and standard assessments, namely that the activity area has a low potential to contain low density (<30/m^2) stone artefact scatters.

The results of the stone tool analysis are presented in Appendix 2, and the respective sites discussed further below.

Test pit and probe dimensions, locations and contents are presented in Appendix 3. Test pit locations are presented on Maps 12 a & b.

Geomorphological Assessment Results

Eight auger holes were investigated across the activity area (Map 11a) to clarify the geomorphological interpretation of the activity area.

The sediment of the activity area is dominated by outwash fans and floodplains. These sediments are characterised by sandy clay, with the sand portion composed of poorly sorted angular fine- and coarse-grained quartz and feldspar grains. Mottling of the sediment can be observed below 20cm depth in the profile, and is caused by oxidation of small pieces of organic matter like charcoal and plant fragments, minerals and the movement of iron through the fluctuation of the natural water table in a floodplain environment (Figure 3; Figure 4). In some places, particularly in the eastern part of the activity area close to the course of Toomuc Creek, clayey sand dominates the profile, and shows signs of rippled bedding in the stratigraphic section that can be attributed to active fluvial deposition (Figure 3). Prior subsurface testing during archaeological investigations recorded sediment profiles that correspond with the geomorphological assessment and the depositional environment currently identified, indicating that the alluvial floodplains and outwash fans exist across the entire activity area, and not in a restricted area around the current stream courses.

The topsoil sediments are comprised largely of silt, and represent the last ~4,000 years in the geological record, the period of time following the wetter climate of the Holocene Climatic Optimum (White & Mitchell 2003). The conditions requisite for these topsoils to form are increasingly arid conditions where windblown silt was transported from inland arid Australia and deposited both on the slopes of the Eastern Uplands to the north as well as the flat surfaces around the activity area. It is likely that some of the silt component was transported during the Last Glacial Maximum, and has only been transported in the latter part of the Holocene. Some of the silt found in the activity area was probably transported from the northern slopes by alluvial processes, and redeposited as the topsoil seen at present.

Thin horizons of fine and coarse sand can be observed at several points in the stratigraphic profile, and these are likely point-bar deposits. Point-bar sediments are deposited on the inside bend in the stream where the velocity of the water current is too low for entrained sand to remain in the current, whereupon it drops to the bed of the stream, creating a curving deposit of sand. These deposits are usually quickly buried by finer material as the stream undergoes dynamic change, leaving only thin point-bar deposits in normal, temperate climate situations like the one that has characterised southern Victoria since the Late Pleistocene (Stern et al 2012).

There is very little organic material present in comparison to the inorganic components (quartz & feldspar) in the sediment, and where observed, is restricted to charcoal particles and twigs. There is no peat in the profile, indicating that there are no swamp sediments present within the activity area. Where present in the stratigraphic profile, the clay component always contains at least a few grains of angular poorly sorted sand. Combined with the lack of peat in the profile and the aforementioned sediment characteristics, this shows that the depositional environment was alluvial in a floodplain setting as opposed to swampy and lacustrine. The clay is derived from flood, overbank and outwash fan deposits that have gradually built up the land surface as different hydrological cycles shift over time in the region. These deposits have further increased the relatively flat relief of the landscape, which in turn promotes further fluvial deposition of finer particles as the energy of the water column decreases on the flat surfaces, allowing clay and silt particles to drop out of the water column.

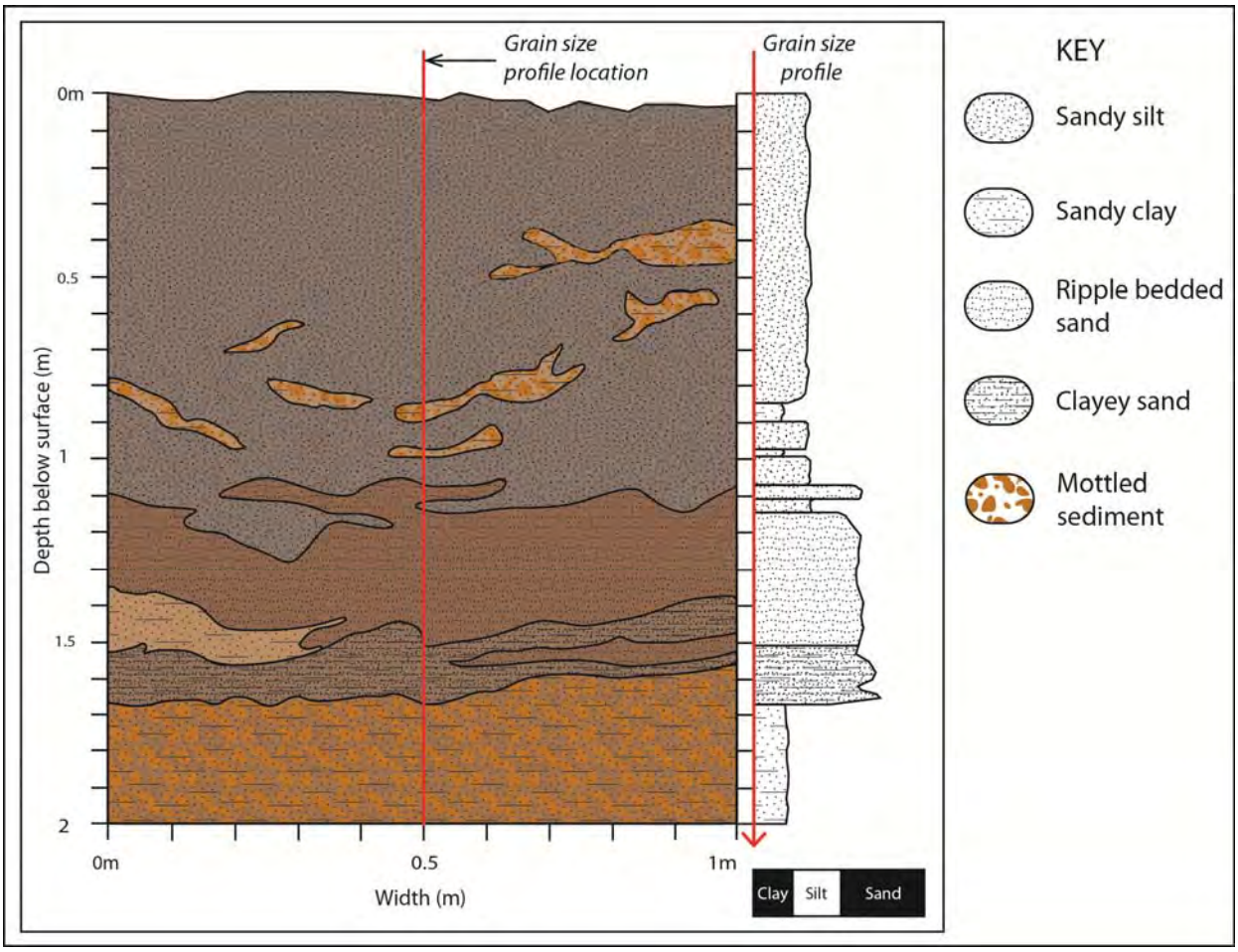


Figure 3: Stratigraphic section of activity area: typical alluvial soil profile (Geomorphological assessment)

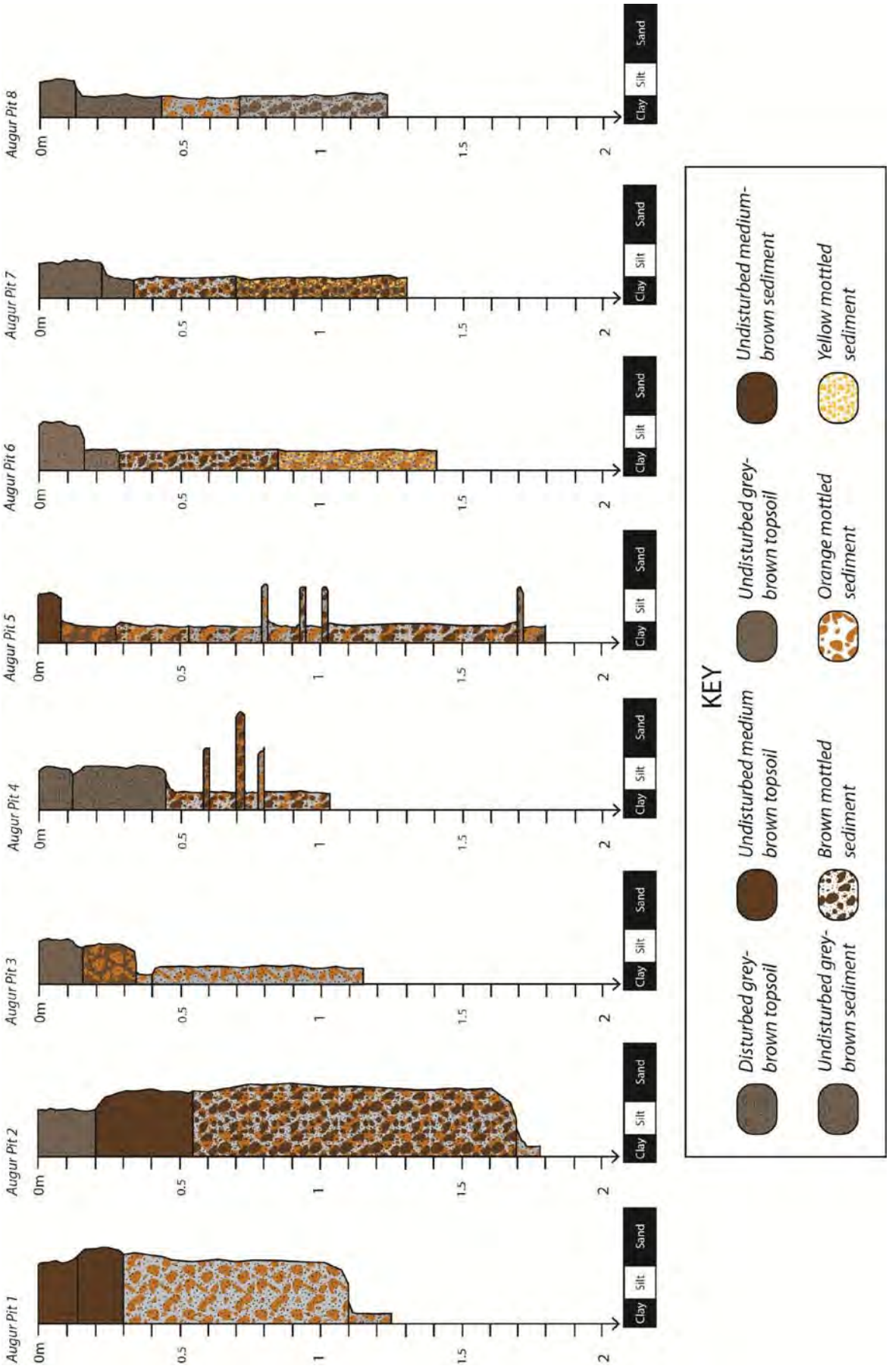
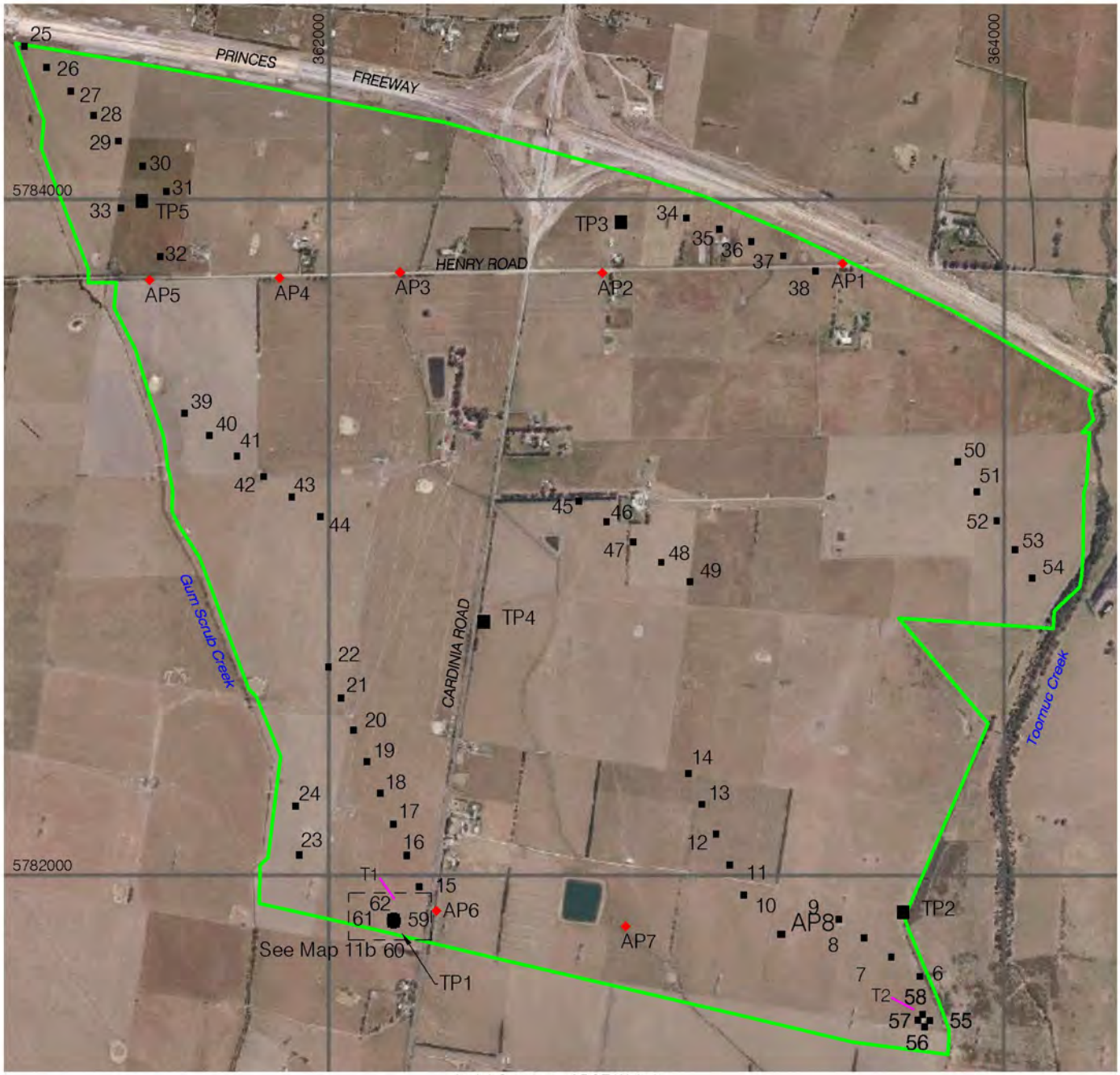


Figure 4: Auger Profiles (Geomorphological Assessment)



Aerial Courtesy of DSE Website

0 250 500
Scale of Metres

Legend:

Denotes Activity Area
590 hectares (approx)

Parish: *Pakenham*
LGA: *Cardinia*

Tx / Transect
x = transect number

xx ■ Test Pit 50x50cm or 25cm Diameter
xx = test pit number

TPxx ■ Test Pit 100x100cm
x = test pit number

APxx ◆ Auger Hole
x = auger hole number

N

GDA
Zone 55

Map 12a Location of Excavations

(Melway Ref: 214 C10)

Aerial Courtesy of DSE Website

0 50 100
Scale of Metres

Legend:

Denotes Activity Area
590 hectares (approx)

Parish: *Pakenham*
LGA: *Cardinia*

TPxx ■ Test Pit 100x100cm
xx = test pit number

xx ▪ Test Pit 50x50cm or 25cm Diameter
xx = test pit number

Tx / Transect
x = transect number

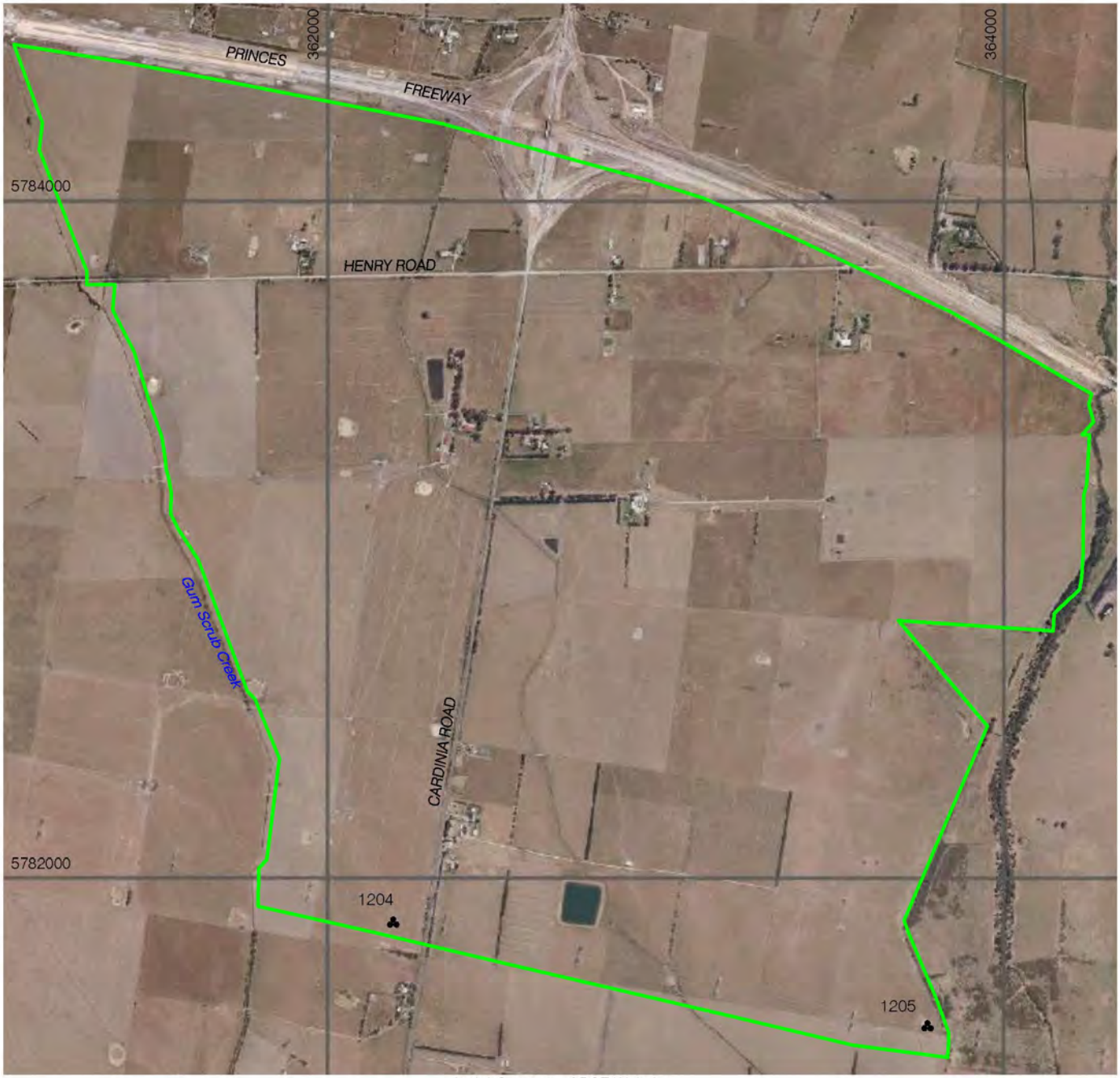
APxx ◆ Auger Hole
x = auger hole number

N

GDA
Zone 55

Map 12b Location of Excavations

(Melway Ref: 214 C10)



Aerial Courtesy of DSE Website

0 250 500
Scale of Metres

Legend:

Denotes Activity Area
590 hectares (approx)

xxxx Artefact Scatter
Approx. Aboriginal place location
VAHR Site number 7921-xxxx

N

GDA
Zone 55

Parish: *Pakenham*
LGA: *Cardinia*

Map 13 Aboriginal Heritage Places within the Activity Area

(Melway Ref: 214 C10)

7. 5 Conclusions from the Sub-surface Testing/Excavation

- A complex assessment was carried out to test the site prediction model and determine the extent of known Aboriginal cultural heritage within the activity area.

- The complex assessment has comprehensively investigated the area considered likely to contain Aboriginal cultural heritage within the activity area (Map 12 a & b).

- The results of the geomorphological investigation confirm the activity area as being located within the floodplains to the Koo Wee Rup Swamp, which were fed by alluvium fanning out from the Gum Scrub and Toomuc Creeks prior to their formalisation and extension to the bay.

- Two new Aboriginal cultural heritage places (stone artefact scatters VAHR7921-1204 & 1205) were located within the activity area (Map 13).

- The results of the complex assessment indicate that apart from known locations, Aboriginal cultural heritage is unlikely to be present within the remainder of the activity area.

- No organic material with cultural association was identified during the sub-surface testing.

8 ABORIGINAL CULTURAL HERITAGE IN THE ACTIVITY AREA

Two new Aboriginal cultural heritage places (VAHR7921-1204 &1205) were located during the complex assessment (Maps 14 & 15). Place data for VAHR7921-1204 & 1205 has been provided to the VAHR.

Aboriginal Place Details:

8.1 VAHR7921-1204

Site Name:	Cardinia Road Employment Precinct 1
VAHR No.:	7921-1204
Site Type:	Very low density stone artefact scatter
MGA Co-ordinates:	362195E, 5781868N
Cadastral Description:	Lot 1, TP 400532, Bass Shire
Location:	270 Cardinia Road, Officer South, 3809
Landform/Topography:	Low lying former floodplain
Test Pits:	1
Recovered Site Contents:	1 silcrete artefact
Test Pit & Probe Artefact Density (/m^2):	1/m^2
Known Extent:	1.0m x 1.0m x 0.4
Site Integrity:	Poor
Scientific Significance:	Extremely Low
Cultural Significance:	General/none specific (however see Section 5.9)

Nature

VAHR7921-1204 is a very low density sub-surface stone artefact scatter. One stone artefact was recovered during the complex assessment in Test Pit 1. Further probes excavated at 10m spacings along cardinal points failed to identify any further Aboriginal stone artefacts, and the site is interpreted as an isolated artefact. The artefact is a complete silcrete flake, red and brown, with a plunge termination.

The artefact was located in natural deposits composed of grey sandy silts. Evidence of disturbance includes some mixing of upper soil profiles, likely caused by stock trampling

No evidence was found of occupation deposits or features (Appendix 7 – Glossary). No suitable sample material was available for radiometric dating or environmental analysis. The evidence demonstrates that the site most likely reflects low intensity discard behaviour resulting from very occasional and minor events of stone tool manufacture and discard.

Only one raw material type was being utilised at this site, comprising fine grained silcrete. Silcrete dominance is highly typical locally, and is consistently associated with recent sites utilising technology of the Australian Small Tool Tradition (Holdaway and Stern 2004) (Plate 10).

Plate 10

Silcrete artefact located in Test Pit 1 in the southwest of the activity area

VAHR7921-1204

Site/Place Extent

VAHR7921-1204 is located on a low lying floodplain fringing the former Koo Wee Rup Swamp. Probes carried out at 10m spacings along cardinal points failed to recover any further artefacts, and the place extent is 1m x 1m x 0.4m. Sterile deposits (Silurian clay) were encountered at a depth of 50cm (Map 14).

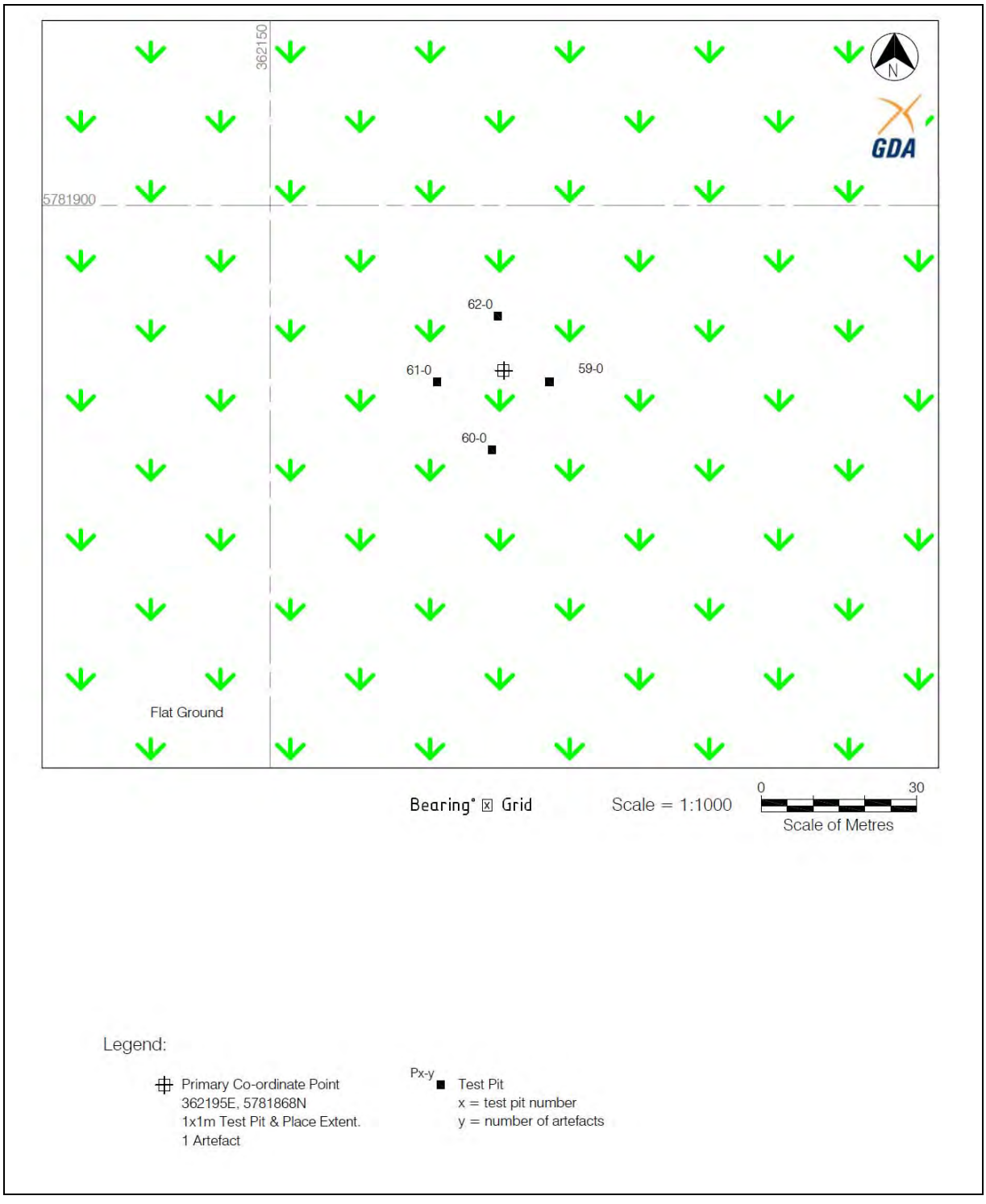
Significance

Evidence from this investigation including the low density of stone artefacts, the lack of occupation deposits or features, and the degree of site disturbance rates the place as

having extremely low scientific significance and no specific cultural significance. Lack of any spatial or temporal integrity prevents a higher scientific significance rating for this place.

Based upon technology, context and raw materials employed, the place is considered to have been formed in the recent past.

A comprehensive analysis of scientific assessment is found in Appendix 6.



Map 14 **Place Extent VAHR7921-1204**

8.2 VAHR7921-1205

Site Name:	Cardinia Road Employment Precinct 2
VAHR No.:	7921-1205
Site Type:	Very low density stone artefact scatter
MGA Co-ordinates:	363777E, 5781561N
Cadastral Description:	Lot 2, PS 507898, Bass Shire
Location:	395 Cardinia Road, Officer South, 3809
Landform/Topography:	Low lying former floodplain
Test Pits:	None – surface survey
Recovered Site Contents:	2 silcrete artefacts
Known Extent:	1.0m x 0.5m x 0.0m
Site Integrity:	Extremely Poor
Scientific Significance:	Extremely Low
Cultural Significance:	None specific / general (however see Section 5.9)

Nature

VAHR7921-1205 is a very low density surface stone artefact scatter. Two stone artefacts were recovered during the standard assessment over an area of 0.5m^2. The artefacts included one red silcrete proximal flake, and one grey silcrete complete flake (Plate 11).

Artefacts were located on the surface cutting inside a small dam. Dam construction has led to significant disturbance to the site, and site integrity can only be described as extremely poor.

It was not possible to excavate additional test pits within the dam as this would compromise the dam's integrity. Additional test pits excavated outside the dam on cardinal points failed to recover any additional artefacts, and the site extent has been determined to be the two surface artefacts within the dam cutting.

No evidence was found of occupation deposits or features (Appendix 7 – Glossary). No suitable sample material was available for radiometric dating or environmental analysis. The evidence demonstrates that the site most likely reflects low intensity discard behaviour resulting from very occasional and minor events of stone tool manufacture and discard.

Only one raw material type was being utilised at this site, comprising fine grained silcrete. Silcrete dominance is highly typical locally, and is consistently associated with recent sites utilising technology of the Australian Small Tool Tradition.

Plate 11

Silcrete artefacts located on the banks of a dam in the southeast corner of the activity area.

VAHR7921-1205

Only one raw material type was being utilised at this site, comprising fine grained silcrete. Silcrete dominance is highly typical locally, and is consistently associated with recent sites utilising technology of the Australian Small Tool Tradition (Holdaway and Stern 2004) (Plate 11).

Site/Place Extent

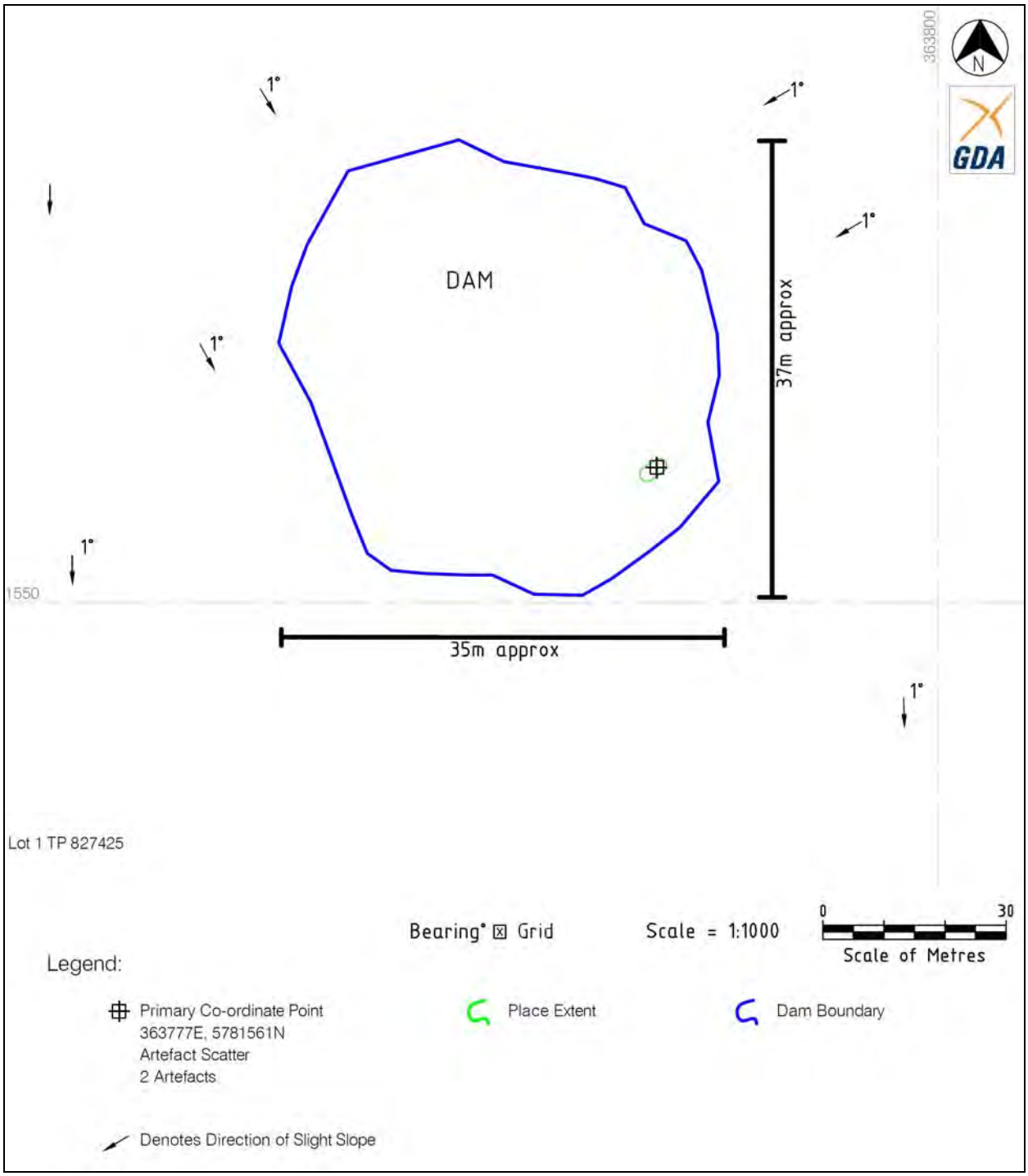
VAHR7921-1205 is located in a small dam on a low lying floodplain fringing the former Koo Wee Rup Swamp. Probes carried out along cardinal points outside the dam failed to recover any further artefacts. No sub-surface artefacts were identified, and the site extent is based upon the distribution of surface artefacts. The place extent is approximately 1.0m x 0.5m x 0.0m (0.5m^2) (Map 15).

Significance

Evidence from this investigation including the low density of stone artefacts, the lack of occupation deposits or features, and the degree of site disturbance rates the place as having extremely low scientific significance and no specific cultural significance. Lack of any spatial or temporal integrity prevents a higher scientific significance rating for this place.

Based upon technology, context and raw materials employed, the place is considered to have been formed in the recent past.

A comprehensive analysis of scientific assessment is found in Appendix 6.



Map 15 Place Extent VAHR7921-1205

8.3 Discussion

The complex assessment has revealed that Survey Units 1 is composed of recent sand silts overlying Silurian clay in excess of 400 million years old. Occasional “coffee rock” is found in sandy silt layers close to the sterile basal deposit. Survey Unit 2, initially thought to be composed of a former watercourse, was interpreted as an infilled dam, based upon clays and refuse within the sands. Soils associated with Survey Units 1 and 2 were notable for disturbance of the upper layers, most likely via cattle trampling, rodent burrowing, or vegetation clearance.

The complex assessment confirmed the findings of the desktop and standard assessments, namely:

- Places VAHR7921-1204 and 1205 are low density stone artefact scatters and are assessed as having extremely low scientific significance and no specific cultural significance (Section 9). The sites are located on low lying floodplains and have been previously disturbed by a combination of farming, and stock trampling and rubs, and dam construction.

- The complex assessment identified sub-surface soil conditions typical of floodplain locations.

- The results of the geomorphological investigation confirm the activity area as being located within the floodplains to the Koo Wee Rup Swamp, which were fed by alluvium fanning out from the Gum Scrub and Toomuc Creeks prior to their formalisation and extension to the bay.

- The floodplain landform would not have provided an attractive location for long or short term habitation as it would frequently have been wet or waterlogged for extended periods.

- The activity area has a low potential to contain low ($<30/m^2$) stone artefact scatters.

- Survey Unit 1 is composed of silts and sands overlying sterile clay, and is the most likely landform to contain Aboriginal cultural heritage value;

- Survey Unit 2 appears to be an isolated event; ie an infilled dam, and does not represent any consistent landform within the activity area;

- Any Aboriginal cultural heritage located in Survey Units 1 and 2 is likely to be composed of extremely low density stone artefact scatters in extremely disturbed contexts, and will be of extremely low scientific significance;

- Survey Unit 3 is composed of farming infrastructure including dams, sheds and houses. These were not subject to sub-surface investigation due to significant levels of previous ground disturbance;

- No grinding grooves, quarries, caves or rockshelters exist within the activity area;

- No evidence of shell middens were located within the activity area;

- No mature native trees capable of presenting cultural scarring are present within the activity area;

- The potential for Aboriginal burials to exist within the activity area is very low.

- No organic material with cultural association was identified during the sub-surface testing, and therefore no radiometric dating was carried out.

- The pH levels obtained from the sub-surface testing ranged between 4.5 and 6.5 (slightly acidic). Acidic sandy soils offer poor preservation conditions for bone and other organic materials (Gordon & Buikstra 1981).

The assessment located two Aboriginal heritage places on floodplains associated with the margins of the former Koo Wee Rup Swamp. No further Aboriginal heritage places were located within the activity area, and this suggests that areas of higher archaeological potential are located outside that activity area, such as nearby hills and elevated land such as nearby Green Hill or the dunes of Cranbourne, or the foothills to the Dandenong and Bunyip Ranges, which would have provided a wider resource range, and formed travel and trade routes.

The results of the complex assessment therefore conform to the site prediction model arrived at in the desktop and standard assessments.

Significance is discussed in Section 9, and an overall Statement of Significance is provided for this site in Section 9.1.

9 ASSESSMENT OF CULTURAL AND SCIENTIFIC SIGNIFICANCE

9.1 Aboriginal Cultural Heritage – Statement of Significance

The activity area lies within low lying former flood plains associated with the former Koo Wee Rup Swamp. This land would likely have been seasonally inundated, and not an attractive position for any long term habitation or resource exploitation. There is no particular archaeological, ethnohistorical, anthropological or cultural evidence that suggests the activity area had any particular cultural significance to past Aboriginal people.

Stone tool analysis of the artefacts recovered from VAHR7921-1204 and 1205 (Appendix 5) reveals that the assemblages bear technological traits characteristic of the Small Tool Tradition associated with the late Holocene. Overall, places VAHR7921-1204 and 1205 are very common site types found in the region. The places have a low density of stone artefacts, and no occupation deposits or features. The artefact types and raw materials are commonly found in the region. Previous ground disturbance may have further diminished their already low scientific significance. The results of this CHMP have indicated that whilst the activity area may have been subject to occasional and sporadic visitation by prehistoric Aboriginal people, it could not be described as being foci of repeated long-term habitation or resource exploitation. Other sites in the region represent much better examples of pre-Contact Aboriginal resource exploitation. Places VAHR7921-1204 and 1205 are attributed extremely low scientific significance. The WTLCCHC, BLCAC and BWFL were not able to provide any information about the specific cultural significance of VAHR7921-1204 and 1205, and therefore they have been attributed only general Aboriginal cultural significance (Table 6). Criteria used to establish significance is based upon the Burra Charter (Appendix 6 – Significance Assessment).

Table 6 Significance Assessment

Place	Scientific Significance	Cultural Significance
VAHR7921-1204	Extremely Low	No specific/General
VAHR7921-1205	Extremely Low	No specific/General

9.2 Results of the Aboriginal Cultural Heritage Assessment

The location of places VAHR7921-1204 and 1205 on floodplains within the activity area confirms the sensitivity of this landform in the region for low density artefact scatters.

Given the low artefact density, small site dimensions, and highly typical nature of stone artefact scatters VAHR7921-1204and 1205, it is not possible to describe these places as campsite. Rather, the frequent number of similar place types in the region reinforces the notion that places on the western plains represent repeated low-level sporadic resource exploitation, or represent brief stopovers, with no evidence of repeated or long term occupation. This supports the notion that areas of higher archaeological potential are located outside that activity area.

9.3 Research Questions

What site formation processes have contributed to any observed patterning of Aboriginal cultural heritage?

Minimal site formation processes have occurred at the places identified within the activity area during this assessment. VAHR7921-1204 and 1205 have had no significant formation processes as they occur in natural soil deposits. Therefore, these places contexts are indicative only of the past presence of Aboriginal people in the activity area. The places are not indicative of intense occupation, rather they represent areas where Aboriginal people passed through or stopped briefly.

What artefact types and features are found in the activity area?

The stone artefact types making up VAHR7921-1204 and 1205 include two complete flakes and one proximal flake. These artefacts are typical of the Australian Small Tool Tradition, and are commonly found in artefact assemblages throughout southeastern Australia.

No features were located in the activity area.

What cultural materials were used and where were they sourced?

The stone raw material used in creating the artefacts identified at VAHR7822-1204 and 1205 are silcrete (n=3 (100%)). This lithic material is preferred for use by Aboriginal people throughout Victoria. Silcrete was a commonly traded raw material throughout southeastern Australia. All stone materials used for artefacts identified within the two places have been imported to the activity area.

When and how long did Aboriginal people occupy the activity area?

No radiocarbon dates were acquired during this assessment and no places have been previously dated within the activity area. However, Aboriginal people have been present in the broader region from around 30,000 years BP to modern times as indicated in Section 5.1.3.

The stone tool assemblages of VAHR7921-1204 and 1205 are characteristic of the ASTT, which is believed to date to the last 6000 years. The low site density within the activity area, and low artefact density within this place does not indicate long term or repeated visitation to the activity area. It is highly probable that given the context of these artefacts, that these places were formed in the last 1,000 years.

What activities were conducted in the activity area?

The stone artefacts identified within the activity area indicate that minor knapping episodes occurred, likely for the repair and/or manufacture of microliths to maintain hunting toolkits.

Is there any intra- and inter-site variability in the Aboriginal behaviour conducted in the activity area?

Artefact assemblages of VAHR7921-1204 and 1205 contain too few artefacts to enable any meaningful inter- or intra-site comparison.

Is there any association in the activity area between Aboriginal behaviour with landform or soil type?

All Aboriginal cultural heritage was identified floodplains. Artefact and site densities within the activity area are too low to identify any association between Aboriginal behaviours and landform.

Is there any association between Aboriginal behaviour and the local distribution of ecological resources?

No inferences associating Aboriginal behaviour and ecological resources can be made for the Aboriginal heritage places (VAHR7921-1204 & 1205) due to their lack of content and individual artefact attributes. Such places are found in all ecological vegetation communities throughout Victoria.

How significant is the archaeology of the activity area to understanding the archaeology of the activity area region?

The lack of Aboriginal cultural heritage material, and the materials lack of attributes does not allow for meaningful comparative information on a regional basis. The results of this assessment have indicated that the activity area has locations that were utilised by past Aboriginal people infrequently and broadly conforms to previous studies in the region (eg Rhodes & Bell 2004). These places further support the notion that the area was part of day to day hunting and foraging rather than base camps.

The raw material used corresponds to archaeological deposits identified during previous investigations.

9.4 Potential Research Value

The Aboriginal cultural heritage identified during this CHMP comprises two very low density surface stone artefact scatters (VAHR7921-1204 and 1205) with no meaningful contextual information. Such places do not have the potential to address or contribute to current research questions.

The stone artefacts identified during the standard and complex assessments are typical of the Australian Small Tool Tradition, and are commonly found in artefact assemblages throughout southeastern Australia.

All of these aspects constrain the potential to address or contribute to current research questions, and therefore no salvage of these sites can be justified on scientific grounds.

Map Courtesy of Client

Map 16 Concept Plan with Aboriginal heritage places

Archaeology At Tardis Pty Ltd, *cultural heritage advisors*

10 CONSIDERATION OF SECTION 61 MATTERS – IMPACT ASSESSMENT

Cultural heritage management is a legal, ethical and scientific process that aims to reconcile the interests of various stakeholders including the land owner/developer, traditional owners (for Aboriginal cultural heritage), government agencies and relevant community groups. Appropriate cultural heritage management seeks to avoid any harm to cultural heritage places by a high impact activity. The most common type of harm is associated with developments that disturb or modify the ground surface, which are typically residential, industrial and infrastructure developments. Any activity that exposes or disturbs in any way the fabric or content of a place reduces its scientific significance. Places can be impacted if their context is reduced to a point where there are no other related reference features in the local landscape to provide context and therefore broader interpretation of a site. This is referred to as the level of cultural landscape integrity. The place recorded during this CHMP lies within an area that will be subject to high impact as part of the activity. Management requirements of heritage places are related directly to significance, and whether any benefit can be achieved from salvage.

10.1 Section 61 Matters in Relation to VAHR7921-1204

VAHR7921-1204 is a low density sub-surface stone artefact scatter located in ploughed paddock. It has extremely low scientific significance, and only general cultural significance. Test pits carried out at 5m spacings along cardinal points from the artefact bearing test pit failed to recover any additional artefacts.

Can harm to VAHR7921-1204 be avoided?

Harm to VAHR7921-1204 cannot be avoided as the area is located in wildlife habitat and requires significant landscape modification to accommodate Growling Grass Frog ponds and native ecosystem rehabilitation (Map 16).

Can harm to VAHR7921-1204 be minimised?

Harm to VAHR7921-1204 cannot be minimised as the area is located in wildlife habitat and requires significant landscape modification to accommodate Growling Grass Frog ponds and native ecosystem rehabilitation (Map 16).

Are specific measures needed for the management of to VAHR7921-1204?

No specific measures are needed for the management of VAHR7921-1204 as the place has extremely low scientific significance and no specific cultural significance. The archaeological component of this place has been collected as part of this plan. Any scientific data which can be derived from the place has been recorded in the VAHR and this CHMP.

10.2 Section 61 Matters in Relation to VAHR7921-1205

VAHR7921-1205 is a low density surface stone artefact scatter located in a farmer's dam. It has extremely low scientific significance, and only general cultural significance. Test pits carried out around the perimeter of the dam failed to recover any additional artefacts.

Can harm to VAHR7921-1205 be avoided?

VAHR7921-1205 is a surface artefact scatter located in a farm dam. Harm to VAHR7921-1205 cannot be avoided as the area is located in a wildlife corridor and requires significant landscape modification to accommodate Growling Grass Frog ponds, native ecosystem rehabilitation and drainage works as part of Melbourne Water's Development Services Scheme for the Precinct (Map 16).

Can harm to VAHR7921-1205 be minimised?

VAHR7921-1205 is a surface artefact scatter in a farm dam. Modification to re-instate the dam as either a wetland or as in-filled land will mean that harm to the surface scatter cannot be minimised. The area is located in a wildlife corridor and requires significant landscape modification to accommodate Growling Grass Frog ponds, native ecosystem rehabilitation and drainage works as part of Melbourne Water's Development Services Scheme for the Precinct (Map 16).

Are specific measures needed for the management of VAHR7921-1205?

No specific measures are needed for the management of VAHR7921-1205 as the place has extremely low scientific significance and no specific cultural significance. The archaeological component of this place has been collected as part of this plan. Any scientific data which can be derived from the place has been recorded in the VAHR and this CHMP.

PART 2 – CULTURAL HERITAGE MANAGEMENT RECOMMENDATIONS

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

11 RECOMMENDATIONS

The activity will harm places VAHR7921-1204 and 1205 as earthworks will occur in these sections of the activity area (Map 16). Based on lack of research potential or likelihood of additional material, no management measures are required. No harm avoidance, minimisation or management measures are required prior to the activity commencing.

Prior to Activity:

Recommendation 1: Stone Artefact Scatter VAHR7822-1204

Stone artefact scatter VAHR7921-1204 will be impacted by the activity (Map 16). The place has extremely low scientific significance and only general cultural significance. The artefacts have been collected and recorded and a site card for the place submitted to the VAHR. Any scientific data which can be derived from the place has been recorded in the VAHR and in this CHMP.

No specific management requirements for this place apply.

Recommendation 2: Stone Artefact Scatter VAHR7822-3205

Stone artefact scatter VAHR7921-1205 will be impacted by the activity (Map 16). The place has extremely low scientific significance and only general cultural significance. The artefacts have been collected and recorded and a site card for the place submitted to the VAHR. Any scientific data which can be derived from the place has been recorded in the VAHR and in this CHMP.

No specific management requirements for this place apply.

Recommendation 3: Custody and Management of Aboriginal Cultural Heritage

The contingency plan presents the custody and management procedures in the unlikely event Aboriginal cultural heritage is found during the conduct of the activity.

For the Aboriginal cultural heritage located during this assessment, upon approval of this CHMP, the custody arrangements detailed in Contingency 1 will be adopted.

Recommendation 4: Aboriginal Heritage Information

Prior to commencing the activity, workers involved in ground disturbance activities must be provided with Aboriginal heritage information by the sponsor in the form of a booklet or induction. The AAV website (http://www.dpcd.vic.gov.au/indigenous/) contains useful heritage information, including Aboriginal heritage mini-posters which must be distributed as a booklet or during an induction.

During the Activity

Recommendation 5: Contingency Plan

During the activity, unexpected Aboriginal cultural heritage may be discovered. If any Aboriginal cultural material is identified, the appropriate contingency plan(s) must be adopted (Section 12).

Post Activity

There are no post activity recommendations.

12 CONTINGENCY PLAN

Contingency Plans are required under the *Aboriginal Heritage Act 2006*, Section 61(d) in relation to disputes, delays and other obstacles that may affect the conduct of the activity (Clause 13(1), Schedule 2 of the *Aboriginal Heritage Regulations 2007*). The sponsor must ensure that the relevant Contingency Plan is followed. To assist in this aim, a checklist has been provided (Appendix 7).

12. 1 Preamble

Contingency Plans are required under the *Aboriginal Heritage Act 2006*: Section 61(d) and the *Aboriginal Heritage Regulations 2007*: Schedule 2, Clause 13 in relation to disputes, delays, CHMP compliance, management of Aboriginal cultural heritage found during the activity and notification of discovery of Aboriginal cultural heritage. The Sponsor must ensure that the relevant Contingency Plan is followed. To assist in this aim, a checklist has been provided (Appendix 7).

The following contingency plans refer to the involvement only of a RAP(s) under the *Aboriginal Heritage Act 2006*. At the time of CHMP submission, no RAP has been appointed for the activity area.

12. 2 Contingency Items

Contingency 1 Notification of Aboriginal Cultural Heritage Discovered during works within the Activity Area

This contingency plan must be followed if any unexpected cultural heritage is suspected or discovered during the activity.

A person making such a discovery will immediately suspend any relevant works at the location and within a 10m radius of the relevant site extent. If not already in attendance, that person shall immediately notify the Project Delegate for the Sponsor who, in turn will contact a suitably qualified cultural heritage advisor as soon as practicable.

Sponsor – Project Delegate	Hilary Rutledge Co-ordinator Growth Area Planning CARDINIA SHIRE PO Box 7 Pakenham VIC 3810 Ph: 5945 4210 Mobile: 0408 923 367 Fax: (03) 5945 4273 Email: h.rutledge@cardinia.vic.gov.au

If necessary, to prevent any further disturbance, the location will be isolated by a temporary fence, safety webbing or other suitable barrier, and works may recommence outside this 10m area of exclusion. Such temporary fencing/barrier must be of a type that does not affect the ground surface (e.g. water bollards, concrete pad-based wire fencing). Any fencing requiring penetration of the ground surface must not be used.

The heritage advisor will evaluate the Aboriginal cultural heritage. If the discovery is determined to be Aboriginal cultural heritage, the heritage advisor will register as a new site, or part of an existing registration. The cultural heritage advisor must report the discovery to the Secretary as soon as practicable (in accordance with Section 24 of the *Aboriginal Heritage Act 2006*) and update (i.e. Place Inspection Form) and/or complete site records as appropriate and advise on possible management strategies.

The heritage advisor will facilitate the involvement of RAP's in the onsite investigation and assessment of significance of the Aboriginal cultural heritage.

Aboriginal artefact scatters below the moderate analytical threshold:

If the Aboriginal cultural heritage is assessed by the heritage advisor, in consultation with the RAP as cultural heritage with below moderate scientific or cultural significance, then after recording the cultural heritage, no further management is required and works may proceed. However, relocating the activity to avoid any cultural heritage must be considered and adopted where possible. The heritage advisor must submit relevant documentation to the Heritage Registrar, AAV.

Aboriginal artefact scatters equal or above the moderate analytical threshold:

If Aboriginal cultural heritage is discovered and assessed as being of moderate or above scientific significance, the heritage advisor in consultation with the RAP and the Sponsor must explore all options to avoid harm to the Aboriginal cultural heritage. If harm is unavoidable, then it must be minimised where possible and salvage excavation of the Aboriginal cultural heritage undertaken to mitigate harm if this will assist the salvage research design. In consultation with the RAP, salvage excavation methodology must be

carried out in accordance with proper archaeological practice taking into account occupational health and safety issues. After salvage works are complete, activity works may recommence. The heritage advisor must complete the appropriate Victorian Aboriginal Heritage Registry forms and submit a report to AAV detailing the results of excavations.

If human remains are discovered then Contingency 3 of this CHMP must be followed.

Within a period not exceeding three (3) working days a decision must be made by the heritage advisor in consultation with the RAP and the Sponsor as to the process to be followed for appropriate management of the Aboriginal cultural heritage, and how to proceed with the works.

Where relevant, the cultural heritage advisor, Sponsor and RAP will ensure that the above steps are followed and that legal obligations and requirements are complied with at all times.

Contingency 2 Management of Aboriginal Cultural Heritage Found During the Activity

Custody and management of cultural heritage material recovered during the process of this CHMP, and cultural heritage material discovered during the activity will be arranged by the heritage advisor in consultation with the RAP. All cultural heritage material will be appropriately recorded and labelled by the heritage advisor prior to the custody and management arrangements.

Where the RAP cannot or will not exercise their right to custody of the cultural heritage, or in the event that no RAP exists for the activity area, custody can be ascribed in the following order:

- Any relevant Native Title holder;
- Any current RAP applicant for the activity area;
- Any relevant person(s) with traditional or familial links;
- Any relevant Aboriginal body with historical or contemporary interests;
- The land owner;
- The Museum of Victoria (*Aboriginal Heritage Act 2006*: Section 61I);
- Local historical society.

Where there are two or more potential custodians of cultural heritage, these potential custodians must agree between themselves as to an appropriate management outcome for the cultural heritage within 14 days from notice of their option to be custodians of the cultural heritage material. If appropriate management has not been agreed to within 14

days, the cultural heritage advisor will proceed to the next potential custodian of the cultural material.

Contingency 3 Discovery of Skeletal Remains

** In the case of the discovery of human remains, the procedures stated in the Contingency for the Discovery of Skeletal Remains included in this plan must be followed.*

If any suspected human remains are found during any activity, works must cease. The Victoria Police and the State Coroner's Office (1300 309 519) should 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.

This advice has been developed further and is described in the following 5 step contingency plan. Any such discovery within the activity area must follow these steps.

Discovery

- If suspected human remains are discovered, all activity in the vicinity must stop to ensure minimal damage is caused to the remains; and,
- The remains must be left in place, and protected from harm or damage.

Notification

- Once suspected human skeletal remains have been found, the Coroner's Office 1300 309 519 and the Victoria Police 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 Coordination Centre must be immediately notified 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 human remains to the Secretary of the Department of Planning and Community Development (DPCD), in accordance with Section 17 of the *Aboriginal Heritage Act 2006*.
- There must be no contact with the media.
- No photographs may be taken without appropriate authorisation.

Impact Mitigation or Salvage

- The Secretary, 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 must be implemented by the sponsor.

Curation and further analysis

- The treatment of salvaged Aboriginal human remains must be in accordance with the direction of the Secretary.

Reburial

- Any reburial site(s) must be fully documented by an experienced and qualified archaeologist, clearly marked and all details provided to AAV; and

- Appropriate management measures must be implemented to ensure that the remains are not disturbed in the future.

Contingency 4 Changes to the Activity

The *Aboriginal Heritage Act 2006* does not allow for changes to the activity that are inconsistent with those described in this CHMP. If the proposed activity is inconsistent with the activities described in Section 2 of this CHMP, then a new CHMP must be prepared for that activity. For example, the activity proposed is a residential development and later changes to industrial, then this plan would be inconsistent with the revised development.

Actions which are considered as inconsistent to an approved plan are described in Part 6 (81(1)(a)(b)(c)) of the *Aboriginal Heritage Act 2006*. This section indicates that when the sponsor of an approved plan has (a) contravened or is likely to contravene the recommendations in the plan or (b) the impact on Aboriginal cultural heritage will be greater than that determined at the time the plan was approved then the Minister may order a cultural heritage audit.

A cultural heritage audit must be conducted by/or under the direction of an inspector or a cultural heritage advisor who will prepare (at the sponsors cost) a report to the Minister to determine whether a contravention to the plan has occurred. If the Minister orders a cultural heritage audit, then a stop order (Part 6, Division 2, 5.87) will also be issued to the sponsor for the activity, whilst the audit is underway. The sponsor is referred to Part 6 of the *Aboriginal Heritage Act 2006* for full details relating to management of plan inconsistencies.

Contingency 5 Dispute Resolution – CHMP Implementation and Conduct of the Activity

As a RAP is not responsible for evaluating this CHMP, there can be no dispute between the RAP and the Sponsor in relation to what is agreed to in the implementation of the CHMP or the conduct of the activity.

Contingency 6 Reviewing Compliance with this CHMP and Mechanisms for Remedying Non-Compliance

Review of this CHMP can be undertaken at any time by project delegates representing the Sponsor and AAV, or an agreed independent reviewer, to ensure that all parties are complying with the terms of this CHMP. Appendix 7 presents a checklist to assist in this aim.

If non-compliance is believed to have occurred, both the Sponsor and AAV are to be notified and mechanism(s)/management for remedying non-compliance are to be developed via consultation between the Sponsor and AAV. Once developed, the mechanism(s)/management for remedying non-compliance is/are to be undertaken as soon as practicable (within 14 days).

Under section 81 of the *Aboriginal Heritage Act* 2006, the Minister may order a cultural heritage audit to be carried out if there is reason to believe that the Sponsor has contravened, or is likely to contravene, the recommendations contained in this CHMP.

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	2006	Report on the Results of Archaeological Sub-Surface Testing at the 'Greenhills' Property, Pakenham. Report to Southeast Business Park Pty Ltd.
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APPENDIX 1 – CHMP DOCUMENTATION

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").

SECTION 1 – Sponsor Information

Name of Sponsor: CARDINIA SHIRE COUNCIL

Business Name: _____

Postal Address: HENTY WAY, PO BOX 7, PAKENHAM 3810

Telephone Number: 1300 787624 Fax number: (03) 59413784

Mob: _____

Email Address: mail@cardinia.vic.gov.au

SECTION 2 – Description of proposed activity and location

- Clearly identify the project name (if applicable),
- Clearly identify the proposed activity and its extent in respect to the area for which the plan is to be prepared (attach a copy of a title search and indicate street address where applicable).
- Attach a map (to scale, with a north arrow and indicating the municipal district - if any) that clearly identifies the area and boundaries in respect of which the cultural heritage management plan is to be prepared.

CARDINIA ROAD EMPLOYMENT PRECINCT STRUCTURE PLAN

WITHIN THE CARDINIA EMPLOYMENT CORRIDOR COMPRISING 2,500 HA OF LAND, CARDINIA SHIRE COUNCIL HAS IDENTIFIED TWO PRIORITY AREAS FOR STRUCTURE PLANNING. ONE OF THEM IS THE CARDINIA ROAD EMPLOYMENT PRECINCT. A DRAFT STRUCTURE PLAN HAS BEEN PREPARED FOR THIS PRECINCT IN CONSULTATION WITH THE STAKEHOLDERS (SEE ENCLOSED PLAN).

THE FOCUS FOR THIS CHMP IS THE ENTIRE AREA WITHIN THE STRUCTURE PLAN AS SHOWN IN THE ATTACHED MAP. IT IS APPROXIMATELY 602 HA OF UNDEVELOPED RURAL LAND.

SECTION 3 – Expected start and finish date for the cultural heritage management plan

Start date: 21 / 11 / 08 Finish date: 21 / 05 / 09

SECTION 4 – Contact details for land owner/manager (where different to sponsor).

SEE ATTACHED LANDOWNERS LIST.

SECTION 5 – List the relevant registered Aboriginal parties (if any)

This section should only be completed where there is a registered Aboriginal party in relation to the Plan

SECTION 6 – Signature of Sponsor

I certify that to the best of my knowledge and belief that the information supplied is correct and complete.

Signed: _____ Date: 21 / 11 / 05

[Sponsor]

SECTION 7 – Checklist

☑ Ensure appropriate attachment/s are completed and attached to this notification (see section 2 of this form).

Please ensure this notice and all attached items are sent to the:

Deputy Director

Aboriginal Affairs Victoria

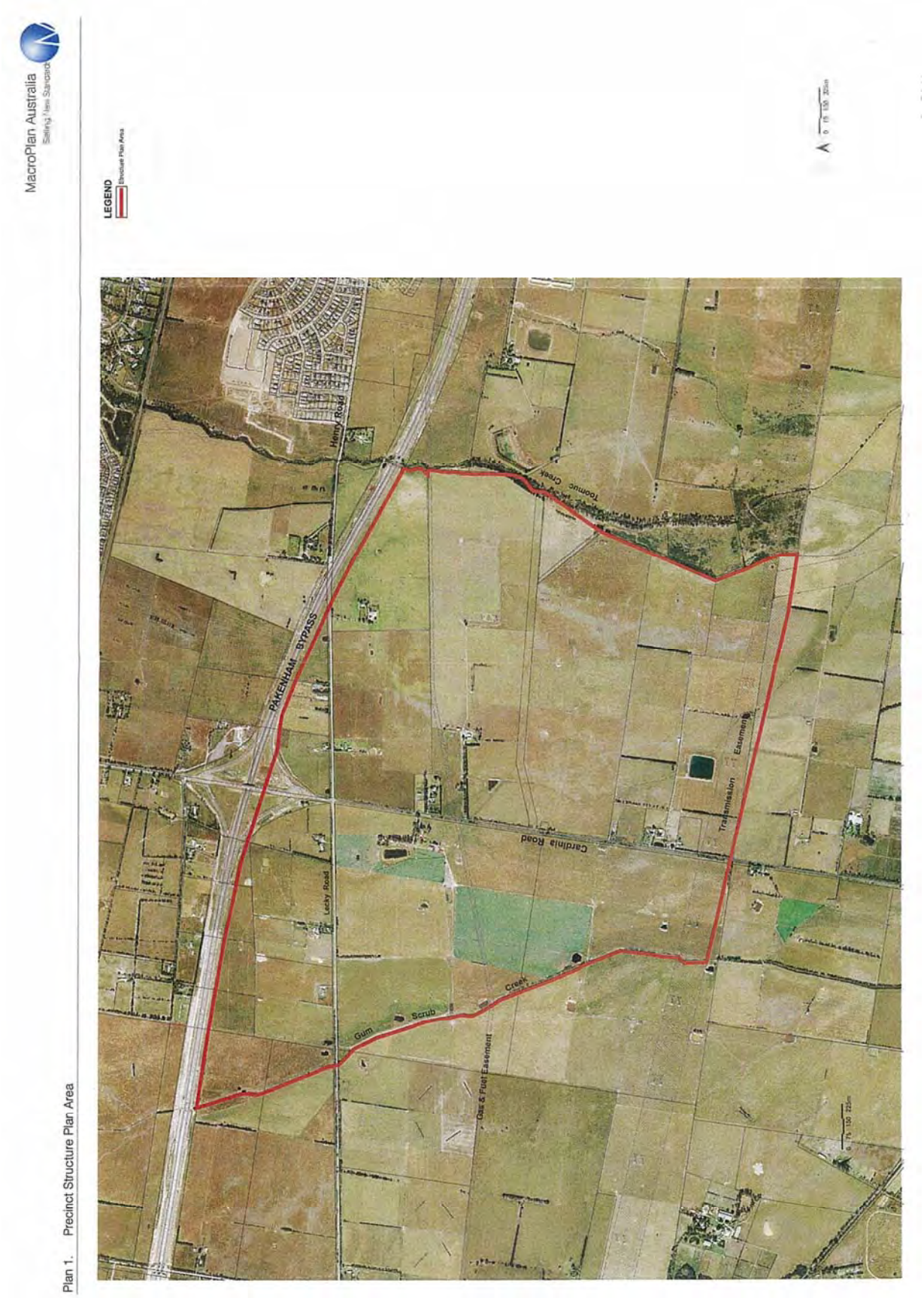
Department for Victorian Communities

GPO Box 2392

MELBOURNE VIC 3001

Notes:

- **Ensure that any relevant registered Aboriginal party/s are also notified. 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.**



Plan 1. Precinct Structure Plan Area

List of Landowners

Address	Cadastral Description	Land Owner/Occupier
185 Officer South Rd, Officer	Lot 2 PS549475 V9951 F963	VicUrban Pty Ltd
185 Officer South Rd, Officer	TP5145 CA 20 Parish of Pakenham	VicUrban Pty Ltd
70 Lecky Rd, Officer	Lot 1 TP108874	P & A Horvath
70 Lecky Rd, Officer	Lot 1 TP108873	P & A Horvath
70 Lecky Rd, Officer	Lot 1 TP108872	P & A Horvath
70 Lecky Rd, Officer	Lot 1 TP97074	P & A Horvath
100 Lecky Rd, Officer	Lot 1 TP250457	FJ Horvath
70 Lecky Rd, Officer	Lot 6 LP13491	P & A Horvath
70 Lecky Rd, Officer	Lot 1 TP135373	P & A Horvath
20 Lecky Rd, Officer	Lot 1 TP102981	Parklea Pty Ltd
25 Enterprise Rd, Pakenham	Lot 1 TP109260	Portbury Development Co Pty Ltd
45 Enterprise Rd, Pakenham	Lot 1 PS609571 V11036 F793	Portbury Development Co Pty Ltd
55 Enterprise Rd, Pakenham	Lot 2 PS609571 V11036 F794	B & K Dickson
Enterprise Rd, Pakenham	Lot 4 PS546337 V10939 F559	Portbury Development Co Pty Ltd
26 Enterprise Rd, Pakenham	Lot 2 PS436220	AG & JM & KM Selimi
92 Enterprise Rd, Pakenham	Lot 1 TP99673	Henry Road Investments Pty Ltd
275 Cardinia Rd, Pakenham	Lot 1 PS436220 V10559 F138	CS Bonney & DJ Chatfield
285 Cardinia Rd, Officer South	TP830910 CA 7D	Parklea Pty Ltd
295 Cardinia Rd, Officer South	TP397801 CA 7C	McMullin Commercial P/L & Baylin Park Pty Ltd
Cardinia Rd, Officer South	Parish of Pakenham Allot. 2009	Road Reserve
Lecky Road, Officer	Lot 2 PS602663 V11049 F194	MJE Beck & Gleneagles Country Club Pty Ltd
270 Cardinia Rd, Officer South	Lot 1 TP542938	Parklea Pty Ltd
270 Cardinia Rd, Officer South	Lot 1 TP400532	Parklea Pty Ltd
Cardinia Rd, Officer South	TP488187 CA 6D	G Hall
Cardinia Rd, Officer South	TP488375 CA 6A	G Hall
Princes Freeway, Officer South	CA 51H Parish of Nar-Nar-Goon	Road Reserve
365 Cardinia Rd, Officer South	Lot 3 PS411234	BS & KP Koolstra
395 Cardinia Rd, Officer South	Lot 1 PS411234	V & C Vincenzino
395 Cardinia Rd, Officer South	Lot 2 PS507898	V & C Vincenzino
395 Cardinia Rd, Officer South	Lot 1 PS507898U (WAS L2 P411234H)	V & C Vincenzino
465 Cardinia Rd, Officer South	CA Pt 5 Parish of Pakenham	RW & PE Wuchatsch
270 Cardinia Rd, Officer South	Lot 1 TP8153 Parish of Pakenham	Parklea Pty Ltd
270 Cardinia Rd, Officer South	Lot 8 LP1336	Parklea Pty Ltd

Our Ref: 90-15-145

Date: 17/12/2008

CARDINIA

<Name & Address Details> ***(See list attached)***

Dear <Name>,

Re: Cardinia Road Employment Precinct Structure Plan
Notice of Intent to Prepare a Cultural Heritage Management Plan

Cardinia Shire Council is sponsoring a Cultural Heritage Management Plan for the Cardinia Road Employment Precinct Structure Plan area.

As required under the Aboriginal Heritage Act 2006, all land owners within the Cardinia Road Employment Precinct are being sent a copy of the notice. Please note, this is for information purposes only and no action is required.

Yours sincerely,

John Holland
Manager Strategic Planning

INVESTOR IN PEOPLE

Cardinia Shire Council
ABN 322 109 06807
Municipal Offices
Henty Way
Pakenham

PO Box 7
Pakenham
3810
(DX 81006)

Tel: 1300 787 624
Fax: (03) 5941 3784
Email:
mail@cardinia.vic.gov.au
Web:
www.cardinia.vic.gov.au

Department of Planning and Community Development

1 Spring Street
Melbourne, Victoria 3000
GPO Box 2392
Melbourne, Victoria 3001
Australia
Telephone (03) 9208 3333
Facsimile (03) 9208 3680

8 December 2008

CARDINIA SHIRE COUNCIL
REPLY ACTION J Holland
REC'D 11 DEC 2008
m Kelly (1)
COMMENT INFORMATION
FILE REF 90-15-145

Cardinia Shire Council
PO Box 7
PAKENHAM VIC 3810

Dear Sir / Madam,

NOTICE OF INTENT TO PREPARE A CULTURAL HERITAGE MANAGEMENT PLAN, CARDINIA ROAD EMPLOYMENT PRECINCT STRUCTURE PLAN, OFFICER.

I am writing to acknowledge your written notice of intention to prepare a management plan, dated 25 November 2008, for Cardinia Road Employment Precinct Structure Plan, Officer.

Your notification has been allocated the AAV Project Number **10656**. Please quote this number when making any future enquires to AAV regarding this plan.

There is currently no relevant registered Aboriginal party in relation to the proposed activity area. Therefore, AAV will evaluate the plan when completed.

Please contact Ms Liz Kilpatrick, Acting Coordinator - Heritage Assessments directly on (telephone) 9208 3268 if you have enquiries regarding this advice. For any other enquiries relating to the *Aboriginal Heritage Act* 2006, please contact the AAV Heritage Policy Team on (free call) 1800 762 003.

Yours sincerely

IAN HAMM
Deputy Director
Aboriginal Affairs Victoria

Victoria
The Place To Be

APPENDIX 2 – PREVIOUSLY REGISTERED ABORIGINAL HERITAGE PLACES WITHIN THE GEOGRAPHIC REGION

Aboriginal Place No	Aboriginal Place Name	Component Type
7921-0198	TOOMUC CREEK 1	Artefact Scatter
7921-0199	TOOMUC CREEK 2	Artefact Scatter
7921-0200	HENRY ROAD SS7	Artefact Scatter
7921-0224	GUM SCRUB CREEK	Artefact Scatter
7921-0397	TOOMUC CK 8	Artefact Scatter
7921-0404	TOOMUC CRK 9	Artefact Scatter
7921-0471	LAKESIDE SITE 3	Artefact Scatter
7921-0472	LAKESIDE SITE 2	Artefact Scatter
7921-0473	LAKESIDE SITE 1	Artefact Scatter
7921-0495	DELFIN 1	Artefact Scatter
7921-0496	DELFIN 2	Artefact Scatter
7921-0512	PAKENHAM LAKESIDE SITE 6	Artefact Scatter
7921-0513	PAKENHAM LAKESIDE SITE 7	Artefact Scatter
7921-0514	PAKENHAM LAKESIDE SITE 8	Artefact Scatter
7921-0515	PAKENHAM LAKESIDE SITE 9	Artefact Scatter
7921-0516	PAKENHAM LAKESIDE SITE 10	Artefact Scatter
7921-0517	PAKENHAM LAKESIDE SITE 11	Artefact Scatter
7921-0518	PAKENHAM LAKESIDE SITE 12	Artefact Scatter
7921-0522	PAKENHAM LAKESIDE SITE 16	Artefact Scatter
7921-0537	HERITAGE SPRINGS 1	Artefact Scatter
7921-0538	HERITAGE SPRINGS 2	Artefact Scatter
7921-0539	HERITAGE SPRINGS 3	Artefact Scatter
7921-0590	CHS 6	Artefact Scatter
7921-0591	CHS 7	Artefact Scatter
7921-0592	CHS 8	Artefact Scatter
7921-0593	CHS 9	Artefact Scatter
7921-0594	CHS 10	Artefact Scatter
7921-0595	CHS 11	Artefact Scatter
7921-0603	MYA-LONG IA1	Artefact Scatter
7921-0604	MYA-LONG AS1	Artefact Scatter
7921-0606	WYEE-LING	Artefact Scatter
7921-0612	OF-1 OFFICER FARM	Artefact Scatter
7921-0613	OF 2 - OFFICER FARM	Artefact Scatter
7921-0629	MYA-LONG AS2	Artefact Scatter
7921-0630	MYA-LONG IA2	Artefact Scatter
7921-0631	MYA-LONG IA3	Artefact Scatter
7921-0632	MYA-LONG IA4	Artefact Scatter
7921-0633	MYA-LONG IA5	Artefact Scatter
7921-0634	MYA-LONG IA6	Artefact Scatter
7921-0635	MYA-LONG IA7	Artefact Scatter
7921-0636	MYA-LONG IA8	Artefact Scatter
7921-0637	MYA-LONG IA9	Artefact Scatter
7921-0638	MYA-LONG IA10	Artefact Scatter
7921-0653	PAKENHAM LAKESIDE 4/5	Artefact Scatter
7921-0653	PAKENHAM LAKESIDE 4/5	Earth Feature
7921-0653	PAKENHAM LAKESIDE 4/5	Earth Feature
7921-0687	PAKENHAM SCHOOL SITE	Artefact Scatter
7921-0741	PB1 N13	Artefact Scatter
7921-0769	HENRY ROAD	Artefact Scatter
7921-0779	CARDINIA ROAD AS1	Artefact Scatter
7921-0780	CARDINIA ROAD AS2	Artefact Scatter
7921-0780	CARDINIA ROAD AS2	Object Collection

Aboriginal Place No	Aboriginal Place Name	Component Type
7921-0781	CARDINIA ROAD AS3	Artefact Scatter
7921-0782	CARDINIA ROAD IA1	Artefact Scatter
7921-0783	CARDINIA ROAD AS4	Artefact Scatter
7921-0787	PBM 1	Artefact Scatter
7921-0788	PBM 2	Artefact Scatter
7921-0789	PBM 3	Artefact Scatter
7921-0790	PBM 4	Artefact Scatter
7921-0799	PB 5	Artefact Scatter
7921-0802	PB 8	Artefact Scatter
7921-0816	HENRY ROAD SS1	Artefact Scatter
7921-0817	HENRY ROAD SS2	Artefact Scatter
7921-0818	HENRY ROAD SS3	Artefact Scatter
7921-0819	HENRY ROAD SS4	Artefact Scatter
7921-0820	HENRY ROAD SS5	Artefact Scatter
7921-0835	HENRY ROAD SS8	Artefact Scatter
7921-0836	HENRY ROAD SS9	Artefact Scatter
7921-0837	HENRY ROAD SS10	Artefact Scatter
7921-0865	PB2M1	Artefact Scatter
7921-0876	EGERTON 1	Artefact Scatter
7921-0923	HENRY ROAD SS11	Artefact Scatter
7921-0924	HENRY ROAD SS12	Artefact Scatter
7921-1163	HENRY RD SUB-SURFACE ARTEFACT DEPOSIT 1	Artefact Scatter
7921-1163	HENRY RD SUB-SURFACE ARTEFACT DEPOSIT 1	Object Collection
7921-1164	HENRY RD SUB-SURFACE ARTEFACT DEPOSIT 2	Artefact Scatter
7921-1164	HENRY RD SUB-SURFACE ARTEFACT DEPOSIT 2	Object Collection
7921-1165	HENRY RD SUB-SURFACE ARTEFACT DEPOSIT 3	Artefact Scatter
7921-1165	HENRY RD SUB-SURFACE ARTEFACT DEPOSIT 3	Object Collection
7921-1169	HENRY ROAD TOOMUC CREEK	Artefact Scatter
7921-1204	CARDINIA ROAD EMPLOYMENT PRECINCT (CREP) 1	Artefact Scatter
7921-1205	CARDINIA ROAD EMPLOYMENT PRECINCT (CREP) 2	Artefact Scatter
7921-1211	HERITAGE SPRINGS 9	Artefact Scatter
7921-1211	HERITAGE SPRINGS 9	Object Collection
7921-1212	HERITAGE SPRINGS 10	Object Collection
7921-1213	HERITAGE SPRINGS 11	Artefact Scatter
7921-1213	HERITAGE SPRINGS 11	Object Collection
7921-1214	HERITAGE SPRINGS 4	Artefact Scatter
7921-1214	HERITAGE SPRINGS 4	Object Collection
7921-1215	HERITAGE SPRINGS 5	Artefact Scatter
7921-1215	HERITAGE SPRINGS 5	Object Collection
7921-1216	HERITAGE SPRINGS 6	Object Collection
7921-1217	HERITAGE SPRINGS 7	Artefact Scatter
7921-1217	HERITAGE SPRINGS 7	Object Collection
7921-1218	HERITAGE SPRINGS 8	Artefact Scatter
7921-1218	HERITAGE SPRINGS 8	Object Collection
7921-1225	KARA 1	Artefact Scatter
7921-1225	KARA 1	Object Collection
7921-1226	KARA 2	Artefact Scatter
7921-1226	KARA 2	Object Collection
7921-1227	KARA 3	Artefact Scatter
7921-1227	KARA 3	Object Collection
7921-1234	HERITAGE SPRINGS SOUTH 2	Artefact Scatter
7921-1234	HERITAGE SPRINGS SOUTH 2	Object Collection

Aboriginal Place No	Aboriginal Place Name	Component Type
7921-0001	Heritage Springs South Artefact Scatter 1	Artefact Scatter
7921-1216	HERITAGE SPRINGS 6	Artefact Scatter
7921-1307	Edenbrook 1	Artefact Scatter
7921-1306	Edenbrook 2	Artefact Scatter
7921-1212	HERITAGE SPRINGS 10	Artefact Scatter
7921-1414	Toomuc Creek Isolated Artefact1	Artefact Scatter
7921-1407	Toomuc Creek Isolated Artefact 2	Artefact Scatter
7921-1421	Henry Road Recreation Reserve 1	Artefact Scatter
7921-1422	Henry Road Recreation Reserve 2	Artefact Scatter

APPENDIX 3 – VAHR PLACE GAZETEER

VAHR #	Site Type	Co-ordinates – GDA94, Zone 55 (derived by dGPS with accuracy of <1.0m)	
		Easting	Northing
7921-1204	Stone Artefact Scatter	362195	5781868
7921-1205	Stone Artefact Scatter	363777	5781561

APPENDIX 4 – TEST PIT DATA

Test Pit Co-ordinates (MGA 94) and Dimensions

Test Pit #	Easting	Northing	Dimensions (m)	Contents
1	362195	5781868	1.0 x 1.0 x 0.70	1 silcrete artefact
2	363703	5781890	1.0 x 1.0 x 0.95	None
3	362867	5783934	1.0 x 1.0 x 0.60	None
4	362460	5782750	1.0 x 1.0 x 0.55	None
5	361447	5783996	1.0 x 1.0 x 0.55	None
6	363753	5781701	0.30 Ø x 0.55	None
7	363668	5781758	0.30 Ø x 0.70	None
8	363588	5781815	0.30 Ø x 0.55	None
9	363512	5781870	0.30 Ø x 0.50	None
10	363230	5781942	0.30 Ø x 0.35	None
11	363189	5782031	0.30 Ø x 0.32	None
12	363148	5782120	0.30 Ø x 0.45	None
13	363107	5782079	0.30 Ø x 0.74	None
14	363066	5782300	0.30 Ø x 0.66	None
15	362268	5781966	0.30 Ø x 0.90	None
16	362231	5782057	0.30 Ø x 0.75	None
17	362192	5782150	0.30 Ø x 0.57	None
18	362154	5782242	0.30 Ø x 0.48	None
19	362114	5782336	0.30 Ø x 0.55	None
20	362074	5782428	0.30 Ø x 0.58	None
21	362038	5782523	0.30 Ø x 0.62	None
22	362000	5782616	0.30 Ø x 0.57	None
23	361913	5782059	0.30 Ø x 0.80	None
24	361903	5782204	0.30 Ø x 0.50	None
25	361098	5784455	0.30 Ø x 0.65	None
26	361165	5784392	0.30 Ø x 0.65	None
27	361236	5784347	0.30 Ø x 0.57	None
28	361304	5784250	0.30 Ø x 0.75	None
29	361377	5784174	0.30 Ø x 0.80	None
30	361449	5784100	0.30 Ø x 0.58	None
31	361520	5784025	0.30 Ø x 0.50	None
32	361501	5783832	0.30 Ø x 0.40	None
33	361385	5783976	0.30 Ø x 0.58	None
34	363059	5783975	0.30 Ø x 0.75	None
35	363157	5783942	0.30 Ø x 0.40	None
36	363252	5783905	0.30 Ø x 0.67	None
37	363346	5783863	0.30 Ø x 0.38	None
38	363442	5783818	0.30 Ø x 0.52	None

Test Pit #	Easting	Northing	Dimensions (m)	Contents
39	361573	5783368	0.30 Ø x 0.49	None
40	361646	5783301	0.30 Ø x 0.81	None
41	361729	5783240	0.30 Ø x 0.75	None
42	361807	5783180	0.30 Ø x 0.45	None
43	361891	5783119	0.30 Ø x 0.51	None
44	361976	5783062	0.30 Ø x 0.43	None
45	362741	5783108	0.30 Ø x 0.62	None
46	362824	5783046	0.30 Ø x 0.81	None
47	362902	5782987	0.30 Ø x 0.65	None
48	362986	5782926	0.30 Ø x 0.41	None
49	363071	5782869	0.30 Ø x 0.81	None
50	363864	5783224	0.30 Ø x 0.75	None
51	363921	5783135	0.30 Ø x 0.60	None
52	363980	5783049	0.30 Ø x 0.43	None
53	364035	5782963	0.30 Ø x 0.55	None
54	364085	5782880	0.30 Ø x 0.64	None
55	363782	5781570	0.4 x 0.4 x 0.50	None
56	363767	5781551	0.4 x 0.4 x 0.60	None
57	363746	5781571	0.4 x 0.4 x 0.56	None
58	363761	5781588	0.4 x 0.4 x 0.41	None
59	362204	5781866	0.4 x 0.4 x 0.73	None
60	362193	5781853	0.4 x 0.4 x 0.45	None
61	362182	5781866	0.4 x 0.4 x 0.47	None
62	362194	5781879	0.4 x 0.4 x 0.65	None

Test Pit Logs

Test Pit #	Landform	Disturbance	Profile Description	Artefact Density /m²	pH
1	LL, FP	VC,OR	[1] 0-25cm light grey silt 10YR5/2, dry, hard [2] 25-35cm light grey silt 10YR5/4, dry, hard [3] 35-52cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 52cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	1	6.0-6.5
2	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/3, dry, hard [2] 15-22cm yellow grey brown mottled clayey silt 10YR4/4, dry, hard [3] 22-78cm light grey brown silty sand 10YR5/3, dry, hard [4] 78-124cm yellow grey brown sand 10YR5/4, moist, firm [5] 124-142cm light grey orange silty clay, moist, firm 10YR5/6 [6] 142-146cm dark brown sand, moist, firm 10YR3/4 [7]146-150cm+orange clay, wet 10YR5/8	0	6.0-6.5
3	LL, FP	VC,OR	[1] 0-32cm light grey silt 10YR5/2, dry, hard [2] 32-40/51cm light grey silt 10YR5/4, dry, hard [3] 40/51-60cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0-6.5
4	LL, FP	VC,OR	[1] 0-25cm light grey silt 10YR5/2, dry, hard [2] 25-44cm light grey silt 10YR5/4, dry, hard [3] 44-60cm+ orange brown clay 10YR6/5 and 10YR5/2, moist hard	0	6.0
5	LL, FP	VC,OR	[1] 0-15cm light grey silt 7.5YR4/2, dry, hard [2] 28/36cm light grey silt 10YR5/4, dry, hard [3] 44-60cm+ orange brown clay 10YR6/5 and 10YR5/2, moist hard	0	5.5-6.0
6	LL, FP	VC,OR	[1] 0-25cm light grey silt 10YR5/2, dry, hard [2] 25-40cm light grey silt 10YR5/4, dry, hard [3] 40-50cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 50-55cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.0-6.0
7	LL, FP	VC,OR	[1] 0-30cm light grey silt 10YR5/2, dry, hard [2] 30-50cm light grey silt 10YR5/4, dry, hard [3] 50-70cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 70cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0-6.5
8	LL, FP	VC,OR	[1] 0-25cm light grey silt 10YR5/2, dry, hard [2] 25-50cm light grey silt 10YR5/4, dry, hard [3] 50-55cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 55cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.0
9	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-35cm light grey silt 10YR5/4, dry, hard [3] 35-50cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.5

Test Pit #	Landform	Disturbance	Profile Description	Artefact Density /m²	pH
10	LL, FP	VC,OR	[1] 0-25cm light grey silt 10YR5/2, dry, hard [2] 25-35cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.0-6.0
11	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-32cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.0
12	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-45cm light grey silt 10YR5/4, dry, hard [3] 45cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0
13	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-45cm light grey silt 10YR5/4, dry, hard [3] 45cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.5
14	LL, FP	VC,OR	[1] 0-23cm light grey silt 10YR5/2, dry, hard [2] 23-60cm light grey silt 10YR5/4, dry, hard [3] 60-74cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.5
15	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/2, dry, hard [2] 15-55cm light grey silt 10YR5/4, dry, hard [3] 55-66cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5
16	LL, FP	VC,OR	[1] 0-35cm light grey silt 10YR5/2, dry, hard [2] 35-84cm light grey silt 10YR5/4, dry, hard [3] 84-90cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0
17	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-35cm light grey silt 10YR5/4, dry, hard [3] 35-75cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.0
18	LL, FP	VC,OR	[1] 0-14cm light grey silt 10YR5/2, dry, hard [2] 14-40cm light grey silt 10YR5/4, dry, hard [3] 40-57cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.0
19	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/2, dry, hard [2] 15-30cm light grey silt 10YR5/4, dry, hard [3] 30-48cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.5
20	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-40cm light grey silt 10YR5/4, dry, hard [3] 40-55cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.0
21	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/2, dry, hard [2] 15-37cm light grey silt 10YR5/4, dry, hard [3] 37-58cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0

Test Pit #	Landform	Disturbance	Profile Description	Artefact Density /m²	pH
22	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/2, dry, hard [2] 15-30cm light grey silt 10YR5/4, dry, hard [3] 30-62cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0
23	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-28cm light grey silt 10YR5/4, dry, hard [3] 28-57cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.5
24	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-70cm light grey silt 10YR5/4, dry, hard [3] 70-80cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.0
25	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/2, dry, hard [2] 15-45cm light grey silt 10YR5/4, dry, hard [3] 45-50cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.0-6.0
26	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-27cm light grey silt 10YR5/4, dry, hard [3] 27-60cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 60-65cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.5
27	LL, FP	VC,OR	[1] 0-13cm light grey silt 10YR5/2, dry, hard [2] 13-25cm light grey silt 10YR5/4, dry, hard [3] 25-40cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 40-65cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0
28	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/2, dry, hard [2] 15-23cm light grey silt 10YR5/4, dry, hard [3] 23-43cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 43-57cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.0
29	LL, FP	VC,OR	[1] 0-18cm light grey silt 10YR5/2, dry, hard [2] 18-35cm light grey silt 10YR5/4, dry, hard [3] 35-52cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 52-75cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0
30	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/2, dry, hard [2] 15-65cm light grey silt 10YR5/4, dry, hard [3] 65-80cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.5
31	LL, FP	VC,OR	[1] 0-14cm light grey silt 10YR5/2, dry, hard [2] 14-25cm light grey silt 10YR5/4, dry, hard [3] 25-50cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 50-58cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5

Test Pit #	Landform	Disturbance	Profile Description	Artefact Density /m²	pH
32	LL, FP	VC,OR	[1] 0-12cm light grey silt 10YR5/2, dry, hard [2] 12-24cm light grey silt 10YR5/4, dry, hard [3] 24-50cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5
33	LL, FP	VC,OR	[1] 0-10cm light grey silt 10YR5/2, dry, hard [2] 10-20cm light grey silt 10YR5/4, dry, hard [3] 20-40cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.0
34	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/2, dry, hard [2] 15-23cm light grey silt 10YR5/4, dry, hard [3] 23-58cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.5
35	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/2, dry, hard [2] 15-35cm light grey silt 10YR5/4, dry, hard [3] 35-50cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 50-75cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.5
36	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-27cm light grey silt 10YR5/4, dry, hard [3] 27-30cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 30-32cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.0
37	LL, FP	VC,OR	[1] 0-12cm light grey silt 10YR5/2, dry, hard [2] 12-25cm light grey silt 10YR5/4, dry, hard [3] 25-27cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.5
38	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-29cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [3] 29cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0
39	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-26cm light grey silt 10YR5/4, dry, hard [3] 26cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0
40	LL, FP	VC,OR	[1] 0-20cm light grey silt 10YR5/2, dry, hard [2] 20-30cm light grey silt 10YR5/4, dry, hard [3] 30-54cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 54cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5
41	LL, FP	VC,OR	[1] 0-12cm light grey silt 10YR5/2, dry, hard [2] 12cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0
42	LL, FP	VC,OR	[1] 0-8cm light grey silt 10YR5/2, dry, hard [2] 8-20cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard		6.0

Test Pit #	Landform	Disturbance	Profile Description	Artefact Density /m²	pH
43	LL, FP	VC,OR	[1] 0-10cm light grey silt 10YR5/2, dry, hard [2] 10-40cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [3] 40-60cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.5
44	LL, FP	VC,OR	[1] 0-10cm light grey silt 10YR5/2, dry, hard [2] 10-25cm light grey silt 10YR5/4, dry, hard [3] 25-50cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 50cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.5
45	LL, FP	VC,OR	[1] 0-5cm light grey silt 10YR5/2, dry, hard [2] 5-40cm light grey silt 10YR5/4, dry, hard [3] 40-50cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 50cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0-6.5
46	LL, FP	VC,OR	[1] 0-5cm light grey silt 10YR5/2, dry, hard [2] 5-30cm light grey silt 10YR5/4, dry, hard [3] 30-39cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 39cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0-6.5
47	LL, FP	VC,OR	[1] 0-5cm light grey silt 10YR5/2, dry, hard [2] 5-40cm light grey silt 10YR5/4, dry, hard [3] 40-55cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 55cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.0
48	LL, FP	VC,OR	[1] 0-5cm light grey silt 10YR5/2, dry, hard [2] 5-53cm light grey silt 10YR5/4, dry, hard [3] 53-73cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 73cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0
49	LL, FP	VC,OR	[1] 0-5cm light grey silt 10YR5/2, dry, hard [2] 5-60cm light grey silt 10YR5/4, dry, hard [3] 60-90cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 90cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0
50	LL, FP	VC,OR	[1] 0-5cm light grey silt 10YR5/2, dry, hard [2] 5-34cm light grey silt 10YR5/4, dry, hard [3] 34-47cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 47cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.5
51	LL, FP	VC,OR	[1] 0-5cm light grey silt 10YR5/2, dry, hard [2] 5-20cm light grey silt 10YR5/4, dry, hard [3] 20-25cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 25cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5

Test Pit #	Landform	Disturbance	Profile Description	Artefact Density /m²	pH
52	LL, FP	VC,OR	[1] 0-5cm light grey silt 10YR5/2, dry, hard [2] 5-60cm light grey silt 10YR5/4, dry, hard [3] 60-75cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 75cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0-6.5
53	LL, FP	VC,OR	[1] 0-14cm light grey silt 10YR5/2, dry, hard [2] 14-38cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [3] 38-57cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5
54	LL, FP	VC,OR	[1] 0-10cm light grey silt 10YR5/2, dry, hard [2] 10-45cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [3] 45-51cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.0
55	LL, FP	VC,OR	[1] 0-14cm light grey silt 10YR5/2, dry, hard [2] 14-41cm light grey silt 10YR5/4, dry, hard [3] 41-50cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	4.5-6.5
56	LL, FP	VC,OR	[1] 0-22cm light grey silt 10YR5/2, dry, hard [2] 22-50cm light grey silt 10YR5/4, dry, hard [3] 50-60cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	4.5-6.0
57	LL, FP	VC,OR	[1] 0-10cm light grey silt 10YR5/2, dry, hard [2] 10-35cm light grey silt 10YR5/4, dry, hard [3] 35-56cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 56cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.5
58	LL, FP	VC,OR	[1] 0-8cm light grey silt 10YR5/2, dry, hard [2] 8-24cm light grey silt 10YR5/4, dry, hard [3] 24-41cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 41cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	4.5-6.0
59	LL, FP	VC,OR	[1] 0-22cm light grey silt 10YR5/2, dry, hard [2] 22-40cm light grey silt 10YR5/4, dry, hard [3] 40-65cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 65-73cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5-6.5
60	LL, FP	VC,OR	[1] 0-15cm light grey silt 10YR5/2, dry, hard [2] 15-27cm light grey silt 10YR5/4, dry, hard [3] 27-37cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 37-45cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0

Test Pit #	Landform	Disturbance	Profile Description	Artefact Density /m²	pH
61	LL, FP	VC,OR	[1] 0-17cm light grey silt 10YR5/2, dry, hard [2] 17-25cm light grey silt 10YR5/4, dry, hard [3] 25-40cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 40-47cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	5.5
62	LL, FP	VC,OR	[1] 0-10cm light grey silt 10YR5/2, dry, hard [2] 10-35cm light grey silt 10YR5/4, dry, hard [3] 35-58cm yellow grey brown mottled clayey silt 10YR5/4, dry, hard [4] 58-65cm+ orange brown clay 10YR6/6 and 10YR3/2, moist hard	0	6.0-6.5

Transect Logs

	Transect 1	Transect 2
Length	75m	75m
Average width	45cm	45cm
Average depth	50cm	55cm
Unit 1	0-20cm mid brown sandy silt	0-20cm mid orange clay
Unit 2	20-45cm pale yellowish grey silty clay	20-38cm mid brown clayey silt
Unit 3	45cm↓ mid orange grey clay	38-55cm grey coarse sandy clay
Unit 4	-	55cm↓ mid orange grey clay with coffee rock
Comments	Modern material dump in former field drain. Sewerage pipe, nails, belt buckle, glass and brick. Co-ords – 0362171E / 5781964N	None
Co-ord start	0362195E / 5781930N	0363735E / 5781603N
Co-ord end	0362152E / 5781992N	0363668E / 5781637N
Photograph of trench		
Photograph of section		

APPENDIX 5 – ARTEFACT INVENTORY

Artefact Inventory

Site VAHR7921-1204

No	Raw material	Manufacture Type	Cortex - River, Weathering	Platform	Termination	Core Scars #	Modification - Grinding, Heating, Pecking	Tool Type	Length (mm)	Width(mm)	Thickness (mm)	Maximum dimension (mm)
1	Red Silcrete	Complete Flake	-	Natural	Plunge	-	Heat Treatment	-	32	12	5	32

Site VAHR7921-1205

No	Raw material	Manufacture Type	Cortex - River, Weathering	Platform	Termination	Core Scars #	Modification - Grinding, Heating, Pecking	Tool Type	Length (mm)	Width(mm)	Thickness (mm)	Maximum dimension (mm)
2	Red Silcrete	Proximal Flake	-	Natural	-	-	Heat Treatment	-	24	26	7	26
3	Grey Silcrete	Complete Flake	-	Flaked	Feather	-	Convex Distal Retouch	-	12	13	4	13

APPENDIX 6 – SIGNIFICANCE ASSESSMENT

The following Appendix presents the cultural and scientific significance assessment ratings of Aboriginal cultural heritage places identified within the activity area.

Assessment of place significance is complex and encompasses a range of heritage values. The heritage values of a site or place are broadly defined as the 'aesthetic, historic, spiritual scientific or social values for past, present or further generations' (Australia ICOMOS, *The Illustrated Burra Charter* 1999). Cultural significance considers aesthetic, historic, spiritual and social values (Appendix 6.2), while scientific significance is considered separately (Appendix 6.3). A detailed explanation of the assessment process for both cultural and scientific significance is provided in Appendix 5.2 and 5.3. Place ratings are based on a detailed and transparent set of queries. The results of the assessments are presented below (Appendix 6.1).

Appendix 6.1 Aboriginal Cultural Heritage Places: Cultural & Scientific Significance

The cultural and scientific significance assessment for places recorded during this complex assessment are based on the criteria presented in Appendices 6.2 and 6.3. The specific cultural and scientific significance assessment rating of individual stone artefact scatters relevant to the present activity area is presented below.

VAHR No	7921-1204		7921-1205	
Query	Answer	Rating	Answer	Rating
Artefact density per m^2	<1	0	<1	0
Extent of place	No	0	No	0
Natural soil horizons	Yes	0	Yes	0
Disturbance	High	-1	High	-1
Contact or Pleistocene / Early Holocene*	No	0	No	0
More than one period*	No	0	No	0
High integrity occupation deposits, surfaces or features*	No	0	No	0
Multiple artefact horizons, stratified high integrity occupation deposits, surfaces or features*	No	0	No	0
Natural history research potential*	No	0	No	0
Representativeness*	C	0	C	0
Scientific Significance	Extremely low (-1)		Extremely low (-1)	

6.2 Aboriginal Cultural Heritage Places – Cultural Significance

Cultural Significance

Where places/sites have a demonstrated variable and specific 'cultural significance', then the Burra Charter conservation principles take precedence. Where communities cannot provide specific evidence for cultural significance for a site/location, general scientific significance assessment is to be adopted. It is assumed that all cultural material will have generalised cultural significance to Aboriginal people.

Aesthetic Significance

'Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of form, scale, colour, texture and materials of the fabric; the smells and sounds associated with the place and its use' (Australian ICOMOS, *The Illustrated Burra Charter* 1999: 73).

In terms of Aboriginal cultural heritage places, in particular archaeological sites, few could be considered to have any specific aesthetic values according to the above definitions apart from some rock art, engravings and rock arrangements including economic structures such as fish traps and wells. Fish traps for example may also demonstrate an aesthetic ideal. Surface and sub-surface lithic deposits do not possess any aesthetic significance. This is consistent with the Australian Heritage Commission definition that aesthetic value has 'a certain quality of a place which provides a sensory experience to a person [public or expert assessor], participation in or viewing a landscape, of such strength that is has a positive impact on human thought' (Australian Heritage Commission, A Preliminary Proposal for Assessment of Aesthetic Values for Regional Assessment).

Does the place have:

- Abstract qualities (also known as scenic or visual quality)?
- Evocative responses (by both public and expert assessors)?
- Meanings (normally long-standing)?
- Landscape integrity (level of degradation)?
- Landmark quality (recognised by broader community)?

Historic Value

'A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phrase or activity. It may also have historic value as the place of an important event. For any given place the significance will be greater where evidence of the association or event survives *in situ*, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment' (Australian ICOMOS, *The Illustrated Burra Charter* 1999: 73).

In terms of Aboriginal cultural heritage places, historic value can be represented as an identifiable sequence of long-term and contiguous occupation. Additionally, sites / places / locations may have been important during the historic period. Such sites / places / locations / routes should also be registered as Aboriginal historic places. The level of

significance must be based on a regional review of the particular Aboriginal historic place type.

Does the place have:

- Evidence of long-term and continuous occupation?
- Associations with a particular event?

Social Value

'Social value embraces the qualities for which a place has become a focus of spiritual, political, national or other current sentiment to a majority or a minority group' (Australian ICOMOS, *The Illustrated Burra Charter* 1999: 73).

Aboriginal cultural heritage places, in particular archaeological sites, can be socially significant in a number of ways. Specific places can have social significance to the general community (eg Willandra Lakes) and at another level, the general undeveloped landscape and all that it contains will have specific values to any traditional groups of Aboriginals that have maintained a more or less continuous presence on their traditional lands. Clearly, the best people to determine social value are traditional Aboriginal groups. In cases where information to assist in assessing social significance is difficult, specialist input, such as an anthropologist, needs to be sought. However, most places (archaeological places) in Victoria relate to evidence of Aboriginal occupation over the past 6,000 years, though some places reflect much greater antiquity to early Pleistocene. These places have no specific traditional significance and are mostly unknown until located during archaeological survey or excavation.

The Commission has further refined criteria for assessing social value:

- Is it an existing community landmark or signature?
- Does the site / place have strongly symbolic qualities that define a community?
- Does the site / place have specific spiritual or traditional connection between past and present?
- Does the site / place represent / embody important collective (community) meanings?
- Does the site / place have associations with events having a profound effect on a community?
- Does the site / place represent attitudes, beliefs or behaviours fundamental to community identity?
- Does the site / place have an essential community function which leads to a special attachment?
- Does the site / place have longevity of use or association, including continuity to the present?

Appendix 6.3 Aboriginal Cultural Heritage Places: Scientific Significance Assessment Criteria

'The scientific or research value of a place will depend upon the importance of the data involved or its rarity, quality or representativeness to the degree which the place may contribute further substantial information' (Australia ICOMOS, *The Illustrated Burra Charter* 1999: 73). Schiffer and Gumerman (1977: 211-212) consider 'a site or a resource ... to be scientifically significant when its further study may be expected to help answer current research questions. This is scientific significance as defined as research potential'. Some places have evidence that may span many thousands of years and therefore have the potential to answer significant research questions regarding natural history, human evolution and adaptation.

The enactment of the *Aboriginal Heritage Act 2006* and *Aboriginal Heritage Regulations 2007* has required the introduction of a new scientific significance assessment framework to replace earlier frameworks (eg du Cros & Associates). This framework rates Aboriginal cultural heritage places in greater detail so that more transparent cultural heritage outcomes and management strategies can be formulated. It comprises a structured query-based analysis which aims to produce detailed place assessments and clear links to place management recommendations. Selected place attributes examine in greater detail questions of place contents, condition and representativeness.

The body of evidence accumulated to date indicates that some place attributes are more significant than others. For example, stratified high integrity occupation deposits are usually in better condition, rarer and contain more significant cultural material than artefact horizons in environmental deposits. However, as archaeological data bases grow and change, the significance of criteria may change. This does not mean that the assessment of archaeological scientific significance is subjective but that it is affected by the interaction of various disciplinary forces including theory, research questions, methodology, knowledge base and the nature of the archaeological record.

After applying the following scientific significance assessment framework, the place rating results are subsequently considered within the context of the analysis of stone artefacts, a discussion of the cultural heritage values within the activity area, answers to specific research questions, an assessment of the research potential of recorded sites and a general assessment of the cultural heritage values of the activity area within a regional context.

This process ensures that the scientific significance assessment framework has been applied reasonably and takes into account unusual scenarios. For example, an artefact may have very little *intrinsic* scientific values in itself, say a single isolated geometric microlith in a natural soil horizon; but may be found within a highly significant stratigraphic *context*; say in an undisturbed soil horizon below a buried terminal Pleistocene ground surface. This place would rate low-moderate scientific significance (3) using the criteria below. However, a consideration within Sections 9.1 to 9.3 would demonstrate that the place is in fact of very high scientific significance because it would demonstrate that the ASTT began thousands of years earlier than previously thought. In this manner *extraordinary* examples can be accounted for.

Stone Artefact Scatters

The stone artefact scatter is a common place-type found in Victoria and consequently comprises a high proportion of places recorded on the VAHR. Scientific significance is assessed in this investigation by the examining the following criteria.

Average Artefact Density

Places with higher average artefact densities per m^2 contain larger amounts and more varied information. Higher artefact densities usually represent more intensive and varied human behaviour. For example, focussed Aboriginal activity, such as longer-term campsites, will generally leave high concentrations of cultural material. In contrast, Aboriginal people traversing the landscape, dropping or otherwise discarding stone artefacts on a regular basis will often leave a very low density of artefacts. This is considered to represent *background cultural noise* or *background archaeological noise* and is identified by artefact densities with less than five artefacts per m^2. The higher the density of stone artefacts within a place, the higher its scientific significance.

Formal artefact density calculations for place scientific significance assessments are based on the results of hand excavated 1m x 1m test pits and / or 50cm x 50cm probes. Once place boundaries are known the average artefact density is calculated by dividing the number of recorded artefacts by the extent of the area excavated (m^2). The density scale is based on consulting experience and benchmarking conducted on various known places (eg VAHR7921-0735, VAHR7921-0736 & VAHR7921-0769) which have been excavated using proper archaeological practice and have different levels of scientific significance (eg VAHR7921-0735 & VAHR7921-0736 having *very high* scientific significance). Artefact density data from most registered places on the VAHR is not used because the data is not of sufficient accuracy for rating scientific significance. It is envisaged that additional benchmark data from the VAHR will be available in the future in order to refine the average artefact density classes used in this scientific significance assessment framework.

Extent of Artefact Densities

Larger places are usually considered to have higher scientific significance than smaller ones because they generally contain more information. Furthermore, larger places were likely the focus of more intensive and varied Aboriginal behaviour. If places have artefact densities of 46 per m^2 or above, then they are likely to be assessed having at least moderate scientific significance (see below). Based on consulting experience and benchmarking (see *Average Artefact Density* above) a significant size threshold is notionally considered here to be at least 100m x 100m in extent (or 10,000m^2). Place-size data from most registered places on the VAHR is not used because it is not of sufficient accuracy for rating scientific significance. It is envisaged that additional benchmark data from the VAHR will be available in the future in order to refine the place-size criteria used in this scientific significance assessment framework.

Natural Soil Horizons

Natural formation processes may form natural soil layers or horizons by the laying down of sediments by natural agents such as wind and water (Isbell 2002; McKenzie et al 2004; cf Schiffer 1972, 1976: 15-16, 1983). These horizons may be subsequently created or destroyed by various post-depositional processes. The process of soil profile genesis and development may bury artefacts but without forming obvious anthroposols or high integrity occupation deposits. Artefacts found within natural soil profiles habitually form artefact horizons. The temporal and spatial integrity of artefact horizons will depend on the depositional and post-depositional formation processes of these deposits. Generally they have less temporal and spatial integrity than intact high integrity occupation deposits and, with all other criteria being equal, have less scientific significance. They comprise the overwhelming artefact scatter type encountered during complex assessments.

Disturbance

Disturbance of Aboriginal cultural heritage places can take many forms and include both environmental and human agents not only at the time of deposition but also after places have been abandoned. Disturbance can be categorised as low, high or significant. Low disturbance is when archaeological deposits or features have little discernable disturbance so they are essentially intact and retain a high degree of spatial and temporal integrity. High disturbance is when agents have likely altered the temporal and spatial integrity to such an extent which has lowered their information potential and therefore scientific significance. Examples of high disturbance include deflation, native vegetation clearance, ploughing, rabbit burrowing, heavy stock trampling and stock rubs. Significant ground disturbance has altered the information potential of a place to such a degree that it has effectively destroyed the integrity of the place. Examples of significant ground disturbance include heavy natural erosion, or grading, excavating digging, dredging and deep ripping by machinery. The information potential remaining will essentially be the intrinsic attributes of the artefacts themselves.

Period and Number of Periods Represented

Most places contain stone tool assemblages attributed to the Australian Small Tool Tradition which may be dated 6,000 and 7,000 years ago (Hiscock & Attenbrow 2004). The landform and depositional context is also usually attributed to the period of latest landscape formation associated with present sea level stabilising 5,000 to 6,000 years BP (Marsden & Mallet 1975: 114-116; Bird 1993: 145; Douglas & Ferguson 1993: 387; Kershaw 1995: 669). Other periods, such as the Late Pleistocene and European Contact, are poorly represented in the archaeological knowledge base. Due to their rareness they are of high research interest and significance. Places with more than one period represented allow the investigation of cultural change, interaction and adaptation over a longer period of time. Based on the criteria of research potential and rarity, these places will have increased scientific significance.

High Integrity Occupation Deposits, Surfaces and / or Features

AAV has no official definition of an *occupation deposit or feature* (r.61(6) *Aboriginal Heritage Regulations 2007*) but unofficially defines an occupation deposit as "anything that is indicative of human occupation eg a single artefact ..." (AAV email 25.5.2009). This nominal definition of an occupation deposit takes no account of the depositional context of cultural material which is critical in understanding the archaeological record and the interpretation of past human behaviour – as pointed out by Binford (1964: 431) more than 45 years ago in the distinction between primary and secondary depositional context. Taking the above into account, and in contrast to the nominal definition of AAV, a high integrity occupation deposit can be defined as a deposit formed by the laying down of deposits (artefacts and / or sediments) by human activities that bury artefacts and form distinct stratigraphic entities such as layers (eg dense lens of stone artefacts & bone between natural soil horizons, stratified shell deposits) or features (eg hearths, occupation mounds). An occupation surface is a distinct layer or interface between depositional strata upon which human activities were carried out and artefacts / features deposited. Most commonly this may be represented by a prior land surface (eg soil horizon) that has been subsequently buried by natural soil horizons (eg dune deposits). High integrity occupation deposits, features and surfaces have a high degree of spatial and temporal integrity and therefore will have higher scientific significance than archaeological deposits with lower integrity (eg artefact horizons in environmental deposits).

Multiple Artefact Horizons, Stratified High Integrity Occupation Deposits, Surfaces and / or Features

Places with multiple artefact horizons, stratified high integrity occupation deposits, surfaces and / or features have the potential to investigate chronological change within places; often with greater time depth and chronological resolution compared to places with lower spatial and temporal integrity. They are rarer, have higher research potential, and therefore also have higher scientific significance. High integrity occupation deposits, surfaces and features will likely have higher scientific significance than artefact horizons (see Appendix 6).

Natural History Potential

Some places have environmental evidence that may span many thousands of years and therefore have the potential to answer significant research questions regarding natural history, climatic and environmental conditions. This evidence can be used to investigate human evolution and adaptation. Generally this evidence is rarely found in Victorian places and has high research potential and scientific significance.

Representativeness

Representativeness refers to the regional distribution of a particular place-type or artefact typology, and its scientific significance. It is assessed to whether the place or artefact is common, rare or very rare in a given region. Assessments of representativeness are biased by current knowledge of the distribution and numbers of places in a region. Current knowledge varies from place to place, depending on the extent and quality of previous archaeological research. Consequently, a place or artefact that is assigned low scientific significance based on other queries, but is considered a rare occurrence, may only be

regarded as such in terms of current knowledge of the regional archaeology. Its rareness may not necessarily increase the place significance to moderate or above.

The representativeness used for Aboriginal cultural heritage places or artefacts are:

- Common occurrence;
- Rare occurrence;
- Very rare occurrence.

Common places and artefact types comprise the majority of stone artefact scatters. Typically such stone artefact scatters have the following attributes: below moderate artefact density class (≤45 artefacts per m^2); date to the Late Holocene, and no evidence of high integrity occupation deposits or features, stratified or otherwise.

Rare stone artefact scatters typically have the following attributes: moderate or above artefact density class (≥46 artefacts per m^2); more than one artefact horizon; more than one period of occupation (eg early and late Holocene); but may not have high integrity occupation deposits.

Very rare stone artefact scatters typically have the following attributes: moderate or above artefact density class (≥46 artefacts per m2); high integrity occupation deposits, stratified or otherwise; and occupation from more than one period (eg late Pleistocene and late Holocene).

Rare artefact types include formal tools such as points, choppers and axes. While these may appear in the archaeological landscape as isolated artefacts, they are rare in south-eastern Australia. The places themselves may not have great scientific significance as the artefact may simply represent an episode of discard or loss, however the artefact type will be one not commonly found within the archaeological record.

Ensuring a representative sample of significant place-types is preserved provides opportunities for research questions and techniques not yet developed to be available for future archaeologists.

Stone artefact scatters identified during this investigation are rated according to the following queries and answers:

What is the average artefact density per metre?

Stone Artefact Density (per m^2)*	Score	Density Class
1 – 4	0	Extremely low
5 – 15	1	Very low
16 – 30	2	Low
31 – 45	3	Low – moderate
46 – 60	4	Moderate
61 – 75	5	Moderate – high
76 – 90	6	High
91+	7	Very high

*Minimum artefact size 10mm

If the average artefact density rates 46 artefacts per m^2 or above, is the density spatially extensive (more than 100m x 100m, 10,000m^2)?
No = 0, Yes = +1

Are artefacts within natural soil horizons?
No = high integrity occupation deposits (see below), Yes = 0

Are the natural soil horizons disturbed?
No = 0, Yes (high) = -1, Yes (significant) = -2

Are European Contact or Pleistocene / Early Holocene periods represented?
No = 0, Yes = +1

Is more than one period represented?
No = 0, Yes = +1

Are there high integrity occupation deposits, occupation surfaces and / or features?
No = 0, Yes = +1

Are there multiple artefact horizons, stratified high integrity occupation deposits, occupation surfaces and / or features?
No = 0, Yes = +1 (artefact horizons), Yes = +2 (high integrity occupation deposits, surfaces, features)

Is there an opportunity to research natural history (eg climate & environmental changes)?
No = 0, Yes = +1

Is the place a common, rare or very rare occurrence?
C = 0, Rare = +1, Very rare = +2

Artefact scatters are rated according to the following scores from the detailed list of queries above:

Score	Scientific Significance Rating
0	extremely low
1	very low
2	low
3	low – moderate
4	moderate
5	moderate – high
6	high
7+	very high

Appendix 6.4 General Principles on the Appropriate Application of the Scientific Significance Assessment Rating Criteria

Although the framework presented above cannot be applied as a simple formula in all circumstances, the appropriate application of the framework must take into account the following principles:

Current knowledge of stone artefact scatters typically means that places with the following attributes must not be rated having moderate or above scientific significance:

- Average stone artefact density of ≤45 per m^2;
- No evidence of a discernable stone artefact horizons;
- A single stone artefact horizon in natural soil horizons;
- One period of occupation either ASTT or post-ASTT;
- No *high integrity occupation deposits* and / or features, stratified or otherwise.

Places rated moderate or above scientific significance typically must have the following attribute:

- Average stone artefact density of ≥46 artefacts per m^2.

If the place has a lower average density class then the place typically must score one or more of the following queries (see Appendix 5.3):

- European Contact or Pleistocene / Early Holocene periods represented;
- More than one period represented;
- *High integrity occupation deposits*, occupation surfaces and / or features;
- Multiple artefact horizons, stratified *high integrity occupation deposits*, occupation surfaces and / or features;
- Natural history research potential; or
- Rare or very rare occurrence;

If the average density score is below moderate, then the number of extra scores required to rate a place with moderate or above scientific significance must be as follows:

Average Density Class	Score	Minimum Extra Score Required
Extremely low	0	4
Very low	1	3
Low	2	2
Low-moderate	3	1

If the principles presented above are not followed, then the framework has not been applied appropriately.

APPENDIX 7 - GLOSSARY

TYPES OF ABORIGINAL ARCHAEOLOGICAL SITES

Artefact Scatter: A surface scatter of stone artefacts is defined as being the occurrence of five (5) or more items of cultural material within an area of about 100 square metres (AAV 1993). Artefact scatters are often the only physical remains of places where Aborigines have camped, prepared and eaten meals and worked stone material.

Burials: Burial sites may occur in association with campsites, in mounds or shell middens or in specific burial grounds that lack any other cultural material. Softer ground was chosen for burials, and any sandy area can be expected to contain burials. Burial sites can contain one or a number of individuals. Burials sites and cemeteries are a common archaeological site type in the sand country adjoining the Murray River, though are a rare feature in the southern part of Victoria.

Contact Site: These are sites relating to the period of first contact between Aboriginal and European people. These sites may be associated with conflict between Aborigines and settlers, mission stations or reserves, or historic camping places. The artefact assemblage of contact sites will often include artefacts manufactured from glass.

Hearth: Usually a sub-surface feature found eroding out of a river or creek bank or in a sand dune - it indicates a place where Aboriginal people cooked food. The remains of a hearth are usually identifiable by the presence of charcoal and sometimes clay balls (like brick fragments) and hearth stones. Remains of burnt bone or shell are sometimes preserved within a hearth.

In Situ: Refers to cultural material that is discovered as being undisturbed and considered to be in its original context. That is, material which, when identified is considered to be in the same location as the time it was abandoned.

Isolated Artefact Occurrence: An isolated artefact is defined as being the occurrence of four (4) or less items of cultural material within an area of about 100 metres (AAV 1993: 1). It/they can be evidence of an ephemeral (or one off) activity location, the results of an artefact being lost or discarded during travel or evidence of an artefact scatter which is otherwise obscured by poor ground surface visibility.

Midden Sites: 'Midden' is a term borrowed from the Danish. It originally applied to the accumulations of shell and other food remains left by Mesolithic man in that country. Australian Midden sites are an accumulation of hearth and food debris, which has built up a deposit on the ground surface over a length of time. Middens are generally comprised of charcoal and either freshwater or coastal shell species, depending on the site's location. Midden sites may also contain stone artefacts, and the food refuse of other native animals such as small mammals. Their thick deposit of burnt shells and dark grey/black deposit can distinguish midden sites within the landscape. Coastal shell middens are often found in close association with rock platforms. Freshwater shell middens are found in close proximity to areas that provided freshwater mussels.

Mound Sites: Mound sites are accumulation of hearth (fire place) debris, which has over time built a thick deposit on the ground's surface. Mounds are generally comprised of charcoal; burnt clay balls and burnt food refuse such as native animal bones. Mound sites may also contain stone artefacts. On rare occasions mound sites may also contain human burial remains. Mound sites can be distinguished in the landscape by their characteristic dark grey/black deposit and height above surrounding land. Mounds that have been utilised over long periods can obtain dimensions of over 100 metres in length and 1 metre in height. Mound sites are generally situated close to major streams, and large water bodies. In times of flood, mound sites are often become marooned, and provide dry land points from which surrounding resources could have been exploited.

Scarred Tree: Scars on trees may be the result of removal of strips of bark by Aborigines for the manufacture of utensils, canoes or for shelter; or resulting from small notches chopped into the bark to provide toe and hand holds for climbers after possums, koalas and/or views of the surrounding area. A scar made by humans as opposed to naturally made by branches falling off, *etc*. is distinguished by the following criteria: symmetry and rounded ends, scar does not extend to the ground, some re-growth has occurred around the edges of the scar, and no holes or knots present in the heartwood.

ABORIGINAL ARTEFACT TYPES

Artefact: Any product made by human hands or caused to be made through human actions.

Anvil: A portable flat stone, usually a river pebble, which has been used as a base for working stone. Anvils that have been used frequently have a small circular depression in the centre where cores were held while being struck. An anvil is often a multifunctional tool used also as a grindstone and hammer stone.

Blade: A long parallel sided flake from a specially prepared core. Blade flakes are twice as long as they are wide.

Bipolar: A core or a flake, which, presumably, has been struck on an anvil. That is, the core from which the flake has been struck has been rotated before the flake has been struck off. Bifacial platforms tend to indicate that the flake has come off a heavily worked core.

Core: An artefact from which flakes have been detached using a hammer stone. Core types include blade, single platform, multiplatform and bipolar forms. These artefacts exhibit a series of negative flake scars, each of which represents the removal of a flake.

Core Types:

Unidirectional cores - These cores have scars originating from a single platform, and all the flakes struck from the core have been struck in the same direction from that platform.

Bidirectional cores - These cores have two platforms, one opposite the other; flakes have been struck from each of the platforms, and thus from opposite directions.

Bifacial cores - These kinds of core have a single platform, but the flakes struck from it have been detached from two core faces.

Multidirectional cores - These cores have two or more platforms and there is no clear pattern, either in the orientation of the platforms or in the orientation of the scars resulting from the striking of flakes from those platforms.

Bipolar core - Nodules or cobbles that are flaked using an anvil. The resulting artefacts exhibit crushing on their proximal, distal and often their lateral margins, where they have been rotated.

Complete Flake: An artefact exhibiting a ventral surface (where the flake was originally connected to the core), dorsal surface (the surface that used to be part of the exterior of the core, platform and/or flake scar).

Broken Flake: Defined by the part of the flake remaining, i.e. proximal (where the platform is present), medial (where neither the platform nor termination is present), or distal (where the termination is present).

Lithic: Anything made of stone.

OTHER TERMS

Artefact Horizon: A discernable horizontal distribution of artefacts within an natural soil horizon. An artefact horizon has generally suffered a degree of post depositional disturbance that has affected the spatial and temporal integrity of the deposits and associated artefact assemblage.

Archaeological Site: A place/location of either Aboriginal or non-Aboriginal origin. Aboriginal archaeological sites have been formed prior to the European settlement of Australia, and may be in any of the forms outlined in section 1.

BP: Before present. The 'Present' is defined as 1950.

Cultural Heritage: Something that is inherited or passed down because it is appreciated and cherished. Categories of cultural heritage include; built structures and their surrounds, gardens, trees; cultural landscapes; sites; areas; precincts; cemeteries; ruins and archaeological sites; shipwrecks; sites of important events; commemorative sites; contents of buildings and significant relics, objects artefacts and collections of objects.

Cultural Landscape Integrity: The level of which the local landscape reflects the environment in which pre-contact Aboriginal people or early European settlers lived. The integrity includes all relevant aspects such as level and type of vegetation cover, hydrology, landforms and structures. A site located in a landscape of high cultural integrity has greater heritage value as it remains in context, and is therefore able to impart a greater level of information to the broader community.

Effective Survey Coverage: The amount of land that provided an adequate level of ground surface visibility to detect surface evidence of Aboriginal occupation/exploitation.

Holocene, Recent or Postglacial Period: The time from the end of the Pleistocene Ice Age (c 10 300 BP) to the present day.

Potential: Based on collated existing data and site inspection an area or specific site may contain the potential for extant or archaeological deposits. Background research will present the most likely site types, contents and state of preservation. Relative levels of potential are described as Low (10-30% probability), Moderate (40-60% probability) and High (70% and above probability).

Pleistocene: The geological period corresponding with the last or Great Ice Age. The onset of the Pleistocene is marked by an increasingly cold climate. The oldest form of man had evolved by the Early Pleistocene, and in archaeological terms the cultures classed as Palaeolithic all fall within this period. The date for the start of the Pleistocene is not well established, and estimates vary from 3.5 to 1.3 million years ago. The period ends with the final but gradual retreat of the ice sheets, which reached their present conditions around 10 300 BP.

Occupation Deposit: The laying down of deposits by human activities that bury artefacts to form distinct stratigraphic entities such as layers (eg dense lens of stone artefacts & bone between environmental deposits, stratified shell deposits) or features (hearths, occupation mounds). Occupation deposits have a high degree of spatial and temporal integrity.

Occupation Surface: A distinct layer or interface between depositional strata upon which human activities were carried out and artefacts/features deposited. Most commonly this may be a prior land surface (eg soil horizon) that has been subsequently buried by later environmental deposits (eg dune deposits).

Visibility: Refers to the degree to which the surface of the ground can be observed. This may be influenced by natural processes such as wind erosion or the character of the native vegetation,

and by land use practices, such as ploughing or grading. It is generally expressed in terms of the percentage of the ground's surface visible for an observer on foot (Bird 1992). For example 10% visibility equates to 10cm^2 per 1 m^2 of ground surface that is not covered by vegetation or soil deposit. The following applies to descriptions of ground surface visibility within this report.

0%	=	No visible ground surface
0 – 10%	=	Very Poor
10 – 30%	=	Poor
30 – 50%	=	Fair
50 – 70%	=	Good
70 – 90%	=	Very Good
90 – 100%	=	Excellent

Raw Material: Organic or inorganic matter that has not been processed by people.

Slope Wash: A term used to describe a specific process of re-deposition of cultural material. Cultural material (most often stone artefacts) that is situated on any sloping land is vulnerable to the affects of slope wash. The term relates to the downward movement of cultural material primarily due to erosion of their original context. This downward movement is most often caused by clearing of vegetation that exposes the ground surface to the affects of water erosion. The result is that cultural material will move down the slope over a period of time. How far material may move is dependent on the gradient and the intensity of the erosion.

Survey Coverage: The amount of land that has been inspected during a standard assessment.

GEOMORPHOLOGICAL TERMS

Aeolian Sediments: Wind-borne, wind-blown or wind-deposited material, usually sand, but also silt and clay.

Alluvium: Sedimentary unconsolidated deposits lain down through the action of running water. Usually found in or near rivers and floodplains. It is usually applied to coarser sediments such as sands and gravels, but sometimes to finer particles such as silt and clay.

Basalt: Fine-grained, hard, but easily weathered dark-grey igneous rock formed by the cooling of lava.

Bedrock: Solid rock at the surface or rock at depth that has been undisturbed by weathering.

Calcareous: A sediment containing calcium carbonate in concentrations of up to 50%.

Coffee Rock: A term used to describe a hardened iron- and organic-rich cemented deposit that when wet, resembles coffee grains. It is usually found in sandy soils that have a source of iron and organic matter.

Colluvium: An unconsolidated mixture of weathered material (gravel, sand, silt and clay) transported downslope by the force of gravity.

Dune: A mound or ridge of wind-blown granular material (usually sand) that is partially, fully or bare of vegetation, and capable of being moved from one location to another while still retaining its characteristic shape.

Ferruginous: Rocks or soils containing a large percentage of iron.

Ferruginisation: The process by which iron minerals move in the sediment and/or regolith, staining and cementing the substrate to form a hard, iron-rich layer.

Fluvial: Referring to rivers and their processes. E.g. stream erosion and deposition.

Gilgai: An undulating surface of mounds and depressions resulting from the uneven shrinking and swelling of the soil. Usually present on basalt soils, but also on alluvial soils.

Granite: A coarse-grained intrusive igneous rock, usually comprised of quartz, feldspar and micas.

Groundwater: Water that lies within the saturated zone of rock and soil. It moves between pore spaces, cavities and fractures in the sediment and rock under the influence of gravity. Groundwater can transport trace minerals and elements dissolved in the water.

Hydrothermal Quartz: Also known as milky quartz. Formed by the intrusion of hydrothermal water containing dissolved silica and other minerals into folded bedrock (commonly metasediments). The hydrothermal water reaches a natural trap such as an anticlinal fold or a fault before cooling, allowing the silica to precipitate into quartz.

Igneous: Rocks that have formed through the crystallisation of magma.

Intrusion: The act of an intrusive igneous rock rising up through the Earth's crust and breaking through the lower levels of the bedrock.

Iron Staining: Where a crust of iron oxide enriched clay coating precipitates on the surfaces of individual sediment grains, giving an orange-red-yellow stain to the sediment or soil as a whole.

Last Glacial Maximum: A period of cold, dry conditions on Earth when the ice caps on the polar regions were at their largest extent. This period lasted between approximately 18-24 ka BP.

Lava: Molten material extruded from a volcano or fissure in the Earth's surface.

Metamorphism: The process by which rocks are transformed by recrystallisation due to increased heat and/or pressure in the Earth's crust. Metamorphism can be either on a regional scale or on a contact scale.

Pisolith: Hard, iron-cemented spherical particles of sediment (usually sand). These range in size from 3mm to 6mm.

Regolith: An incoherent mantle of varying thickness that lies above fresh rock. This is usually the decomposed, weathered and broken up derivative of the fresh bedrock. The soil profile lies above this layer.

Sand Sheet: A thin, continuous deposit of sand with no large topographic features on the surface.

Scoria: Pyroclastic volcanic rock containing numerous gas pockets and spaces. Colour ranges from red-brown to black.

Siliceous: Rocks and sediments that contain an abundance of silica.

Stony Rise: Irregular, hummocky and stony ground formed on younger lava flows. Caused by uneven cooling and slumping of basalt flows.

Swale: A linear depression that runs between two ridges. This is usually applied to dune environments where the swale is located between two dune ridges and is occupied by a swampy environment.

Terrace: A gently sloping or flat step-like structure usually associated with a fluvial environment and bounded by steeper slopes on the outer margins. Streams commonly flow along terraces. Terraces can be paired or unpaired according to the depositional environment.

Uplift: Upward surface movement attributed to faulting or movement of the continental plates.

Weathering: The process by which fresh rock degrades/breaks down at or near the surface. This process modifies rock chemically, organically, and/or physically, whereby a mantle of waste known as regolith will remain *in situ* until it is eroded away.

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APPENDIX 8 – CULTURAL HERITAGE ADVISOR SUMMARY CVs

ANDREA MURPHY
cultural heritage consultant

AWARDS

Winner of the 2003 UNESCO Asia-Pacific Cultural Heritage Conservation Award

QUALIFICATIONS

Bachelor of Arts (Prehistory) – La Trobe University

Masters Preliminary of Arts (Historic Archaeology) – La Trobe University

AFFILIATIONS

Member of:
Australian Society of Historic Archaeology

Australian Association of Consulting Archaeologists (Office Bearer)

Australian Anthropological and Archaeological Society

Historic Gardens Society

National Trust

Royal Historical Society

Andrea Murphy is a Senior Cultural Heritage Consultant with extensive experience and qualifications in both indigenous and non-indigenous cultural heritage assessment and management, including EES and EIS projects, major urban excavations, desktop assessments, site survey, excavation, monitoring and production of site management strategies. Andrea has been the manager of Archaeology At Tardis Pty Ltd, cultural heritage consultants for over 10 years and a heritage professional for more than 20 years. Andrea has personally authored more than 350 cultural heritage assessment reports.

RECENT RELEVANT EXPERIENCE

MAJOR CULTURAL HERITAGE PROJECTS IN VICTORIA

- Pipeline Routes
- Telco Cable Routes
- Road and Highway/Freeway Infrastructure
- Rail Infrastructure – Urban and Regional Fast Rail
- Urban Developments
- Waterway Rehabilitation Works
- Wind Farms
- Archaeological Excavations
- Local Government Advisor and Project Manager
- Defence Advisor and Project Manager
- Parks Advisor and Project Manager

ANDREW MORRIS
archaeologist & cultural heritage advisor

QUALIFICATIONS

Bachelor of Arts - Honours
(arch. major)
La Trobe University, 2007

AFFILIATIONS

Member of:
Australian Archaeological Association

Australian Society for Historical Archaeology

Andrew Morris is an archaeologist having graduated with an Honours Degree in Arts (archaeology major) at La Trobe University. Andrew has extensive experience in excavation, survey, archaeological testing, archaeological research and artefact analysis. Andrew has been actively involved in archaeological research, cultural heritage fieldwork and laboratory analysis since 2004. Andrew has developed an array of excavation, survey and laboratory experience, having worked on projects in Tasmania, Victoria and Cyprus.

MAJOR INTERNATIONAL PROJECTS

- AUSTRALIAN-CYPRUS EXPEDITION - DENEIA
- PALAION DEMARCHEION EXCAVATION - NICOSIA

MAJOR CULTURAL HERITAGE PROJECTS IN AUSTRALIA

- COASTAL SHELL MIDDEN SURVEY IN SOUTH-WEST GIPPSLAND
- YORKTOWN CONVICT SETTLEMENT TASMANIA
- CARLTON GARDENS MELBOURNE
- ROAD AND HIGHWAY/FREEWAY INFRASTRUCTURE
- URBAN DEVELOPMENTS
- MIXED USE ZONE DEVELOPMENTS
- GOLF COURSE DEVELOPMENTS

SUMMARY OF EXPERIENCE

- RESEARCH
- SITE EXCAVATION
- SITE SURVEY AND RECORDING
- ARCHAEOLOGICAL TESTING
- ARCHAEOLOGICAL MONITORING
- ARTEFACT ANALYSIS
- DRAFTING
- REPORT WRITING AND PRODUCTION
- EXCAVATION AND ANALYSIS OF HUMAN REMAINS
- EXCAVATION AND ANALYSIS OF FAUNAL ASSEMBLAGES

APPENDIX 9 – CORRESPONDENCE LOG

CORRESPONDENCE – Cardinia Road Employment Precinct, Pakenham, Structure Plan			
Date	**Type**	**Recipient**	**Regarding**
21.11.2008	Email	AAV	NOI
8.12.2008	Email	CSC	Notification of CHMP # 10656
17.12.2008	Email	Landowners/Occupiers	Notification of CHMP being carried out
10.08.2008	Email	BWFL	Request for rep participation in Standard Assessment
10.08.2008	Email	BLCAC	Request for rep participation in Standard Assessment
21.05.2009	Email	BLCAC	Request for transcripts of oral tradition or knowledge of cultural significance specific to the activity area
21.05.2009	Email	BWFL	Request for transcripts of oral tradition or knowledge of cultural significance specific to the activity area
13.08.2009	Meeting	CSC and Tardis	Discuss testing program and Landowner permission/access details
4.11.2009	Email	BLCAC	Request for rep participation in Complex Assessment
2.12.2009	Email	BWFL	Request for rep participation in Complex Assessment
5.01.2010	Email	BLCAC	Request for rep participation in Complex Assessment
22.03.2010	Meeting	AAV, GAA, CSC, Tardis	Meeting to present CHMP results to Jamin Moon and GAA consultants
6.04.2012	Email	AAV	Submission of CHMP10656 for evaluation
19.04.2010	Email	Hilary Rutledge CSC	Notification by Alex Cowled that the CHMP will not be approved and meeting request
17.05.2010	Email	David Clark AAV	Requesting confirmation of methodology for mechanical excavation methodology
28.05.2010	Email	Andrew Morris	Email from David Clark noting that mechanical excavation is fine provided hand excavation is carried out if cultural heritage is found
23.08.2012	Email	Andrew Morris	Hilary Rutledge (CSC) provided revised activity description as per previous AAV meeting request, and requested the CHMP be finalised
27.09.2012	Email	WTLCCHC, BWFL, BLCAC	Draft Recommendations and request for cultural heritage or oral tradition specific to the activity area
2.10.2012	Email	AAV	CHMP Submission

AAV: Aboriginal Affairs Victoria; CSC: Cardinia Shire Council; GAA: Growth Areas Association; BWFL: Boonwurrung Foundation Ltd; BLCAC: Bunurong Land Council Aboriginal Corporation; WTLCCHC: Wurundjerii Tribe Land and Compensation Cultural Heritage Council Inc.

APPENDIX 10 – CHECKLIST

CHECKLIST FOR COMPLIANCE WITH CHMP 10656			
Preceding the Activity:		Yes	No
1	Have all workers been provided with a cultural heritage awareness induction?		
Discovery of Cultural Material:			
2	Has all activity within 10m ceased?		
3	Has the Heritage Advisor been advised?		
4	Has the find/s been left in place?		
5	Has the find/s been protected (e.g.: with fencing) if required?		
6	In relation to suspected human remains, has the Coroner's Office been notified?		
7	Has an appropriate mitigation/salvage strategy been developed?		
8	Has the mitigation/salvage works been implemented?		
Reburial:			
9	Has the reburial site(s) been fully documented by a suitably qualified archaeologist?		
10	Has the reburial site been clearly marked?		
11	Have all details been provided to AAV?		
12	Has a strategy been developed to ensure no further disturbance will occur to the remains (such as Section 173 in the Planning and Provision Act)?		
Changes to Activity:			
13	Does the activity deviate in any way from the activity as described in this CHMP? If so, then a new plan must be prepared for the activity.		