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Mount Shamrock, Pakenham, Archaeological Excavations of Site VAHR7921/0680

October 2011

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Report for
Holcim (Australia) Pty. Ltd.

Mount Shamrock, Pakenham, Archaeological Excavations of Site VAHR7921/0680

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ABBREVIATIONS

AAV	Aboriginal Affairs Victoria (Heritage Services Branch)
AHC	Australian Heritage Commission
AMG	Australian Map Grid
ATSIC	Aboriginal and Torres Strait Islander Commission
BP	Before Present
DCNR	Department of Conservation and Natural Resources (now DNRE)
DNRE	Department of Natural Resources and Environment
DSE	Department of Sustainability and Environment (formerly DNRE)
DOI	Department of Infrastructure
DVC	Department for Victorian Communities
HV	Heritage Victoria (DSE)
ICOMOS	International Council on Monuments and Sites
LCC	Land Conservation Council
RNE	Register of the National Estate
TL	Thermoluminesence (see Glossary)
VAS	Victoria Archaeological Survey (now part of AAV and Heritage Victoria)

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1.0 SUMMARY

1.1 Background

This report documents the controlled excavations commissioned by Holcim (Australia) Pty. Ltd. (formerly Readymix Holdings) and undertaken by Biosis Research Pty. Ltd., Wurundjeri Tribe Land Compensation and Cultural Heritage Council Inc. (Wurundjeri) and Urban Colours at the Mt Shamrock Quarry, Pakenham (see Figure 1). Holcim seek to expand their quarrying operations to the south and west of the existing quarry, and this will have a major impact on a number of Aboriginal archaeological sites.

As a result of previous archaeological assessments, six Aboriginal sites have been recorded. These include two artefact scatters (VAHR7921/0680 and VAHR 7921/0681) and four isolated artefact sites (VAHR7921/0651, 7921/0678, 7921/0679 and 7921/0697). This report discusses the results of the excavation of site VAHR7921/0680, which is an extensive artefact scatter located south of the existing quarry (see Figure 2). The site boundaries had been established during previous sub-surface testing involving manual and mechanical excavation (see Figure 3) (Biosis Research 2005a, 2005b).

Holcim required a Consent to Disturb the Aboriginal sites from the Wurundjeri Tribe Land Compensation and Cultural Heritage Council Inc. under the *Aboriginal and Torres Strait Islander Heritage Protection Act* 1984, in order to proceed with the proposed quarry expansion. The Wurundjeri issued a Consent to Disturb the sites, and included conditions regarding salvaging the recorded sites (see Appendix 1). Conditions included that a controlled excavation of site VAHR7921/0680 be carried out in order to document and salvage as much cultural material as possible to provide maximum information about the site. It was acknowledged that it would not be possible to excavate 100% of the site in the time available, and it was agreed that the site would be sampled with excavation squares within its boundaries, in order to provide comprehensive coverage and obtain as much information as possible. Areas of the site that were not excavated manually were to be mechanically excavated in controlled increments (10cm spits). This soil was to be stockpiled and used for revegetation, ensuring that the artefacts did not leave the Mt Shamrock location.

1.2 Excavation

Thirty-two 2 x 2m excavation squares were excavated across site VAHR7921/0680, as well as ten 1 x 1m squares in the south-west corner of the site and twenty-two 1 x 1m squares in its north-west portion (see Figure 4). This is in addition to the eight backhoe transects and six 1 x 1m test pits that were

excavated during sub-surface testing. The densest part of the site measures approximately 120 x 110m (13,200 sq.m.). Excavation of 605sq.m was carried out; this equates to approximately 20.1% of the site.

The remainder of the site was stripped mechanically and the soil sieved through a mechanical sieve with 5mm mesh to collect artefacts, and stockpiled in an area that will be revegetated and rehabilitated.

1.3 Conclusions

The large excavation carried out at Mt Shamrock AS 1 (VAHR7921/0680) has contributed a great deal of information about the site. The number of artefacts found, range of tool types and intact nature of some of the deposits confirm the high scientific significance of the site. Sites of this size and nature have not been recorded previously on the hill tops in the Pakenham region.

High numbers of artefacts:

Excavation of site VAHR7921/0680 resulted in the recovery of well over 10,000 stone artefacts from within the uppermost 30cm of soil, 15cm of which showed strong evidence for having been disturbed by ploughing in the past. The number of artefacts was far greater than anticipated. These have been analysed. The artefacts were recovered from all areas of the excavation, indicating a broad distribution of stone artefacts across an area of approximately 180 x 230m, but with specific locations associated with certain raw materials. In addition, examination of the stone assemblage has confirmed the existence of different stone tool production locations within the boundaries of the site.

Artefacts were also located outside the excavation area, following mechanical excavation of the disturbed top 15cm. These were found during walkovers of the stripped areas and constituted a lower density of artefacts. This redefines the site boundaries as covering an area of 260 x 380m altogether (see Figure 5).

Tool Types:

The extensive number of artefacts showed a relatively low percentage of tools (9.7). Recent archaeological assessment at University Hill, Bundoora, has indicated that the assemblage from two sites there (VAHR7922-0831 and VAHR7922-833) contains 14% tools, which although in a different context and considering the likely close proximity of source material to the University Hill sites, suggests that Mt Shamrock was likely to have had more primary stone working and tool making, rather than tool using activities. (See Vines 2010,

"*Salvage Excavation of VAHR 7922-0831, Janefield AS1, University Hill, Bundoora Victoria").*

The assemblage includes hand axes, grinding stones, flakes, blades, cores, formal tools such as Bondi and Pirri points, geometric microliths, scrapers and piercers. The range of artefact types indicates that a variety of activities was taking place at Mt Shamrock, including food preparation, tool making, wood working and hide working. The presence of blades indicates later stages of tool production as blades are usually used as the blanks for formal tools, such as backed blades (see Thomson and Vines, 2005:28).

Raw materials would have been available locally, with a silcrete source located in Berwick and quartz available as cobbles in the local creeks, including Toomuc Creek. These were the most prolific materials in the assemblage.

Evidence of in situ artefacts:

The top 15cm of soil has been ploughed and planted with potatoes in the past. The disturbance to the soil was evident in the soil profile, and was confirmed by the previous landowner who farmed the land on which the site is located (Rex Whiteley, pers. comm. 2005). In addition to ploughing and cultivation, the site has been subjected to movement of stock, farming activities and vegetation clearance.

However, soil below the ploughzone had not undergone significant disturbance, and material found in the deeper soils was considered to be in situ. The in situ deposits provide information about the various activities that were occurring on site, and any specific locations on which these may have been concentrated.

There was no evidence of stratigraphy, soil was red brown loamy clay across most of the site, and this became more compact with depth (see Table 1). It is not possible to determine the amount of time over which the artefacts were accumulated. Artefacts were found to a depth of 42cm, although these were the exception. The majority of artefacts were found within the top 30cm, with greater numbers occurring in the top 15cm. Analysis of the artefacts suggests some intensive workshop events, but the site may have been used frequently over a long period of time.

Datable cultural features were not recorded in any context of the excavation. In the absence of datable cultural material, the stone tool assemblage is indicative of a mid to late Holocene occupation (4,500bp – prior to contact) for the Mt Shamrock Quarry site.

Rarity of very dense artefact concentrations on Pakenham's hilltops:

Prior to the archaeological investigations at Mt Shamrock, dense artefact scatters had not been recorded on the hilltops and ridgelines around Pakenham. Low density artefact scatters and isolated artefacts were a more frequently recorded site type.

1.4 Recommendations

Recommendation 1

Holcim have fulfilled their obligations as per the Consent to Disturb issued by the Wurundjeri, with regard to excavation of site VAHR7921/0680 (see Appendix 1).

Recommendation 2

All works must cease immediately if human skeletal remains are encountered. The Police or Victorian Coroner's office must be notified immediately, as required by the *Coroner's Act 1985*. The State Coroners Office can be contacted on (03) 9684 4444. If it is suspected on reasonable grounds that the human remains are Aboriginal, Aboriginal Affairs Victoria should also be contacted on 1300 888 544. Further details regarding this matter are contained in Appendix 3.

Archaeological reports and the management recommendations contained therein will be independently reviewed by the Heritage Services Branch of Aboriginal Affairs Victoria, the relevant Aboriginal community and Heritage Victoria.

Although the findings of a consultant's report will be taken into consideration, recommendations in relation to managing heritage place should not be taken to imply automatic approval of those actions by Aboriginal Affairs Victoria, the Aboriginal community or Heritage Victoria.

1.5 Project Background

Holcim (Australia) Pty. Ltd. is seeking to expand the extraction limit of its existing basalt quarry at Mt Shamrock Road, Pakenham (Figure 1). As part of this process, Biosis Research Pty. Ltd. has undertaken a series of archaeological assessments for Aboriginal and historical sites at Mt Shamrock, culminating in an Environmental Effects Study (EES) in 2005 (Biosis Research 2005a; 2005b). Following on from the survey and sub-surface testing programs that formed the basis of the cultural heritage component of the EES, this report presents the results of the final stage of the archaeological investigations – a series of excavations of recorded Aboriginal site VAHR7921/0680.

Site 7921/0680 was recorded during the program of sub-surface testing (Biosis Research 2005a), and registered as site Shamrock AS 1, an Aboriginal artefact scatter (Figure 2). The site was considered to be of high scientific significance due to the higher number of artefacts, the fact that some of the artefacts were in situ, and the rarity of recorded artefact scatters on hill tops in the Pakenham area. A second phase of sub-surface testing around site VAHR7921/0680 was then carried out (Biosis Research 2005b) in order to clarify site boundaries and artefact densities.

A number of other sites were also found during the investigations, namely four isolated artefact sites (Shamrock IA 1 [VAHR7921/0651; Shamrock IA 2 [VAHR7921/0678]; Shamrock IA 3 [VAHR7921/0679] and Shamrock IA 4 [VAHR7921/0697} and one other artefact scatter site, Shamrock AS 2 (VAHR7921/0681).

Following the two stages of sub-surface testing, and in keeping with consultation between Holcim, Biosis Research, the Wurundjeri Tribe Land Compensation and Cultural Heritage Council Inc. and the Bunurong Land Council, a number of outcomes were reached in relation to site VAHR7921/0680. The Wurundjeri Tribe Land and Compensation Cultural Heritage Council Inc. issued a Consent to Disturb site VAHR7921/0680, as well as sites VAHR7921/0651; 0678; 0679; 0681 and 0697, on 17 May 2007 (refer Appendix 1). This Consent was issued with a set of strict conditions for all sites, with particular requirements to conduct hand-controlled excavation of the undisturbed portions of site VAHR7921/0680 (see Section 1.7 for details). The issuing of the Consent to Disturb the sites then enabled the Minister for Planning, Justin Madden, to approve the Planning Permit for the extension to the Mount Shamrock quarry, in line with the specific recommendations made by the EES panel for the quarry extension.

Further details of the permit and consultation are described in Section 1.7.1.1. A copy of the Consent can be viewed in Appendix 1.

1.6 Aims

The following discussion is a summary of the major objectives of the excavation of site VAHR7921/0680. These were:

- to provide further detailed information about the extent, distribution and density of archaeological material associated with site VAHR7921/0680;
- to identify the presence of significant sub-surface occupation events and areas that remain undisturbed and, if features are present, to use scientific dating such as radiocarbon dating or TL if the sediment was suitable to reassess the extent and impact of disturbance on the site; and
- to provide further information regarding Aboriginal occupation of the hills environment around Pakenham.

1.7 Consultation

Before undertaking excavations for heritage places there is a statutory requirement to notify the Heritage Service Branch of Aboriginal Affairs Victoria – the State Government agency responsible for Aboriginal heritage places - and to consult with the relevant Aboriginal community organisations.

1.7.1 Consultation with Aboriginal Affairs Victoria and the Aboriginal Community

1.7.1.1 Aboriginal Affairs Victoria

As a Consent to Disturb site VAHR7921/0680 was issued by the Wurundjeri under the *Aboriginal and Torres Strait Islander Heritage Protection Act* 1984, a Consent to Disturb was not required from AAV. The conditions contained within the Wurundjeri consent were very specific and detailed, and as such no Cultural Heritage Permit to excavate was required from AAV, as the excavation commenced after the *Aboriginal Heritage Act* 2006 was enacted. This was confirmed by AAV in an email to the consultant on 16 August 2007.

Wurundjeri Tribe Land Compensation and Cultural Heritage Council Inc.

A Consent to Disturb was sought by Holcim from the Wurundjeri for site VAHR7921/0680. An outcome granting consent to disturb the sites would enable extension of the quarry to proceed, in accordance with the findings of the Environmental Effects Statement (EES) for the Mount Shamrock proposed quarry extension.

A Consent was issued by the Wurundjeri on 17 May 2007 for the disturbance of site VAHR7921/0680, as well as sites VAHR7921/0651; 0678; 0679; 0681 and 0697 (see Appendix 1). Under the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*, Consent was granted for the disturbance of all these sites within the proposed extraction limit in strict accordance with a series of conditions (see Appendix 1). The conditions related specifically to the controlled archaeological excavation of site VAHR7921/0680, as well as a series of conditions pertaining to the sieving and monitoring of ground disturbance of sites VAHR7921/0651; 0678; 0679; 0681 and 0697. As this sieving and monitoring will be conducted concurrently with the construction of the quarry extension, a separate report will be generated regarding the outcomes of the Consent conditions. This report specifically discusses the excavation, analysis and interpretation of site VAHR7921/0680.

The conditions that relate specifically to site VAHR7921/0680 were listed as follows:

> **Controlled Archaeological Excavation – VAHR7921/0680 – Shamrock AS1**
>
> *Condition 3:*
>
> Before any ground disturbance there will be controlled hand excavation of 100% of the archaeological deposits at site VAHR7921-680 – Shamrock AS1.
>
> *Condition 4:*
>
> This excavation will be conducted by a qualified archaeologist and involve representatives from the Wurundjeri Council.
>
> *Condition 5:*
>
> The archaeological excavation and recording methods will meet the standards set out in the Guideline for Conducting Aboriginal Heritage Assessments (set out by Aboriginal Affairs Victoria {AAV}).
>
> *Condition 6:*
>
> Following the completion of the excavation there will be analysis of the artefacts excavated and a report produced outlining the results of this analysis.

Following the issue of the Consents to disturb the Aboriginal archaeological sites by the Wurundjeri at Mount Shamrock, a Planning Permit (Application T050156) was issued for the Mount Shamrock Quarry to Holcim by the Minister for Planning, Justin Madden.

Further clarification on the conditions of the Consent was provided in a letter from Megan Goulding, Interim Chief Executive Officer for the Wurundjeri to Holcim on 4th September 2007 (see Appendix 1), stating:

> *…Previous excavation at the site has demonstrated that the site, which is 130m x 100m, contains archaeological deposits under a disturbed plough zone of approximately 15cm and that there are areas of the site that have been totally disturbed by ploughing. I understand that as part of the methodological approach the archaeologist at the site, Jenny Fiddian, wishes to remove the disturbed components of the site with a mechanical excavator and further, that she proposes to sieve these deposits for artefacts by mechanical means.*
>
> *I believe that this is an acceptable approach to the excavation of the site and note that there is support for this method by Wurundjeri community members who are currently working on the site. By way of clarification, the aim of the consent was to ensure that where the deposits are in situ, that is largely undisturbed, that they be excavated using controlled hand excavation methods.*
>
> *It would be preferable if the removal of the top disturbed plough zone layer be carried out in segments that allow for some spatial control. Clearly great care will need to be exercised to ensure that the excavator does not interfere with in situ material. This should be monitored carefully by the archaeologist and/or Wurundjeri representatives at the time.*

Megan Goulding, Interim Chief Executive Officer for the Wurundjeri, organised Wurundjeri representatives to assist the consultants during the controlled excavations. The assistants were Diane Kerr, Melissa Kerr, Gail Smith, Ashley Kerr, Bob Mullins, Naomi Mullins, Ronald Terrick, Craig Terrick, Harry Terrick, Michelle Terrick, Winifred Bridges, Alice Kolasa, Vicki Nicholson-Brown, Mandy Nicholson, Eddie Ockwell, Bill Nicholson, Luke Gardiner, Mark Gardiner, Danielle Mullins, Mathew Gardiner, Shane Nicholson, Joe Armstrong, Kerry Xiberras, Georgina Nicholson, Emma Mildenhall, Liticia Ross, Cary Smith, Michelle Mills, Malcolm Hoye, Kathryn Morris, Alex Kerr and Michael Xiberras.

1.7.2 Report Lodgement

This draft report has been distributed to:

- Holcim (Australia) Pty. Ltd.
- Wurundjeri Tribe Land Compensation Cultural Heritage Inc.

1.8 Authorship

Jenny Fiddian, Keith Patton, Andrew Orr, Matt Schlitz, Scott Rogerson, Chris Lewczak, John Edgar and Helen Cekalovic (Biosis Research) carried out the controlled excavation. Jenny Fiddian wrote the report. Cheryl Kift undertook additional background research, Kendal Houghton and Delta Freedman assisted with production of the report. Robert Fitzgerald and Sally Mitchell compiled all the map figures. Robyn Butler and Jenny Fiddian (Biosis Research) along with members of the WTLC&CHC Inc. completed the artefact analysis. Project management was undertaken by Jenny Fiddian and editing of the report was undertaken by Taryn Debney.

2.0 BACKGROUND INFORMATION

A synopsis of the environmental context of the Mt Shamrock study area is provided below, along with a discussion on archaeological survey and excavation work undertaken in the immediate area. Regional patterns are informative regarding the overall character of the archaeological record in certain areas, so these are briefly discussed, in relation to the following Biosis Research reports (Biosis Research 2005a, 2005b, 2007).

2.1 Environmental and Cultural Background

A more comprehensive discussion of the wider environment of the study area, including flora and fauna is contained in:

- Biosis Research 2005a, *A pre- and post-contact cultural heritage assessment of Readymix Mt Shamrock Quarry (Pakenham).* Report for Readymix Holdings Pty. Ltd.
- Biosis Research 2005b, *A pre- and post-contact cultural heritage assessment of Readymix Mt Shamrock Quarry (Pakenham) Results of further studies.* Report for Readymix Holdings Pty. Ltd.
- Biosis Research 2007, *Further sub-surface testing at Readymix Mt Shamrock Quarry (Pakenham).* Report for Readymix Holdings Pty. Ltd.

2.1.1 Geology and Landforms

During the Tertiary (65 million – 1.8 million years ago), basalts of the older volcanics were extruded in the Pakenham / Berwick area (LCC 1973: 24). These occurred as a series of narrow valley flows, separated by ridges of Silurian basement and overlain by a thin veneer of Tertiary sand and clay (Leonard 1988: 553). The study area is an outcrop of older volcanics basalt. Occasional surface outcrops of basalt are evident, but much of the study area is covered with a veneer of clay soil.

The study area is located amongst the foothills of the Dandenong Ranges, which slope down to the flat lowland plains that continue on to Westernport Bay. Numerous temporary and permanent creeks drain into the Koo-wee-rup Plain, the central part of which is swamp (now drained). Low hills and rises on the plains formed on Silurian to lower Devonian sedimentary rocks, and generally consist of sandstones and mudstones, although towards the western side of the plain there are also partially buried sand dunes (Jenkin 1974: 35).

Mt Shamrock is a broad, relatively low, flat-topped hill, a feature made more obvious by the recent quarrying operations on its crest. On its southern face the slope grades upwards with an increasingly steep gradient before coming to the top of the broad, flattish hill top. Site VAHR7921/0680 is located on the southern face of Mt Shamrock, south of the existing extraction area. Artefacts have been recorded within a long and wide, slightly concave depression approximately 170m wide and 200m long, on this southern face, only a few metres below the top of the hill. At the back of this depression the land gently slopes upwards again before reaching the plateau-like, quarried hill top. This southerly concavity would have provided protection from northerly, westerly and easterly winds due to its protected location. Other smaller sites have been recorded on the western and south-western faces of Mt Shamrock, however the evidence to date indicates that site VAHR7921/0680 is by far the largest and most intact.

The site is located to overlook the Toomuc Valley. There are commanding views in all directions of the surrounding plain, and occasional red gums would have provided shade on the hilltop and as the vegetation has been cleared or thinned since European settlement, more extensive shelter may have been available in the past.. It is within 500 metres of Toomuc Creek, and as well there are numerous natural springs that would have provided potable water to the east and southwest within a few hundred metres, all sources that were easily accessible from Mt Shamrock. The high density and broad distribution of artefacts recorded during the subsurface sampling strategy (Phases 1 and 2) in site VAHR7921/0680 indicates that Aboriginal people had used Mt Shamrock.

2.1.1.1 Soils

Soils associated with volcanics basalts are variable depending on the ages of the lava flow, elevation, erosional history, past and present climate and nature of sediments deposited after the lavas solidified (Cochrane *et. al*. 1995:85). The soils typical of this region, when found in association with volcanic eroding material, are hard pedal red duplex soils (as defined in Northcote *et. al.* 1975: Figure 1, 105-108). Red duplex soils generally have loamy A horizons ranging from thin to quite thick, being either weakly structured or showing variable development. The underlying red-brown clay subsoils become mottled with depth and usually grade to a weathered C horizon between 0.3 and 2 metres (Northcote *et. al.* 1975:105). The upper A horizon ranges from dark grey-brown to dark reddish brown loamy sand to clay loam. The lower horizon varies from light brown to light reddish or grey-brown (Northcote *et. al.* 1975:105). The underlying basalt rock represents an outcrop of older volcanics basalt flow deposits which have formed a solid base beneath the ground surface soil.

Within the site the uppermost 15 centimetres of soil has been ploughed over many years and used for growing potatoes. In recent years the land has also been used to graze cattle. The topsoil was consistently red brown compacted loam. Typically this overlaid a yellow brown loamy clay to 25-30 centimetres in depth, which in turn overlaid a red clay which was very thick by 35 centimetres and considered culturally sterile. Decomposing basalt was evident in all test pits. Charcoal fragments were noted during the phases of sub-surface testing, and ironstone pebbles were present throughout.

The particular geomorphological characteristics of the concavity in which site VAHR7921/0680 is found may have assisted in the protection of its soils and artefacts from downward erosional slopewash. Within the slight concavity near the apex of Mt Shamrock the typical basaltic hard pedal red duplex soils had developed a higher organic content. A thin lens of richer, brown silty soil with a higher organic content characterised the uppermost soil. This soil is quite different to that of the lower gentle slopes and flat plains. The significant elevation of the hill above the Toomuc Creek valley has led to the formation of a richer silty soil, which is prevented from serious wind and water erosion by the presence of occasional *in situ* basalt outcrops and its general shape. In contrast, clearance of the plains associated with grazing regimes has caused the surface layers of the hard pedal soils to be eroded away by wind and rain, exposing the infertile layers beneath.

The existing quarry may have had an impact on the site which may have extended further north originally.

The region would have provided Aboriginal people with an ample supply of raw stone material suitable for stone tool production. Quartz and quartzite would have been available in local creek beds, while hornfels and basalt outcrops occur within or near the study area (Smith 1989; LCC 1973, McHaffie 1988: 565). Other materials such as fine grained silcrete and chert were not available locally but were imported into the area, most probably from the hills immediately north.

2.1.2 Climate and Hydrology

The study region has a temperate climate with a mean average rainfall of 900 millimetres (LCC 1991). The hottest months of the year are from January to March and the coldest from June to August. It is during the winter months that the highest rainfall occurs and so peak flooding is more likely to have been during the period from July through to September. The creeks in the surrounding landscape form part of the Bunyip Drainage Basin (LCC 1973: 45) that flow into the Koo-wee-rup swamp. The closest major waterways located within the vicinity of the study area are Toomuc Creek to the north-west and Deep and Ararat creeks to the east. The headwaters of Toomuc Creek are located in the

upper sections of Dandenong Ranges to the north. Although this is a small creek course, it is deeply incised and cuts through sandy deposits. Periodic flooding would have occurred across the low terraces on either side of Toomuc Creek, to the west of the study area. The resulting floodplain sedimentation either side of the creek resulted in favourable soil conditions for wetland vegetation and good habitat for various species of fauna across these lower areas prior to land clearing and pastoral activity in the area.

2.1.3 Previous Archaeological Assessments at the Mt Shamrock Quarry

No Aboriginal archaeological sites were found during the initial survey of the study area due to very low ground surface visibility, however one isolated artefact was recorded on a subsequent visit (Biosis Research 2005a) (see Table 1). Both these inspections were of the ground surface only, and were severely limited by very low ground visibility due to dense grass cover. Because of this poor ground visibility, and the potential for unrecorded, buried archaeological deposits to be present below the grass layer, a program of sub-surface testing was undertaken to determine whether additional material was present (Biosis Research 2005a). During this first phase of testing, eleven transects were scraped by excavator within the proposed extraction area (see Figure 3). Transects were between 25-100 metres in length, 1.2 metres wide and up to 0.6 metres deep. During this phase four previously unrecorded sites were found, including two artefact scatters and two isolated artefact sites (VAHR7921/0678 – VAHR7921/0681 inclusive) (see Table 1). One of these sites was VAHR7921/0680, the subject of this report.

AAV SITE NUMBER	Site Type	Location
AAV7921/0651	Isolated artefact	Southern face, edge of dam
AAV7921/0678	Isolated artefact	Western side of Mt Shamrock top of slope
AAV7921/0679	Isolated artefact	Western side of Mt Shamrock mid-slope
AAV7921/0680	**Artefact scatter**	**Large site located on rise on southern face of Mt Shamrock top of slope**
AAV7921/0681	Artefact scatter	South-western edge and top of slope
Shamrock IA 4 (AAV7921/0697)	Isolated artefact	Rise on east side of study area

Table 1: Aboriginal archaeological sites recorded within the study area

This first phase of sub-surface testing resulted in 81 artefacts being found to represent site VAHR7921/0680 over an area of 60 x 80m from two intersecting transects (Transects 1 and 2) on the flattest part of the shelf immediately back from the edge of slope. The majority of artefacts were found at depths of 15cm

to 40cm, which was below the plough zone, although a number of artefacts were also found within the ploughzone. In addition, an area of potential sensitivity for further Aboriginal archaeological material was identified 100m either side of site VAHR7921/0680, that basically included all areas of relatively flat land comprising the broad shelf on the southern face of Mt Shamrock (see Figure 3). This area was identified based on landform and soil type, which remained consistent across this feature.

The second phase of sub-surface testing (Biosis Research 2005b) was undertaken to clarify the boundaries of this site, as well as artefact density within the site. During this phase, a further seven transects were excavated, and these were numbered 12-18, continuing on from Phase 1. Eight transects were excavated across site VAHR7921/0680 (see Figure 3). Transects were between 35-55 metres in length, 1.2 metres wide and up to 0.6 metres in depth, and are described in Biosis Research (2005b). The total area of sub-surface testing was approximately 350 square metres, involving removal of approximately 130 cubic metres of soil.

As a result of Phase 2 testing, a further 137 artefacts were found. Twenty-eight of these were located below the plough zone at depths of below 15cm, and the remaining 109 were within the top 15cm plough zone. These were almost all confined to the red loamy soil of one rise in the southern part of the study area. The site boundaries were redefined as encompassing an area of 130 x 110m (see Figure 3). After this phase of testing it was concluded that the majority of artefacts found had been present within the top 15cm of disturbed soil, caused by ploughing for potatoes. These artefacts had been removed from their stratigraphic context and had undergone a great deal of disturbance and displacement. The number of broken flakes and blades present suggest that the artefacts may have been damaged by stock trampling, vehicle movement or ploughing. However a smaller number of artefacts had been recorded below that depth, to between 15-40cm, and are more likely to represent in situ artefacts still in their original place of discard.

Finally, in 2007 the Wurundjeri requested that additional testing, in the form of manually excavated test pits, be undertaken across the site in order to clarify further the nature and extent of the sub-surface deposits, and to gain a greater understanding of the potential impact of the quarry extension on the recorded site, and to further determine its significance. It was agreed that up to six 1 x 1 metre test pits would be excavated within the site boundaries, in between the excavated transects (see Figure 3). These were to be excavated to clay or sterile soil (approximately 40 centimetres).

Sixty-six artefacts were found during excavation of the six test pits (Biosis Research 2007). Artefacts were found in five of the six test pits, with a total of 37 artefacts found within the top 15 centimetres (ploughzone). Twenty-two

artefacts were found between 15-25 centimetres, and seven were found at between 25-35 cm depth. The deepest artefact was found at 32 centimetres in test pit 1, and was located at the top of the impenetrable clay layer. The clay is highly compacted, and artefacts could not be displaced through it. Therefore, it is extremely unlikely that any artefacts will be found within the clay layer or at greater depth.

Test pits 1 and 2 contained the most artefacts, with 31 found in test pit 1 and 22 in test pit 2. These two pits, along with test pit 5, which contained 11 artefacts, were located at the top of the slope whereas the remaining test pits were located further downslope. This is consistent with results from previous sub-surface testing stages, during which it was noted that most artefacts were located on the top (flattest part) of the site (see Biosis Research 2005b).

Both phases of sub-surface testing produced a large number of artefacts, some of which were found at a depth of 40cm. The extent, density, depth and rarity of such sites in the Pakenham region meant that site VAHR7921/0680 was assessed as being of high scientific significance.

This report describes the final phase of archaeological investigation undertaken for site VAHR7921/0680, which was a salvage excavation of the site.

2.1.4 Description of Site VAHR7921/0680

Site VAHR7921/0680 is located on the southern face and upper slope of Mt Shamrock, a relatively low and broad hill, with a flat top (see Figure 2). This shape is exacerbated by the quarrying operations on the northern portion of the hilltop. The site has been recorded immediately above the sharp incline of the southern slope of the hill, where the land flattens out to form a large, level to slightly concave area of approximately 200 x 170 metres. The land slopes steeply down to the south, east and west of the site, and the existing basalt quarry is located slightly uphill and to the north. At the time of these investigations, site AAV7921/0680 measured approximately 130 x 110 metres. However, by completion of the excavation including the monitored mechanical scrapes, the dimensions of the site were found to be 280x330m although the densest concentration of artefacts was confirmed to be within the previously identified area (see Figure 5). The site is to some extent defined by the shape of the shelf, but there is a correlation between the density of artefacts and the red loamy soil. Away from this soil, where soil is brown, drier, shallower and contains more basalt pieces, there are notably fewer artefacts and these are at shallower depths.

The topsoil of the site was consistently red-brown compacted loam. Charcoal fragments were noted in several test pits, and ironstone pebbles were present throughout. This topsoil overlay yellow-brown loamy clay to 25-30 centimetres

in depth, which in turn overlaid red clay which was very thick by 35 centimetres and considered culturally sterile. Decomposing basalt was evident in all test pits.

The proportion of artefacts found within the plough zone compared with those found in undisturbed soil have been consistent with results from the various sub-surface testing phases. Over the three sub-surface testing phases, the combined totals indicate that 52% of artefacts were located in the plough zone, and 48% below the plough zone. Hence, while effectively half the depth of the site has been severely compromised by ploughing, the lower half of cultural deposits can be considered to have a higher integrity. However it is also possible that artefacts from these lower depths have suffered from the effects of ploughing.

Within the boundaries of the site a total of 14579 artefacts have been recorded. The assemblage consists predominantly of unretouched flakes, however the presence of cores, core trim flakes, debitage and angular fragments indicates that tool making was occurring on site. Forty-eight backed microliths were found (0.03% of total assemblage). These may have been hafted onto spears or a number of them hafted onto a wooden shaft and used as a knife. A range of daily tasks was evidently carried out on site, including primarily food processing and tool making. Cores, anvils, debitage and core trimming flakes indicate that tools were manufactured on site, while flakes and blades were used in food preparation and processing.

Very little retouch was noted on the artefacts, suggesting that stone resources were readily available, and therefore conservation of stone was not practised to a great extent.

Silcrete artefacts were more common than quartz, with 66.2% of the assemblage being made from silcrete, 24.3% from quartz, 7.5% of crystal quartz, 1.5% quartzite and 0.5% a range of other materials including hornfels, basalt, rhyolite, mudstone, sandstone and greenstone. Quartz cobbles would have been available in the nearby creeks and rivers, while silcrete is found in association with basalt. There may have been a local source of silcrete, otherwise it would have been brought to the site from elsewhere.

The silcrete used was predominantly fine-grained, and a range of colours was noted including grey, beige, red, pink, mottled and banded.

2.1.4.1 Existing Site Conditions and Disturbance

Investigations have confirmed that the integrity of the site has been seriously compromised by the degree of disturbance it has sustained. The top 15 centimetres of soil has been repeatedly ploughed over many years and used for growing potatoes. Mr. Whiteley, the farmer ploughing at Mt Shamrock, commented that potatoes were only planted in areas of red loamy soil. Deeper

soils and subsoils tend to be too clayey to be suitable for cropping and therefore result in relatively shallow ploughing. Subsoil and clays in lower deposits have therefore not been disturbed to any great depth, and are too densely compacted to allow vertical movement of artefacts through the soil other than through ploughing. It is, therefore, considered that sterile soil was reached during excavation. In recent years the land has also been used to graze cattle, and the quarrying operations on the crest of Mt Shamrock are immediate (less than 100m to the east at its closest point). Also, because of the site's situation close to the slope on the southern face of the hill, artefact displacement downslope due to movement caused by human, animal and erosional agents has been demonstrated.

Bioturbation (the process of plants, animals and insects disturbing the soil so that artefacts are displaced horizontally and vertically) has clearly been occurring as the depth of artefacts cannot be explained by accumulation of new sediments over the surface.

2.1.5 Aboriginal Context

South-eastern Australia is known to have been occupied by Aboriginal people for at least 40,000 years (Gaughwin and Stockton 1983: 17; Bowler et al 1976; O'Connor 1995). Over that extensive period the Aboriginal people who camped or passed through the study area would have had some general impact on the natural environment. One significant change was caused by the application of firestick farming, which is the alteration of the vegetation cover using fire (Presland 1997: 2). The Aboriginal occupants of the region practiced a hunter/gatherer subsistence system in order to utilise the resources available in the area.

After European settlement of the area in the mid 1800s, much Indigenous knowledge of the study area was lost, but historians have attempted to piece together fractured accounts of Aboriginal life in the area. However the primary sources of this information are 19th century European ethnographic observations and limited oral histories and as a result these accounts may not accurately represent the lifestyle of indigenous people prior to the introduction of European influences.

An overview of Aboriginal life at the time of European contact in this region is provided by Presland (1994) and Goulding (1988 in LCC 1991: 14-32). More specific information on the social and organisational aspects of the Aboriginal people that inhabited the study area is provided in Barwick (1984), Clark (1990) and Cotter (2001).

People who identified themselves as the 'Kulin' nation occupied a large portion of south central Victoria. The Kulin nation was a confederation of five language groups.

> *In traditional Koorie society the most common day to day group was the foraging band, composed generally of one or two families, plus visitors. The clan was the land owning unit in traditional society and was also the group with which the individual Koorie would first identify herself or himself. All members of a clan spoke the same language and identified with a particular area of land or estate, which they regarded as their own…In traditional Koorie society a number of clans who spoke the same language and had adjacent estates made up of a larger group was usually referred to as a tribe. The tribal territory was the total area of the clan's estates* (Presland 1994: 38-39).

It is difficult to determine the ethnography and post-contact history of specific Aboriginal clans within the study area as Aboriginal people from a diverse range of clans and language groups were attracted to the region for its rich supply of resources.

Some sources, such as Clark (1990) and Barwick (1984), state that the study area is located in the territory of the *Woi wurrung*, who are composed of a number of clans who spoke the same language (Clark 1990: 364). The territory stretched loosely along physical features, such as rivers, from Kyneton in the north, the Werribee River and Bacchus Marsh in the west and to Mount Baw Baw in the east. The language group occupied most of present metropolitan Melbourne, except for the southern suburbs and areas around Port Phillip Bay. A clan of the *Woi wurrung*, the *Baluk-willam* which is part of the *Wurundjeri-baluk* clan, occupied the region that includes the present study area. Their lands extended from south of Yering on the upper Yarra, south-east to the Koo-wee-rup swamp and headwaters of the Latrobe River, and south-west to adjoin *Bun wurrung* clan lands around Cranbourne and Dandenong (Barwick 1984:120).

Other sources (for example Thomas in Gaughwin and Sullivan 1984: 86) state that the *Bun wurrung* occupied "…all lands from the Dandenong Range…[to the coast]", while others suggest that *Woi wurrung* and *Bun wurrung* had reciprocal rights to the hills and plains of the Pakenham area (Murphy 2003a: 14). Smith (1989: 16) notes that the *Woi wurrung* occupied land immediately to the north of the Berwick – Pakenham corridor, and that contact between the two tribes appears to have been fairly frequent. The *Bun wurrung* language group occupied an area of land extending from the northern shores of Port Phillip Bay to Wilson's Promontory and comprised at least six clans. The *Mayune balug* clan of the *Bun wurrung* (Clark 1990: 365) or *Bunurong* (Barwick 1984: 117) Aboriginal language groups, would have been closest to the study area at the time of European contact (Barwick 1984: 119; Clark 1990: 365, 368).

These clans shared a common boundary, language and some socio/economic ties. Intermarriage and exchange of goods between these two language groups is known to have occurred as Kulin people often met for inter-clan gatherings (Ellender 1991: 15).

Aboriginal camps would have been situated around rivers and creeks with substantial flows as tributaries would not have been able to sustain large groups of people. Toomuc Creek is a major creek in the vicinity of the study area that would have been a focus for Aboriginal subsistence practises and occupation on either side of its high banks during summer months when seasonal flooding had abated. Cardinia Creek even further west of the study area was a known pathway for Aboriginal people travelling north-south through the Koo-wee-rup Swamp (Smith 1991: 15; Gaughwin 1981: 74).

As the areas around Toomuc Creek would have been capable of sustaining moderate sized Aboriginal groups, it is generally agreed that camps in this area were mainly seasonal occupations, utilized on a temporary basis. Aboriginal groups would move into an area and spend 5 – 10 days exploiting resources that were plentiful and in season before moving on to the next camp. This practise ensured sustainable continued exploitation of resources as well as increased nutritional benefit by exploiting resources at the peak of their season (Sullivan, 1981: 37).

Although somewhat limited by language difficulties, and misunderstandings of indigenous concepts of ownership, the Assistant Aboriginal Protector for the Melbourne District, William Thomas, provided some of the most detailed ethnographic information regarding *Bun wurrung* people. Thomas' early observations of *Bun wurrung* movements indicate that foraging groups of 20-30 people ranged an average of 10 kilometres a day, but that larger base camps of 100 residences were also established (Sullivan 1981:33). Thomas observed that movement around the peninsula was mainly via the coasts, with evidence that there was also of exploitation of hinterland resources, particularly close to fresh water sources (Sullivan 1981:36). Thomas suggested a circular travelling route by the *Bun wurrung* between Dandenong and the Tooradin area. The route possibly passed through the Cranbourne region to Carrum Swamp, Port Phillip Bay, down the Mornington Peninsula and back up to Tooradin using the Western Port coastline (Gaughwin and Sullivan 1984: 88). Sullivan (1981: 33) states that the movement between places consisted of short journeys and overnight (to a couple of days) camping, though sometimes clans camped for long periods of a week or more. Cardinia Creek was a known pathway for Aboriginal people travelling north/south through the Koo-wee-rup Swamp (Smith 1991: 15; Gaughwin 1981: 74). Large campsites are known in the region, such as Barnibyrnong on Cardinia Creek, Tirhatuan on Dandenong Creek and at Tooradin, Yallock and Red Bluff on the coast (Gunson 1968: 10).

This seasonal movement between the Port Phillip and Western Port Bay coastal areas, the Carrum and Koo-wee-rup Swamp and further inland would have provided plentiful food resources. Coastal areas supplied an ample food supply including shellfish, while swamps contained a rich resource of bird life, eels and plant foods. Inland areas had numerous species of larger animals, such as kangaroo, wallaby and emu. Andrew McCrae (in Moorhead 1971: 34) wrote that the *Bun wurrung* were nomadic hunters and fishermen, who stayed in one place if food was plentiful and then returned to their camp sites around Arthur's Seat. It is likely that clans moved from the interior in winter to the coast in the summer (Sullivan 1981: 31).

With the settlement of Europeans in the area, the availability of these resources was greatly diminished and the Aboriginal people would have been forced to adapt in order to survive. There is documented evidence of individuals trading lyrebird feathers, blackfish and eels for flour, sugar and salt from the European settlers (Beaumont, James, Cunnan & Hughes, 1979: 34).

The introduction of the *Protection Act* of 1839-1849 resulted in widespread changes to Aboriginal people's way of life in Victoria. In 1839 George Augustus Robinson was appointed as the Leader of the Aboriginal Protectorate with William Thomas as one of four assistants. Thomas established a station situated at Arthur's Seat on the Mornington Peninsula which was later relocated to Narre Warren to the north-west of Pakenham. The station served to dispense food, blankets and other essential items to Aboriginal people in the area but this was too late for many who ha already succumbed to disease, starvation, psychological stress, alcohol and inter-tribal conflict among other factors (LCC, 1991: 22).

2.1.6 Regional Context

AAV SITE NUMBER	Site Type	Location
7921/203	Artefact scatter	Toomuc Creek
7921/222	Artefact scatter	Toomuc Creek
7921/221	Collection	Toomuc Creek

Table 2: Previously recorded Aboriginal archaeological sites within 5 kilometres of the study area (prior to Mt Shamrock archaeological investigations).

In the greater Melbourne region, high archaeological site densities are generally associated with waterways. Rivers, lakes and swamps provided many resources to attract Aboriginal people. In the wider region there are natural creeks and waterways, although Cardinia, Toomuc and Deep creeks may have been modified since the arrival of European people. These natural waterways are considered areas of archaeological potential (Smith 1989: 81). Previous studies

of the region have also shown that where a current landform is low-lying or swampy, areas on higher, drier ground often have a higher potential for Aboriginal archaeological sites.

While there may be numerous areas of archaeological potential, a major factor in identifying sites in these areas is ground visibility and disturbance. Landforms containing sandy deposits may conceivably have medium to high ground visibility. This is due to a combination of the poor fertility of the soil matrix and post-contact European farming practices of stock grazing and ploughing for market gardens which have disturbed the soil, which repeated over time can also significantly churn the topsoil layers and disturb and/or alter site contexts. While these factors may provide enough erosion and disturbance so that material evidence of Aboriginal occupation may be uncovered, the context in which the artefacts are found may be in doubt. Ground surface visibility is a major agent in determining whether sites can be located in an area For example, in rural areas, where most of the native vegetation has been cleared for farming, many areas are covered in pasture grasses for much of the year, obscuring the ground. Dense scrub also decreases the likelihood of locating Aboriginal archaeological sites. Land clearance practices may have removed any scarred trees in the area.

Smith's (1991) site prediction study, based on a surface survey, proposed that Aboriginal archaeological sites would generally be found within 100 metres of water courses within the wider region. Rhodes' work around Lakeside (2003, 2004) revealed that sub-surface sites could be found from 50 to 1300 metres from the west bank of Toomuc Creek. This work indicates that there is potential for sub-surface Aboriginal archaeological sites to be located in similar landforms close to the study area. Rhodes (2003:29) has suggested that sites found on the Koo Wee Rup floodplain are older than those located on the hills. He has speculated that some floodplain sites located over a kilometre away from Toomuc Creek might be associated with older tributaries of the creek that were eventually blocked during periods of sedimentation.

Rhodes (2004:4) also put forward an alternative suggestion that patterns of archaeological site distribution in upper soils over the alluvial plain bordered by Toomuc and Cardinia creeks might reflect recent exploitation of resources by Aboriginal people. Soil erosion as a result of tree clearance on the hills north of the study area could have led to extensive sedimentation in the lower floodplains around Pakenham. However, Rhodes considered this model unlikely, given that the drainage from the Toomuc and Cardinia creeks occurred before this land clearance and so sediments would have been transported further south of the and not over the alluvial plain. Cardinia Creek, within 10 kilometres of the current Activity area, has exposed channel walls that reveal earlier swamp and alluvial sedimentation (Rosengren, 1984:87, 98). Thus it is unlikely that the draining of the former swampland and land clearing activity over the last 130 years has

caused any upper layer sedimentation. The former water courses in the wider region across the plain have changed with the drainage of the swamp during the nineteenth century and higher water volumes to create the rejuvenated, deeply incised creek formations visible now.

Aboriginal archaeological sites are therefore more likely to be found on the low ridges characteristic of relic stream banks formed during sedimentation of the plain prior to drainage of the Koo Wee Rup swamp and land clearance activities in the region. The work of Rhodes (2003, 2004:4, 21) demonstrates that these landforms are more likely to be occupied by Aboriginal people in the region. The stream banks would have been suitable pathways for travel among the shallow water courses with access to the past resources in the region.

2.1.7 Major Conclusions

Manual excavation over the site indicated that there were activity-specific areas across the site, locations at which people made tools or carried out other specific activities. These were particularly evident in the 2x2m Test Pits 2, 7, 10, 14 and 18. These test pits contained a dense concentration of artefacts consistent with tool making, including cores, debitage, angular fragments and flakes associated with tool production. Specialised tools were also present, indicating that specific activities were being addressed, such as hunting, wood working and hide working. These dense concentrations were located in spit 2, below plough zone, between 15-25cm depth. They had not been displaced through ploughing activities.

Interestingly, the distribution of raw materials varied across the site also. Fine-grained silcrete was by far the most commonly occurring stone, followed by quartz, however prolific use had been made of crystal quartz, and quartzite and hornfels were also well represented. A concentration of artefacts made from crystal quartz was evident in Test Pit 2.

One test pit, TP7 (2x2), contained a concentration of medium clast silcrete which was quite distinctive and clearly from the one original core. Artefacts from this particular material did not occur elsewhere across the site.

3.0 ARCHAEOLOGICAL EXCAVATION METHODS

3.1 Aims of the Program

The excavation program was designed to determine the extent, density, nature and integrity of recorded site VAHR7921/0680 within a sub-surface context. The archaeological methodology outlined below was devised in light of the landform attributes, the preliminary results of test excavations within the site, and in consultation with Aboriginal stakeholders the Wurundjeri Tribe Land Compensation and Cultural Heritage Council Inc.

3.2 Overview

Controlled excavations were conducted at the Mt Shamrock quarry between 22nd August 2007 – 21st December 2007.

Permit conditions for the salvage excavation of site VAHR7921/0680 included that controlled excavation be carried out in order to document and salvage as much cultural material as possible to provide maximum information about the site (see Appendix 1). Due to various constraints on the excavation, it was acknowledged that it would not be possible to excavate 100% of the site. The Wurundjeri permit conditions therefore required that the site would be sample-excavated with excavation squares placed at strategic locations within its boundaries, in order to provide comprehensive coverage and obtain as much information as possible. Areas of the site that were not excavated manually were to be mechanically excavated in controlled increments (10cm spits). This soil was to be stockpiled and used for revegetation, ensuring that the artefacts did not leave the Mt Shamrock location. These methods of excavation employed two major techniques, which are discussed below:

1. Manual, controlled excavation; and

2. Mechanical removal of non-excavated areas in controlled increments.

3.3 General Methodology

The methodology to test the presence, extent and character of the archaeological resource involved the excavation of thirty-two 2 x 2m test pits in a grid pattern across the 40 m x 47m area of densest artefact concentration, twenty-two 1 x 1m test pits within the north-west section of this same area, and ten 1 x 1m test pits in the south-west section of this area also (see Figure 4).

The following excavation methods were used:

- Surface collection of any artefacts identified.
- Each test pit was excavated using a long handle shovels, spades and trowels following the identified stratigraphy.
- The soil from each stratigraphic layer was dry sieved in nested 3mm and 6mm sieves and all artefacts collected, bagged and clearly labelled.

For each test pit that was excavated, the following documentation was made:

- Unique test pit identification number
- Soil colour and texture
- Amount and location of artefacts within deposit
- Nature of disturbance if present
- Stratigraphy
- Archaeological features (if present)
- Photographic records; and
- Spit records.

Representatives from the Wurundjeri Tribe Land Compensation and Cultural Heritage Council Inc. participated during the controlled excavations at Mt Shamrock.

3.4 Manual Excavation

The site extent had been defined through sub-surface testing as measuring approximately 130 x 110m (13,200sq.m.). Initially, the entire site was pegged out and the site boundaries mapped in using a dumpy level. Following this, the location of the main concentration of artefacts within the site was identified and pegged for intensive controlled excavation. This was an area of 40 x 47 metres, located at the top of the hill, where the land flattens out to form an extensive level area.

Firstly, the uppermost soil deposit (top 15cm) (identified as being within the ploughzone and having sustained significant ground disturbance) was removed mechanically from this section and stockpiled for fine sieving. Ploughzone soil removal was completed with the use of a flat-bladed bucket in increments of 5-10cm, where each increment was separately labelled. It was then determined to sample across this area using a series of 2 x 2 metre test pits. Test pits were

pegged out within this 40 x 47m area in order to cover as broad an area as possible, and were mapped with the dumpy level. Within this section of the site, thirty-two 2 x 2m squares were excavated (see Figure 4).

Further to this, two areas of further interest within the 40x47m area of the site were identified and pegged out for further controlled excavation. These were situated in the north-west and south-west portions of this area of more intensive artefact collection, and were identified for close excavation to test different areas within the zone of artefact concentration. A series of 1 x 1m test pits was gridded out for manual excavation. These two areas retained the uppermost soil deposit from the plough zone, and this was excavated manually. Following this, ten 1 x 1m squares were excavated in the south-west corner, and twenty-two 1 x 1m squares in its north-west portion (see Figure 5). This is in addition to the eight backhoe transects and six 1 x 1m test pits that were excavated during sub-surface testing (see Figure 4). Excavation of 605sq.m was carried out; this equates to approximately 20.1% of the site.

The results of the controlled excavation provided information regarding the underlying stratigraphy and the location, depth and extent of cultural deposits within broad areas of the site. The details of the excavation and findings of each test pit were recorded on individual recording forms. An absolute height, bearing and distance to each test pit corner was taken using an automatic level. The datum for the excavations was provided by Holcim. Soil colour (Munsell) and profile were noted for each excavated test pit and each pit that contained artefacts was also photographed.

The 1 x 1m and 2 x 2m test pits were dug in arbitrary excavation units (spits) of 5 or 10 centimetres using trowels. The soil from the test pits was sieved using hand-held nested 3mm and 6mm mesh sieves. Trowels and hands were used to move and break up soil within the sieves. A Munsell soil chart was used to describe soil colour and texture (Section 3.3.2). Photographs were taken of each spit surface, section profiles and site overviews. Selections of the artefact assemblage were photographed.

Stratigraphic descriptions, spit heights, the presence of inclusions and any disturbance within the test pits were recorded for each spit. Stone artefacts were collected in plastic bags and labelled for analysis (section 3.3.3.3). Artefacts visible on the surface were collected, having had their location recorded using a hand-held GPS. A full list of the artefact attributes and characteristics that were recorded is provided in Appendix 2.

At the conclusion of the excavation, the site boundaries had been redefined and extended over an area of 10.7ha, although the densest part of the site was within the 130 x 110m area, and constituted 2.9ha.

3.5 Mechanical Excavation

Following consultation with the Wurundjeri, a qualifier to the Consent to Disturb was issued by them allowing mechanical excavation of the top 15cm of soil to hasten the excavation process (ploughzone) (see Appendix 1). Excavated soil was stockpiled and mechanically sieved. This was to expedite the excavation by removing the ploughzone, following which additional soil was control-excavated manually.

Initially the 40 x 47m zone of densest artefact concentrations was mechanically excavated to a depth of 15cm. During the course of the program, the remainder of the site (within the broader 130 x 110m area outside the zone of artefact concentration) was also mechanically excavated to 15cm depth and the soil stockpiled. This was done in accordance with the division of the site into four sections, and soil from these sections was stockpiled in separate locations so that determining provenance of artefacts from each section would be possible within a defined boundary. While this method prevented determining accurate provenance to within metres, it permitted attributing artefacts to a general area of the site, and given that the soil had been ploughed it was deemed to be no less accurate than if it had been manually excavated, as far as original location of artefacts goes. That is, the artefacts had been moved an unknown distance and number of times prior to mechanical excavation. All artefacts collected were placed in labelled bags for analysis. This ensured recovery of almost 100% of the artefacts from the site, with as much control as possible given the time available for excavation.

Dividing the site into four sections allowed comparisons to be made regarding artefact density, and there was a clear difference between the areas. The northern section contained the densest concentrations, and the eastern section also contained dense concentrations.

Close to 15,000 artefacts were excavated from site VAHR7921/0680, and the majority were located within the top 15cm. Many additional artefacts were collected during mechanical sieving of the mechanically excavated soil, and numerous artefacts were also located during walk-overs of the site. Once the grass zone had been stripped the exposed surface was regularly walked to record and collect artefacts, particularly after rain. The locations of these were recorded using GPS and were collected, bagged and labelled for analysis.

The stockpiled soil was placed by a small excavator into the mechanical sieve where it was sieved through 5mm mesh wire. The sieved soil fell through to the ground and the artefacts were collected from the sieve, bagged and labelled with details of dates, personnel, and provenance of excavated soil. Sieving was undertaken by Luke Rae (Holcim) operating the excavator and at least two of the field staff. While a small number of artefacts may have slipped through the

process it is considered that at least 95% of artefacts were collected during this process.

3.5.1 Existing Site Disturbance and Test Pit Placement

The site has undergone some disturbance over many years through ploughing activities and potato cultivation. This has affected the top 15cm of the ground surface. Soil below plough zone has not undergone such disturbance. Apart from ploughing, the paddock in which the site is located has been grazed by cattle up until the archaeological excavation started. In addition, vehicles have driven over the site.

The test pits were placed to maximise excavation of the densest part of the site, while also adequately sampling across the remainder of the site to confirm site density. Locations for test pits were agreed on after discussion between the archaeologists and the Wurundjeri representatives.

4.0 EXCAVATION RESULTS

4.1 Overview

The excavation program sampled locations believed to have the highest artefact densities within site VAHR7921-0680 in order to further determine the extent and character of sub-surface Aboriginal archaeological material within the site. The excavation resulted in the excavation of thirty-two 2 x 2m test pits in a grid pattern across the 40 m x 47m area of densest artefact concentration, twenty-two 1 x 1m test pits within the north-west section of this same area, and ten 1 x 1m test pits in the south-west section of this area also (see Figure 5).

Typically, test pits located on the north section of the site yielded the greatest numbers of artefacts.

The combined manually excavated surface area was 160m², with a total excavated soil volume of 224m^3 (see Table 3). The excavation of the test pits provided a good coverage of the site in order to answer the research questions posed in the methodology.

Excavation method	*Number of pits*	*Area of exc. (m^2)*	*Volume of exc. (m^3)*	*No. of pits with artefacts*	*% of pits artefacts*
2 x 2m Test Pits	32	128 m²	192m^3	32	100
1 x 1m Test Pits (NW)	22	22m²	22m^3	21	95.4
1 x 1m Test Pits (SW)	10	10 m²	10m^3	6	60
Total	64	160	224	59	

Table 3: Sub-surface testing results

A total of 2891 artefacts were recovered from the thirty-two 2 x 2m test pits and the thirty-two 1 x 1 test pits during the excavation. All of the 2x2m test pits contained artefacts, as well as 27 of the 1x1m test pits. In addition, many thousands of artefacts were found as a result of mechanical excavation and sieving.

4.1.1 Soil description

Soil was almost uniformly red brown loamy clay across the entire site, whereas away from the site the soil is more basaltic and drier, less clayey in some parts, and increasing clay content in other parts (see Table 1 below). Ploughing had occurred over the years across the site and reached a depth of approximately 15cm. Potatoes were grown in the past on the area that incorporates site 7921/0680 (Rex Whiteley pers comm. 5 January 2005).

Some parts of the site exhibited heavy compacted clay that was extremely difficult and slow to excavate. Basalt occurred close to the surface in some parts of the site

It was evident that ploughing had occurred, and the presence of tree roots and rabbit burrows was noted in some sections of the site, indicating a level of disturbance. In addition, a small number of Burrowing Crayfish were noted in some of the test pits, providing evidence of bioturbation.

4.1.2 Features

Evidence of specialised work areas was noted with the presence of flaking floors in TP2 and TP7 (see Figure 4). These squares exhibited a dense concentration of artefacts that reflected manufacturing activities. Artefacts included flakes, cores, debitage and angular fragments within a confined area, and of material from a narrow range of sources, for example TP2 included silcrete cores, flakes and debitage made from identical material, as well as numerous artefacts made from crystal quartz. This suggests that stone working was taking place at these locations.

4.1.3 Stone Artefact Assemblage - Analysis

The terminology used in this report has been taken from Holdaway and Stern (2004). Stone tool identification was largely based on the work of McCarthy (1967).

The assemblage includes flakes, debitage, cores, angular fragments, tools including Bondi and Pirri points, geometric microliths, Woakwine points, piercers, core rejuvenation flakes, a whetstone, grinding stones and an axe.

Raw Materials

Raw material was predominantly silcrete (66.2%), generally fine grained, although some coarser grained material was noted. Quartz made up 24.3% of the assemblage, and crystal quartz contributed 7.5%. The remaining 2% consisted of

quartzite (217 pieces), basalt material (56 pieces), hornfels, chert, sandstone, petrified wood, granite, mudstone and unknown stone types. Silcrete may have been obtained from sources in the nearby hills around Pakenham. If a silcrete source was located on Mt Shamrock, it is no longer there and there is no evidence of silcrete occurring there. Quartz would have been available as cobbles along creeks such as Toomuc Creek. Obtaining stone for tool making was evidently not a problem, as only a small proportion of artefacts had been retouched.

Material	Number	%
Silcrete	9089	66.2
Quartz	3848	24.3
Crystal Quartz	1263	7.5
Quartzite	229	1.5
Other – chert, basalt, hornfels, petrified wood, mudstone, sandstone, granite, unknown	70	0.5
Total	14499	100

Table 4: Raw materials at Mt Shamrock 7921-0680

Technological Analysis

The Mt Shamrock site VAHR7921/0680 consisted primarily of manufacturing debris with flakes, debitage and angular fragments totalling 71% of the assemblage (Table 6). A large number of cores (871) and core fragments (60) were also present, indicating that stone tool manufacturing activities took place at this site. These cores were primarily made of silcrete and were used to produce flakes and blades. Considerably fewer microblade cores were recovered. Platform preparation was evident with most of the cores having their platforms flaked prior to flake removal. Use of the cores was intensive, with most cores having multiple platforms and flaked multidirectionally. The presence of platform removal flakes and core trim flakes within the assemblage also indicates intensive use, as these flakes are attempts at rejuvenating the core through the removal of a spent platform. However, some cores also have small amounts of cortex present, which may indicate that the cores were not exhausted prior to discard. The discarding of cores prior to exhaustion may be due to a ready availability of silcrete within the area.

	Tools	Flakes	Cores	Hammer stone	Angular fragments	Debitage	Flaked pieces	Manu port
Number	1408	7434	931	3	1138	1732	87	4
% of assemblage	9.7	51.2	6.4	0.02	7.8	11.9	0.6	0.027

Table 5: Artefact types at Mt Shamrock AS1

Table 5 quantifies the artefacts into broad categories and are described in more detail below. The quantity of unretouched flakes and the results of manufacturing activity including cores, debitage and angular fragments indicate that tool manufacture was a major activity on site.

Angular fragments and debitage are part of the flaking debris that results from tool manufacture (Holdaway and Stern 2004: 113). Angular fragments lack diagnostic features that are used to identify in more detail artificially modified stone. Debitage is the waste "off cuts" produced during tool manufacture.

Specialised tools were far less common, comprising 9.7% of the assemblage. Specialised activities were being carried out on site, but may have been secondary.

Core Type	
Flake	862
Microblade	9
Core fragment	60
Total	931

Table 6: Core types Mt Shamrock

Table 6 indicates the numbers of flake and microblade cores, and core fragments.

Cores are blocks or cobbles of stone from which flakes have been detached using a hammerstone. Core types include single platform, multi-platform and bipolar forms. Frequently cores are shaped to facilitate the removal of particular types of flakes such as blades or bladelets.

	Unretouched flakes	Core trim	Unretouched blades
Number	7434	21	610
% of assemblage	51.2	0.14	4.2

Table 7: Flake types

The majority of the flakes present at VAHR7921/0680 were unmodified flakes, although numerous showed evidence of being used. More than half of the flakes are also broken, which may have occurred through trampling of the site during occupation. However, as most of the contexts from which the flakes have originated have been largely disturbed, it is likely that the high number of broken flakes is a result of post-depositional processes, particularly ploughing.

One third of the flakes contained cortex, indicating that these flakes had been removed during the early stages of core preparation. This is further confirmed by a number of the flakes still retaining cortical platforms. The presence of cortical flakes is consistent with some of the cores also displaying cortex.

Blades are small parallel sided flakes generally at least twice as long as they are wide (Flood 1995: 309). To produce a blade rather than a flake, technological changes in the preparation of the core had to take place. The material needed to produce a long thin blade must also be suitable: finer grained stone was used, sometimes imported from a long distance away (Lourandos 1997:287).

	Bondi point	piercer	Burin	Awl	Backed blade	Pirri point	Woakwine	Eloura	Unknown	Whet stone	Grinding stone
Number	65	11	2	3	372	1	3	1	45	1	3
% of assemblage	0.44	0.07	0.01	0.02	2.5	0.006	0.02	0.006	0.3	0.006	0.02

Table 8: Tool types

The range of tool types listed in Tables 8 and 9, albeit low numbers, indicates that hafted implements were being used or manufactured on site. Tools including points and geometric microliths would have been hafted onto spears for hunting and sawing. Hide working and wood working would have been carried out.

	Geometric microlith	Crescent microlith	Point	Incomplete	Retouched flakes	Broken tools
Number	36	6	52	18	56	5
% of assemblage	0.24	0.04	0.35	0.12	0.38	0.03

Table 9: Microliths

Geometric microliths or backed blades are small blades or blade pieces, which have one margin steeply retouched to form a blunt edge. They are generally smaller than three centimetres in length but can measure up to five centimetres, although this is rare (Flood 1995: 224). This tool type had a short-lived history, appearing approximately 6000bp. The more delicately retouched microliths start to appear at 4000bp, and began to disappear from the archaeological record around 1500bp, but in some coastal areas people continued to use them until several hundred years ago (Mulvaney and Kamminga 1999: 230). The backed blade is distributed more heavily in the southern half of Australia but a few have been found in northwest Queensland (Hiscock and Hughes 1980). Some suggestions for their use are that they were used as scarification tools or as the barbs on fighting spears. A few spears have been found with sharp non-backed quartz flakes, and there have been finds in northern New South Wales of backed blades with hafting gum on the thicker blunt end, consistent with their use as mounted barbs on spears (Flood 1995: 225). There has also been the suggestion that they were mounted in line on a small shaft of wood with gum and used as a knife. A recent study has found feather residues from the Family *Anseriformes* (which includes ducks, geese and swans) on a set of geometric microliths from the mid coast of NSW (Robertson 2002: 180). This suggests a possible role in ceremonial activity or in the butchery of birds before cooking and eating.

	Thumbnail scraper	**End scraper**	**Side scraper**	**Round edged scraper**	**Steep edged scraper**	**Notched scraper**	**Unspecified scraper**
Number	58	9	3	2	5	15	636
%	0.4	0.06	0.02	0.01	0.03	0.1	4.3

Table 10: Scrapers

A range of scraper types were found, the most common being thumbnail scrapers. Scrapers were used for wood and hide working. Scrapers have been a component of the Australian Aboriginal tool kit for many thousands of years. The core tool and scraper tradition dominated the landscape until the introduction of blade technology (Lourandos 1997: 287). This introduction changed the size

and shape of scrapers. Small segments of blades were steeply retouched, from one side, on the margins to produce various shapes, including convex, concave and nosed scrapers.

The nature of the data collected in this study makes it difficult to comment directly on the frequency and duration of occupation at Mt Shamrock. Indeed, it would be unwise to merely translate frequencies of artefacts recovered from different levels of the test pits as indicators of changing intensities of occupation, because notions such as 'occupation' are, on the whole, poorly defined and not directly related to the archaeological record from which they are derived (Schiffer 1976). As mentioned above, all archaeological depositional environments are relatively complex, and become more so when attempts are made to extricate information regarding discrete events like single occupations - regardless of their relative duration. Because of the spans of time that generally contribute to the cultural formation of an archaeological assemblage, the assemblage is likely to consist of a melange of material from an unknown number of events or occupations; this is known as 'time averaging' (Shott 1997, Stern 1994).

Certainly, the Mt Shamrock assemblage is no exception. However, recent studies have focused not so much on the construction of fine time units within which to couch occupational narratives, but rather on principles which may be informative about occupation in a more general way. One such example comes from Shott (1997) who notes that the diversity of tools in an assemblage and the numerical size of an assemblage share a complex relationship that can be informative about the occupational regime(s) that contributed to the assemblage. In essence he observes that different tools have different use lives, and therefore are discarded with differential repetition across the landscape. It follows that the greater the diversity of tools present in an assemblage, the more frequent or intense (in terms of duration) the occupations that contribute to the assemblage's composition.

The diversity of tools noted at Mt Shamrock, which definitely have differential use lives, as well as the presence of indicators of *in situ* tool production, suggest that it is likely that Mt Shamrock was occupied relatively frequently in the past, with the nature of these occupations being somewhat intense and best described as 'residential camps'. However, it is most likely that these occupations are superimposed in the record with other, possibly more fleeting occupations of the area. Even despite the inability to firmly relate artefact depth and frequency to notions of occupation, the very presence of artefacts at different depth levels also suggests that occupation occurred at different times. However, we cannot be precise about the time these occupations occurred, their duration or the duration of time between them.

4.1.4 Chronological context of the Mt Shamrock Quarry artefacts

Detailed reconstruction of a chronology for the Mt Shamrock Quarry artefacts is not possible in the absence of the application of chronometric dating techniques. Nevertheless, the character and composition of the artefact assemblage does allow some general conclusions to be drawn about the likely age of the assemblage. Australian prehistoric stone artefact assemblages have generally been characterised into a two part chronological scheme of tool making 'traditions'. The *Core Tool and Scraper Tradition* is characterised by a diverse range of large scrapers and core tools and dates to 40,000 - 4,500 years ago. The *Small Tool Tradition* is characterised by the addition to assemblages of small microlithic tools, based on blade technologies and backing retouch (see Glossary), which dates post 4,500 years ago (Flood 1995; Frankel 1991: 24-5).

There is a great deal of debate regarding the regional variation within this generalised continental scheme, and the nature and timing of the appearance of the characteristic 'small tool' technology, because aspects of the technology and examples of fossil tool types have been evidenced prior to 4,500 years ago (Hiscock and Attenbrow 1998; Holdaway 1995). However, all researchers agree that there is a definite numerical increase of small tools post 4,500 years ago in virtually all securely dated assemblages. The most characteristic indicator of this increase is small backed artefacts such as geometric microliths and backed point types. The presence of backed blades and geometric microliths in the Mt Shamrock Quarry assemblage (see volume 2 Database) is a very strong indication that the age of the artefacts is less than 4,500 years BP. It is not possible to be any more precise than this regarding pre-contact assemblages.

4.2 Dating

In order to obtain radiocarbon dates, undisturbed charcoal, shell and other organic material found in association with cultural materials needs to be found. Advice from the Radiocarbon Dating Laboratory, Waikato, is that AMS dating requires an even higher level of certainty about context than standard C14 dating. Similarly, on advice from the University of Adelaide the errors in OSL dating are largely because of poor sample sources. A restrictive set of requirements for luminescence dating is required if it is to be reliable.

In all the archaeological investigations at Mount Shamrock, no material suitable for radiocarbon dating has been obtained. Reasons for this include:

- suitable material for C14 dating rarely occurs in the soil;
- much of the archaeological material has been found in disturbed contexts, including plough-zone;

- there are no clear stratigraphic sequences, or discernable changes in the artefact assemblages that can be interpreted as providing meaningful superposition or seriation; and

- OSL, TL and other forms of dating were not considered worthwhile due to their cost and high probability of errors such as contamination, as well as lack of stratigraphic associations for the meaningful interpretation of chronology.

In terms of artefact typology, the material at Mt Shamrock can be generally ascribed to the Australian Small Tool Tradition and therefore the sites might be dated to the last 4-5,000 years.

4.2.1 Discussion

The following conclusions can be drawn from the analysis of the stone artefacts at Mt Shamrock quarry. The stone assemblage consisted primarily of flakes, debitage and tools belonging to the Australian Small Tool Tradition. The presence of cores and flaking debitage within the assemblage indicates that stone tool manufacturing occurred on site. The small number of tools, which represent 5% of the assemblage, suggests that although some specialised activities were taking place, the majority of artefacts are indicative of daily campsite activities such as food processing and tool making.

The range of tool types represented in the assemblage indicates that activities such as food, plant and hide preparation were conducted. In addition the presence of grinding stone fragments indicates that seed processing was occurring at the site. Grinding stones may also have been used to grind ochre. Ochre was noted during the sub-surface testing and the excavation of VAHR7921/0680, however no archaeological evidence was found that this source had been exploited by the Aboriginal people who were occupying the site.

The presence of hafted implements, such as Bondi points and geometric microliths, indicates that the manufacture of spears was carried out on site, in preparation for hunting.

Analysis of the tools further confirms a mid-late Holocene date for the sites. No cultural features that contained material suitable for dating and that were associated with artefacts were recorded in the excavation.

Analysis of the artefact assemblage from Mt Shamrock has provided much information regarding the prehistoric occupation of the study area. Based on the nature and frequency of artefacts and tools recovered from Mt Shamrock it is concluded the site was occupied during the last 4,500 years. A number of artefact raw materials were present in the assemblage and these provide valuable insights into the prehistoric use of stone as a resource and the particular strategies employed to exploit this resource. Whilst it is difficult for many reasons to

comment confidently on notions such as 'occupation,' several prehistoric activities were identified and postulated as contributing to the assemblage; notably artefacts appear to have been manufactured, used and discarded at Mt Shamrock, suggesting a complex occupational history for the site. Taken as a whole, the assemblage, its information potential demonstrated above, and its status as a relatively undisturbed prehistoric archaeological site in the Pakenham hills make it of high significance.

4.3 Site location and distribution

The site patterning which is the archaeological signature of Aboriginal prehistory is highly complex, reflecting extensive use of the landscape and mobility (Zvelebil *et. al.* 1992:193). One aspect of the archaeological record which reflects this complexity, and is a more durable and visible part of the archaeological landscape, is stone artefacts. Stone artefacts provide information on how humans behaved through the process of artefact discard, although it is important to avoid assuming that the stone artefact patterning which is visible on the landscape today provides a complete picture about how Aboriginal people lived. Provided this is acknowledged, the continued accumulation of large numbers of stone artefacts provides valuable insight into how a landscape was used by Aboriginal people, and what variation there might be within such use.

Generally, artefact discard patterns in riverine locations reflect residential camps and smaller satellite camps, which represent more restricted or specialised use such as hunting, tool curation or raw material procurement (Zvelebil *et. al.* 1992:215). This site, although not along Toomuc Creek, is located close to a number of fresh water springs on the side of the hill, and conforms to this patterning. Artefacts have been discarded in a series of concentrations, around which smaller numbers of artefacts grade into a sparser scatter.

Stone artefact site patterning is traditionally complicated by a number of factors; (1) debris-producing behaviour does not always conform with spatially centralised patterning, (2) archaeological discard is continuous, resulting in an overlaying of occupation layers which blurs patterning, and (3) taphonomic processes disturb the patterning. To further complicate matters, the patterning of stone artefacts should not be considered to represent the entire spectrum of people's social and economic activities in the past. Some activities, such as the production of many stone tools in discrete locations, may have resulted in the discard of large amounts of stone artefacts, which are virtually indestructible. Other activities, such as hunting or ceremonial pursuits, might be indiscernible today as part of the cultural landscape, as they might have resulted in the production of organic materials which no longer exist.

A brief discussion of the major factors which influence site patterning within the study area are discussed below.

4.3.1 Major influences on spatial distribution of artefacts

4.3.1.1 Lack of chronological resolution

The artefacts in the Mt Shamrock assemblage have been treated as a single chronologically insensitive assemblage for the spatial analysis, which simply reflects the repeated use over time of the site. This is because much of the assemblage was located in the ploughzone, and had therefore undergone significant disturbance and are likely to be the result of numerous phases of occupation, or palimpsests, which has resulted in the mixing of chronologically unrelated deposits.

4.3.1.2 Taphonomic processes

Taphonomic processes, or site formation processes, are factors that influence the spatial distribution of artefacts in the landscape.

One important consideration in spatial analysis is what the taphonomic effects on spatial distribution are, and how they affect spatial patterning. Taphonomic agents cause a blurring of spatial patterns and the mixing of temporally unrelated remains, hence it is important to understand how such processes influence and change archaeological deposits within the surrounding landscape.

Taphonomic processes have significantly contributed to distortion of the artefact distribution in large sections of the site. The more significant post-depositional processes include stock trampling, land clearance, pastoralism, burning and soil erosion, though a general discussion of disturbance processes which influence archaeological site formation are discussed in Wood and Johnston (1978).

Grazing impacts on sites are reported to be “less severe than anticipated” (Roney 1977:15 in Wildesen 1982:57). Grazing could obscure very fine site patterning but otherwise leaves spatial patterns relating to activity areas and the isolation of individual sites intact. The extent of impaction of artefacts caused by grazing varies broadly, depending on animal bulk, soil type, slope and vegetation cover (Wildesen 1982:63). Grazing within the site has occurred over many years, and in recent years has been primarily by cattle.

Land clearance of basalt boulders in order to clear the ground for ploughing is also likely to have caused localised erosion. The impact is expected to have been localised to the red loamy soil area, most suited to potato cultivation.

Annual controlled burning is a causal agent of disturbance. Fire is a potent impact agent because of the damage which it can cause directly and because it interacts with other agents to enhance disturbance. Fire disturbs and removes any organic matter which may be present and increases erosion potential (Wildesen 1982:68). The effect of this may vary depending on the intensity of the fire, amount of fuel, soil conditions and topography. There was evidence in the excavated soil that some burning had occurred over time. The local Aboriginal occupants would no doubt have undertaken controlled burning prior to contact to encourage new growth, reduce lush vegetation and clear pathways. Fire would have exposed artefacts to water and wind erosion. Artefacts on very gentle slopes and flat plains may have undergone some lateral displacement, and on medium to steep slopes would have moved further down slope.

Ploughing and scarification have been shown to cause some lateral displacement of artefacts, though spatial relationships are usually not distorted (Wildesen 1982:68). The indirect affect of this activity is accelerated erosion. Resulting changes caused by erosion would be the disruption of soil structure, removal of protective vegetation and increased impact of rainfall on sites, again leaving sites susceptible to lateral movement. Lateral erosion is more likely to have taken place on the gentle slopes and flat plains.

Bioturbation (meaning the movement of soil and inclusions (such as Aboriginal stone artefacts) through the soil profile through the agency of plant growth and decay, animal and insect burrowing, and the properties of soil bacteria and mechanics) may alo have impacted on the location and depth of artefacts found in the soil layers. While dispersal of artefacts horizontally from animal scratchings or root throw when a tree falls may have occurred, the more common mechanism is for artefacts to gradually work down into the soil profile as insects and worms gradually raise finer soil particles to the surface (see for example Distinguishing Natural and Archaeological Deposits: Stratigraphy, Taxonomy, and Taphonomy of Holocene Shell-Rich Accumulations from the Louisiana Chenier Plain HENDERSON et al. *Palaios*.2002; 17: 192-205)

In summary, the patterning of stone artefacts at Mt Shamrock has been influenced by taphonomic factors which influence chronological resolution. Lack of chronological resolution is also likely to be higher in areas which have suffered significant post-depositional disturbance.

It is suggested above that these two major factors have some influence over the distribution of artefacts within the study area. Therefore, to understand more about how people were using the creek from the existing discard patterns, it is more appropriate to observe variation in the land use through the differences in densities of discarded artefacts at a broad level. This may enhance our understanding of the repeated use of certain locations as opposed to others within the context of the surrounding landscape.

4.3.2 Lithic patterning

The pattern of Aboriginal artefact location and distribution within the study area is consistent with the repeated use or intensive use of the location over a long period. Various daily activities were undertaken on site, and specific areas were the focus for particular activities such as tool making. These may have been situated to take greatest advantage of shade, shelter, panoramic views across the valley or simply convenience.

Being in relative proximity to the springs the shelf on which the site is located would more likely have formed a significant part of the resource base from which food sources could be obtained by clan members. They would regularly have been foraged for food, and would also have formed part of the travel routes between the Dandenong Ranges foothills, Koo Wee Rup Swamp and Port Phillip bay. The location of the site on the southern face of Mt Shamrock would also have provided an excellent vantage point from which clan or faunal movements could be monitored.

4.4 Summary

4.4.1 Aboriginal Cultural Significance

Aboriginal sites and areas of land for which a local Aboriginal community has custodianship usually have a special significance for Australian Aboriginal people.

> *Australian Aborigines have a very ancient and distinct traditional culture, which is very much alive. At the same time, in Australian society today they constitute a visibly oppressed and disadvantaged minority. These two elements give their heritage and history a special significance,…Aboriginal places may be important to Aboriginal people in a number of ways.*
>
> *In southern Australia the vast majority of sites are prehistoric [rather than 'sacred' or historic]. They relate to evidence of Aboriginal occupation of the continent over 60,000 years, but they have no specific traditional significance to any particular group. They are usually as unknown to Aborigines as to others until located and identified by archaeological survey of other research.*
>
> (Pearson and Sullivan 1995: 159, 162)

All pre-contact (pre-European settlement) sites that are located in the study area are considered to be of cultural significance to Wurundjeri. The sites are evidence of past Aboriginal occupation and use of the area, and are the main source of information about the Aboriginal past. The consultants cannot comment directly on such cultural significance – comment can only be made by

the Aboriginal community. In addition, any recorded (and unrecorded) pre-contact sites are of cultural significance because they are rare or, at least, uncommon site-types. In particular, many sites in the greater Melbourne region have been destroyed as a result of land clearance and land-use practices in the historic period.

Below is a statement of significance from the Wurundjeri Tribe Land Compensation and Cultural Heritage Council Inc.

> *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 Mt Shamrock Quarry Activity Area. In this instance, the natural values, including a waterway 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 in the Activity Area.*

5.0 MANAGEMENT ISSUES AND RECOMMENDATIONS

5.1 Introduction

Cultural heritage places provide us with evidence of past human activity. Heritage places may be confined to a small area, or represented by a complex of features, including a cultural landscape. The nature of human activity is that the places used in the past are affected by the actions of the present, particularly urban expansion and agricultural processes. This means cultural heritage places are a diminishing resource.

Cultural heritage places are valuable, not only for the scientific records of the past they provide, but also for their social significance. Many Aboriginal places, for example, have a special significance to Aboriginal communities as places where traditional life has continued and places that may have sacred or symbolic significance.

Many heritage places may also be outstanding examples of artistic and creative achievement. Heritage places are valuable to Australians – and the rest of the world – as they not only provide a link with a culturally rich past, but they can contribute to recreational and community life.

Heritage places may also have economic potential (Pearson and Sullivan 1995: 15). These values should, where possible, be protected and handed on to future generations. We all have some degree of social, spiritual, ethical – and legal – obligation to see that this happens.

5.2 Management Recommendations

Recommendations

Recommendation 1

Holcim have fulfilled their obligations as per the Consent to Disturb issued by the Wurundjeri, with regard to excavation of site VAHR7921/0680 (see Appendix 1).

Recommendation 2

All works must cease immediately if human skeletal remains are encountered. The Police or Victorian Coroner's office must be notified immediately, as required by the *Coroner's Act 1985.* The State Coroners Office can be contacted on (03) 9684 4444. If it is suspected on reasonable grounds that the human

remains are Aboriginal, Aboriginal Affairs Victoria should also be contacted on 1300 888 544. Further details regarding this matter are contained in Appendix 3.

Archaeological reports and the management recommendations contained therein will be independently reviewed by the Heritage Services Branch of Aboriginal Affairs Victoria, the relevant Aboriginal community and Heritage Victoria.

Although the findings of a consultant's report will be taken into consideration, recommendations in relation to managing heritage place should not be taken to imply automatic approval of those actions by Aboriginal Affairs Victoria, the Aboriginal community or Heritage Victoria.

5.3 Report Lodgement

A draft copy of this report has been sent to:

- Holcim (Australia) Pty. Ltd.
- Wurundjeri Tribe Land Compensation and Cultural Heritage Council Inc.

5.4 Independent Review of Reports

Archaeological reports and the management recommendations contained therein will be independently reviewed by the Heritage Services Branch of Aboriginal Affairs Victoria, the relevant Aboriginal community and Heritage Victoria.

Although the findings of a consultant's report will be taken into consideration, recommendations in relation to managing a heritage place should not be taken to imply automatic approval of those actions by Aboriginal Affairs Victoria, the Aboriginal community or Heritage Victoria.

FIGURES

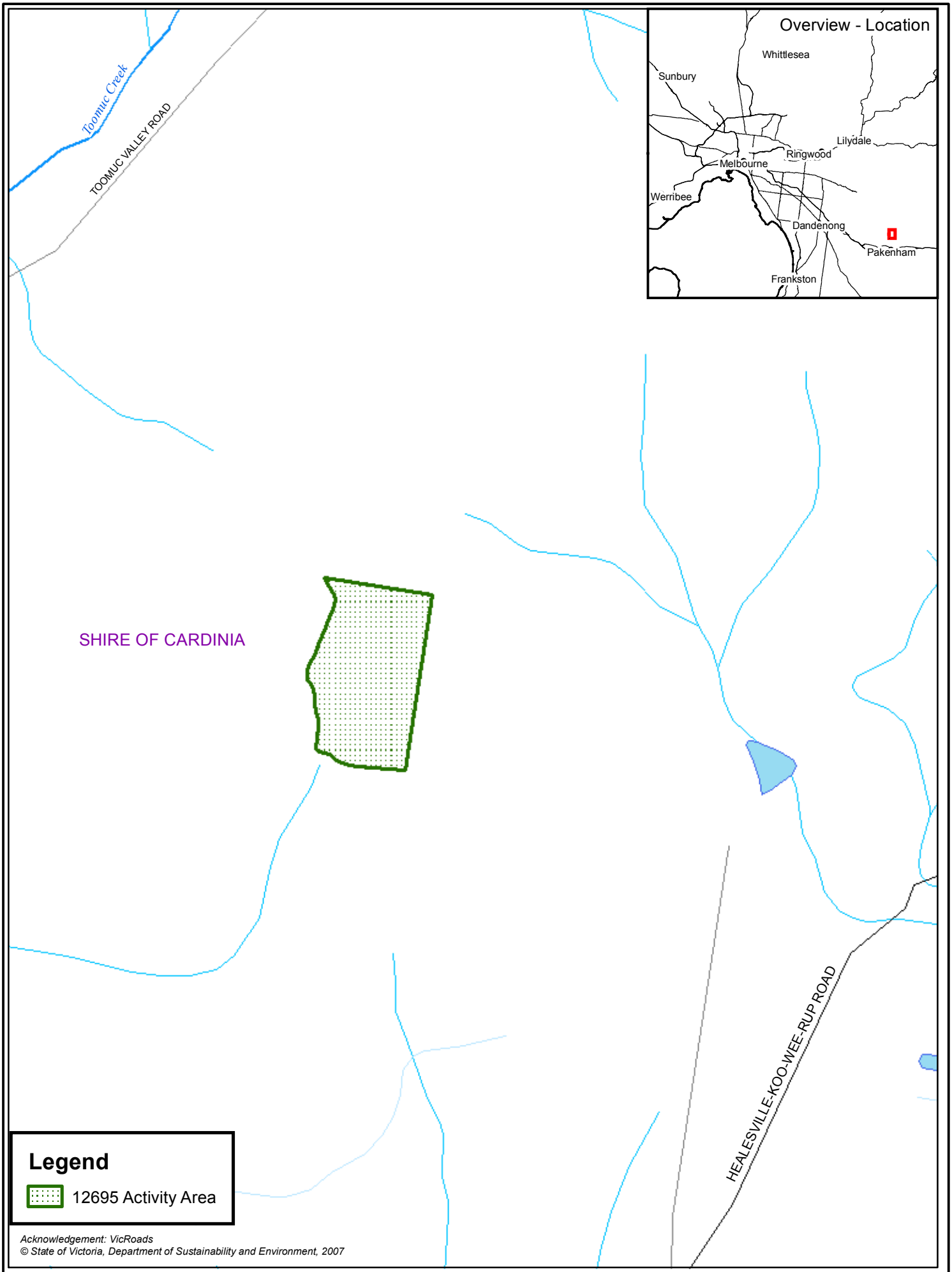

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Figure 1: Location of the Study Area
Mount Shamrock

Matter: 12695
Date: 20 October 2011, Checked By: JRF, Drawn By: SKM
Location: P:\12600s\12695\Mapping\12695 Fig 1.mxd

0 30 60 120 180 240 300
Metres
N
Scale 1:10,000 @ A4, GDA 1994 MGA Zone 55

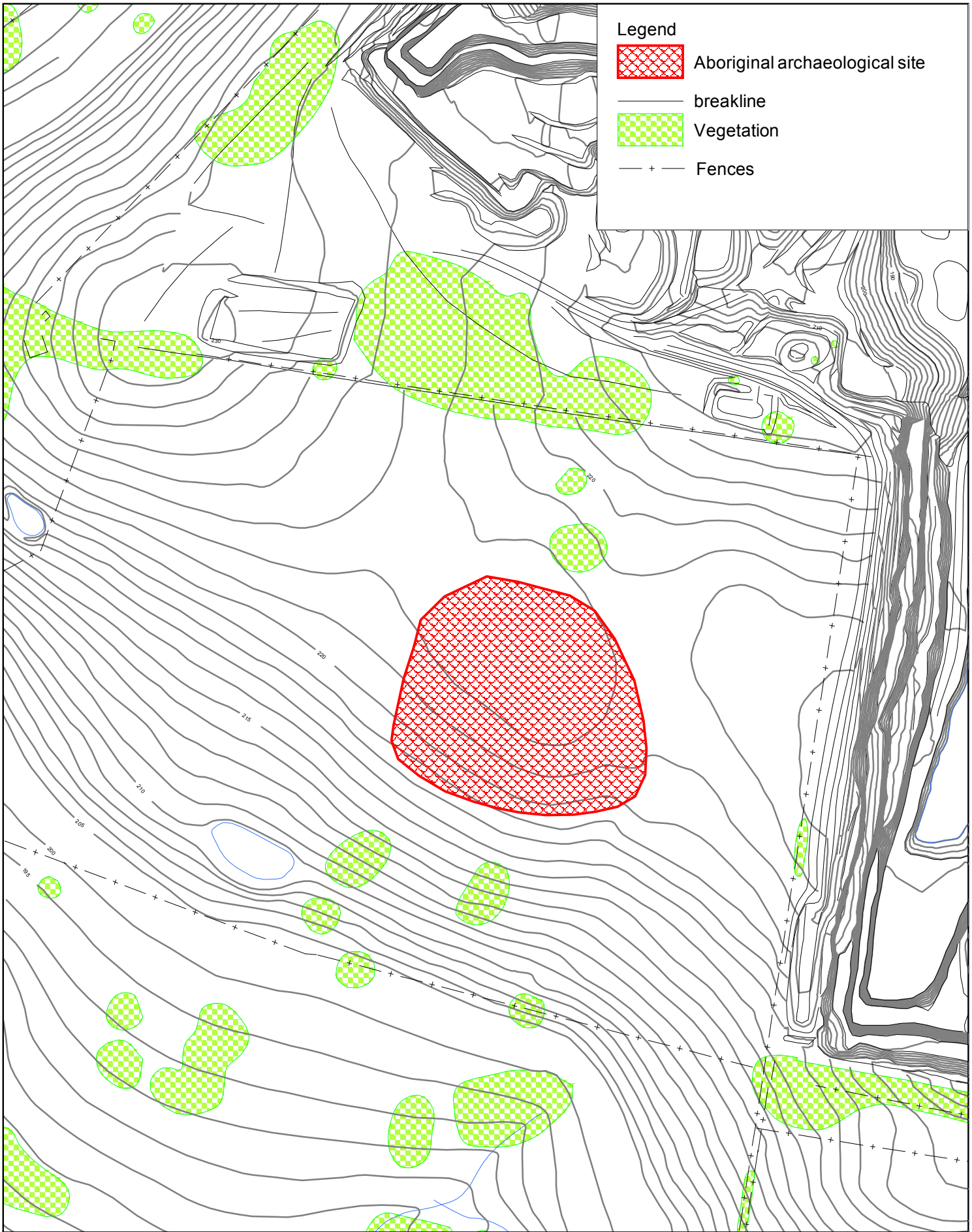

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Figure 2: Extent of Aboriginal archeological site VAHR 7921-0680 before sub-surface testing

DATE: 18 October 2011

Checked by: JRF | Drawn by: SKM | File number: 12695

Location: ..\12695\Mapping\12695 Fig 2.wor

Scale: 0 25 50 75 100 metres

MGA94 Zone 55

N W E S

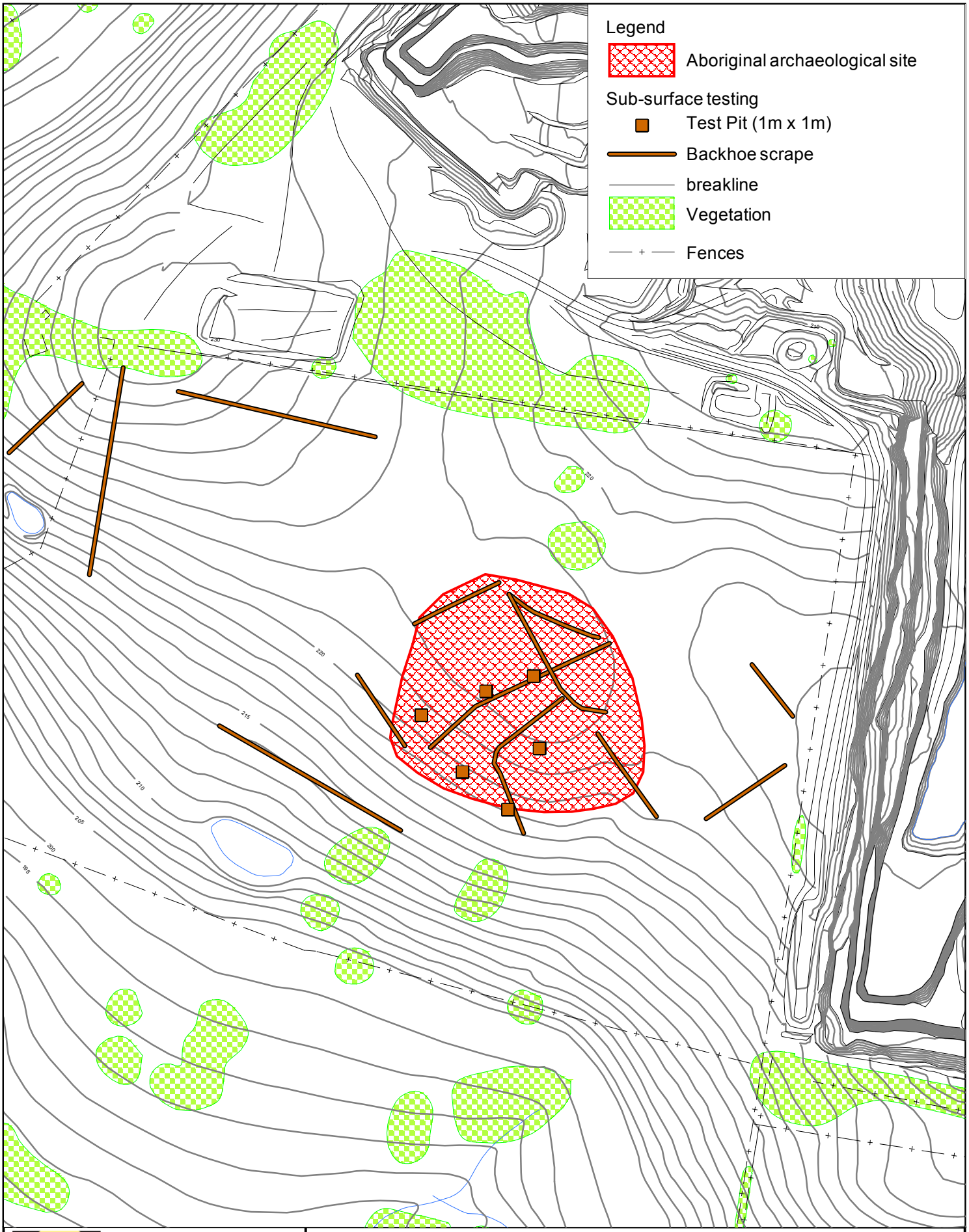

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Figure 3: Previous sub-surface testing locations.

DATE: 18 October 2011

Checked by: JRF | Drawn by: SKM | File number: 12695

Location: ..\12695\Mapping\12695 Fig 3.wor

Scale: 0 25 50 75 100 metres

MGA94 Zone 55

N W E S

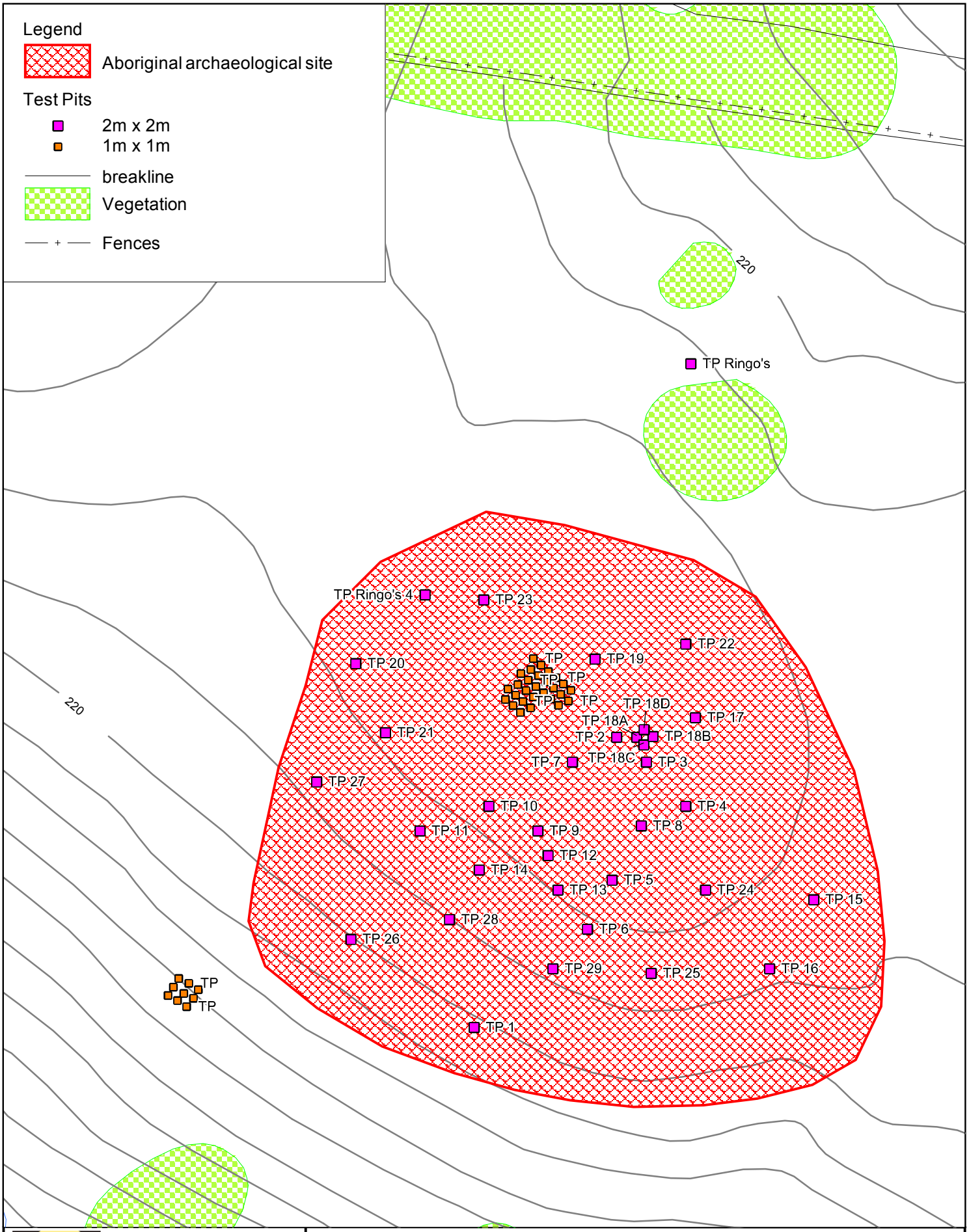

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Figure 4: Test pit locations

DATE: 18 October 2011

Checked by: JRF | Drawn by: SKM | File number: 12695

Location: ..\12695\Mapping\12695 Fig 4.wor

Scale: 0 10 20 30 40 metres

MGA94 Zone 55

N W E S

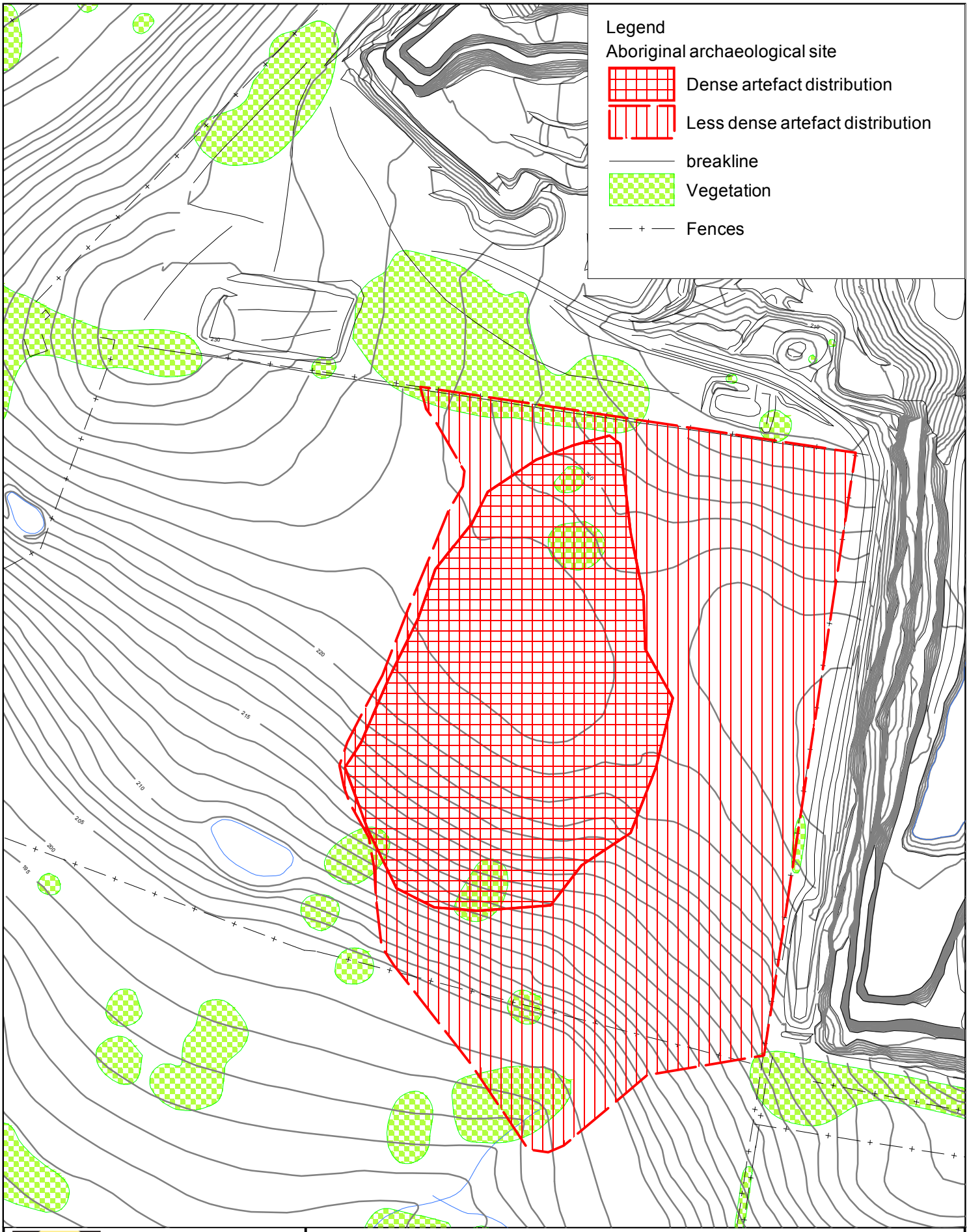

Figure 5: New site boundary for VAHR 7921-0680

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DATE: 20 October 2011

Checked by: JRF | Drawn by: SKM | File number: 12695

Location: ..\12695\Mapping\12695 Fig 5.wor

Scale: 0 25 50 75 100 metres

MGA94 Zone 55

PLATES

Plate 1: Square N3A, spit 2, facing north

Plate 2: Layout of 1x1m squares, facing northeast

Plate 3: Squares N5E, D, C – spit 3. Facing north

Plate 4: Vicki's 2x2m excavation square, spit 2, facing north. Artefacts are evident on the pedestals in the square.

Plate 5: Mechanical scrapes to remove ploughzone, facing south.

APPENDICES

APPENDIX 1
A 1. Permits and Notifications

Appendix 2
A 2. Test Pit Data Table

Test Pit	Spit	Soil Description (Munsell, compaction, type, soil inclusions)	pH	Depth (cm)				Artefacts
				NE	SE	SW	NW	
South								
Test pit S6A	1	Dark brown loam, basalt pebbles, ironstone pebbles, 1 piece dead wood	6.5 slightly acidic	15	15	11	14	1 silcrete flake
	2	Dark brown red compact clayey loam, charcoal flecks		20	20	20	20	2 artefacts
	3	Red brown loamy clay, < heavy clay with depth	6.5	30	25	28	30	
Test pit S6C	1	Rib bone 5cm depth		16	15	15	20	1 quartzite flake 10cm sw cnr, same material as core in S10A/spit 1
	2	Red brown compact clay from 18cm, decomposing basalt pebbles		30	25	29	30	
Test pit S6E	1	Red brown loamy clay		13	12	13	14	1 quartz artefact sw cnr 10cm
	2	As above		20	23	23	22	2 artefacts 16cm sw, charcoal base of ploughzone
	3	Red loamy clay, compact at bottom, decomposing basalt pebbles		30	30	28	30	
Test pit S7A	1	Red brown loamy clay, charcoal fragments		19	14	14	25	
	2	-		-	-	-	-	
	3	Red clay		30	29	27	30	
Test pit S8A	1	Organic to below roots, basalt pebbles. Mottled clay to red clayey loam		15	17	17	14	
	2	Brown clay. Roots, charcoal, root chamber east side, basalt gravel, burnt wood pieces		20	17.5	17.5	20	1 silcrete artefact
	3	Brown clay grading to red brown, basalt pebbles, charcoal fragments, tree root east & south walls	6.5	35	32	33	39	
Test pit S8C	1	Charcoal east wall 10cm depth, burnt root		15	17	17	20	
	2			23	22	23	26	
Test pit S8E	1	Red brown loamy clay, Yellow, brown, burgundy ochre; charcoal; few pieces quartz, worms		8	18	18	7	Crystal quartz broken flake
	2	Brown, burgundy ochre; red clay from 15cm	6.5	20	20	20	20	
	3	Red clay compact at bottom, weathered basalt pebbles west & north wall, charcoal fragments		30	23	30	33	1 crystal quartz broken flake, 1 quartz flake
Test pit S10A	1	Red brown loamy clay, charcoal pieces, dead wood pieces, small pieces red ochre		15	15	14	16	Quartzite core 3cm depth, nw cnr
	2	< compact clay, tree roots north, charcoal pieces sw		25	25	25	25	

Test Pit	Spit	Soil Description (Munsell, compaction, type, soil inclusions)	pH	Depth (cm)				Artefacts
				NE	SE	SW	NW	
South								
		cnr, quartz rolled pebble						
	3	Red brown clay from 23cm, heavy clay at bottom. Charcoal sw central, damper clay north. Root & charcoal north wall 16cm depth.						1 quartz artefact 30cm
Test pit S10C	1	Loose, basalt pebbles, roots, branch		17	15	15	17	
	2	Red brown loamy clay, 5YR 3/4 dark reddish brown. Heavy clay at bottom. Broken rolled quartz pebble. Tree roots north wall 16cm depth.		28	26	25	25	
Test pit S10E	1			15	15	17	15	
	2	Heavy clay at bottom, decomposing basalt, burnt pieces of wood, soft brown loam se cnr		20	24	20	20	
North								
Test pit N1A	1	Charcoal fragments		15	14	16	16	4 artefacts top 15cm
	2	Charcoal fragments, decomposing basalt		25	25	24	25	Artefacts at 20cm
	3	Small cobble red ochre, heavy red clay at bottom, charcoal fragments		30	30	30	30	Debitage 30cm sw
N1C	1	Medium brown clayey loam		20	16	16	17	2 artefacts 10cm, 1 in wall at 13cm
	2			30	24	25	27	artefact
N1D	1	Charcoal, basalt fragments		16	15	15	15	Several artefacts in sieved soil
	2	Charcoal, decomposing basalt		25	25	26	25	Silcrete artefact 18cm, crystal quartz 20cm
	3	Decomposing basalt sw cnr, small amount charcoal, compact clay & decom basalt bottom		28	28	28	28	Artefact 30cm
Test pit N1E	1	Dark reddish brown loamy clay 5YR3/3, charcoal fragments below 10cm, decomposing basalt, ironstone pieces	6 slightly acidic	23	25	19	19	2 artefacts top 10cm north
	2	Heavy clay west side, < heavy east, decomposing basalt from just below ploughzone, charcoal		29	29	27	29	4 artefacts at 22 & 27cm
Test pit N2B	1			15	15	15	15	Artefacts at 3cm, 10cm, 15cm, 1 crystal quartz flake east wall 15cm
	2	Charcoal fragments, decomposing basalt		25	25	25	25	Artefacts 25cm
	3	Heavy red clay at 30cm, charcoal throughout, decomposing basalt		30	30	29	30	Silcrete core at 25cm, crystal quartz broken flake

Test Pit	Spit	Soil Description (Munsell, compaction, type, soil inclusions)	pH	Depth (cm)				Artefacts
				NE	SE	SW	NW	
South								
Test pit N2E	1			15	14	10	12	Artefacts just under grass,
	2			24	22	22	25	4 artefacts 17cm, 7 artefacts below 17cm
	3	Heavy red brown loamy clay at bottom. Charcoal , basalt pieces.		30	30	29	29	Silcrete blade 30cm nw.
Test pit N3A	1	Dark reddish brown loamy clay		17	16	15	15	8 in situ artefacts, 1 in wall
	2			27	27	27	25	7 artefacts at 25cm, 1 quartz artefact south wall 20cm
	3	Red clay at bottom, charcoal fragments		30	30	30	31	Artefacts at 20cm
Test pit N3C	1	Charcoal top 15cm, burnt root & soil, 3 basalt cobbles. *Polyporous mylitta* top 15cm		18	20	16	20	3 artefacts top 10cm
	2	Mountain cray (yabby) burrow, charcoal						Artefacts 17cm
	3	Compact clay at bottom, little charcoal, decomposing basalt		39	40	39	39	Artefact south wall 26cm. No artefacts below 35cm.
Test pit N3E	1	N/A						
	2	Decomposing basalt, charcoal fragments north		27	26	25	27	
	3	Heavy red brown clay bottom, decomposing basalt east & south walls		30	30	30	30	
Test pit N4B	1	Soil variable, compact clay & friable below 6cm. Red brown loamy clay. Worms.						Artefacts to 15cm, most above 6cm, north half.
	2	Red brown compact, friable in patches. High worm activity. Decomposing basalt 15-20cm		25	25	25	27	4 silcrete, 1 quartz artefacts 20-25cm
	3	Compact red brown clay, decayed basalt, worms.		34	33	33	33	2 quartz flakes 28cm, 1 silcrete flake 30cm.
Test pit N5A	1	Charcoal fragments at bottom		16	16	16	20	2 artefacts 15cm
	2	Red loamy clay, occasional charcoal flecks		23	25	26	25	Artefacts 20 & 22cm
	3	Red brown clayey, few inclusions		354	34	33	34	
Test pit N5C	1	Red loamy clay		14	18	19	16	Silcrete blade at 15cm
	2	Compact red brown clay, basalt piece nth wall 24cm depth, charcoal fragments, burnt wood		30	30	30	30	1 artefact 25cm
	3	*Polyporous mylitta* 35cm, heavy red clay at bottom, burnt root at 27cm east wall to bottom		33	35	34	35	
Test pit N5D	1			5	5	15	15	

Test Pit	Spit	Soil Description (Munsell, compaction, type, soil inclusions)	pH	Depth (cm)				Artefacts
				NE	SE	SW	NW	
South								
	2/3			31	33	29	32	Artefacts 18cm, 23cm, 16cm
Test pit N5E	1	Red loamy clay, charcoal fragments, basalt piece, decomposing basalt		16	17	14	15	3 artefacts top 15cm
	2	Decomposing basalt		25	25	27	28	1 artefact 23cm
	3	Clay at bottom, charcoal & decomposing basalt fragments		37	30	30	33	Artefacts 25cm, 30cm
Test pit N6B	1	Red brown friable clay, small stones		15	15	15	15	4 silcrete, 1 quartz artefacts
	2	Friable red brown, clay inclusions, grass roots, worms, stones		25	25	26	26	6 quartz, 1 silcrete, 1 quartzite 15-23cm
	3	Red brown clay		34	34	34	34	5 artefacts between 25-32cm
Test pit N7B	1	friable		15	15	15	14	9 artefacts, ochre cobbles
	2			27	27	28	25	2 artefacts 26cm
	3	Compact red clay at bottom, decomposing basalt, ironstone fragments		31	30	33	30	1 silcrete broken flake 32cm depth
*Test pit N8B	2	Dark orange clay		12	14	14	13	10 artefacts
	3	Red loamy clay		21	21.5	21	21	8 artefacts 21cm depth
	4	Compact clay, few charcoal fragments, decomposing basalt		22	22	24	25	artefacts
*Test pit N9A	2	Dark orange clay, charcoal, gravel		15	9	9.5	15	Artefacts
	3			21	22	22	21	Artefact 19cm
	4			29	28	28	30	Artefacts at 28cm
*Test pit N10B	2	Red brown loamy clay, < clay						8 Artefacts between 11-20cm
	3	red orange clay						Artefacts 20 &26cm
Test pit N11A	1	Red brown loamy clay		17	16	16	16	5 artefacts (3 sieve)
	2	Decomposing basalt 25cm, small depression in ne cnr – maybe tree stump / root		26	21	25	25	Artefacts between 15-25cm
	3	Red orange clay		48	non	28	33	Artefact 42cm
Test pit N12A	1							
	2			30	33	31	30	artefacts
	3	Red clay at bottom, decomposing basalt pebbles, charcoal		40	38	40	40	
*Test pit N12B	1							
	2			14	13	14	12	Artefacts
	3	Compact red orange clay		24	23	24	23	2 quartz blades
	4			36	34	36	37	Artefact at 28.5cm

Test Pit	Spit	Soil Description (Munsell, compaction, type, soil inclusions)	pH	Depth (cm)				Artefacts
				NE	SE	SW	NW	
South								
Ringo's scatter 2 1x1.38m	1	medium light brown loamy clayx		5	5	5	5	Top 5cm mechanically removed. 9 artefacts within top 5cm. Surface artefacts abundant.
2x2m squares								
Ringo's 2x2 (1)	1	Red brown loamy clay		15	15	15	15	Removed mechanically, small concentration of artefacts
	2	< clay with depth, some charcoal		31	25	27	30	Approx. 200 artefacts
TP11 2x2	1	Red brown loamy clay		15	15	15	15	Removed mechanically
	2	decomposing basalt pebbles, rabbit burrows, grey burnt soil in sw & ne wall, ironstone pieces. < clay with depth		25	23	25	24	Artefact at 20, 23 & 25cm
	3	Took nw quadrant to spit 3, rest disturbed through rabbits. Charcoal fragments, decomposing basalt.		33	31	35	33	No cultural material
TP4 2x2	1	Red brown loamy clay		10	10	10	10	
	2	Darker stained soil in sw, charcoal fragments to 23cm nw. Lighter yellow brown loamy clay overlying red clay		22	27	38	23	Artefacts just below plough & 21, 23, 25cm
	3	Heavy clay at bottom, some ironstone, charcoal nw cnr, burnt tree root		31	31	39	33	Artefacts in situ and sieved
TP2 2x2	1	Red brown loamy clay		15	15	15	15	removed mechanically
	2	Decomposing basalt pebbles, small amount charcoal		29	26	27	27	Artefacts from interface plough
	3	Clay at bottom, decomposing basalt sthn half, rabbit burrow north wall		33	32	33	33	Artefacts 28-33cm
TP3 2x2	1			15	15	15	15	Removed mechanically
	2			25	25	25	25	
	3	Compact red clay at bottom, decomposing basalt nw cnr, ironstone fragments		32	34	35	35	Artefacts at 30cm, between 25-35cm. Se cnr softer – maybe burrow
TP5 2x2	1	Red brown loamy clay		15	15	15	15	Removed mechanically
	2	Some charcoal, loose baked soil < clay with depth, tree root east wall		24	22	23	22	Artefacts in sieve
	3	Heavy red clay, decomposing basalt centre, nth central, se cnr, some charcoal		33	29	30	32	No artefacts

Test Pit	Spit	Soil Description (Munsell, compaction, type, soil inclusions)	pH	Depth (cm)				Artefacts
				NE	SE	SW	NW	
South								
TP6 2x2	1	Red brown loamy clay		15	15	15	15	removed mechanically
	2	Tree root nth wall		25	25	26	26	Artefacts at ploughzone interface, 21cm
	3	Heavy red clay, tree root nth wall, charcoal sth central, decomposing basalt west		34	32	34	34	debitage
TP12 2x2	1	Ground slopes down nth to sth. Red brown loamy clay		15	15	15	15	removed mechanically
	2			29	27	25	31	Artefacts to 29cm
	3	Hard clay, some charcoal, decomposing basalt sw cnr & nw		40	38	37	39	Few artefacts
TP7 2x2	1	Red brown loamy clay		15	15	15	15	removed mechanically
	2	Soft sunken section east central, charcoal fragments, decomposing basalt ne		25	25	25	25	artefacts
	3	Heavy clay, dry & crumbly, decomposing basalt, charcoal		32	32	32	33	artefacts
TP9 2x2	1	Red brown loamy clay		15	15	15	15	removed mechanically
	2	Rabbit burrow nw cnr, burnt soil, charcoal sw cnr		28	25	26	27	Most artefacts east – less disturbed
	3	Root or small burrow (mouse? Snake?) central nth, heavy clay at bottom, softer areas where burrows, burnt soil are		37	32	29	35	1 artefact
TP8 2x2	1	Red brown loamy clay		15	15	15	15	removed mechanically
	2	Charcoal nth central, rabbit burrow ne cnr		25	24	25	26	Artefacts – several from same core
	3	Heavy clay. Burrow ne cnr, root or burrow across sth – damper, looser		35	35	32	35	Artefacts ne cnr
TP1 2x2	1			15	15	15	15	removed mechanically
	2	Compact clay softened by rain and rehardened, land slopes down nth to sth, reasonably steep gradient. Ironstone pieces red clay at bottom becoming heavier. Land slopes north to south, spit excavated flat, not according to slope of land. Charcoal fragments		28	25	25	27	4 in situ artefacts
	3			42	33	30	40	no in situ artefacts
TP13 2x2	1	Red brown loamy clay		15	15	15	15	removed mechanically
	2	Red clay						
	3	Compact red clay at bottom, decomposing basalt, land slopes nth to		34	35	35	32	2 qtz artefacts 29cm

Test Pit	Spit	Soil Description (Munsell, compaction, type, soil inclusions)	pH	Depth (cm)				Artefacts
				NE	SE	SW	NW	
South								
		sth						
TP10 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	decom basalt ne & se cnr, red clay < heavy with depth, grades into yellow clay in sth esp sw cnr – softer. Land slopes from nth to sth. Charcoal fragments.		29	26	27	30	Dozen in situ artefacts
	3	baked red clay at bottom, some decom basalt ne cnr & west side. Some charcoal nw cnr		38	37	35	42	4 artefacts between 25-34cm
TP 15 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	grey loam, becomes light brown at 25cm. Charcoal fragments, quartz, ironstone pebbles		25	25	30	30	artefacts between 15-25cm
	3	after storm & flash flood pit filled with water, still full next day. Drained 2 days later, still very damp, unworkable. Was almost finished prior to storm. Some soil washed in north & west sides. Land slopes west to east. Soil heavy yellow clay, decomposing basalt		24	30	32	32	qtz fragment 24cm depth, 2nd pegged artefact gone in flood.
TP 17 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	decomposing basalt nw cnr		25	25	25	26	2 artefacts just below ploughzone, several sieved artefacts
	3	v compact clay, decomposing basalt throughout, esp nw and se quads, charcoal fragments. Basalt from 20cm depth. Ground slopes down from south to north. Fine red clay midway along south wall.		33	29	27	30	2 debitage – 1 quartz, 1 silcrete
TP 16 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	fine red brown loamy clay, charcoal fragments		25	25	25	26	11 artefacts in situ
	3	after flash flood & storm a lot of sieved soil washed into square & it was under water. Some artefacts washed away from markers. Square		32	32	34	35	8 artefacts were marked in western half, 1 silcrete bf 30cm depth, rest between 30-35cm but all washed

Test Pit	Spit	Soil Description (Munsell, compaction, type, soil inclusions)	pH	Depth (cm)				Artefacts
				NE	SE	SW	NW	
South								
		was almost finished but was abandoned as so much soil washed in. Ground slopes down from west to east.						away
TP 18 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	land slopes slightly west to east, was dampened and baked several times – v hard to dig. 2x2m squares added north and east as dense artefact concentration, charcoal fragments – burnt tree roots,decomposing basalt 23cm		25	25	25	25	dense artefact concentration
	3	heavy rain washed soil in, decom basalt nw cnr		24	30	33	27	several artefacts, mostly at interface between spits 2 & 3
TP 18A 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	yellowy red clay. Immed nth of TP 18, some charcoal, decom basalt & ironstone. Land slopes west to east & v slightly south to nth		25	25	24	25	Approx 20 in situ artefacts
TP 18B 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	hard yellowy red clay. East of TP18. Slopes from sth to nth, west to east		25	24	25	25	>30 in situ artefacts
TP 18C 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	red loamy clay, slopes gradually from south to north, also from west to east, charcoal fragments, decomposing basalt se cnr. Square immed north of 18B, east of 18A		28	24	25	24	dozen in situ artefacts
TP 19 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	red brown loamy clay, charcoal fragments, decomposing basalt at 25cm. Ironstone fragments. Land sloping gradually from south to north. Square close to site boundary. Dampened & baked several times during excavation		25	25	25	25	11 artefacts between 15-28cm
	3	red loamy clay, heavy red clay at bottom, decomposing basalt		33	34	35	34	2 in situ. Crys qutz bf 25cm depth, sil bf 34cm, qtz bf 25cm in west wall

Test Pit	Spit	Soil Description (Munsell, compaction, type, soil inclusions)	pH	Depth (cm)				Artefacts
				NE	SE	SW	NW	
South								
TP 20 2x2	1	red brown loamy clay						
	2	red loamy clay, decom basalt southern half. Land slopes north to south, east to west		25	24	27	24	numerous artefacts in situ
	3							artefacts
TP 21 2x2	1							
	2	fine compact red clay, charcoal fragments, decomposing basalt fragments		25	22	24	22	
	3	compact red clay, charcoal fragments east wall, burnt root, decom basalt		36	36	34.5	35	no artefacts
TP 22 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	v compact clay, burnt root ne quad		27	24	26	27	approx 20 in situ artefacts, 2 in sieve
	3	v heavy hard red baked clay, soft in ne cnr, a bit softer sw cnr. Charcoal, decom basalt, some ironstone.		33	33	31	34	1silcrete bf & 1 silcrete pirri at 32cm
TP 23 2x2	1	red brown loamy clay		12	12	12	12	removed mechanically
	2	red loamy clay, decomposing basalt at 20cm. Clay redder on west side, decom basalt east side, small amount charcoal.		21	22	24	22	Dozen artefacts, 5 in plough zone, rest in situ
	3	heavy red clay at bottom, charcoal fragments, decomposing basalt esp east side		34	35	33	33	artefacts
TP 24 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	land slopes down from west to east. Square flooded during storm, unworkable		25	25	28	31	artefacts but unprovenanced due to storm
TP 25 2x2	1	red brown loamy clay		10	10	10	10	removed mechanically
	2	red loamy clay, clay at base, se quad redder clay, charcoal fragments throughout, small amound decom basalt. Land slopes down from nth to sth, west to east		22	20	22	20	approx 12 in situ artefacts
	3	heavy red clay at bottom, some decom basalt. Tree root nth section – shallow depression, some charcoal lower. West wall evidence of tree root at		30	30	33	32	2 artefacts nth – silcrete bf, quartz cf

Test Pit	Spit	Soil Description (Munsell, compaction, type, soil inclusions)	pH	Depth (cm)				Artefacts
				NE	SE	SW	NW	
South								
		23cm						
TP 26 2x2	1	brown loamy clay		10	10	10	10	removed mechanically
	2	medium brown loamy clay, small amount decom basalt, some charcoal se		20	20	18	19	1 silcrete cf 1cm, 1 qtz rolled pebble
	3							
TP 27 2x2	1	brown loamy clay		10	10	10	10	removed mechanically
	2	medium brown loamy clay, decom basalt, charcoal fragments. Land slopes down from north to south, east to west		21	18	20	21	4 artefacts north half
TP 28 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	looser medium brown sandy clay, charcoal fragments, decomposing basalt, ironstone		25	25	24	24	5 artefacts ne quad
	3	red loamy clay		32	31	33	n/a	2 qtz artefacts 23-25cm. Nw cnr not excavated to spit 3 due to time constraints
TP 29 2x2	1	red brown loamy clay		15	15	15	15	removed mechanically
	2	red brown loamy clay		24	25	25	25	4 silcrete artefacts between 17-22cm

Table A1: Soil descriptions for each test pit and spit.

Appendix 3
A 3. Statutory Regulations

A3.1 Aboriginal Sites

i) Victorian Aboriginal cultural heritage legislation

The permit under which this excavation took place was issued by the Wurundjeri Tribe Land Compensation and Cultural Heritage Council Inc. under the *Aboriginal and Torres Strait Islander Heritage Protection Act* 1984.

The Victorian *Aboriginal Heritage Act* 2006 was enacted on 28 May 2007, replacing the *Archaeological and Aboriginal Relics Protection Ac*t 1972 and Part IIA of the Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act* 1984. From this date Aboriginal cultural heritage in Victoria is protected through the *Aboriginal Heritage Act* 2006 and the Aboriginal Heritage Regulations 2007. This is outlined below.

Aboriginal Heritage Council

Establishing an Aboriginal Heritage Council that contains 11 Indigenous members and registers RAPs and advises the Minister on Aboriginal heritage management.

Registered Aboriginal Parties (RAPs)

Creating Registered Aboriginal Parties (RAPs). Local Aboriginal organisations can apply to become RAPS. The RAPS are involved in assessing all relevant CHMPs, Cultural Heritage Permits and are generally involved in heritage management at a local level;

If a CHMP is produced, the relevant RAP must evaluate the Plan by considering a notice of intention to prepare a Plan, and advise in writing within 14 days of the notification as to whether the RAP intends to evaluate the Plan. If the RAP chooses to assess the Plan, it must consult with the sponsor on the cultural heritage assessment, recommendations, and participate in the conduct of the assessment. A decision must be made by the RAP on the approval or refusal of the Plan within 30 days of receiving the Plan. If the Plan is refused the sponsor has the right to appeal at VCAT.

Cultural Heritage Management Plans

Requiring cultural heritage assessments in the form of Cultural Heritage Management Plans, for all projects that may have a significant cultural heritage impact;

CHMPs are required under the Aboriginal Heritage Regulations 2007, if directed by the Minister, or if an activity is to be the subject of an Environmental Effects Statement (EES);

CHMPs stipulate what management actions there should be where there will be an impact on Aboriginal places from activities or developments;

The Act prescribes in regulations the circumstances in which a CHMP is required, for certain types of development activities located in archaeologically sensitive landforms;

The Plan must be approved by the relevant RAP where one exists, and if not the Secretary of the DPCD will assess it.

There are provisions for dispute resolution through the Victorian Civil and Administrative Claims Tribunal (VCAT).

Decision-making authorities such as government agencies and local government will not be able to issue statutory approval for a work authority, license or planning permit for certain activities unless an approval CHMP has first been received.

Cultural Heritage Permits

In those cases where a CHMP is not required but an activity is still likely to impact or harm an Aboriginal heritage place, a Cultural Heritage Permit may be required.

Permits are required for the purposes of uncovering or discovering Aboriginal cultural heritage, or where there is likely to be an impact on a cultural heritage place.

A Permit cannot be granted for an activity that requires a CHMP.

Permits are lodged with the Secretary of the Department of Planning & Community Development (DPCD), who forwards them to the relevant RAP. RAPs have 30 days to advise in writing if they agree or refuse to grant the Permit.

Permits are granted by the Secretary of the Department of Planning & Community Development RAPs may object to the issue of a permit, in which case the Secretary of the DPDC must refuse to grant a permit if the objection was raised during the 30 day consideration period.

There is an avenue for review of refusals through VCAT.

Declarations and Cultural Heritage Agreements

Declarations may be made under the Act by the Minister, to protect and preserve important Aboriginal cultural heritage places. Land owners and managers may enter into Cultural Heritage Agreements with RAPs to manage and protect important cultural heritage resources.

Penalties and Heritage Inspectors

Penalties for failing to comply with the Act are substantially increased under the new Act. There are a range of enforcement provisions to provide better protection of Aboriginal places, including penalties of up to $1 million and clear powers for Heritage Inspectors.

The Minister appoints Inspectors in consultation with the AHC.

Inspectors have powers of entry, search and seizure in prescribed circumstances so that the Act can be enforced.

Stop Orders and Audits

Stop Orders can be issued by Inspectors or the Minister, in order to stop any activity that endangers or harms an Aboriginal place. Stop Orders will stay in place for 30 days while decisions are made about mitigation measures to protect the place.

The Minister for Aboriginal Affairs may also order a person to audit their activity under specific circumstances, such as where it is suspected that the specific actions recommended in a CHMP have been contravened or the conditions of a Cultural Heritage Permit have been breached.

When audits are ordered, a Stop Order is also ordered to prevent further risk of harm to Aboriginal cultural heritage places.

The audit report will be provided to the Minister, who can then amend a CHMP or the conditions of a Cultural Heritage Permit as required.

Victorian Aboriginal Heritage Register

The Act establishes the Victorian Aboriginal Heritage Register which holds details on all recorded Aboriginal heritage places in the State.

Transitional Arrangements

The new Act has transitional provisions to deal with the change-over from the previous to the new legislation. The following existing permits, consents and agreements will still be valid after 28th of May 2007:

A consent granted under S.21U(4) or (5) of the Commonwealth Act;

A consent granted by the Minister under S.21 of the State Act to damage relics;

A consent granted by the Secretary to buy, sell or possess relics under S.26A of the State Act; and

An Aboriginal cultural heritage agreement under S.21K of the Commonwealth Act.

A Cultural Heritage Management Plan (CHMP) will not be required for a development activity if, on the 28 May 2007:

It has statutory authorization such as a planning permit;

A proponent has submitted an application for a 'statutory authorisation' for the activity to the relevant decision maker (and see S.50 of the new Act for the definition of a 'statutory authority');

All of the place information collected in an archaeological survey with respect to the activity has been submitted to AAV in accordance with S.22(5b) of the State Act; and

A consent under S.21(u) of the Commonwealth Act is in force to do an act referred to under S.21(u) of the Commonwealth Act.

ii) Native Title Act 1993

The Commonwealth Native Title Act establishes the principles and mechanisms for the preservation of Native Title for Aboriginal people.

Under Subdivision P of the Act, *Right to negotiate*, native title claimants can negotiate about some proposed developments over land and waters (known as 'Future Acts') if they have the right to negotiate. Claimants gain the right to negotiate if their native title claimant application satisfies the registration test conditions.

The right to negotiate applies over some proposed developments or activities that may affect native title. These are known as future acts under the Native Title Act 1993. Native title claimants only have the right to negotiate over certain types of future acts, such as mining. Activities such as exploration and prospecting on the land do not usually attract the right to negotiate.

The right to negotiate is not a right to stop projects going ahead — it is a right to have a say about how the development takes place. In some situations, the right to negotiate does not apply. In these circumstances, claimants may have the right to be notified, to be consulted, to object and to be heard by an independent umpire.

The right to negotiate is triggered when a government issues a notice to say that it intends to allow certain things to happen on land, such as granting a mining lease. This notice is called a 'section 29 notice.

People who claim to hold native title in the area, but have not yet made a native title claimant application, have three months from the date given in the section 29 notice to file a claim if they want to have a say about the proposed development. To get the right to negotiate, the claim must be registered within a month after that.

If the right to negotiate applies, the government, the developer and the registered native title parties must negotiate 'in good faith' about the effect of the proposed development on the registered native title rights and interests of the claimants.

The parties can ask the National Native Title Tribunal to mediate during the negotiations.

If the negotiations do not result in an agreement the parties can ask the Tribunal (no sooner than six months after the notification date) to decide whether or not the future act should go ahead, or on what conditions it should go ahead.

The National Native Title Tribunal administers the future act processes under the Commonwealth legislation. The Tribunal's role includes mediating between parties, conducting inquiries and making decisions (called 'future act determinations') where parties can't reach agreements.

When the Tribunal receives a future act determination application, it must conduct an inquiry (an arbitration) in order to determine whether the future act can be done and if so whether any conditions should be imposed.

A member of the Tribunal (or a panel of three members) will be appointed to conduct the inquiry, and will initially hold a preliminary conference and set directions for the parties to provide submissions and evidence. Members who have mediated a particular matter are not usually appointed as inquiry members. Inquiry members conduct hearings, receive submissions and evidence from the parties and take into account matters set out in section 39 of the Native Title Act such as:

- the effect of the future act on the enjoyment by the native title party of their registered native title rights and interests; their way of life, culture and traditions; the development of their social, cultural and economic structures; their freedom of access to the land and freedom to conduct ceremonies and other cultural activities; and the effect of the future act on any area or site of particular (special) significance to the native title party;
- the interests, proposals, opinions or wishes of the native title party;
- the economic or other significance of the future act;
- the public interest; and
- the presence of any existing non-native title rights and interests and use of the land by other persons (for instance, pastoralists).

- *Planning and Environment Act 1987*

The Victorian Planning and Environment Act provides local governments with the power to implement heritage controls over significant buildings or places. Heritage and conservation areas and heritage places – both Aboriginal and non-Aboriginal – can be identified and listed on a particular local planning scheme (usually through inclusion in the Heritage Overlay), and protected as places of heritage significance. A planning permit may be required from the local council if a

place is subject to a heritage overlay control or is individually listed in the planning scheme. It is advisable to check with the relevant local council to determine if any additional permits are required.

- *Environment Effects Act 1978 and Amendment Act 1994*

The Victorian Environment Effects Act may have relevance with certain projects as it requires some development proposals to be assessed for their possible impact on the environment. The definition of environment includes the cultural heritage of the project area.

ii.) Commonwealth legislation

- *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

The Commonwealth Australian Heritage Commission Act was recently repealed and in its place amendments to the EPBC Act and the provision of an Australian Heritage Council have also been made in new legislation.

Under the EPBC Act Amendments (No 88, 2003) two mechanisms have been created for protection of heritage places of Commonwealth or National significance. Initially places in Commonwealth ownership may be placed on the Commonwealth list with similar protection measures as under the previous AHC act. In addition the National list provides protection to places of cultural significance to Australia. By law, no one can take any action that has, will have, or is likely to have, a significant impact on any places of national heritage value, without approval. Such actions must be referred to the Australian Government Minister for the Environment and Heritage.

A 4. Advice about the Discovery of Human Remains

If suspected human remains are discovered during any excavation or development work, the steps outlined below should be followed.

1. Legal requirements

The *Coroner's Act 1985* requires anyone who discovers the remains of a 'person whose identity is unknown' to report the discovery directly to the State Coroner's Office or to the Victoria Police. A person who fails to report the discovery of such remains is liable to a $10,000 fine. The Coroner's Act does not differentiate between treatment of Aboriginal and non-Aboriginal remains. The majority of burials found during development work are, therefore, likely to be subject to this reporting requirement.

In addition, Part IIA of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* requires anyone who discovers suspected Aboriginal remains in Victoria to report the discovery to the responsible Minister. The Director, Aboriginal Affairs Victoria, holds delegated authority to receive and investigate such reports.

It should be noted that the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* is subordinate to the *Coroner's Act* 1985 regarding the discovery of human remains. Therefore, the location at which the remains are found should be first treated as a possible crime scene, and the developer and/or contractor should not make any assumptions about the age or ethnicity of the burial.

Victoria Police Standing Orders require that an archaeologist from the Heritage Services Branch, Aboriginal Affairs Victoria, should be in attendance when suspected Aboriginal remains have been reported (Police Headquarters and the State Coroner's Office hold after-hours contact numbers for Heritage Services Branch staff). Where it is believed the remains are Aboriginal, the Police will usually invite representatives of the local Aboriginal community to be present when the remains are assessed. This is because Aboriginal people usually have particular concerns about the treatment of Aboriginal burials and associated materials.

2. Aboriginal Affairs Victoria - suggested procedure to be followed if suspected human remains are discovered

1. If suspected human remains are discovered during development, work in the area must cease and the Police or State Coroner's Office must be informed of the discovery without delay. The State Coroner's Office can be contacted at any time on ph: (03) 9684 4444.
2. If there are reasonable grounds to suspect the remains are Aboriginal, the discovery should also be reported to Aboriginal Affairs Victoria on ph: (03) 9637 8000. Aboriginal Affairs Victoria will ensure that the local Aboriginal community is informed about the circumstances of the discovery.
3. Do not touch or otherwise interfere with the remains, other than to safeguard them from further disturbance.
4. Do not contact the media.

GLOSSARY AND REFERENCES

GLOSSARY

Introduction and terminology

The following list provides definitions of various terms used in this report. Many of the terms have been referenced and the sources included in the reference list at the end of this report.

There is often a degree of confusion about the use of terms such as *heritage place*, *historical site*, *archaeological site* and so on. The definitions of these terms, as used in this report, have been included in the glossary and their relationship outlined in **Figure 1** below. The term used most consistently is *heritage place* and this is defined as follows:

Heritage place: A place that has aesthetic, historic, scientific or social values for past, present or future generations – ' ... this definition encompasses all cultural places with any *potential* present or future value as defined above' (Pearson and Sullivan 1995:7).

For the purpose of discussion in this document 'heritage place' can be sub-divided into **Aboriginal place** and **historic place** (i.e. a historic place refers more particularly to non-Aboriginal sites).

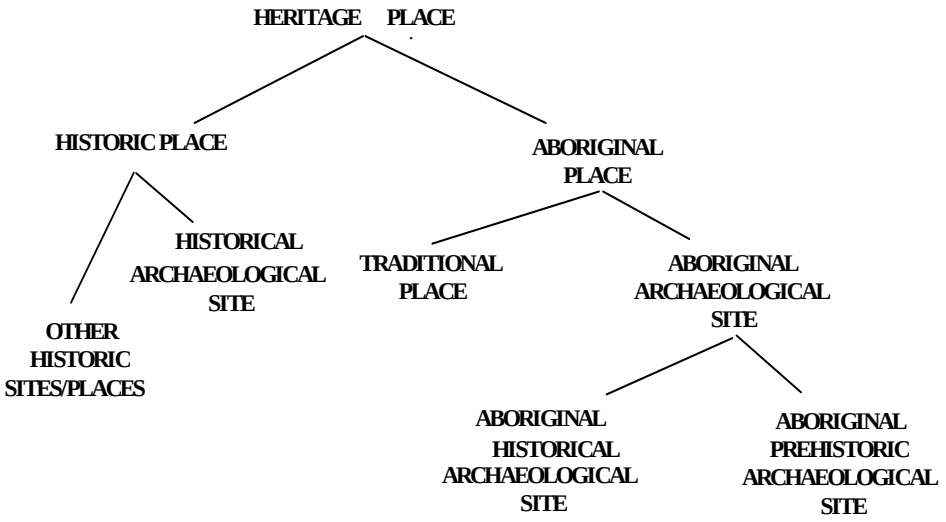

Figure G1: Terminology used for categories of heritage places.

Archaeological site types

The archaeological site types encountered in Australia can be divided into three main groups:

Historical archaeological site: an archaeological site formed since non-Aboriginal settlement that contains physical evidence of past human activity (for example a structure, landscape or artefact scatter).

Aboriginal historical archaeological site (or contact site): a site with a historical context such as an Aboriginal mission station or provisioning point; or a site that shows evidence of Aboriginal use of non-Aboriginal materials and ideas (for example: artefact scatter sites that have artefacts made from glass, metal or ceramics).

Aboriginal prehistoric archaeological site: a site that contains physical evidence of past Aboriginal activity, formed or used by Aboriginal people either before, or not long after, European settlement. These sites are commonly grouped as follows (further definition of each is contained in the glossary list):

- artefact scatter
- burial
- hearth
- isolated artefact
- mound
- quarry
- scarred tree
- shell midden
- structures
- rock art
- rock shelter
- rock well

One of the most common artefact types that provides evidence of Aboriginal people are those made from stone. Types and categories are outlined below in **Figure 2**, with further definition of each in the glossary list.

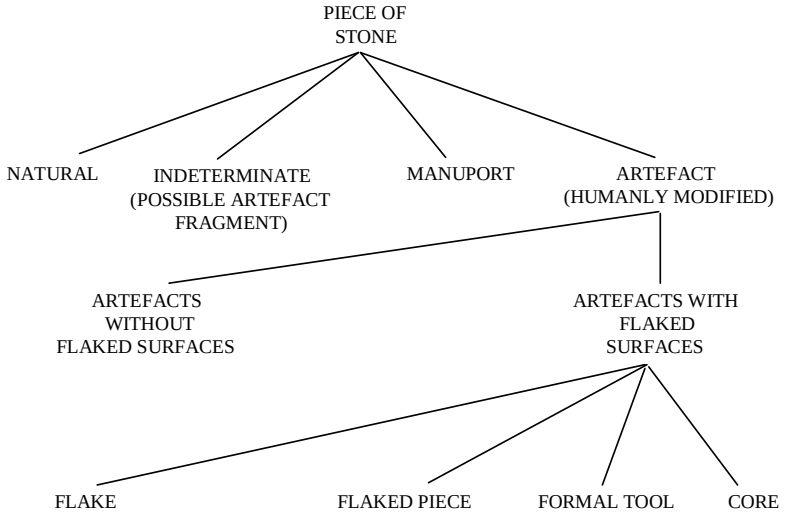

Figure G2: Stone artefact types/categories.

List of definitions

Aboriginal historical archaeological site (or contact site): either a site with an historic context such as an Aboriginal mission station or provisioning point; or a site that shows evidence of Aboriginal use of European/non-Aboriginal materials and ideas (e.g. artefact scatter sites that contain artefacts made from glass, metal or ceramics).

Aboriginal prehistoric archaeological site: a site that contains physical evidence of past Aboriginal use, formed or used by Aboriginal people either before, or not long after, European settlement.

Alluvial terrace: a platform created from deposits of alluvial material along river banks.

Anvil: a portable flat stone, usually a river pebble, used as a base for working stone. Anvils used frequently have a small circular depression in the centre where cores were held while being struck. An anvil is often a multi-functional tool also used as a grindstone and hammerstone.

Archaeology: the study of the remains of past human activity.

Artefact scatter: a surface scatter of cultural material. Aboriginal artefact scatters are defined as being the occurrence of five (5) or more items of cultural material within an area of about 100 sq. metres (AAV 1993:1j). Artefact scatters are often the only physical remains of places where people have lived camped, prepared and eaten meals and worked.

Backed piece: a flake or blade that has been abruptly retouched along one or more margins opposite an acute (sharp) edge. Backed pieces include backed blades and geometric microliths. They are thought to have been hafted onto wooden handles to produce composite cutting tools. Backed pieces are a feature of the 'Australian small tool tradition', dating from between

5000 and 1000 years ago in southern Australia (Mulvaney 1975).

Bipolar working: technique used for the reduction of stone, in particular quartz, by placing a core on an anvil and 'smashing' with a hammerstone.

Blade: a flake at least twice as long as it is wide.

Burial site: usually a sub-surface pit containing human remains and sometimes associated artefacts.

Burin: a stone implement roughly rectangular-shaped with a corner flaked to act as point for piercing holes in animal skins. The distinguishing feature is a narrow spall, usually struck from the distal end down the lateral margin of a blade, but sometimes across the end of a flake (McCarthy 1976:38).

Contact site: see 'Aboriginal historical archaeological site'.

Core: an artefact from which flakes have been detached using a hammerstone. Core types include single platform, multi-platform and bipolar forms.

Cortex: original or natural (unflaked) surface of a stone.

Edge-ground implement: a tool, such as an axe or adze, which has usually been flaked to a rough shape and then ground against another stone to produce a sharp edge.

Edge modification: irregular small flake scaring along one or more margins of a flake, flaked piece or core, which is the result of utilisation/retouch or natural edge damage.

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

Flaked piece: a piece of stone with definite flake surfaces, which cannot be classified as a flake or core.

Formal tool: an artefact that has been shaped by flaking, including retouch, or grinding to a predetermined form for use as a tool. Formal tools include scrapers, backed pieces and axes.

Gilgai soils: soils with an undulating surface, presenting as a pattern of mounds and depressions. A possible cause is the alternation of swelling and cracking of clay during periods of wet and dry conditions.

Grindstones: upper (handstone) and lower (basal) stones used to grind plants for food and medicine and/or ochre for painting. A handstone sometimes doubles as a hammerstone and/or anvil.

Hammerstone: a piece of stone, often a creek/river pebble/cobble, which has been used to detach flakes from a core by percussion. During flaking, the edges of the hammerstone become 'bruised' or crushed by impact with the core.

Hearth: usually a sub-surface feature found eroding from a river or creek bank or 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.

Heat treatment: the thermal alteration of stone (including silcrete) by stone workers to improve its flaking qualities (see Flenniken and White 1983).

Heritage Place: A place with aesthetic, historic, scientific or social values for past, present or future generations – '...this definition encompasses all cultural places with any *potential* present or future value as defined above' (Pearson and Sullivan 1995:7).

Historic place: a place that has some significance or noted association in history.

Historical archaeological site: an archaeological site formed since non-Aboriginal settlement that contains physical evidence of past human activity (for example a structure, landscape or artefact scatter).

Isolated artefact: the occurrence of less than five items of cultural material within

an area of about 100 sq. metres (AAV 1993:1j). It/they can be evidence of a short-lived (or one-off) activity location, the result of an artefact being lost or discarded during travel, or evidence of an artefact scatter that is otherwise obscured by poor ground visibility.

Manuport: foreign fragment**,** chunk or lump of stone that shows no clear signs of flaking but is out of geological context and must have been transported to the site by people.

Moiety: a moiety is a half. Tribes were composed of two moieties (halves), and each clan belonged to one of the moieties.

Mound: **t**hese sites, often appearing as raised areas of darker soil, are found most commonly in the volcanic plains of western Victoria or on higher ground near bodies of water. The majority were probably formed by a slow build-up of debris resulting from earth-oven cooking; although some may have been formed by the collapse of sod or turf structures. It has also been suggested some were deliberately constructed as hut foundations (Bird and Frankel 1991: 7–8).

Noxious weeds: plants that have been proclaimed under the Victorian *Catchment and Land Protection Act 1994*. They include four types**:** state prohibited, regionally prohibited, regionally controlled and restricted. Noxious weeds are species that seriously threaten or potentially threaten agricultural production.

Obtrusiveness: how visible a site is within a particular landscape. Some site types are more conspicuous than others. A surface stone artefact scatter is generally not obtrusive, but a scarred tree will be (Bird 1992).

Pebble/cobble: natural stone fragments of any shape. Pebbles are 2–60 mm in size and cobbles are 60–200 mm in size (McDonald et al. 1984: 78).

Percussion: the act of hitting a core with a hammerstone to strike off flakes.

Platform preparation: removal of small flake scars on the dorsal edge of a flake, opposite the bulb of percussion. These overhang removal scars are produced to prevent a platform from shattering (Hiscock 1986: 49).

Pre-contact: before contact with non-Aboriginal people.

Post-contact: after contact with non-Aboriginal people.

Quarry (stone/ochre source): a place where stone or ochre is exposed and has been extracted by Aboriginal people. The rock types most commonly quarried for artefact manufacture in Victoria include silcrete, quartz, quartzite, chert and fine-grained volcanics such as greenstone.

Regionally controlled weed: legally defined by the Victorian Catchment and Land Protection Act, and determined by each Victorian Regional Catchment authority in conjunction with DSE for each particular Region. Listed species are those that are widespread, but are still considered important for control. Landholders must take all reasonable steps to control and prevent the spread of these weeds on their property and adjacent roadsides.

Retouch: a flake, flaked piece or core with intentional secondary flaking along one or more edges.

Rock art: 'paintings, engravings and shallow relief work on natural rock surfaces' (Rosenfeld 1988: 1). Paintings were often produced by mineral pigments, such as ochre, combined with clay and usually mixed with water to form a paste or liquid that was applied to an unprepared rock surface. Rock engravings were made by incising, pounding, pecking or chiselling a design into a rock surface. Rare examples of carved trees occasionally survive.

Rock shelter: may contain the physical remains of camping places where people prepared meals, flaked stone, etc. They are often classed as a different type of site due to their fixed boundaries and greater likelihood of containing sub-surface deposits. Rockshelters may also contain rock art.

Rock-well: a natural or modified depression within a stone outcrop, which collects

water. The most identifiable of these sites have been modified by Aboriginal people, either by deepening or enlarging.

Scarred tree: scars on trees may be the result of removal of strips of bark by Aborigines e.g. for the manufacture of utensils, canoes or for shelter; or resulting from small notches chopped into the bark to provide hand and toe holds for hunting possums and koalas. Some scars may be the result of non-Aboriginal activity, such as surveyors marks.

Scraper: a flake, flaked piece or core with systematic retouch on one or more margins. Scraper types follow Jones (1971).

Shell midden: a surface scatter and/or deposit comprised mainly of shell, sometimes containing stone artefacts, charcoal, bone and manuports. These site types are normally found in association with coastlines, rivers, creeks and swamps – wherever coastal, riverine or estuarine shellfish resources were accessed and exploited.

Significance: the importance of a heritage place or site for aesthetic, historic, scientific or social values for past, present or future generations.

Striking platform: the surface of a core, which is struck by a hammerstone to remove flakes.

Structures (Aboriginal): can refer to a number of different site types, grouped here only because of their relative rarity and their status as built structures. Most structures tend to be made of locally available rock, such as rock arrangements (ceremonial and domestic), fishtraps, dams and cairns, or of earth, such as mounds or some fishtraps.

Stratified deposit: material that has been laid down, over time, in distinguishable layers.

TL or Thermoluminescence: Luminescence dating is a form of geochronology that measures the energy of photons being released. In natural settings, ionizing radiation (U, Th, Rb, & K) is absorbed and stored by sediments in the crystal lattice. This stored radiation dose can be evicted with stimulation and released as luminescence. The calculated age is the time since the last exposure to sunlight or intense heat. The sunlight bleaches away the luminescence signal and resets the time 'clock'. As time passes, the luminescence signal increases through exposure to the ionizing radiation and cosmic rays. Luminescence dating is based on quantifying both the radiation dose received by a sample since its zeroing event, and the dose rate which it has experienced during the accumulation period. The principal minerals used in luminescence dating are quartz and potassium feldspar.

[Source:http://crustal.usgs.gov/laboratories/luminescence_dating/what_is_tl.html]

Utilised artefact: a flake, flaked piece or core that has irregular small flake scarring along one or more margins that does not represent platform preparation.

Visibility: the degree to which the surface of the ground can be seen. 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. Visibility is generally expressed in terms of the percentage of the ground surface visible for an observer on foot (Bird 1992).

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