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| *Aboriginal Heritage Act 2006* |
| Practice Note: Subsurface Testing |



This Practice Note has been prepared under section 143 of the *Aboriginal Heritage Act 2006* (the Act). It provides guidance about subsurface testing as it relates to the preparation of a Cultural Heritage Management Plan in accordance with the Act. The Practice Note covers:

* General information about Cultural Heritage Management Plans and consultation
* When a Cultural Heritage Management Plan may include subsurface testing
* Why subsurface testing may be required
* Supervision of subsurface testing
* Developing a subsurface testing strategy and methodology
* How much subsurface testing is necessary
* Subsurface testing methods and their usefulness
* Considerations when analysing and reporting on subsurface testing
* Archaeological standards relevant to subsurface testing.

Finally, a series of scenarios are presented as examples to illustrate the application of topics discussed in the Practice Note.

## What is a Cultural Heritage Management Plan?

A Cultural Heritage Management Plan (CHMP) is required for an activity (the development or use of land) if all or part of the activity is a high impact activity and all or part of the activity area is an area of cultural heritage sensitivity. The terms ‘high impact activity’ and ‘area of cultural heritage sensitivity’ are defined in the Aboriginal Heritage Regulations 2018 (the Regulations). A CHMP must also be prepared when an activity requires an Environmental Effects Statement, or when directed by the Minister for Aboriginal Affairs. A person may also elect to prepare a CHMP even if not required to under the Act.

An approved CHMP must be submitted by the ‘sponsor’ of an activity to a responsible authority before the necessary statutory approval can be granted and/or before works can start.

A CHMP involves an assessment of an area to determine the nature and extent of any Aboriginal cultural heritage that may be present. This information may be obtained through background research, interviews with Traditional Owners, a ground surface survey, subsurface testing and/or archaeological excavation.

A CHMP determines how the proposed activity can be carried out while avoiding harm to any Aboriginal cultural heritage present. If this is not possible, it considers how to conduct the activity in a way that minimises harm. For more information about CHMPs see the Aboriginal Victoria (AV) website at: <http://www.dpc.vic.gov.au/index.php/aboriginal-affairs/aboriginal-cultural-heritage/cultural-heritage-management-plans>.

## CHMP consultation

When developing a subsurface testing strategy and methodology it is important to consult with the relevant Registered Aboriginal Party (RAP), where one exists and has elected to evaluate the CHMP in accordance with section 60 of the Act, about the proposed methodology. Relevant Traditional Owner groups should be consulted in the absence of a RAP. A person appropriately qualified in archaeology should develop the final subsurface testing strategy and methodology.

## When may a CHMP include subsurface testing?

The Regulations prescribe standards for preparing CHMPs based on the level of assessment required to develop the plan. In some cases a ‘standard assessment’ may be all that is required, while in other circumstances a ‘complex assessment’ may be required.

Regulation 59(4) specifies that a standard assessment may include the following subsurface investigations: ground penetrating radar survey, resistivity survey, remote sensing, ground magnetic survey, electromagnetic survey, and soil and sediment testing with a manual auger no larger than 12cm in diameter.

In accordance with Regulation 60, a complex assessment is required when Aboriginal cultural heritage is, or is likely to be, present in the activity area, and when it is not possible to identify the nature, extent, and significance of the Aboriginal cultural heritage unless a complex assessment is carried out. A complex assessment involves the disturbance (or excavation) of part of the activity area to uncover or discover Aboriginal cultural heritage (Regulation 61(1)). This is referred to as subsurface testing, requirements for which are detailed in Regulation 64 (b), Schedule 2 (9). A complex assessment is not required if the proposed activity will not harm Aboriginal cultural heritage in that area (Regulation 60(2)).

## Why may subsurface testing be required?

Subsurface testing may be required to determine:

* the stratigraphy and general subsurface nature of the area being investigated;
* whether there may be subsurface cultural deposits present in areas of impact or where the surface visibility is poor;
* the nature, extent and significance of any cultural heritage visible on the surface of the ground is likely to continue below the surface.

### When is subsurface testing not appropriate?

The disturbance or excavation of land to uncover or discover Aboriginal cultural heritage is destructive and it is important that it is only carried out when necessary to identify and document the extent, nature and significance of Aboriginal cultural heritage that is threatened by the proposed activity.

Subsurface testing should not be carried out in areas where it is not proposed the activity will cause any harm.

Subsurface testing should be avoided if it causes more harm than the proposed activity.

Test excavations should not be designed as salvage operations, nor should they be undertaken in areas that will not be affected by the proposed activity.

## Who must supervise subsurface testing?

In accordance with Regulation 65(3), a complex assessment must be supervised by a person appropriately qualified in archaeology and must be carried out in accordance with proper archaeological practice. Aboriginal Victoria recommends that such a person should also be responsible for developing the subsurface testing strategy and methodology, and for analysing the results.

## Considerations when developing a subsurface testing strategy and methodology

Subsurface testing is used to find out what is below the surface of the ground, within the area likely to be impacted by the proposed activity. It should provide enough information to make reasonable predictions about the presence of Aboriginal cultural heritage across the activity area, and assist in determining the nature, extent and significance of any Aboriginal cultural heritage that may be impacted by the activity. Therefore careful thought should go into developing a subsurface testing strategy and identifying the appropriate methodology to achieve the most effective results.

Developing a subsurface testing strategy includes formulating some initial predictions or questions about potential cultural landscapes that may contain Aboriginal cultural heritage material in the affected area. Relevant information should incorporate information obtained through the desktop assessment, including:

* knowledge about the Aboriginal cultural heritage and history of the area, particularly from relevant Traditional Owners; and
* information about the area’s landforms, geomorphology, palaeo-environmental and prior land-use history.

A ground surface survey or standard assessment should generally be carried out to refine the predictions or questions derived from the desktop assessment. This information helps to set up parameters for where and how to sample the proposed activity area(s).

In developing a subsurface sampling strategy and methodology it is also useful to consider what type of information subsurface testing may uncover, and how this may guide the preparation of the CHMP. Subsurface testing may assist in determining:

* the archaeological potential of the area; by interpreting the geomorphology and stratigraphy across the activity area;
* the location of cultural deposits, including any in situ deposits;
* the depth of cultural material.
* the horizontal extent and thickness of any cultural deposits and their condition;
* the density and type of artefactual material, and any variation across the site;
* the age of cultural material; either through direct dating methods, determining the age of relevant geological strata or comparative typology of artefacts;
* the depth of the base sterile layer or bedrock across the site and how this relates to the depth of the proposed area of impact; and
* any previous ground disturbance.

Analysis of this information will help to define and understand the nature, extent and significance of any subsurface Aboriginal cultural heritage material with reasonable confidence. Along with the results of the ground surface survey, it will enable appropriate heritage protection and mitigation measures to be developed in the CHMP.

Regulation 61(3) specifies that subsurface testing must be carried out in accordance with proper archaeological practice. The subsurface testing strategy and methodology should inform the amount and type of subsurface sampling to be conducted as well as outline appropriate subsurface testing methods and techniques. Subsurface testing must be conducted in a safe manner and adhere to relevant safe work practices. It is important to incorporate some flexibility in the strategy, taking into account the results of subsurface testing as they become available.

The rationale for any subsurface testing strategy and accompanying methodology should be clearly explained and documented in the CHMP. Any changes in methodology must also be clearly documented and justified.

## How much subsurface testing is necessary?

A subsurface testing strategy should be sufficient to enable you to determine, with reasonable confidence, whether the proposed activity will cause harm to Aboriginal cultural heritage and if so, how the proposed activity could be altered to avoid harm and/or minimise harm. Subsurface testing should also be sufficient to provide a representative sample of the material culture present at the Aboriginal place, and to enable an informed assessment of the nature and significance of the place.

Where appropriate, subsurface testing should aim to facilitate the registration of Aboriginal places by discrete landform, rather than attempting to define place extents based on positive / negative subsurface testing.

It is not appropriate to define an Aboriginal place based on the dimensions of a single test pit or shovel test pit.

If there is a fairly dense scatter of Aboriginal cultural heritage material visible on the ground surface, only limited sampling on- and off-site, i.e. next to the visible Aboriginal cultural heritage material, may be required. However, if there is potential for buried stratified deposits; no surface evidence of cultural material; a very sparse artefact scatter or only a few isolated artefacts, then subsurface sampling will need to include larger and more closely spaced test pits. As a general rule, each landform or discrete part of a landform that is likely to contain Aboriginal cultural heritage should be tested. Landforms or strata that are more likely to contain cultural deposits should be tested more thoroughly. Sampling should also be undertaken across the area of impact, not merely in a linear fashion.

## What are the most useful subsurface testing methods?

There are a number of subsurface testing methods that may be used as part of preparing a CHMP. These are described with comments on their appropriate conduct in accordance with proper archaeological practice in Regulations 61(3) and 61(7). The interval between subsurface testing pits can be as critical in identifying Aboriginal cultural heritage as the type of testing adopted.

**Manual auger –** Testing with a manual auger is the only ground-disturbing subsurface testing method permitted during a standard assessment for a CHMP. Regulation 59(4)(f) states that soil and sediment testing may be carried out with a manual auger no larger than 12cm in diameter. Manual augering may only be used to assist in defining the nature and extent of identified Aboriginal cultural heritage. It may not be used as a ‘site discovery’ survey technique in a standard assessment.

Due to the narrow diameter of a manual auger, this subsurface testing method is only useful in certain circumstances. It can, for example, assist in defining the extent of an Aboriginal earthen mound or shell midden, or testing that natural clay has been reached, but is unlikely to be of any use for defining the extent of stone artefact scatters. All excavated deposits (100%) must be sieved.

A manual auger may also be used as part of a complex assessment. Manual augering can assist in identifying major changes in stratigraphy, but where sediments are loose, these may crumble in the auger, making it difficult to obtain a controlled sample sequence of the stratigraphy (as required by Regulation 61(4)). In such circumstances, a sand auger or a test pit should be used.

In a complex assessment, manual augering may be used to supplement the results from controlled test pit excavations – to provide additional spatial information when tracing the extent and characteristics of certain lenses or layers identified in the test pits. In these circumstances, using a manual auger is less destructive and labour intensive than excavating additional test pits.

In a complex assessment a manual auger may have a larger diameter that the 12cm allowed for a standard assessment, in consultation with the relevant RAP or Traditional Owner group(s), although it is recommended that this be less than 25cm. Mechanical augers may sometimes be used when a manual auger cannot reach a particular depth and/or when the sediments are too hard for a manual auger. They may also be of assistance in guiding the use of mechanical excavations under limited circumstances. All excavated deposits (100%) must be sieved.

**Shovel test pit (STP) –** These should be no smaller than 0.5m x 0.5m in size and have vertical sides. Smaller STPs and those that taper markedly with depth are of little value for investigating deposits with low or variable artefact densities. STPs can be excavated by shovel or spade to the maximum depth of the proposed impact; vertical control should be maintained so as to identify the depth at which any artefacts occur.

STPs which do not meet these standards are of little use to develop an understanding of the nature, extent and significance of Aboriginal cultural heritage. All excavated deposits (100%) must be sieved.

Each STP found to contain cultural material should be expanded to at least 1m x 1m in area and be manually excavated in a controlled manner, to properly consider the nature of the cultural material. Only if a STP is being used to augment information from an existing test pit, such as in extent testing, is expanding the STP unnecessary.

**Test Pit (TP) –** These are controlled excavation pits at least 1m x 1m in area, although larger or additional pits may be excavated. While a spade may be used to excavate the topsoil and/or deposits where there is no cultural material, as soon as artefacts are identified the TP should be excavated manually using small hand tools (trowels, where possible) and in accordance with proper archaeological practice. Excavation should be in stratigraphic layers and/or arbitrary levels (maximum of 5 – 10cm spits) to the maximum depth of the proposed impact of the activity, sterile layer, or weathered bedrock. The TP should have straight vertical walls and maintain consistent horizontal dimensions, i.e. not step down and become smaller. If the depth of the TP is, or becomes a safety issue, a larger area should be opened and excavated in a controlled manner, or Safe Work Australia’s Excavation Work Code of Practice standards for trenching and shoring must be followed. A TP is the most useful method for carrying out controlled subsurface testing. It can be useful for understanding and documenting the stratigraphy and may be used on-site or off-site. All excavated deposits (100%) must be sieved.

**Mechanical excavation –** Mechanical excavation should only be considered when manual excavation is not practicable - such as when the cultural deposits are deep and below extensive sterile layers or when the area to be investigated is too large to systematically sample by manual excavation.

Mechanical excavation should be carried out in a controlled manner. Using appropriate machines, operators should be able to excavate in even, horizontal scrapes, utlising the stratigraphic basis that was established beforehand. Any Aboriginal cultural heritage material found through sieving should be able to be provenanced to the appropriate stratigraphic layer and approximate horizontal location. It is, for example, not appropriate to report that 200 Aboriginal stone artefacts were found in a 400m x 1m trench that was 3m deep; greater locational precision is required.

Mechanical excavation should be conducted in a manner that will assist in determining the nature, extent and significance of any Aboriginal cultural heritage that may be impacted by the proposed activity. Note that where occupation deposits or features are encountered, these must be uncovered and assessed by controlled manual excavation.

Mechanical excavation should not be used in areas where minimal ground disturbance is planned as it has the potential to result in more disturbance and damage to Aboriginal cultural heritage than the proposed activity. Mechanical excavation can be very destructive; one scrape can completely remove small, discrete or shallow features, or entire occupation deposits.

If machinery is used the Regulations require that the disturbance be conducted on a detailed stratigraphic basis (Regulation 61(5)), i.e. the stratigraphy must be established beforehand using a Test Pit. Horizontal, as well as vertical, control should be maintained. If the use of machinery uncovers occupation deposits or features, then the deposits or features must be uncovered and assessed by controlled excavation using hand tools (Regulations 61(6, 7)) unless in exceptional circumstances when might be unsafe to do so. All excavated deposits (100%) must be sieved.

## Archaeological standards relevant to subsurface testing for CHMPs

Regulation 61(3) requires that subsurface testing for a complex assessment must be carried out in accordance with proper archaeological practice. This includes, but is not limited, to the following standards:

### Subsurface testing

* Establish the subsurface nature and stratigraphy of the area manually before using any machines.
* Cultural or occupation deposits must always be excavated in a controlled manner using accepted stratigraphic methods. Note that occupation deposits may be in situ, dispersed or disturbed.
* All cultural layers and any adjacent non-cultural layers/areas should be excavated manually with trowels or other small tools unless it is not practicable to do so.
* Where machinery is used, it must be clear why it is not practicable to excavate manually; for health and safety reasons, or the impracticality of excavating a large metre trench entirely by hand, for example.
* Where appropriate, establish a site datum. Coordinates for the datum should follow requirements for recording coordinates as outlined in AV’s Standards for Recording Victorian Aboriginal Heritage Places and Objects.
* Maps showing subsurface testing should include contours to assist in determining the relationship (if any) between artefact distributions and landforms. A topographic map of the area may need to be prepared for the proposed activity area. This will assist with stratigraphic and vertical control of subsurface testing and assist in documenting landform and site formation processes.
* Subsurface testing units should be linked to the site datum (including level heights) and incorporated into the site grid. Use a logical numbering system and identify all coordinates of a TP or trench; for an auger hole or STP one coordinate (southwest coordinate) is sufficient.
* Excavate in stratigraphic layers and/or arbitrary levels (maximum of 5 – 10cm spits) to base sterile layer (i.e. layer dating to before human occupation), or to bedrock (note: in sandy deposits, cemented ferruginous inclusions, commonly known as ‘coffee rock’, do not necessarily indicate sterile). Any features should be excavated separately and also in stratigraphic layers and/or arbitrary levels.
* Do not ‘step down’ (i.e. diminish the size of a TP as you go down), except where:
1. the excavation needs to be several metres deep (under these circumstances the base of the test pit should remain 1m x 1m); or
2. you have already reached the base sterile layer and you wish to obtain a better understanding of this layer.
* Excavate to the depth of the proposed impact of the activity; below any possible cultural deposits to the base sterile layer (i.e. layer dating to before human occupation), or weathered bedrock, whichever is sooner. If a cultural deposit sits on a sterile soil horizon, ensure you are able to show that you have fully excavated to the sterile soil horizon.
* Investigate what, if any, disturbance has occurred to the cultural place, how extensive it is and how this will affect your analysis.
* If stratigraphy and/or a cultural deposit is visible in an exposure, e.g. a cliff face, manually clean back the face to properly establish the stratigraphy.
* Carry out 100% sieving on all subsurface testing; sieve size should be no greater than 5mm for artefacts and midden material, augmented by a smaller sieve size for charcoal and smaller artefacts.
* Spoil heaps and sieving sites should be at a reasonable distance from the testing area.
* Take pH samples, describe soils and document Munsell colours of spits and stratigraphic layers and features.
* Where available and relevant; obtain dating samples of cultural deposits and/
or stratigraphic layers. All dates must be reported to the Victorian Aboriginal Heritage Register (VAHR) using the relevant approved form.
* The entire stratigraphic profile must be clearly visible in all photographs of subsurface testing. Use photographic boards and include an appropriate scale. Scale increments should be stated.
* All material recovered should be labelled/catalogued with reference to its provenance.
* Any salvage excavation may only be undertaken once a CHMP (which must include a detailed salvage methodology), has been approved.

## Analysing and reporting on subsurface testing

There are a number of principles that should be followed when analysing and reporting on subsurface testing to accord with proper archaeological practice:

Information should be collected in a controlled manner useful for analysis. This means that you should quantify results using appropriate spatial control (e.g. stratigraphic control, calculating artefact densities per area tested, and measuring any variation across the area of impact).

* Results must be properly documented and reported in the CHMP. This means the reader or user of the report has sufficient detailed information to reconstruct what happened and why, as well as to understand how the conclusions and recommendations were reached.

### Reporting in a CHMP

* Describe how, why and what subsurface testing was undertaken.
* Describe the tools, techniques and methodology used.
* Ensure all information is clearly documented and is legible in the CHMP.
* Clearly label subsurface testing areas on maps; all plans illustrating subsurface testing should have clear legends and use symbols differentiating the different kinds of subsurface testing undertaken; label plans, section and stratigraphic drawings and indicate where cultural material or dating samples come from – label GPS reading locations.
* Use standard scales on maps, section and stratigraphic drawings – avoid vertical or horizontal exaggeration.
* Do not include schematic section drawings where the stratigraphy is irregular.
* Include at least one representative TP or trench section to scale. Include additional representative section drawings for any stratigraphic profile changes. This should include horizontal and vertical scale bars, clear labelling of layers or legend, and show vertically where artefacts were found.
* Include all data in tables, identifying their spatial context.
* Analyse stratigraphy and clearly describe how you have defined discrete cultural deposits or layers within a site (e.g. based on stratigraphy, feature, age, variation in assemblage or landform element).
* Where appropriate, present and analyse data by defined discrete cultural deposits or components – do not lump data for the whole Aboriginal place or TP.
* Ensure subsurface testing areas are clearly documented on relevant VAHR forms.
* Estimate predicted artefact totals for the entire activity area based on recorded artefact densities and the landforms identified. Discuss past Aboriginal lifestyles and landscape utilisation in the light of these data.
* All source material cited in the report must appear in the References.

## Scenarios:

Note: these scenarios are examples only and intended as a guide rather than as a template. Subsurface testing methodologies should be developed for each activity area on a case by case basis.

### Scenario 1:

An activity area is located in a region where previous fieldwork has identified shallow deposits and most Aboriginal cultural heritage occurs as surface artefact scatters. An intensive standard assessment, with every effort made to maximise ground surface visibility, is likely to be more effective than a perfunctory standard assessment of land with low surface visibility prior to subsurface testing. Surveying the activity area during drier conditions when less vegetation is present, should be considered. A manual auger may be useful to test the depth of the deposits. Any landforms which are likely to consist of deeper, potentially artefact-bearing deposits should undergo complex assessment.

### Scenario 2:

A large activity area includes plain and riverbank landforms. Subsurface testing should focus on the areas of highest sensitivity, with less intensive testing elsewhere. Intervals between TPs should range between 25-50m in the areas of highest sensitivity. Intervals between TPs in less sensitive areas should be around 100m, where practical. Controlled mechanical testing may be appropriate in areas of lower sensitivity where low density scatters are anticipated but are unlikely to be identified by relatively small manual excavation trenches. Mechanical testing, however, should revert to manual excavation if features or concentrations of artefacts are encountered.

### Scenario 3:

A large activity area includes several distinct landforms (e.g. dunes), which have been associated with Aboriginal cultural heritage elsewhere in the region. Subsurface testing should be sufficient to determine whether a landform based approach to registering Aboriginal places is appropriate. Each discrete part of a landform element (in this case, each dune) should be tested using at least one 1 x 1m TP, as well as STPs if appropriate. Manual augering may be useful to minimise harm during testing of the extent of a shell midden. Mechanical testing should be considered in the methodology and may be appropriate where the depth of deposits is likely to exceed that safe to excavate manually, but it should only be employed in sensitive landforms if and when these levels are reached. Appropriate mechanical testing techniques include using a mud bucket to remove a spit of an appropriate depth for the length of the trench. At the completion of each mechanically excavated spit an additional 25cm on each side of the trench may be manually excavated to expose a clean section and to prevent the displacement of artefacts between spits.

### Scenario 4:

The activity area is uniform with no distinctive landform features or results from the Standard Assessment to guide the location of subsurface testing. A regular grid of subsurface testing should be applied, sufficient to assess the distribution and density of artefacts (if any) across the activity area based on the results of the desktop assessment predictive model. Mechanical testing may be appropriate to maximise the area of deposits testing on landforms with predicted low density artefact distributions. Mechanical testing, however, should revert to controlled manual excavation if features or concentrations of artefacts are encountered.

### Scenario 5:

An activity area includes an area of cultural sensitivity but is in an urban context and has had a dwelling and driveway on it for many years. The dwelling is on stumps set into c.300mm of levelling fill and the driveway impacted to a similar depth. A CHMP is required because the whole of the activity area has not been impacted by significant ground disturbance and the proposed impact will extend to 1.5m in depth. The desktop assessment shows that few CHMPs have been undertaken in the geographic region, and most were limited to a standard assessment, but by considering the existing reports and prior landforms present, on balance it is likely subsurface Aboriginal cultural heritage is present. A mechanical excavator may be used to remove the established depth of fill and driveway, prior to normal subsurface testing commencing.