



CULTURAL
HERITAGE
MANAGEMENT
AUSTRALIA

Scrivener Dam Dissipator Upgrade

Cultural Heritage Assessment and
Statement of Heritage Effect

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Executive Summary

Project Description

The National Capital Authority is proposing to undertake a project to strengthen the dissipator component of Scrivener Dam, located immediately downstream of the existing dam wall. These works are necessary to rectify deterioration and weakening of the dissipator (see Figures 1 and 2).

Scrivener Dam falls within a recognized heritage place; Lake Burley Griffin and Adjacent Lands, as listed on the Commonwealth Heritage List. This listing relates to the built heritage values of the study area and has been addressed in a separate report by Marshall and Baker (2023).

CHMA have now been engaged by the National Capital Authority to undertake an Aboriginal Cultural Heritage Assessment (CHA) and production of a Statement of Heritage Effects (SHE) for the proposed upgrades. The current report details the outcomes of the CHA and provides a SHE for the proposed works.

Aims of the Investigation

The primary aims of the current heritage assessment were as follows:

- Conduct a desktop review to identify previously listed Aboriginal heritage sites within the study area,
- Liaise with stakeholders including Representative Aboriginal Organisations and ACT Heritage,
- Undertake a field survey of the study areas, including representatives of the four RAOs in the ACT and identify any existing heritage sites within the study area
- Assess the Aboriginal cultural values of any heritage sites identified within the study area,
- Identify any direct or indirect impacts that may be imposed on sites by the proposed development; and
- To develop a set of management recommendations aimed at minimising the impact of the proposed road works on identified heritage values.

Existing Sites within the Study Area

As part of the assessment, a search was undertaken of the ACT Aboriginal site database to ascertain whether any previously recorded Aboriginal sites exist within the proposed impact area (ACTMapi Heritage Layer accessed 8th May 2023). The search included a buffer of 300m from the proposed dissipator and upgrades. No previously recorded Aboriginal sites occur within 300m of the study area.

Project Methodology

The scope of works for the present archaeological investigations was undertaken in three stages; background research, fieldwork and report writing. The field component of the project was undertaken on the 16th May 2023.

Summary of Results

No Aboriginal archaeological sites occur within the study area, no areas of archaeological potential occur within the study area. The study area is identified as being of extremely low archaeological sensitivity given the massive and complete disturbance previously undertaken within the proposed impact footprint.

Impact Assessment and Statement of Heritage Effect

No Aboriginal sites exist within the proposed area of impact and there is no potential for subsurface finds to exist in situ or even within a broader associated context within the current study area. The proposed upgrades to Scrivener Dam therefore propose no risk to any Aboriginal heritage values within the project area.

No Aboriginal cultural heritage sites occur within the study area. There is no potential for subsurface cultural deposits to exist within the study area. As such, the proposed dissipator upgrades will have no effect on Aboriginal heritage values within the study area.

Management Recommendations

The heritage management options and recommendations provided in this report are made on the following basis:

- Consultation with representatives of the Representative Aboriginal Organisations present at the field assessment, these being:
 - Buru Ngunawal Aboriginal Corporation;
 - Ngarigu Currawong Clan;
 - King Brown Tribal Group
- Heritage Act 2004 requirements and ACT Heritage Council advice;
- The results of the investigation as documented in this report; and
- Background research into the extant archaeological record for the study area and its surrounding regions.

The recommendations below were made in direct consultation with the RAOs including discussions held on site (see formal support included in Appendix A) and review of this document. A draft copy of this report was circulated to all RAOs on the 24th May 2023 requesting comment within 14 days. No written responses were received.

Recommendations

- No Aboriginal archaeological sites occur within the study area

- No areas of archaeological potential occur within the study area
- The study area is identified as being of extremely low archaeological sensitivity. However, if, during the course of the proposed road improvement works, previously undetected archaeological sites or suspected skeletal remains are located, the processes outlined in the Unanticipated Discovery Plan should be followed.
- Final copies of this SHE must be provided to all four RAOs.
- This report must be submitted to the National Capital Authority for approval prior to the commencement of any development works.

1.0 Project Outline

1.1 Project Summary

The National Capital Authority is proposing to undertake a project to strengthen the dissipator component of Scrivener Dam, located immediately downstream of the existing dam wall. These works are necessary to rectify deterioration and weakening of the dissipator (see Figures 1 and 2).

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CHMA have now been engaged by the National Capital Authority, through Duncan Marshall, to undertake an Aboriginal Cultural Heritage Assessment (CHA) and production of a Statement of Heritage Effects (SHE) for the proposed upgrades. The current report details the outcomes of the CHA and provides a SHE for the proposed works.

1.2 Aims of the Investigation

The primary aims of the current heritage assessment were as follows:

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- Liaise with stakeholders including Representative Aboriginal Organisations and ACT Heritage,
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- To develop a set of management recommendations aimed at minimising the impact of the proposed road works on identified heritage values.

1.3 Limitations of the Investigation

All archaeological investigations are subject to limiting factors that may affect the reliability of the results. This survey was limited to some extent by low surface visibility the majority of the study area is covered with dense vegetation, coupled by massive disturbance to the original landscape from the initial construction of Scrivener Dam. Visibility is discussed further in section 1.5 below.

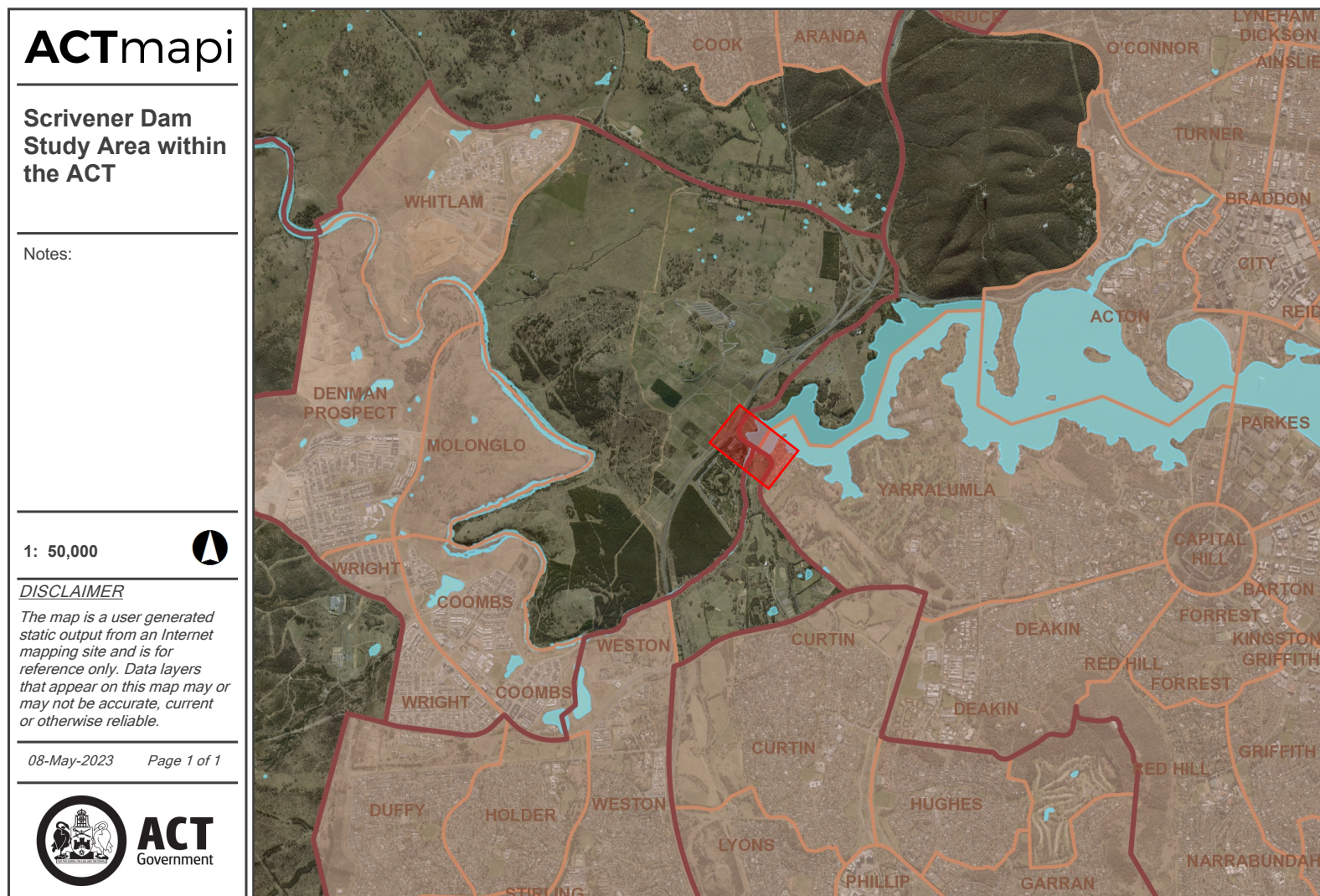


Figure 1. Location of Proposed Developments within ACT Region (image modified from ACTMapi accessed 8th May 2023).

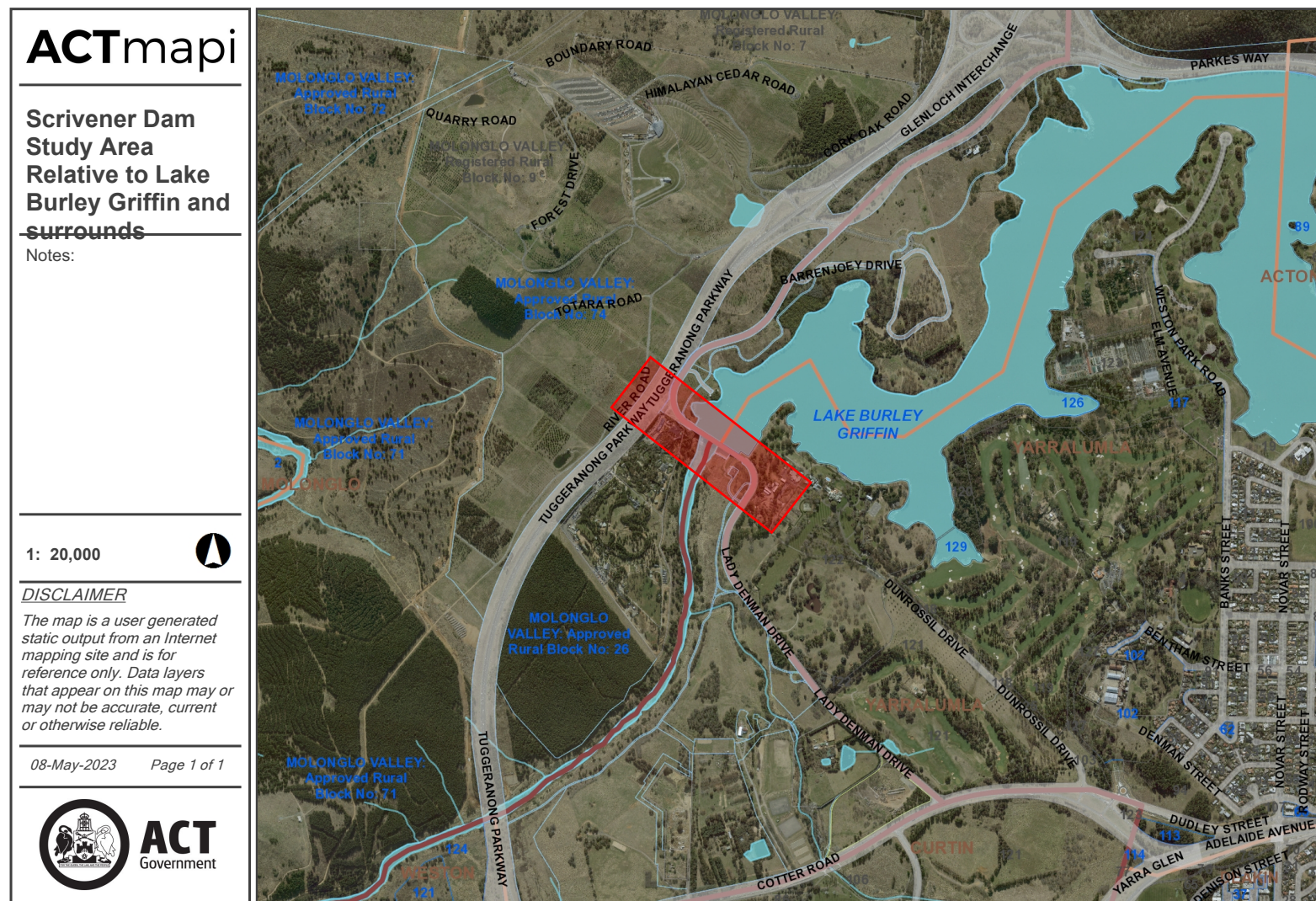


Figure 2. Proposed Development relative to Lake Burley Griffin and Surrounds (image modified from ACTMapi accessed 8th May 2023).

1.4 Project Methodology

The scope of works for the present archaeological investigations was undertaken in three stages.

Stage 1 – Background Research

As part of stage 1, the following tasks were completed prior to the commencement of fieldwork.

Liaison with the Representative Aboriginal Organisations (RAOs)

Prior to the commencement of fieldwork, each of the four Representative Aboriginal Organisations were contacted to:

- Invite one representative from each group to participate in the investigations;
- Discuss the proposed methodology for the project, including logistics and timing;
- Advise the groups (verbally and in writing) of the requirement that all participants must have their own insurances.

As part of an ongoing consultation process, all aspects of the project were discussed with the groups, including the findings of the field work, the significance of sites dealt with, and the proposed management recommendations for the site areas. Section 2 presents a more detailed account of the consultation undertaken with the RAOs.

The collation of relevant documentation for the project

The following background information was collated:

- A review of the relevant heritage registers and the collation of information pertaining to any heritage sites located within the study area.
- 1 : 25 000 maps of the study area;
- relevant reports documenting the outcomes of previous heritage studies in the vicinity of the study area;
- ethno historic literature for the region;
- references to the land use history of the study area.

Stage 2 – Fieldwork

Stage 2 entailed the fieldwork component of the project. Fieldwork was undertaken over the course of half a day (16th May 2023). The following individuals were involved in the fieldwork assessment:

- Adrian Brown (King Brown Tribal Group)
- Wally Bell (Buru Ngunawal Aboriginal Corporation)
- James Mundy (Ngarigu Currawong Clan)
- Dr Sophie Collins (CHMA Archaeologist) and James Hofmeyr (Field Assistant)

A representative from Mirrabee was also invited but could not attend due to last minute issues on the day. This report has since been provided to each of the RAOs for comment and review.

The field assessment was undertaken on foot and involved the team walking transects across 100% of the proposed impact area. The results of the survey were discussed with the RAOs as well as mapping of previous extent of impacts across the study area. This report reflects the outcome of field survey and heritage assessment.

Stage 3 – Report Writing

Stage 3 of the project involved the production of a Draft and Final Report of findings, an assessment of significance and management recommendations. This report was written by Dr Sophie Collins.

1.5 Survey Coverage, Surface Visibility and Effective Survey Coverage

Survey coverage refers to the estimated proportion of the study area that has actually been visually inspected as part of a field survey assessment. The discrete nature of the study area is such that the entirety of the area of proposed impact was surveyed (100%).

Surface Visibility refers to the extent to which the actual soils of a ground surface are available for inspection. There are a number of factors that can affect surface visibility, including vegetation cover and the presence introduced materials over the ground surface. A guide to assessing surface visibility is presented in Figure 3 below (AHT 2011).

Surface visibility within the study area varied considerably. Highest levels of visibility (up to 80%) were provided by large areas of previous disturbance in the form of graded tracks (see Plates 1 and 2. Visibility in the remainder of the study area was heavily obscured by existing disturbance, dense vegetation, soil stabilization matting and imported materials (see Plates 3 to 7).

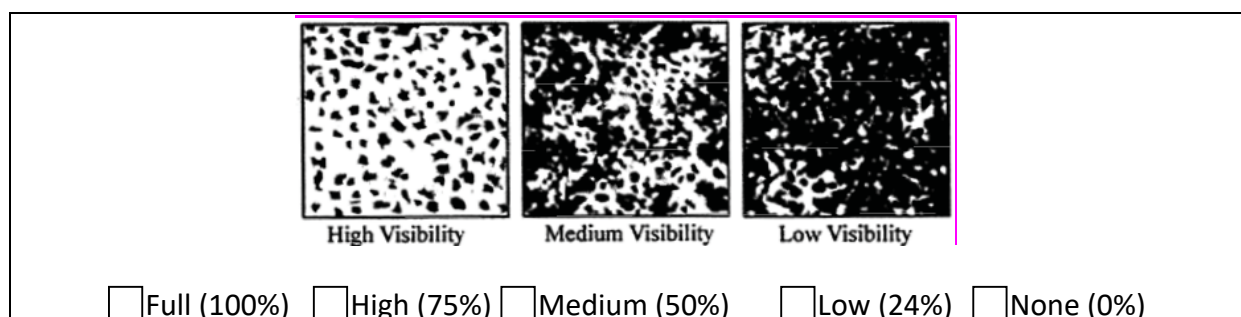


Figure 3: Guidelines for the estimation of surface visibility (from AHT 2009)

Variations in both survey coverage and surface visibility have a direct bearing on the ability for a field team to detect heritage sites. The combination of survey coverage and surface

visibility is referred to as effective survey coverage. Table 1. below present levels of effective survey coverage across the study area. An average effective survey coverage of up to 3% was achieved in this survey. Extremely high levels of previous disturbance are evident across the site (Plates 8 and 9).



Plates 1 and 2. Areas of visibility along existing tracks, cutting and benching



Plates 3 to 5. Sediment control, dense vegetation and introduced gravels respectively.



Plates 6 and 7. Dense vegetation along creekline and surrounds obscuring ground visibility



Plates 8 and 9. Examples of extensive disturbance across study area.

Table 1. Effective Survey Coverage

| Section of Survey | Total Area | Estimated Survey Coverage of Section | Average Surface Visibility across Section | Effective Coverage of Section |
|----------------------|----------------------------|--|---|--|
| Eastern River | 35,510m ² | 100% | 1% | 1% × 35,510m ² = 355.1m ² or 1% |
| Western River | 17,930m ² | 1300m ² 16630m ² (100%) | 80% 1% | 80% × 1300m ² = 1040m ² 1% × 16630m ² = 166.3 m ² or 7% |
| TOTAL | 53,440m² | 53,440m² | 2.9% | 1561.4m² or 2.9% |

1.6 Description of Proposed Development

The following description of the proposed works is taken from Marshall and Baker (2022:3):

- Preliminary works include the construction of temporary site facilities, laydown areas and access roads
- Demolition – Removal of the existing baffle blocks and surface preparation of the existing slab for placement of the new overlay concrete;
- Anchoring works – Installation of approximately 670 No. 57.5 mm diameter double-corrosion protected passive anchors, on a grid of 2.4m x 2.4m x 12.5 m deep upstream of the central baffles, and a grid of 2.9m x 2.9m x 10m deep downstream of the baffles;
- Slab works – Placement of a 500 mm thick overlay slab on the top of the existing slab, including construction of contraction joints with double waterstops and tie-ins to the existing structure. As part of these works, the existing chute blocks, baffle blocks and end sill will be raised by 500 mm. The raising will be achieved by complete demolition and reconstruction of the baffle blocks, however the chute blocks and end sill will be raised via a concrete overlay;
- Training Wall extension – Extension of a short (triangular) section of the left and right side walls of the stilling basin to stop water impacting and eroding the abutments; and

- Erosion armouring – Erosion protection of the left and right abutment slopes adjacent to the stilling basin, to minimise erosion of the abutments under unusual and extreme floods. (GHD 2021, pp. ii-iii)

The location of these works is indicated in Figure 3.



Figure 4. Location of proposed dissipator works program (image provided by NCA).



Figure 5. Location of proposed temporary impacts (image provided by NCA).

Additional to the permanent works proposed will be a series of temporary impacts, located downstream of the dam and related to construction, including:

- Access roads,
- A site compound
- Storage and handling areas, and
- Cranes.

The location of these additional works is outlined in Figure 4.

2.0 Environmental Context

This section provides a summary of the geology, landforms, climate, flora and fauna of the Study Area with a specific focus on those elements of the environment known to have affected human behaviour and archaeological site formation processes.

2.1 Geology and Soils

The entirety of the current study area is underlain by soils of the Williamsdale Soil Landscape, which overlies the Silurian Volcanics of the Canberra Lowlands. Williamsdale soils occur on undulating rises, fans and valley flats over slopes of less than 10% in areas of completely cleared woodland and grassland (2000). The lower slopes and drainage lines occupying the study area is dominated by moderate to very deep (up to 150cm) imperfectly drained brown and yellow chromosols with some brown kandosols (Jenkins 2004). Lithologies include ignimbrites and tuffs with minor siltstone, shale, sandstone and limestone.

2.2 Vegetation and Fauna

The landscape and ecology of the river corridor has been greatly altered since European settlement. Investigations of the former vegetation types of the area indicate that it would

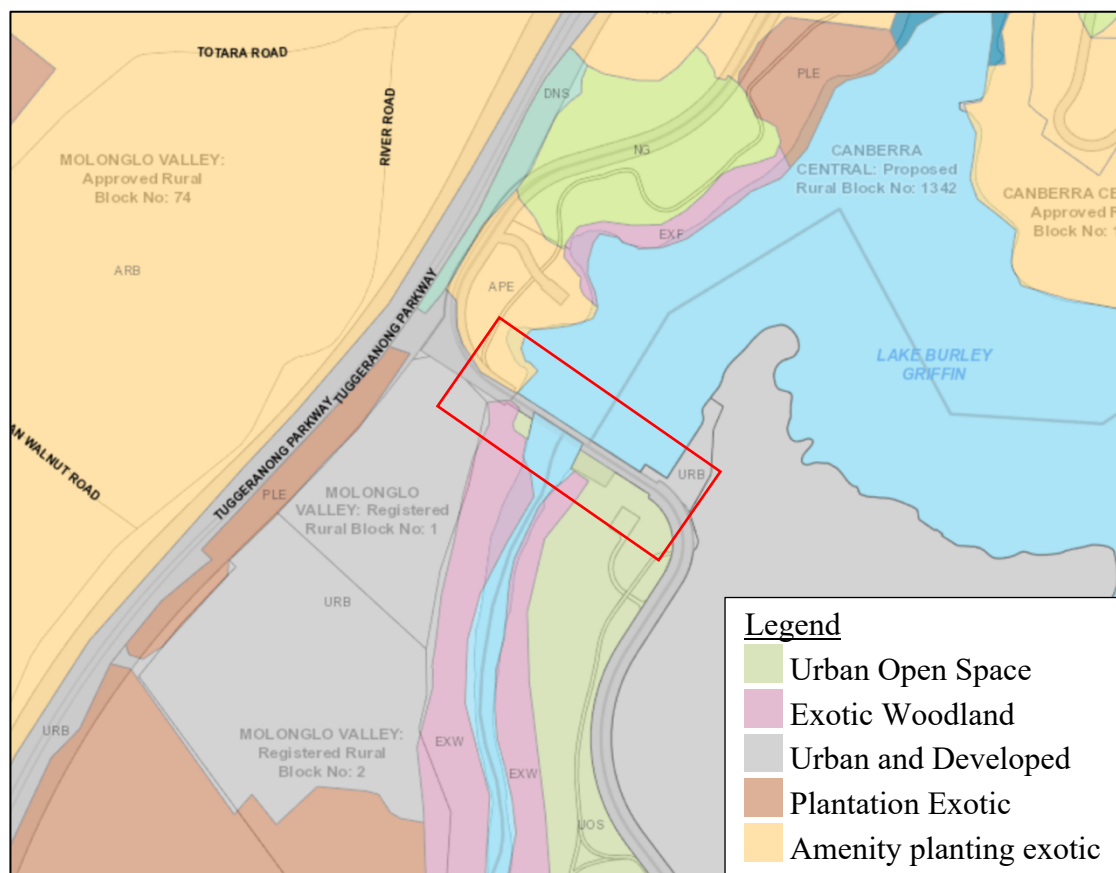


Figure 6. Existing vegetation with Study area (image modified from ACTMapi Vegetation Communities layer accessed 8th May 2023)

once have comprised 'Eucalyptus open woodland' with grassland including *Themeda australis* (kangaroo grass), *Stipa* spp. (speargrasses) and *Poa* spp. (snow grasses). The few remaining trees and tree stands in the area include *Eucalyptus bridgesiana* (Apple Box) and *Eucalyptus melliodora* (Yellow Box) (Jenkins 2000). Within the Molonglo River Corridor, the dominant vegetation would have been riverine *Casuarina* Forest.

Terrestrial, avian and aquatic fauna are all present within the Molonglo River Corridor. Species such as kangaroos, wombats, possums and koala would have been readily found, along with raptors, woodland birds, cockatoos, song larks, the swift and superb parrots (ACT Government 2004). Reptiles such as lizards, snakes and skinks frequent the rocky slopes, while water rats, crayfish, turtles and fish have been observed in the river. The river corridor operated as a pathway for fauna and provides the opportunity to protect, enhance and repair native habitat.

Existing vegetation within the study area is predominantly introduced species (see Figure 6); comprising a combination of urban and developed landscapes, exotic plantings and exotic woodland.

2.3 Resource Statement

The above discussion of geology, soils, vegetation and fauna allows an understanding of the resources available to past occupants of the region. Veins of tuff and other raw materials would have been available locally within the Volcanic landscape while suitable vegetation and fauna would have been available for food and other supplies.

The proximity of the area to the permanent water source of the Molonglo gives the area some appeal for settlement, however access to the water would not have been easy at this point of the River, with moderately steep landforms either side. It is therefore ill suited to long term occupation, with low level site visits most likely as people travelled through the area to more moderately inclined landforms with easier access to water nearby.

2.4 Past Land Use

The current study area has suffered considerable disturbance during the historic period and early European settlement of Canberra. Figure 7 shows the study area as it originally was, prior to the construction of Scrivener Dam and the artificial creation of Lake Burley Griffin. The image shows a gently winding river with moderately inclined access to the water from either side, cultivated paddocks/pine plantations to the east and large open, cleared paddocks to the north, south and west. Government House is well established.

Figure 8 shows the dam under construction in 1961. Impacts associated with the construction of the dam extend across almost the entire expanse between the plantings at Government House and the Molonglo (see red dashed line on Figure 8). The entire area

appears to have been scarified and worked over in during construction and the existing dissipator is already visible and in place. The 1961 image shows extensive disturbance along the western side of the River also, with a large area of pine trees removed to allow bridge construction both sides of the bridge and dam.



Figure 7. Aerial Image taken 1952 Run 3 no 5076 (accessed via ACTmapi 8th May 2023)



Figure 8. Aerial Image taken 1961 Run 12 no 0179 (accessed via ACTmapi 8th May 2023)



Figure 9. Aerial Image taken 1979 Run 14 no 0679 (accessed via ACTmapi 8th May 2023)

By 1979 (Figure 9) the dam has been well and truly established, with the inundation complete, existing visitor lookout established and formally planted. By 2004 (Figure 10) the existing Canberra Zoo and Aquarium had been established, to the effect that impacts had now occurred along the entire western edge of the study area up to the existing dissipator. The dissipator can be seen on Figure 8 but is no longer visible in Figure 9.



Figure 10. Aerial Image 2004 (accessed via ACTmapi 8th May 2023)

Figure 11 overlays the proposed impacts for strengthening the dissipator with the 1961 impacts. The two areas of impact overlap almost exactly, with only minor pockets of the site not having been subject to previous disturbance. Moreover, the 1961 image shows a single moment in time and it is likely that areas not visibly impacted in that moment were still subject to impacts during other periods of the dam's construction.



Figure 11. Existing proposed impacts over 1961 aerial image of impacts (red = potential impact areas, green = existing roads, yellow = proposed laydown areas, brown = temporary construction roads).

One small pocket of potential integrity appears to remain on the western side of the River in Figure 12 however subsequent impacts have occurred to this location, with the installation of a foot path and imported gravels at this location. Closer to the waterline, the potential exists for unimpacted portions of land, however these areas would fall within the River flood plain (see Figure 12 and inset).

Inevitably, this land-use history will have a significant impact on the survival and integrity of any cultural sites within the area. Surface artefacts will either have been removed altogether during the construction period, or have suffered both vertical and horizontal

disturbance. While site types such as artefact scatters and isolated finds may still be identified within these contexts, scarred trees or stone arrangements or earth rings will no longer be evident. Any artefact scatters or isolated finds within the study area will be out of context and no longer retain archaeological integrity.



Figure 12. Post 1961 impacts to study area.

3.0 Aboriginal Occupation Models – Ethnohistory

3.1 Background Information

Ethnohistory entails the use of historical literature as a source for constructing ethnographic analogies and models in the study of the prehistory and contact history of indigenous peoples (McBryde 1979). Although ethno historic accounts have been recognised as a valuable source for providing insights into the life-ways of prehistoric people, their application can be problematical. These problems relate primarily to the nature of the sources, their accuracy and/or validity.

Flood (1990) identifies three types of ethno historic observations:

- the first hand, eyewitness observations made at the time of first contact with Europeans,
- first hand observations made at a later stage when Aboriginal society had become 'Europeanised', and
- second-hand or generalised accounts of Aboriginal life.

Of these sources of information, the most valuable and reliable for the reconstruction of precontact Aboriginal life are the first-hand observations made at the time of first contact with Europeans. These include the accounts by explorers, surveyors and pioneer settlers. This does not necessarily mean that other forms of observations should be disregarded. However, caution must be exercised in their application.

3.2 Overview of Ethno-historic Models

The following provides a brief overview of the nature of pre-contact Aboriginal groupings, Aboriginal concepts of land ownership, and the relationship of both these to pre-contact Aboriginal land use in Australia. While this section does not specifically relate to the study area it does provide a basic framework of understanding regarding Aboriginal social organisation, within which the archaeology of the study area may then be viewed. Such an understanding is an essential prerequisite to any archaeological research analysing the relationship between Aboriginal people and their environment.

The model of Aboriginal society being divided into a series of tribes, based on Tindale's 1974 publication is now generally considered to be defunct. The tribe is described by the early ethnographers as having rights over a defined tract of land, that included control over entry to people from outside and the right to hunt and extract resources from within the bounds of that area (Keen 2010:46). Several researchers have argued that the concept of a tribe does not account for the complexities of social interaction and organisation found in Aboriginal society (e.g. Keen 2004). The tribal model was used for most of the twentieth century by anthropologists to describe the social organisation of Aboriginal groups and how this related to land ownership. There has been a shift to attempts to describe Aboriginal

society as multi layered and to explore interconnected relationships that operated within broad social groups.

In Australia, the band is generally considered by anthropologists as the basic social and economic unit in pre-contact Australian Aboriginal society (Service 1966, Peterson 1976). The band is described as a small-scale population, comprised of between two to six extended family units, or about 14 – 33 people, which together cooperate in the food quest (Service 1966; Keen 2004:106). The composition of this group (in terms of numbers) was not rigid; group size fluctuated in response to factors such as the availability of resources and visiting kin (Peterson 1975).

Individual bands are seen to occupy and exploit a specific range (Service 1966). The concept of a band's 'range' is not easily defined, and is therefore somewhat problematical to delineate. The ideal method of defining range would be to identify the outermost points of an area used by a group in order to demonstrate the total area, or range, in which that band operated. Yet, as Peterson (1986) points out, the kind of evidence needed to achieve this, (details of daily movements over several years) is not available for any group within Australia. Nor is such evidence likely to be discernible in the archaeological record. The practical alternative, both from an archaeological and an anthropological perspective, is to identify the base camps used over a period of time by a group. This provides a rough equivalent of a band's "home range".

Environmental Determinants of Social Organisation

Ecology is, according to Peterson (2008:186) a 'crucial variable' when assessing estate, range and domain. Range normally encompassed the estate, although there were exceptions to this (Peterson 2008:186). In cultures across the world it is impossible to separate natural landscapes from cultural landscapes (White 2003:188). From an archaeological perspective, it is equally impossible to discuss economy and subsistence without reference to the environment.

As Sutton (2008:170) explains, WEH Stanner explored the connectedness of economy, environment and spirituality over forty years ago. Stanner's famous paper 'Aboriginal territorial organisation: estate, range, domain and regime' published in Oceania in 1965 was a benchmark as it provided a new framework within which to define and discuss Aboriginal land ownership (Peterson 2008:185). This framework separated concepts of land ownership from the land that people actually used. Peterson (2008:185) suggests that this was a fundamental shift that has influenced the last forty years of anthropological debate.

In coastal and riverine environments where a higher population density could be supported compared to desert environments, people could lead more sedentary lives (Keen 2004:103). In these situations the social organisation of neighbouring groups could become more

individualised; whereas in more arid climates people relied on being able to traverse vast tracts of land to access food and water, requiring closer social relations with neighbouring people (Keen 2004:103).

This argument reflects Louis Binford's model of 'foragers' and 'collector' societies. Foragers are highly mobile groups that move regularly and as a whole to new locations in order to exploit resources. In contrast, collector societies may move less often but rely on individual members of a society venturing out beyond the camp site location in order to provide the group with resources to continue residing at the location (Keen 2004:104). Keen (2004:104) suggests that most Australian Aboriginal societies fall within Binford's 'collectors' model – forming home bases and voyaging out from these bases to exploit resources from the surrounding area, which could be very large.

It was economically vital for Aboriginal people to be organised into bands, as this made groups more effective at surviving. Subsistence becomes more efficient and reliable if people are organised into groups that are larger than the nuclear family. This increases the number of 'producers' (people who can actively provide food for a group) and acts as a buffer against the sickness, injury or death of any one individual (Keen 2004:105). However, these groups will never become too large, as increased numbers reduce the mobility of the band, as well as potentially leading to broader social disintegration (Keen 2004:106).

The range of a band had to be capable of providing for the survival of the group for much of the year. Keen (2004) takes an economic view of range and presents a case for the range of a group to be determined by access to preferred food resources. As Keen (2004) argues, availability of foods, food preferences, production techniques and methods of transport all affect the means by which Aboriginal people across Australia were able to access food resources at varying times of the year. These factors therefore greatly affected mobility; groups had to be able to mobilise and move to where the preferred, available and accessible foods were located (Keen 2004:23).

Keen (2004:126) suggests that seasonal mobility of a particular group is largely influenced by rainfall. In Gippsland where there are clearly defined seasons, but steady year round rainfall people operated within a broad seasonal migration pattern. However, in the Western desert where rainfall was much less reliable, this was a weaker pattern of seasonal movement. Regular droughts brought on by the El Nino cycles and other more haphazard climatic events all influenced the seasonal movement based on food resources that Aboriginal people required (Keen 2004:79). This affected issues of range, ceremony and interactions with neighbouring groups (Keen 2004:79).

The factors that influence selection of a 'home base' are varied and illustrate the nature of precontact Aboriginal societies. Access to fresh water is probably the most fundamental

requirement, and will be common to all home base sites. Distance to food resources is the next consideration. As Keen (2004:104) notes it may be that home sites are better located adjacent to less transportable resources, rather than in areas where there is the highest abundance of food items. The distance that an individual collector can travel within a single day forms an important scope of the range of the home base, and therefore the size of the resource pool available. Keen (2004:104) suggests that in hunter-gatherer societies around the world, a distance of 20-30km is considered the maximum foraging distance from a home base. People could then establish smaller temporary camps away from the central home site to enable longer foraging journeys (Keen 2004:105).

Despite the difficulties faced in defining ranges, Peterson (1986) believes there is good evidence for supposing that bands are localised and generally have bounded and exclusive ranges. The most significant evidence is ethnographic accounts recording the elaborate rites of entry accorded to visitors when entering a bands range (see Peterson 1986). However, it appears that the boundaries of a group's 'range' were not necessarily clearly demarcated lines. Trigger describes these overlapping boundaries as 'zones of transition' (Trigger 2010:155).

Aspects of Aboriginal Social Organisation

Individual bands or clans were by no means a social or cultural isolate, but rather interacted with each other in a variety of ways. Typically, these interactions involved visitations, marriage, ceremonies and trade. Through these interactions, links were established or re-affirmed between neighbouring bands. The result was the formation of a cluster of bands, wherein there was some sense of collective identity, often expressed in terms of possessing a common and distinctive language (White & Cane 1986). Most people in pre-contact Aboriginal society were multi-lingual and marriages outside of the language group were common (Keen 2004:134). Indeed, within some totemic groups several languages were spoken (Keen 2004:135).

Linguistic inheritance could be multi-layered. Trigger (1992:104) records how in some northern Australian societies most people were (a) multi-lingual and (b) adopted a primary linguistic label based on where their present circumstances were aligned.

This implies that linguistic affiliation was perhaps a less formal and more adaptive social mechanism. Trigger (1992:105) suggests that this undermines the concept of linguistic groups, which was a characteristic often used in the past to define tribal groups.

Similarly, Keen argues that a shared language did not necessarily indicate shared cosmic beliefs or social customs, nor did language or dialect clearly define social groups (Keen 2004:135). Rather, Keen suggests that broad social groups tended to define themselves more by location, with reference to the type of environment (coastal, hinterland etc.) or

direction (northerners or southerners) (Keen 2004:135). Groups were also sometimes named after and therefore defined by, the name of the leader or a prominent person in that community (Keen 2004:135). Blundell (2003) discusses how the Wandjina rock art sites of the Kimberly formed the cultural and cosmic centers for the 'little countries' or 'dambina' which correlate with the concept of an estate as used by anthropologists (Blundell 2003:162).

Keen (2004:170) presents a model of the complexities of Aboriginal society, where an individual's identity depended largely on context. In some situations, Keen (2004) argues language was the defining factor, in another the broad region to which you claimed affinity, and in yet other circumstances it may be totemic identity that was important. Interestingly, Keen (2004:170) suggests that identity was 'most clearly defined' in areas rich in resources, such as coastal zones, while people in more arid environments had less strongly applied rules governing identity. This reflects the imperative for desert people to be on solid relationships with their neighbours. The following section discusses issues of Aboriginal connection to the land in more detail.

Concepts of Aboriginal Land Ownership

The band was in essence a land using group, but not a land owning group. Land ownership was vested in 'the clan' or 'corporate group' which is defined as a broad group of people that shared social characteristics, and was often tied to having rights over certain tracts of land, known as an 'estate' (Keen 2004:134; Peterson 1986). It is uncertain whether clans within eastern Australia were strictly patrilineal (as is suggested in other parts of Australia), or whether membership was determined more on the basis of place of birth (White and Cane 1986). Keen (2004:136) argues that across Australia it was common for totems to be patrilineal, where a child took their father's totem, and that this was strongly tied to land ownership. The totem was an important feature of Aboriginal society and was used to define individuals, small groups and larger groups (Keen 2004:135). This was by no means the only form of land connection across Australia; in some parts a person's place of birth determined which country they were tied to (Keen 2004:137).

Where matrilineal systems operated (where a totem was passed from mother to child) it tended to cause people of the same totemic identity to be dispersed among several land based groups. In this way, matrilineal relations become important when determining marriage and other social ceremonies, but were not generally connected to land ownership (Keen 2004:137).

The system of patrilineal transition of land ownership concepts is reflected in Patterson's 1811 account of Bennelong's sense of ownership of Goat Island (Keen 2010:45). Patterson wrote that Bennelong had 'inherited' Goat Island from his father and that he in turn had the right to pass it on to his companion By-gone (Keen 2010:45). This is supported by Eyre's

1845 observations about the hereditary transmission of Aboriginal land ownership (Keen 2010:46).

Ancestral law was the defining principle that controlled access to country and landmarks, including water sources (Keen 2004:299). Tied to this notion are concepts of cosmology, religion and the ongoing influence of the ancestors (Keen 2004:303). Keen suggests that: 'ancestral significance integrated country, resources and technologies into the all-encompassing framework of ancestral law, not only as a mode of control, but as a way of being.' (Keen 2004:303). Myers has also argued that ownership of territory was largely vested in knowledge of the 'stories, objects, and ritual associated with the mythological ancestors of the dreaming at a particular place (in Peterson 2008:192).

Ethnographic and anthropological research provides a context within which to view the archaeological record. The overview presented here reveals the complexities of Aboriginal societies across Australia. It indicates the interrelated nature of the environment, religion and social structure in pre-contact Aboriginal societies and has implications for discussions of the archaeological record.

3.3 Aboriginal Social Organisation, Customs and Lifestyle in the ACT

According to Tindale (1974), the ACT was primarily occupied by the Ngunawal (previously the Kamberri), whose country Tindale recorded as extending from Marulan and Goulburn to the Shoalhaven and Molonglo rivers, including Lake George and Queanbeyan, across to the Goodradigbee and Tumut rivers, north to Boorowa and back across to Goulburn. However arguments have arisen suggesting that this boundary reflects the 20th century developments and not the territory of the Ngunawal at the time European explorers first arrived at Lake George (see Jackson-Nakano 2001:21). According to Jackson-Nakano, the broader area now known as the ACT was originally occupied by a wide range of Aboriginal groups, including the Pajong, Wallagalooa and Yass Communities, the Kamberri and the Moolingoolah or Molonglo Plains community.

Within the earliest historical documents, the Aborigines of the Canberra region were variously referred to as the 'Kamberra' tribe (William Davis Wright of Lanyon), the 'Nganbra Pialligo' tribe and the 'Kgamburry' tribe (William Philip Bluett) and the 'Kembery' tribe (Dr John Lhotsky) by the various early European explorers of the region (Gillespie 1984:2). Importantly, the tribal names used by early settlers and explorers rarely mimicked the correct tribal names; instead tribes were regularly referred to by their location with numerous references appearing in early records to the 'Murrumbidgee blacks, the Lachlan blacks, the Limestone blacks, the Yass blacks and other similar appellations' (Gillespie 1984:45). Nevertheless, these records provide the best documentation for what is currently known of the customs and lifestyle of the Canberra Aborigines prior to and at the time of European settlement.

Population

Whilst an accurate count of the Ngunawal tribal numbers was never made, available records seem to indicate that at the time of settlement Ngunawal people numbered between 400 and 800, with 500 as the most frequent estimate (Gillespie 1984:2). William Davis Wright of Lanyon wrote in 1923 'From many conversations I had with various members of the tribe I got to know them and their customs pretty well....It was an ordinary sized tribe, between 400 and 500 at the time of first white settlement', however subsequent reports suggest numbers of between 7 and 800 once existed (cited in Gillespie 1984:2).

More detailed records were made in 1938 by George Augustus Robinson, given his particular interest in Aborigines, who recorded a list of 48 Aborigines he encountered near Yarralumla. His list included Ong gong and a number of other members including Jemmy the Rover (Noolup). Robinson described the Limestone natives as 'a fine, sturdy, athletic race, men and women well proportioned and finely finished' (cited in Gillespie 1984:45).

Early explorers suggest that Aborigines generally lived in family groups or sub-groups, with gatherings of larger numbers only occurring on special occasions and involving the meeting of several tribes (Gillespie 1984).

Regardless of exact population counts, it is clear that Aborigines frequented the Canberra region in substantial numbers at the time of European settlement.

Hunting, Gathering and Settlement

The observations of early explorers indicate that, like most Aboriginal tribes, those of the Canberra region were hunter gatherers, with men taking the role of hunting and women gathering food (Gillespie 1984:45). Given the limited ability of tribes to transport and store large quantities of food, food procurement occurred on a daily basis.

Early observations by W.P Bluett indicate that the area surrounding the Limestone plains (prior to European settlement) abounded with bird and animal life including terrestrial animals around the open plains such as kangaroos, emus and brolgas, as well as resources related with the Queanbeyan, Molonglo and Murrumbidgee Rivers which provided excellent aquatic resources as well as scrubby growth and reeds which provided excellent cover and nesting places for aquatic birds. Smaller game included birds, lizards, opossums, native cats, squirrels, fish, birds eggs, yams, berries, grubs and seed (cited in Gillespie 1984:45). The ready plentiful availability of kangaroos, opossums and wombats meant they were highest on the list of Aboriginal diets, however the smaller game was equally important.

The availability of game and other resources was noted to largely determine the location of campsites. However, the weather and the corresponding seasonal availability of some resources or droughts would also cause Aborigines to move on to more favourable

locations. The arrival of the Bogong moths in late spring each year was noted to be a dependable food source, resulting in an annual trek to the mountains (Gillespie 1984). Campsites were usually in areas that provided shelter from the wind, were near water sources.

John Gale, an early arrival in the area recorded the following method of capturing wombats: 'A blackfellow enters the burrow, the roof of which he strikes as he progresses. His companions above ground listen for the sounds and by that means follow the direction of the burrow. When the animal is reached at the end of his burrow a certain signal is made, whereupon they dig down and effect a capture, the wombat being prevented from making his exit by the blackfellow who had pursued him' (Cited in Gillespie 1984:45). According to Gillespie, the Canberra Aborigines maximized all resources available to them 'overlooking very little which was tasty and edible' (1984:46).

Clothing

In 1834 Lhotsky encountered a group of 60 Aborigines near Gunning, recording that 'They were all naked, excepting that the men wore a girdle with a small sort of apron formed of fringes before and behind.... A few of the strong young men wore a sort of armlet upon their left arms, made (as were also the girdles abovementioned) of the twisted hair of kangaroos and which was a sort of distinction for brave warriors' (Cited in Gillespie 1984:47)

Lhotsky later observed the preparation of opossum skins for cloaks and nets by women sitting in gunyahs, however it was noted that the wearing of cloaks was not for all members of the tribe, being reserved for the more privileged of the group.

Habitations

Most reports of the shelters created by Aborigines in the area suggest that they were simple structures. Bluett describes their 'gunyahs' as 'flimsy seasonal affairs' (cited in Gillespie 1984:47) constructed from green bushes with leaves sloping downwards against a low branch of a tree or against a pole set between two forks. He also noted furred skins for bedding, along with a few bark dishes vessels for holding water and food.

By comparison, Wright recorded that shelter types and complexity of construction varied with location, ranging between simply bough shelters sufficient to shield the rain to very good bark huts (cited in Gillespie 1984:47).

The Aborigines also made use of natural rock shelters wherever possible, with numerous rockshelters retaining rock art and cultural remains throughout the broader region.

Customs

Very few first hand recordings exist of traditional Aboriginal customs. One exception is provided by German Naturalist Dr John Lotsky, who visited the area in 1834, who recorded the following information about a corroboree, which he overheard:

‘Their strain was in 2-4 time, which they marked by beating crotchets and in moments of greater excitement, quavers.....The tones weakened by degrees, the tones died away and grand silence and aetherial clearness filled the plain and all the wilderness about my camp” (Cited in Gillespie 1984:30).

4.0 The Prehistoric Context

4.1 Previous Archaeological Investigations – Regional Overview

The broader Molonglo Valley region has been subject to multiple archaeological/heritage assessments over the past 30 years. Approximately 155 Aboriginal sites have now been identified within the broader Molonglo Valley area. These sites comprise 66 isolated finds, 85 artefact scatters (several accompanied by PADs), a set of grinding grooves, two possible scarred trees and a rockshelter.

The vast majority of identified sites comprise isolated finds or low density artefact scatters numbering less than 10 artefacts. A handful of larger sites numbering over 50 artefacts (with some in excess of 100 artefacts) have also been identified. Larger occupation sites consistently occur on locally flat, elevated landforms with good drainage, adequate protection from the elements and in close proximity to water sources. Occupation of the area therefore appears to have been regular but not intensive, with no long term, extensive campsites observed. It is likely that small groups of hunter-gatherers undertook logistical forays to these parts of the Valley to utilize available resources, setting up temporary/short term sites rather than large scale movement and settlement of groups and the establishment of basecamps. Detailed reduction analyses of the assemblages recovered from the area would give clarity to this assertion.

Recorded artefact assemblages are heavily dominated by chert, silcrete, quartz and quartzite with hornfels, tuff and jasper recorded in smaller numbers. Artefact classes include a broad range of artefact types including representatives of all stages of manufacture including flakes, retouched flakes and cores as well as grinding hammer stones.

Those investigations most relevant to the current study are summarised below.

In 1985, English undertook a survey of the Molonglo Gorge area with the intention of determining the effect of river pools on Aboriginal site patterning and exploring the nature of occupation of the area during winter. The survey resulted in the identification of 27 Aboriginal sites. All comprised small open artefact scatters or isolated finds, with only two large sites identified (consisting of 100 artefacts or more).

Sixty-two Aboriginal sites were identified by Bulbeck and Boot in 1990, as part of ACT Forests' cultural heritage survey for the Stromlo Pine Forest. Sites comprised of 28 open artefact scatters and 34 isolated finds. Bulbeck and Boot created an occupation model based on these findings, in which they posited that lower spurs overlooking water were favoured occupation sites, as were intermediate slopes with easy access and proximity to water. Artefact densities were found to be lowest in steep terrain and away from watercourses.

A survey of the West Belconnen Urban Land releases was undertaken in 1991 by Navin Officer and resulted in the identification of four scarred trees and six small open artefact scatters. The location of all artefact scatters adjacent to major creek lines, lead Navin Officer to conclude that areas within 100m of a creek were the most likely landforms for Aboriginal site occupations.

In 1995 Saunders completed a survey of the lower Molonglo River Corridor for ACT Parks and Conservation Services. The study located sites across all landforms throughout the study area, with Saunders concluding that sites could occur anywhere in the landscape with the exception of very steep terrain, but are more likely to occur in proximity to water (BIOSIS 2012:15).

A broad regional heritage review of the Molonglo Valley was undertaken by AASC in 2006. The study collated and synthesized previous archaeological work undertaken throughout the valley and produced a locational model based on the results of the review. Drawing on information from 79 Aboriginal sites over the wider Molonglo Valley and 27 historical sites, AASC concluded that elevated landscapes near water sources would be the primary focus of occupation within the area. This model was refined in 2008 when CHMA (formerly AASC) found an additional four Aboriginal sites in the area of North Weston and Weston Creek, to include elevated and generally level landscape features within 100m of the Molonglo River.

An extensive heritage assessment and sub-surface testing program on the southern side of the Molonglo River (BIOSIS 2010) resulted in the identification of 38 Aboriginal sites (artefact scatters and isolated finds) and two historic sites (a surveyors tree and a slab hut). The study concluded that patterning of Aboriginal sites corresponded with the site locational model devised by Bulbeck and Boot and refined by subsequent investigations.

In 2012, BIOSIS undertook two cultural heritage assessments for the ACT Land Development Agency on lands around the Molonglo River (BIOSIS 2012a, 2012b). One included only a small pocket of land on the northern/eastern banks of the river and resulted in the identification of two isolated finds and one area of moderate archaeological potential on a spur line adjacent to the River (BIOSIS 2012b).

The second comprised the entirety of the Molonglo Stage 3 Future Urban Releases, comprising the land on the northern side of the Molonglo River Corridor and to the south of William Hovell Drive, with Coppins Crossing Road running within the study area (BIOSIS 2012a). The investigation included a comprehensive survey of the entire area, targeting landforms with highest potential for heritage places, as identified by previous predictive models. The northern boundary of this investigation immediately abuts the Current Study area, beginning on the southern side of William Hovell Drive, where the current gas main ceases 20m to the north on the northern side of William Hovell. The investigation resulted in

the identification of 33 previously unrecorded Aboriginal sites consisting of open artefact scatters or isolated finds. Higher densities of sites were predicted, with the lower numbers recorded attributed to the poor levels of ground surface visibility across the study area at the time of the field survey. Nine areas of PAD (potential archaeological deposits) were also identified within the study area based on landform analysis, relationship to creek lines and position to the Molonglo River; all nine PAD areas were associated with surface artefacts (BIOSIS 2012a:iv). Recommendations were made for subsurface testing at all 9 PADs.

A single historic site was also newly recorded; Kallenia Rivers woolshed has since been nominated to the ACT Heritage Register.

The subsurface testing and surface salvage program recommended in 2012 (BIOSIS 2012a) was completed by BIOSIS in 2013. All nine PADs and an additional eight areas of low potential were excavated, however no artefacts were recovered from any of these subsurface contexts. A total of 335 lithic artefacts were recovered from the 33 surface sites recorded. The heritage assessment of Kallenia Woolshed was assessed against the criteria for listing to the ACT Heritage Register with the recommendation made for its nomination.

The absence of sites within subsurface contexts in both PAD and non-PAD areas led BIOSIS to conclude that 'subsurface deposits were unlikely across all the landscape features of the Project Area and that a predictive model based on the landforms and proximity to water while accurately reflecting the location of surface sites does not reflect the potential for subsurface deposits' (BIOSIS 2013:50).

Also in 2013, CHMA conducted a comprehensive heritage assessment of the Molonglo River Corridor in 2013. This study led to the field assessment of the MRC Priority Area and the MRC Survey Area resulted in the identification of 16 new sites (MRC1-MRC15, MRC17), and the relocation of 4 previously identified sites (14E1, MV13/MRC16, MOL A3 and 1870). In addition to the above-mentioned sites, four potential archaeological deposits were recorded (PADs 1-4). Sub-surface test pit excavations were conducted at these PAD locations. The test pitting program confirmed the presence of Aboriginal artefact deposits at all four PAD locations. Low density artefact deposits were recovered from PADs 2-3-4. Comparatively high densities of artefact deposits were encountered at PAD1. The evidence indicates that the PAD1 area was a focal point of Aboriginal activity, and was probably utilised as a favoured overnight camp site by Aboriginal people moving along the Molonglo River corridor (CHMA 2013a).

Based on the findings of the field survey assessment and test pitting program, the archaeological signature for the MRC Study Area can be broadly characterised as a low density spread of sites and artefacts across the landscape. A distinctive pattern of site

location and distribution is apparent, with sites tending to be located on elevated and level landscape features, bordering the margins of the Molonglo River.

For the most part, sites are typically small, comprising less than 10 artefacts, and are confined to discreet areas. At most site locations soil deposits are quite shallow, and as a consequence artefact deposits are predominantly confined to the surface or the very upper soil horizons. These small sites are typically representative of the sporadic movement of Aboriginal people along the River Corridor.

The stone artefacts present at these sites are predominantly manufactured from stone materials that are locally available along the River Corridor. CHMA did not identify any specific stone procurement or quarry sites. However, good quality volcanic and quartz nodules were observed to be present at many localities along the river margins. The reason for the apparent low densities of sites and artefacts across this section of the Molonglo River Corridor, is probably directly linked to the nature of the landscape.

Most recently, a series of investigations have been undertaken to the immediate north of the proposed study area, within the area designated for Whitlam Residential Estate. Two areas of PAD associated with sites CLB7 and MVS2 were subject to subsurface investigation in June 2018. The program recovered almost 200 artefacts and identified the need for further salvage works at both PAD sites, which retained high numbers of backed artefacts and moderate artefact densities across the board. Both sites were 100-200m of a tributary of the Molonglo River, providing permanent and easily accessible water.

4.2 Results of the Search of the ACT Aboriginal Heritage Site Database

As part of the current assessment, a search was undertaken of the ACT Aboriginal site database in order to ascertain whether any previously recorded Aboriginal sites exist within the proposed impact area (actmapi heritage layer, accessed 8th May 2023). The search included a buffer of 300m from the proposed impact area.

A single Aboriginal site occurs within 300m of the proposed Scrivener Dam works. Site 1211 was identified in 1990 by Bulbeck and Boot during their investigations in Stromlo Forest. The site comprises a single isolated artefact visible in a disturbed forestry trail, approximately 170m south of the proposed impact area on the western side of the Molonglo River. There is no potential for this site to be impacted by the current development. The site location is mapped in Figure 13.

Table 2. Summary results of the Search of the ACT Aboriginal Site Database

| Site Name | Location | Site Type | Recorded by | Description | Status |
|-----------|-----------------------|------------------|--------------------------|-------------------------------------|--|
| 1211 | E 688226 N 6091478 | Isolated find | Bulbeck and Boot 1990 | Isolated find on forest track | Site remains in place 170m south of study area |



Figure 13. Location of 1211 relative to current study area.

Scrivener Dam itself retains historical heritage values which are the subject of a recent report by Marshall and Baker (2022). These values are not included here.

5.0 Predictive Model

5.1 Introduction to Predictive Modeling

Predictive modeling, in an archaeological context, is a fairly straightforward concept that has been utilised by archaeologists in Australia for a number of years as a tool for undertaking research into Aboriginal heritage sites. In summary, predictive modeling involves the collation of information generated from previous archaeological research in a given region to establish patterns of Aboriginal site distribution within a given landscape. On the basis of perceived patterns of site distribution, archaeologists can make predictive statements regarding the potential for various Aboriginal site types to occur within certain landscape settings. This allows preliminary assessments of potential archaeological sensitivity of landscape types to be developed.

5.2 Predictive Models: Strengths and Weaknesses

It should be acknowledged that most, if not all, predictive models have a number of inherent weaknesses, which may limit their value. These include the following:

- The accuracy of a predictive model is directly influenced by the quality and quantity of the available site data and information for a given region. The more data available and the greater the quality of that data, the more likely it is that an accurate predictive model can be developed.
- Predictive-modeling works very well for certain types, most particularly isolated artefacts and artefact scatters, and to a lesser extent scarred trees. For other site types it is far more difficult to accurately establish distribution patterns and therefore make predictive statements. Unfortunately, these site types are generally the rarer site types (in terms of frequency of occurrence) and are therefore generally the more significant sites.
- Predictive modeling (unless it is very sophisticated and detailed) will generally not take into account micro-landscape features within a given area. These micro features may include (but is certainly not limited to) slight elevations in the landscape (such as small terraces) or small soaks or drainage depressions that may have held water. These micro features have been previously demonstrated to occasionally be focal points for Aboriginal activity.
- Predictive modeling to a large extent is often predicated on the presence of watercourses. However, in some instances the alignment of these watercourses has changed considerably over time. As a consequence the present alignment of a watercourse may be substantially different to its alignment in the past. The consequence of this for predictive modeling (if the alignment of these ancient water courses is not taken into account) is that predicted patterns of site distributions may be greatly skewed.

5.3 Predictive Model of Aboriginal Site Type Distribution for the Study Area

Previous investigations within the broader Molonglo Valley context demonstrate patterns in Aboriginal site locations within the area. These may be summarised as follows:

Open artefact scatters and isolated finds are the most common and therefore most likely site types in the Study Area;

- Artefact scatters are most likely to occur on level, or gently sloping, well-drained ground;
- Isolated finds occur anywhere in the landscape;
- Sites most commonly occur in proximity to water sources or on elevated terraces overlooking them. Within the current study area, disturbance associated with the creation of the existing bridge, Coppins Crossing Rd and the asphalt carpark on the southern side of the River has eliminated any areas of potential that might have existed, with the roads cut and benched on both sides.
- Extensive subsurface testing in the broader area suggests surface sites have little depth in the area, with none found in sub-surface contexts;
- Levels of disturbance within the study area indicate any sites identified will no longer retain any archaeological context;
- Grinding grooves have been found along major creek lines, and are more likely to occur where large boulders or outcrops are visible and of suitable material (names sandstone or similar). The geology of the study area and distance from water precludes the possibility of finding grinding grooves within the study area;
- Scarred trees occur in all topographies where woodlands occur and old growth trees survive, likely as isolated trees. The current study area has been entirely cleared, with existing trees in the study area comprising exotic species of pine of not more than 15 years of age. This precludes the possibility of scarred trees in the study area;
- Burial sites are extremely rare site types for reasons of perseveration. However they do occur in landforms characterised by relatively deep profiles of soft sediments such as sand and alluvium. The possibility of burials in alluvial deposits along the River cannot be ignored, however the extensive disturbance present within these deeper deposits within the study area suggests in situ burials would no longer occur. The possibility of burials below the 50cm depth of disturbance currently evident in the Aeolian sand areas of the study area cannot be precluded.

Levels of previous disturbance at this site are such that none of the existing landscape remains within the study area. The proposed area of impact no longer retain any potential to retain in situ finds, with any materials identified likely to have been imported to the site during construction of the Dam itself and subsequent establishment and landscaping around the zoo, lookout and compound.

6.0 Survey Results

As anticipated by predictive modelling of the study area and history of previous impacts, the study area no longer retains any archaeological potential. The entire area has been subject to extensive and total destruction, including cutting and benching for the creation of the dam, existing tracks and construction associated with the zoo large scale scarification of the landscape, construction of the compound and look out infrastructure, formalized plantings and sediment stabilization and large scale importation of gravels and construction materials.

No Aboriginal sites were identified during the current investigation and no areas of potential archaeological sensitivity.

The study area is assessed as having no potential for sites of Aboriginal sites of heritage significance.

7.0 Legislation

Scrivener Dam is located on National (Designated) Land and as such, is subject to Commonwealth Land management systems. The National Capital Authority has management and planning responsibilities associated with the study area.

The National Capital Authority is a statutory agency of the Australian Government established under the Australian Capital Territory (Planning and Land Management) Act 1988 (see below), which manages the Australian Government's interest in the future planning and development of Canberra as the National Capital (NCA Heritage Strategy 2010-2013:3). In accordance with their heritage strategy, the NCA's roles include:

- Securing the planning and development of Canberra as the capital
- Accommodating the seat of Government and associated national and cultural requirements;
- The provision of national public places for all Australians to visit and enjoy;
- the enhancement of the unique character and symbolic meaning of the capital and;
- the development of appreciation of the capital as a reflection of our democracy and national life (NCA Heritage Strategy 2010-2013:3).

The management of the Study Area therefore operates within a legislative framework, which includes:

- Australian Capital Territory (Planning and Land Management) Act 1988 (Commonwealth);
- Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth);
- Parliament Act 1974 (Commonwealth);
- The Australian Heritage Council Act 2003 (Commonwealth),
- The Aboriginal and Torres Strait Islander Heritage Protection Act 1987.

Each of these Acts is discussed below.

7.1 Australian Capital Territory (Planning and Land Management) Act 1988 (Commonwealth)

This Act established the National Capital Authority (NCA) as an agency managing land (places) on behalf of the Commonwealth. One of the primary roles of the NCA is the preparation and administering of the National Capital Plan (National Capital Authority 2011). According to section 9 of the ACT (PALM) Act 1988, the primary object of the National Capital Plan is 'to ensure that Canberra and the Territory are planned and developed in accordance with their national significance.'

In addition, the Plan identifies Designated Areas and establishes policies for land use and conditions for development, planning and design within these areas. All 'works' proposed

within a Designated Area must be approved by the NCA. However, as a manager of places that have heritage values, the NCA is also subject to provisions under the EPBC Act.

7.1.1 The National Capital Plan

The purpose of the Plan (NCA 2011) is to ensure that Canberra and the wider Territory are planned and developed in accordance with their national significance; specifically the preservation and enhancement of those aspects of the National Capital which are identified as being of national significance.

The plan establishes the broad pattern of land use to be adopted in the development of Canberra as well as providing detailed conditions for the planning, design and development of National Land. These works include anything from new buildings and structures to landscaping, excavation, tree felling and demolition.

The plan is guided by a number of principles, which include,

‘The planning and development of the National Capital will seek to respect and enhance the main principles of Walter Burley Griffin's formally adopted plan for Canberra...

The Parliamentary Zone and its setting remain the heart of the National Capital. In this area, priority will be given to the development of buildings and associated structures which have activities and functions that symbolise the Capital and through it the nation. Other developments in the area should be sited and designed to support the prominence of these national functions and reinforce the character of the area.’ (NCA 2011, Section 1.1.2)

Approvals under the NCA are obtained based on the relevant provisions of the National Capital Plan

7.1.2 Heritage Protection under the National Capital Plan

A number of difficulties arise in the ACT with respect to heritage due to the definition of ‘Commonwealth areas.’ Subsection 525(2) of the EPBC Act specifically excludes Territory Land in the ACT as a Commonwealth area. This creates a problem given the fact that under the ACT (PALM) Act, the NCA controls works in Designated Areas regardless of whether they are located on National or Territory Land (section 12).

‘For places with heritage values located on Territory Land in Designated Areas, the ACT heritage provisions have no effective control, because the NCA is the works approving agency. The issue is compounded by the fact that the definition of an action in the EPBC Act excludes decisions granted by the NCA such as works approvals’ (NCA Heritage Strategy 2010-2013:7). Under the EPBC Act, the only protection for places with heritage significance

in Designated Areas on Territory Land occurs when an action has/will have/or may have a significant impact on matters of national environmental significance. As such, other than the National Capital Plan, their statutory obligation on controllers of land to identify/assess places for the presence of any heritage values. 'The plan becomes the only statutory measure able to require the identification, protection, conservation and management of heritage values on places of Territory land' (NCA Heritage Strategy 2010-2013:8) (National Capital Plan p 129). The onus is thus very much on the Plan to develop appropriate heritage policies and to ensure that the approval of all works in Designated Areas are undertaken in accordance with the plan (NCA Heritage Strategy 2010-2013:8).

7.2 The Environment Protection and Biodiversity Conservation Act 1999

This Act has been amended, through the Environment and Heritage Legislation Amendment Act (No1) 2003 to provide protection for cultural heritage sites, in addition to the existing aim of protecting environmental areas and sites of national significance. The Act also promotes the ecologically sustainable use of natural resources, biodiversity and the incorporation of community consultation and knowledge.

The 2003 amendments to the Environment Protection and Biodiversity Conservation Act 1999 have resulted in the inclusion of indigenous and non-Indigenous heritage sites and areas. These heritage items are defined as:

'indigenous heritage value of a place means a heritage value of the place that is of significance to indigenous persons in accordance with their practices, observances, customs, traditions, beliefs or history;

Items identified under this legislation are given the same penalty as actions taken against environmentally sensitive sites. Specific to cultural heritage sites are §324A-324ZB.

The Act also enables the identification and subsequent listing of items for the Commonwealth and National Heritage Lists. The Act establishes the National Heritage List, which enables the inclusion of all heritage, natural, Indigenous and non-Indigenous, and the *Commonwealth* Heritage List, which enables listing of sites nationally and internationally that are significant and governed by Australia.

The legislation provides for:

- A National Heritage List (a list of places of national heritage significance);
- A Commonwealth Heritage List (for significant heritage places that are Commonwealth owned or managed or are on Commonwealth land);
- The continuation of the Register of the national Estate (in modified form whereby no new places can be added to the Register); and
- The creation of an expert body, the Australian Heritage Council, to advise the Minister on the listing and protection of heritage places.

Under the EPBC Act approval must be provided from the Minister for the Environment and Energy for all actions likely to have a significant impact on matters protected under Part 3 of the Act, including National Heritage (s15B and s15C), Commonwealth actions (s28) and Commonwealth land (s26). These requirements are summarized as follows:

- ‘taken which have, will have, or is likely to have a significant impact on National Heritage values will require the approval of the Minister for Sustainability, Environment, Water, Population and Communities;
- taken on Commonwealth land which are likely to have a significant impact on the environment will require the approval of the Minister;
- taken outside Commonwealth land which are likely to have a significant impact on the environment on Commonwealth land, will require the approval of the Minister; and
- taken by the Commonwealth or its agencies which are likely to have a significant impact on the environment anywhere will require approval by the Minister’ (Marshall et al. 2012:25).

Under the EPBC Act, definitions for terms such as ‘significant impact’, ‘environment’ and ‘action’ are specific and highly relevant. Significant impact with reference to National and Commonwealth heritage is defined as follows:

‘A ‘significant impact’ is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment, which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance.’ (DEWHA 2009, p. 3)

‘Environment’ includes the heritage values of places such as those included on the National and Commonwealth Heritage Lists, while ‘action’ is defined as including any development, undertaking, activity or series of activities or any variation of these (Marshall et al. 2012).

‘If a proposed action relating to National Heritage, on National Land or by a Commonwealth agency is likely to have a significant impact on National Heritage Values/the environment, it is necessary to make a referral under sections 68 or 71 of the EPBC Act. The Minister is then required to decide whether or not the action needs approval under the Act, and to notify the person proposing to take the action of his or her decision’ (Marshall et al. 2012).

In accordance with section 75(2) of the EPBC Act, assessments about the question of ‘significant impact’ made by the Minister must only take into account the adverse impacts of the actions, and must not consider the beneficial impacts. Accordingly, the benefits of

the proposed action are not relevant to considerations of 'significant impact' and whether or not a referral is necessary.

Exceptions from seeking approvals for an action can be obtained where an accredited management plan is in place.

Additional specific heritage provisions under the Act include:

- creation of Commonwealth and National Heritage Lists; and
- special provisions regarding Commonwealth Heritage (see below).

The EPBC Act is highly complex and the implications of some aspects are difficult to interpret. As such, and given that significant penalties now apply to breaches of the Act, a cautious approach is advised.

7.3 Parliament Act 1974

Major works proposed within the Parliamentary Zone require the approval of both Houses of Federal Parliament. The Joint Standing Committee on the National Capital and External Territories however, generally manages minor works and impacts such as maintenance and repairs.

'In 2007 a series of matters were considered by the Committee including amendments to the National Capital Plan related to the Griffin Legacy initiative. The amendments are discussed in greater detail in the following section on the National Capital Plan. However in its report, the Committee:

- supported the broad aims of the Griffin Legacy Project;
- believed that the Griffin Legacy Amendments could be improved;
- noted evidence which questioned the adequacy of parts of these amendments;
- noted in relation to Amendment 56 (principles and policies) concerns about
- excessive building height, traffic and transport implications, loss of vistas of national significance and loss of green space. In addition, there were concerns about the scale of the proposed developments and the lack of a rigorous planning rationale;
- noted in relation to Amendment 59 (City Hill, outside but adjacent to the study area) concerns about the level of detail, and specific concerns about excess building heights and loss of vistas;
- noted in relation to Amendment 60 (Constitution Avenue, outside but adjacent to the study area) concerns about the scale of the proposal and the possible negative impact on the vista from Parliament House towards Constitution Avenue which is, perhaps, one of the most significant urban vistas in the nation;
- suggested that the scale of development for West Basin (within the setting of the study area) should configure more closely to the NCA's 2004 proposal; and

- the committee recommended that Amendments 56, 59, 60 and 61 be disallowed so that the NCA had the opportunity to further refine the amendments taking into account issues raised in the committee's report. This fine tuning being necessary and in the interests of Canberra and the nation (Joint Standing Committee on the National Capital and External Territories 2007, pp. iii-iv)' (Marshall et al. 2012:194)

Importantly, the Committee's recommendations were not agreed by the Government. (Marshall et al. 2012:195).

7.4 Australian Heritage Council Act 2003

The *Australian Heritage Council Act 2003* defines the heritage advisory boards and relevant lists, with the Act's Consequential and Transitional Provisions repealing the *Australian Heritage Commission Act 1975*. The *Australian Heritage Council Act*, like the *Australian Heritage Commission Act*, does not provide legislative protection regarding the conservation of heritage items in Australia, but has compiled a list of items recognised as possessing heritage significance to the Australian community. The Register of the National Estate, managed by the Australian Heritage Council, applies no legal constraints on heritage items included on this list.

7.5 The Aboriginal and Torres Strait Islander Heritage Protection Act 1987.

This Federal Act is administered by the Department of Sustainability, Environment, Water, Populations and Communities (SEWPaC) with the Commonwealth having jurisdiction. The Act was passed to provide protection for the Aboriginal heritage, in circumstances where it could be demonstrated that such protection was not available at a state level. In certain instances the Act overrides relevant state and territory provisions.

The major purpose of the Act is to preserve and protect from injury and desecration, areas and objects of significance to Aborigines and Islanders. The Act enables immediate and direct action for protection of threatened areas and objects by a declaration from the Commonwealth minister or authorised officers. The Act must be invoked by, or on behalf of an Aboriginal or Torres Strait Islander or organisation.

Any Aboriginal or Torres Strait Islander person or organization may apply to the Commonwealth Minister for a temporary or permanent 'Stop Order' for protection of threatened areas or objects of significant indigenous cultural heritage.

The Commonwealth Act 'overrides' State legislation if the Commonwealth Minister is of the opinion that the State legislation (or undertaken process) is insufficient to protect the threatened areas or objects. Thus, in the event that an application is made to the Commonwealth Minister for a Stop Order, the Commonwealth Minister will, as a matter of course, contact the relevant State Agency to ascertain what protection is being imposed by

the State and/or what mitigation procedures have been proposed by the landuser/developer.

In addition to the threat of a 'Stop Order' being imposed, the Act also provides for the following:

- If the Federal Court, on application from the Commonwealth Minister, is satisfied that a person has engaged or is proposing to engage in conduct that breaches the 'Stop Order', it may grant an injunction preventing or stopping such a breach (s.26). Penalties for breach of a Court Order can be substantial and may include a term of imprisonment;
- If a person contravenes a declaration in relation to a significant Aboriginal area, penalties for an individual are a fine up to \$10,000.00 and/or 5 years gaol and for a Corporation a fine up to \$50,000.00 (s.22);
- If the contravention is in relation to a significant Aboriginal object, the penalties are \$5,000.00 and/or 2 years gaol and \$25,000.00 respectively (s.22);
- In addition, offences under s.22 are considered 'indictable' offences that also attract an individual fine of \$2,000 and/or 12 months gaol or, for a Corporation, a fine of \$10,000.00 (s.23). Section 23 also includes attempts, inciting, urging and/or being an accessory after the fact within the definition of 'indictable' offences in this regard.

The Commonwealth Act is presently under review by Parliament and it is generally accepted that any new Commonwealth Act will be even more restrictive than the current legislation.

8.0 Impact Assessment and Statement of Heritage Effects

8.1 Impact Assessment

No Aboriginal sites exist within the proposed area of impact and there is no potential for subsurface finds to exist in situ or even within a broader associated context within the current study area. The proposed upgrades to Scrivener Dam therefore propose no risk to any Aboriginal heritage values within the project area.

8.2 Statement of Heritage Effects

No Aboriginal cultural heritage sites occur within the study area. There is no potential for subsurface cultural deposits to exist within the study area. As such, the proposed dissipator upgrades will have no effect on Aboriginal heritage values within the study area.

8.3 Risk Reduction and Efforts to Reduce Diminishment of Heritage Significance

The proposed upgrades occur exclusively within areas of extensive prior disturbance. The proposed impacts will not increase the footprint or area of disturbance caused by previous impacts associated with the construction of Scrivener Dam and environs. Risk reductions and Risk Diminishment are not necessary as no Aboriginal heritage significance values exist within the proposed construction footprint.

9.0 Management Recommendations

The heritage management options and recommendations provided in this report are made on the following basis:

- Consultation with representatives of the Representative Aboriginal Organisations present at the field assessment, these being:
 - Buru Ngunawal Aboriginal Corporation;
 - Ngarigu Currawong Clan;
 - King Brown Tribal Group
- Heritage Act 2004 requirements and ACT Heritage Council advice;
- The results of the investigation as documented in this report; and
- Background research into the extant archaeological record for the study area and its surrounding regions.

The recommendations below were made in direct consultation with the RAOs including discussions held on site (see formal support included in Appendix A) and review of this document. A draft copy of this report was circulated to all RAOs on the 24th May 2023 requesting comment within 14 days. No written responses were received.

Recommendations

- No Aboriginal archaeological sites occur within the study area
- No areas of archaeological potential occur within the study area
- The study area is identified as being of extremely low archaeological sensitivity. However, if, during the course of the proposed road improvement works, previously undetected archaeological sites or suspected skeletal remains are located, the processes outlined in the Unanticipated Discovery Plan should be followed.
- Final copies of this SHE must be provided to all four RAOs.
- This report must be submitted to the National Capital Authority for approval prior to the commencement of any development works.

10.0 Unanticipated Discovery Plan

The following text describes the proposed method for dealing with unanticipated discoveries of Aboriginal archaeological materials on this project. The plan provides guidance to project personnel so that they may meet their obligations with respect to heritage in accordance with the Heritage Act 2004.

Unanticipated discoveries include all Aboriginal places and objects. This includes (but may not be limited to) moderate to high-density artefact scatters, scarred trees, stone procurement (quarry) sites, ochre deposits, hearths, scarred trees and skeletal remains (burials).

Please Note: There are two different processes presented for the mitigation of these unanticipated discoveries. The first process applies for the discovery of cultural heritage sites or features, which include all of the site types, mentioned above, with the exception of skeletal remains, burials. The second process applies exclusively to the discovery of skeletal remains (burials).

Discovery of Cultural Heritage Items

Step 1

If any project personnel, contractors or subcontractors believe that they have discovered or uncovered Aboriginal cultural heritage materials, the individual should notify machinery operators that are working in the general vicinity of the area that earth disturbance works should stop immediately. Remember health and safety requirements when approaching machinery operators.

Step 2

A buffer protection zone of 20m x 20m should be established around the suspected cultural heritage site or items. No unauthorised entry or earth disturbance will be allowed within this 'archaeological zone' until such time as the suspected cultural heritage items have been assessed, and appropriate mitigation measures have been carried out.

Step 3

An archaeologist, in consultation with the RAOs should carry out an assessment of the cultural heritage find.

Step 4

Based on the findings of the assessment, appropriate management recommendations should be developed for the cultural heritage find. These recommendations should be submitted to ACT Heritage and the ACT Heritage Council for review and endorsement.

Step 5

Once endorsement has been obtained, the prescribed management recommendations should be carried out by the appropriate personnel.

Step 6

On the completion of the prescribed works, the relevant authorities (ACT Heritage and ACT Heritage Council) should advise the Site Supervisor (or other Project Personnel) that construction works may recommence in the 'archaeological zone'. If there are further constraints to construction works in the 'archaeological zone', then the Site Supervisor should be informed of these. It is the responsibility of the Site Supervisor to inform construction crews of these constraints.

NB. Any additional Aboriginal places or objects encountered must be reported to the ACT Heritage Council within five working days, in accordance with Section 51 of the Heritage Act 2004.

Discovery of Skeletal Material

Step 1

Under no circumstances should the suspected skeletal remains be touched or disturbed. If these are human remains, then this area potentially is a crime scene. Tampering with a crime scene is a criminal offence.

Step 2

Any person discovering suspected skeletal remains should notify machinery operators that are working in the general vicinity of the area that earth disturbing works should stop immediately. Remember health and safety requirements when approaching machinery operators.

Step 3

A buffer protection zone of 50m x 50m should be established around the suspected skeletal remains. No unauthorised entry or earth disturbance will be allowed with this buffer zone until such time as the suspected skeletal remains have been assessed.

Step 4

The relevant authorities (police) will be contacted and informed of the discovery. If the skeletal remains are suspected to be of Aboriginal origin, the authorities may decide to seek the advice of an archaeologist or appropriate expert in relation to the discovery.

Step 5

Should the skeletal remains be declared an Indigenous burial site, the following procedures will be implemented:

- An archaeologist, in consultation with the RAOs should carry out an assessment of the skeletal remains.
- Based on the findings of the assessment, appropriate management recommendations should be developed for the cultural heritage find. These recommendations should be submitted (in the form of a Conservation and Management Plan) to the ACT Heritage Council for review and endorsement.
- Once endorsement has been obtained, the prescribed management recommendations should be carried out by the appropriate personnel.

On the completion of the prescribed works, the relevant authorities (ACT Heritage Council) should advise the Site Supervisor (or other Project Personnel) that construction works may recommence in the 'archaeological zone'. If there are further constraints to construction works in the 'archaeological zone', then the Site Supervisor should be informed of these. It is the responsibility of the Site Supervisor to inform construction crews of these constraints.

Bibliography

Aboriginal and Torres Strait Islander Heritage Protection Act 1974 (Commonwealth)

Australian Heritage Council Act 2003 (Commonwealth)

ACT Government, 2004. *Woodlands for Wildlife: ACT Lowland Woodland Conservation Strategy*. Action Plan No 27, Environment ACT, Canberra.

Anderson, J. 1984. *Between Plateau and Plain*. Occasional Papers in Prehistory 4. RSPAS, ANU, Canberra.

Australian Archaeological Survey Consultants (AASC). 2006. *Molonglo Valley Heritage Review*. Report to ACT Planning and Land Authority.

Australian Archaeological Survey Consultants. 2006. *Molonglo Valley Heritage Review*. Report to ACT Planning and Land Authority.

Australian Archaeological Survey Consultants and Cultural Heritage Management Australia. 2008. *Canberra International Arboretum and Gardens Cultural Heritage Salvage Program*. A report to the ACT Chief Ministers Department.

Avery, S. 1994. *Aboriginal and European Encounter in the Canberra Region: a question of change and the archaeological record*. Attorney General's Department, Canberra.

Bayliss, James J. 11 December 1880. *Plan shewing road between Queanbeyan and the Murrumbidgee River*. NLA MAP G8971.G46 1880

Bars, RKB. 1981. *Murrumbidgee River Corridor: an archaeological survey for the National Capital Development Commission*.

Barz, RKB and JH Winston-Gregson 1982. *Murrumbidgee River Corridor 2: The Second part of an archaeological survey for the National Capital Development Commission*.

Besant, A and S Avery. 1996. *Excavations of an Aboriginal and/or Historical site, Ginninderra Blacksmith's Shop, Ginninderra*. Final Report to the Canberra Archaeological Society.

Biosis Research Pty Ltd. 2010a. *Molonglo Stage 2: Detailed Heritage Assessment – Aboriginal and Historical Heritage*. Report to ACT Planning and Land Authority.

Biosis Research Pty Ltd 2010b. *Molonglo Stage 2: Surface Artefact Salvage Program – Aboriginal Heritage*. Report for ACT Planning and Land Authority.

Biosis Research Pty Ltd. 2012a. *Molonglo Stage 3 Future Urban Releases: Detailed Heritage Assessment – Aboriginal and Historical Heritage*. Report for Environment, Sustainable Development Directorate.

Biosis Research Pty Ltd. 2012b. *Molonglo Stage 2: Detailed Heritage Assessment – Aboriginal and Historical Heritage*. Report to ACT Planning and Land Authority.

Biosis Research Pty Ltd. 2013. *Molonglo Stage 3 Future Urban Release: Sub Surface testing report and further studies*. Prepared for Environment and Sustainable Development Directorate.

Bluett, W.P. 1954. *The Aborigines of the Canberra District at the Arrival of the White Man*. Canberra Historical Society: Canberra.

Bowdler, S. 1981. Archaeological significance as a mutable quality. In Sullivan, S. and Bowdler, S. (eds). *Site Surveys and Significance Assessment in Australian Archaeology*. Dept. of Prehistory, ANU, Canberra.

Burra Charter. 1999. *Australia ICOMOS Charter for the conservation of places of cultural significance*.

Bulbeck, D. & Boot, P. 1990. *Stromlo Forest Cultural Resource Survey and Conservation Plan*. Report to ACT Forests, ACT Parks and Conservation Service.

Coroners Act 1997 (ACT)

Canberra's Engineering Heritage 2008. *Molonglo Outfall Sewer*. Website accessed 26/07/2013. http://www.engineer.org.au/main_outfall_sewer.html

Cross, Rex and Bert Sheedy. 1983. *Queanbeyan Pioneers, First Study: pocket biographies of 112 pioneers*. Queanbeyan Books and Prints. Queanbeyan.

Cultural Heritage Management Australia (CHMA) 2011a. *National Arboretum Sewerage Pipeline Extension CMP*. Report to Department of Land and Property Services.

Cultural Heritage Management Australia (CHMA) 2011b. *ACT NOWaste Mugga Lane Resource Management Centre Extensions CMP*.

Cultural Heritage Management Australia (CHMA) 2008. *Coombs, Wright and Environs Detailed Heritage Assessment Report No 0901*. Report to ACTPLA.

Cultural Heritage Management Australia (CHMA) 2013a. *Molonglo River Corridor Cultural Heritage Assessment and Conservation Management Plan*. A report to TAMSD.

Cultural Heritage Management Australia (CHMA) 2013b. *Riverview Excavation Report*. A report to TAMSD.

Currie, M.J. 1825. *Journal of an excursion to the southward of Lake George in New South Wales*. In B. Field (ed.), *Geographical memoirs on NSW*. London.

Dargavel, J. 1997 'Forestry' in *Australian and New Zealand Forest History No. 1*, ANU, Canberra. Website accessed 25/07/13, www.fennerschool-associated.anu.edu/envirohist/links/publications.

Dixon, Robert. 1830. Molonglo River. *Original in Archives Office of NSW, reproduction by Association of Surveyors Australia*. Copy held by ACTPLA Archives.

Douglas, Marion and Fiona Douglas. 1996 *Not Without My Corsets! Oral Histories of the families who farmed soldier-settler blocks in the Woden Valley from 1920-1963*. ACT Government Heritage Grants Program. Canberra.

English, W.B. 1985. *Where the Molonglo Runs* B.A. (Hons) Thesis, ANU, Canberra.

Environmental Protection and Biodiversity Conservation Act 1999 (Cth)

Flood, J. 1973. *The Moth Hunters- Investigations Toward a Prehistory of the South-eastern Highlands of Australia*. Unpub. PhD Thesis, Australian National University, Canberra.

Flood, J. 1980. *The Moth Hunters*. Australian Institute of Aboriginal Studies: Canberra.

Gillespie, L 1984. *Aborigines of the Canberra Region*. Lyall L. Gillespie: Campbell, ACT.

Gillespie, L 1988. *The Southwell Family: Pioneers of the Canberra District 1838 – 1988*. Southwell Reunion Committee, Fyshwick, ACT.

Gillespie, L. 1992. *Canberra 1820-1913*. Australian Government Publishing Services, Canberra.

Gillespie, L. 2000. *Canberra's Pioneer Families: Stories by Lyall Gillespie*. A Supplement to the Canberra Times, February 15th, 2000. Hassell Ltd.

Gillespie, L. 2012. *Molonglo River Park Concept Plan Report*. An unpublished report to the ACT Government, Environment and Sustainable Development Division.

Henderson, G. 1981 *Geology of Canberra, Queanbeyan and Environs: Notes to Accompany the 1980 1:50 000 Geological Map*. Australian Government Publishing Service, Canberra.

Heritage Act 2004 (ACT)

Jenkins, B. 2000. *Soil Landscapes of the Canberra 1:100000 Sheet*. Department of Land and Water Conservation, Sydney.

Jackson-Nakano, A. 2001 *The Kamberri: A History of Aboriginal Families in the ACT and Surrounds*. Aboriginal History Monograph 8; Weereewaa History Series Vol. 1. Ann Jackson-Nakano and Aboriginal History Inc., Canberra.

Kabaila, P. 1997. *Belconnen's Aboriginal Past: A glimpse into the archaeology of the Australian Capital Territory*. Black Mountain Projects, Jamieson ACT.

Lea-Scarlett, E. 1968. *Queanbeyan District and People*. Queanbeyan Municipal Council: Queanbeyan.

Marquis-Kyle, P. and Walker, M. 1992. *The Illustrated Burra Charter: Making Good Decisions about the Care of Important Places, Australia* ICOMOS, Brisbane.

Marshal, D. and K. Baker. 2022 *Scrivener Dam Dissipator Strengthening Project*. A report for National Capital Authority.

Moore, B. 1981 *The Warm Corner*. Published by Bruce Moore. Canberra.

Navin, K & Officer, K. 1991. *West Belconnen Urban Release Area Archaeological Assessment*. Report to Kinhill Pty Ltd.

NVIS 2006. *Australia – Estimated pre 1750 Major Vegetation Groups – NVIS Stage 1, Version 3.0*. Australian Government Department of the Environment, Water, Heritage and the Arts Resources Website.

Navin Officer Heritage Consultants 2011. *ACTEW Molonglo Liquid Waste Receiving Point, Block 1572, Belconnen ACT*. Report to ActewAGL.

Native Title Act 1993 (Cth)

NVIS, 2006, Australia – *Estimated pre 1750 Major Vegetation Groups – NVIS Stage 1, Version 3.0* Australian Government Department of the Environment, Water, Heritage and the Arts Resources Website.

Owen, M. 1987 *Geological Monuments in the Australian Capital Territory*. Australian Heritage Commission, Canberra.

Paton, Rob. 2009 *Coombs Wright and Environs Detailed Heritage Assessment Report No. 0901*. CHMA Report to ACTPLA.

Parishes of Canberra, Narrabundah, Tuggeranong, Weetangera and Yarrolumla, County of Murray. 1892. NLA MAP G8981.G46 1892

Parish of Yarrolumla, County of Murray [cartographic material]: Land District of Queanbeyan, Eastern Division, [NSW]. 1904. NSW Dept. of Lands. NLA MAP G8971.G46. Accessed 24 January 2011 via <http://nla.gov.au/nla.map-vn3723794-sd-cd>

Parish of Yarromlumla, County of Murray [cartographic material]: Land District of Queanbeyan, Commonwealth Territory Yarrolumla Shire. 1912. NLA MAP G8971.G46 svar. Accessed 24 January 2011 via <http://nla.gov.au/nla.map-vn1374529-sd-cd>

Plan Showing Federal Capital Lands Available for Lease. 1919. Lease Ordinance. NLA MAP G8984.C3G46 1920.

Ruediger, W. 1995 *Over the Limestone Plains: Canberra*. Openbook Publishers. Adelaide.

Saunders, P. 1995. *Preliminary Cultural Resource Survey of Lower Molonglo Corridor, ACT*. Report to the Department of Environment, Land and Planning.

Stewart, K, and B. Percival. 1997. *Bush Foods of New South Wales*. Royal Botanic Gardens Sydney.

Trail, J. 2013. *25 Years of CORC*. Pamphlet published by CORC, Canberra.

Witter, D. 1980. *An Archaeological Pipeline Survey between Dalton and Canberra*. Aboriginal and Historical Resources Section, National Parks and Wildlife Service, Sydney, NSW.

APPENDIX A – RAO SUPPORT FOR RECOMMENDATIONS HEREIN

