Technical Paper 3

CULTURAL HERITAGE

Keepit Dam Upgrade

Cultural Heritage Assessment

May 2007

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A Report to Parsons Brinckerhoff Pty Ltd

EXECUTIVE SUMMARY

Introduction

Keepit Dam was constructed on the Namoi River, 25 kilometres northeast of Gunnedah between 1939 and 1960/1. It supplies water for irrigation and domestic use in the Namoi Valley.

There is now a need to upgrade the dam infrastructure to comply with the safety requirements of the NSW Dams Safety Committee including requirements to withstand extreme events such as a probable maximum flood (PMF) and severe earthquake.

This report documents the results of a cultural heritage assessment of the potential impacts of three options for the Keepit Dam Upgrade (the project). The dam safety upgrade options under consideration are referred to as Options B1, D2 and D3.

Aboriginal Consultation

The Keepit Dam study area which has been assessed in this report is located within the boundaries of the Tamworth Local Aboriginal Land Council (LALC). However, as part of the broader public consultation within the communities surrounding Keepit Dam and the Namoi River, State Water Corporation (State Water) has also consulted with Red Chief LALC at Gunnedah. Both groups were involved in field investigations.

Advertising for registration of interested Aboriginal groups resulted in a response from the Gunida Gunyah Community Development Employment Project. The Min Min Aboriginal Corporation was also contacted.

Draft copies of the heritage report were forwarded for discussion and review to the Tamworth and Red Chief Land Councils, the Gunida Gunyah CDEP group and the Min Min group in November 2006. Written and verbal responses were received from each group.

Results

Combining the results from cultural heritage field surveys undertaken in 2005 and the 2006, a total of twenty eight (28) previously unidentified Aboriginal sites have been recorded within the Keepit Dam study area. Sites comprise five isolated finds, thirteen artefact scatters, nine scarred trees and one stone procurement source.

Eleven sites had previously been recorded within a 10 km radius of the study area. These comprise two possible scarred trees, an isolated find, a grinding groove site, a stone procurement source, and five open scatters of stone artefacts.

One historic Aboriginal site, a former Aboriginal Reserve has also been identified within the study area.

Thirteen (13) European heritage sites were recorded as a result of the Keepit Dam investigations. These comprise two house ruins, ruins on an island in Lake Keepit, a shearing shed and house ruin, the *Tulcumbah* and *Violet Banks* homesteads, a school/scout hall, the former Gunnenbeme/Gunnenbene Public School site, a residence (former school) at Carroll Gap, Keepit Dam and Keepit Dam Workshop Equipment, the former Roman Catholic Church/cemetery site and the Former Keepit School (the latter two sites have been inundated by the waters of Lake Keepit).

One palaeontological site, a fossil-bearing limestone outcrop, was also identified within the study area.

Option Assessment

The construction impacts to heritage sites are very similar for each option. All options involve impact to the main dam wall (site KDH8) with Option D3 causing the greatest impact as it would raise the

wall by a greater height (5.5 m) than Options D2 (4.6 m) and B1 (3.4 m). It is considered that the differences between the heights for all three options are only slight and that they all equate to a moderate impact to the heritage of the existing dam structure.

The main differences between the options relate to the footprint for construction of the boat ramp saddle dam and spillway and the central stockpile area. These elements of Options D2 and D3 have the potential to impact the Aboriginal stone procurement source #20-5-21 and the school/scout complex KDH3. The potential for impact to these sites is highest with Options D2 and D3 and less for option B1.

No other cultural heritage sites that fall within the construction areas would be impacted.

In terms of potential construction impacts to known heritage sites, Option B1 is more favourable having slightly less impacts to known heritage items than Options D2 and D3. However, in terms of possible impacts to unrecorded heritage sites during construction, Option B1 is least favourable, having impacts to two areas of moderate archaeological potential. Options D2 and D3 each have impacts to only one area of moderate archaeological potential.

Overall, Option B1 is likely to have the least impact with Options D2 and D3 indistinguishable but greater than Option B1.

The operational impacts to heritage sites are very similar for Options D2 and D3. The main difference between those options and Option B1 is the impact of scouring downstream of the spillways. Option B1 has the potential to impact an additional 15 recorded sites compared to Options D2 and D3 due to the effects of scouring below the subsidiary dam spillway. Option D3 has the potential to impact one additional site to Options B1 and D2 through upstream inundation.

In terms of potential operational impacts to heritage sites, Option D2 is most favourable, followed by Option D3 and then Option B1.

Conclusions

The Keepit Dam Upgrade project would have an impact on recorded Aboriginal and historical heritage sites. The impacts would mostly be associated with the construction aspects of the project. Operational impacts would occur only in low probability circumstances of very large to extreme flood events with a frequency of occurrence of approximately 1:10,000 years or less.

It is considered that if construction impacts can be mitigated for the stone source #20-5-21 and the school/scout site KDH3 under both Options D2 and D3, then Option D2 is likely to have the least impact to heritage sites in both construction and operational scenarios, followed by Option D3. While Option B1 has less impact on known sites, it has a greater potential to impact unrecorded sites during construction and combined with the operational impact is considered to be least favoured.

There is no consensus for site management between the Aboriginal groups consulted for this project.

Recommendations

Based on the results of the field surveys, the assessment of the significance of the identified heritage items and the potential impacts to heritage items, the following management recommendations are provided for heritage sites.

- Minimise impact to the main dam wall - Minimise disturbance to the condition of the existing main dam wall, that is, minimise disturbance to the physical state of the fabric of the dam wall and its potential for survival. Minimise disturbance to the integrity of the existing dam wall, that is, minimise the degree to which changes are made to the dam wall, thereby allowing it to maintain its status as an appropriate representation in its original form.

  Subject to detailed design, impact to the dam wall may be minimised by:

- Use of materials that are sympathetic to those that are present in the existing main dam wall;

- Use of the existing spillway gate lifting gear;

- The removal and refurbishment, as necessary, of the gantry crane on top of the existing main dam wall and its replacement on top of the raised main dam wall;

- The removal and secure storage of historic items located on the top of the existing main dam wall, including the metal dedication and commemorative plaques and the metal 'Water Conservation and Irrigation Commission, NSW', insignia, and their relocation to similar locations on top of the raised main dam wall; and

- Archival recording of the existing main dam wall in accordance with best practice outlined in the NSW Heritage Office 1998 guidelines 'How to Prepare Archival Records of Heritage Items' (NSW Heritage Office 1998) before construction work begins.

- Avoid direct impact to the Aboriginal stone procurement source #20-5-21 by:

  - Fencing off the crest area of the ridge on which the site is situated;

  - Avoiding excavation of ridge deposits for fill in the boat ramp saddle dam wall;

  - Avoiding excavation of ridge deposits and rock for the boat ramp saddle spillway; and

  - If Option D2 or D3 is adopted, an archaeological survey of the impact area of the boat ramp saddle dam should be undertaken to determine if there would be impacts to the stone procurement source site.

- If Aboriginal stone procurement source #20-5-21 cannot be avoided, then archaeological salvage of the site would be required. This would include detailed site recording and collection and analysis of a sample of artefacts from the site. If this work was carried out prior to Part 3a approval, then a permit from the DEC would be required

- Restrict the area of the stockpile north east of the subsidiary dam wall to the existing area of disturbance (as mapped). If additional disturbance is to occur, then subsurface investigations may be required to determine impacts to potential archaeological deposits

- If Option B1 is adopted, conduct a field survey of the construction work area south of the subsidiary dam wall.

- If the central stockpile area is to be used under Options D2 and D3, then a buffer of at least 10 metres should be formed around the site complex of KDH3. All of the associated buildings at this site should be avoided by construction and stockpiles.

- If other heritage items/Aboriginal Objects are discovered during construction works, then a qualified heritage specialist should be contacted to inspect the find/s and provide advice on appropriate management requirements.

- It is not considered warranted to mitigate impacts to the sites that only have potential to be affected by extreme flood events. However, further consultation with the DEC on long term management should be undertaken considering the views of at least two of the Aboriginal groups consulted.

- Consultation with relevant Aboriginal communities should continue with regard to the assessment and management of Aboriginal sites potentially affected by the upgrade proposal.

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1. INTRODUCTION

1.1 The Proposed Development and Study Area

Keepit Dam was constructed on the Namoi River, 25 kilometres (km) northeast of Gunnedah (Figure 1) between 1939 and 1960/1. It supplies water for irrigation and domestic use in the Namoi Valley.

There is now a need to upgrade the dam infrastructure to comply with the dam safety requirements of the NSW Dams Safety Committee including requirements to withstand extreme events such as a probable maximum flood (PMF) and earthquake.

Based on the existing infrastructure, it is estimated that dam failure would result from a one in 2,800 year flooding event. Flood modelling has been prepared for very large to extreme flood events with frequencies of occurrence ranging up to the probable maximum flood which is estimated to have a frequency of 1 in 500,000 years or less. The modelling shows flooding of the Peel River and the Namoi River both upstream and downstream of Keepit Dam. All of this potential flood area, as shown in Figures 2 and 3, is included in the present assessment.

This report documents the results of a cultural heritage assessment of the potential impacts of three options for the long term upgrade of Keepit Dam. The options under consideration are referred to as Options B1, D2 and D3.

The aim of this investigation was to provide a report which would assess the impacts of each option on the items of cultural heritage and includes consideration of both Aboriginal and European heritage items. This investigation provides a comprehensive assessment of all potential impacts associated with each option.

The upgrade of Keepit Dam will be conducted by State Water Corporation (State Water) under Part 3A of the *Environmental Planning and Assessment Act 1979*. The project has been conducted with reference to the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (Department of Environment and Conservation 2005). This report was commissioned by Parsons Brinckerhoff Australia Pty Ltd.

It should be noted that none of the proposals for Keepit Dam detailed in this report affect Split Rock Dam upstream on the Manilla River.

1.2 Report Outline

Background information relating to the Keepit Dam area and surrounding region has been previously compiled as part of a desktop heritage assessment for the proposed upgrading of the dam (Navin Officer Heritage Consultants 2003). In addition, background information and an assessment of the scour area below the sub dam wall is presented in another archaeological report (Environmental Resources Management 2002). Targeted field survey was undertaken in July 2005 for an options development report (Navin Officer Heritage Consultants 2005) and more recently for this assessment in July 2006.

This report provides an assessment of the potential impacts of the dam upgrading and associated works. It also provides an outline of the potential impacts to heritage values from very large to extreme flood events. Information obtained from field investigations in 2005 and 2006 was used in the compilation of the report.

This report details the following:

- Study Methodology;
- Background Research;
- Results of Field Surveys;

- Impact Assessment; and
- Recommendations.

1.3 Project Personnel

The field survey was carried out by Matthew Barber and Lindsay Smith. Assistance was provided by representatives of the Tamworth and Red Chief Local Aboriginal Land Councils.

The report was written by Matthew Barber, Lindsay Smith and Kelvin Officer.

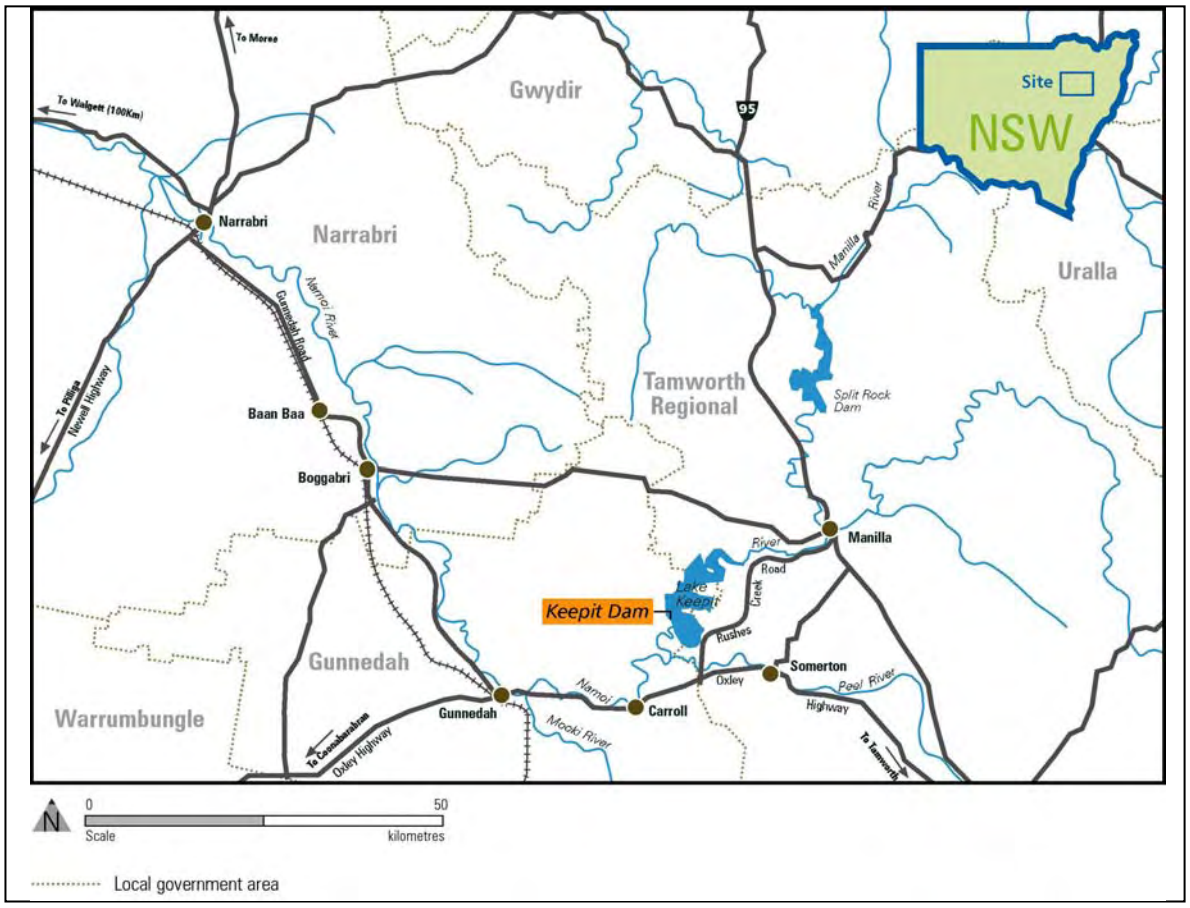

Figure 1 Regional location of Keepit Dam.
(Map supplied by Parsons Brinckerhoff)

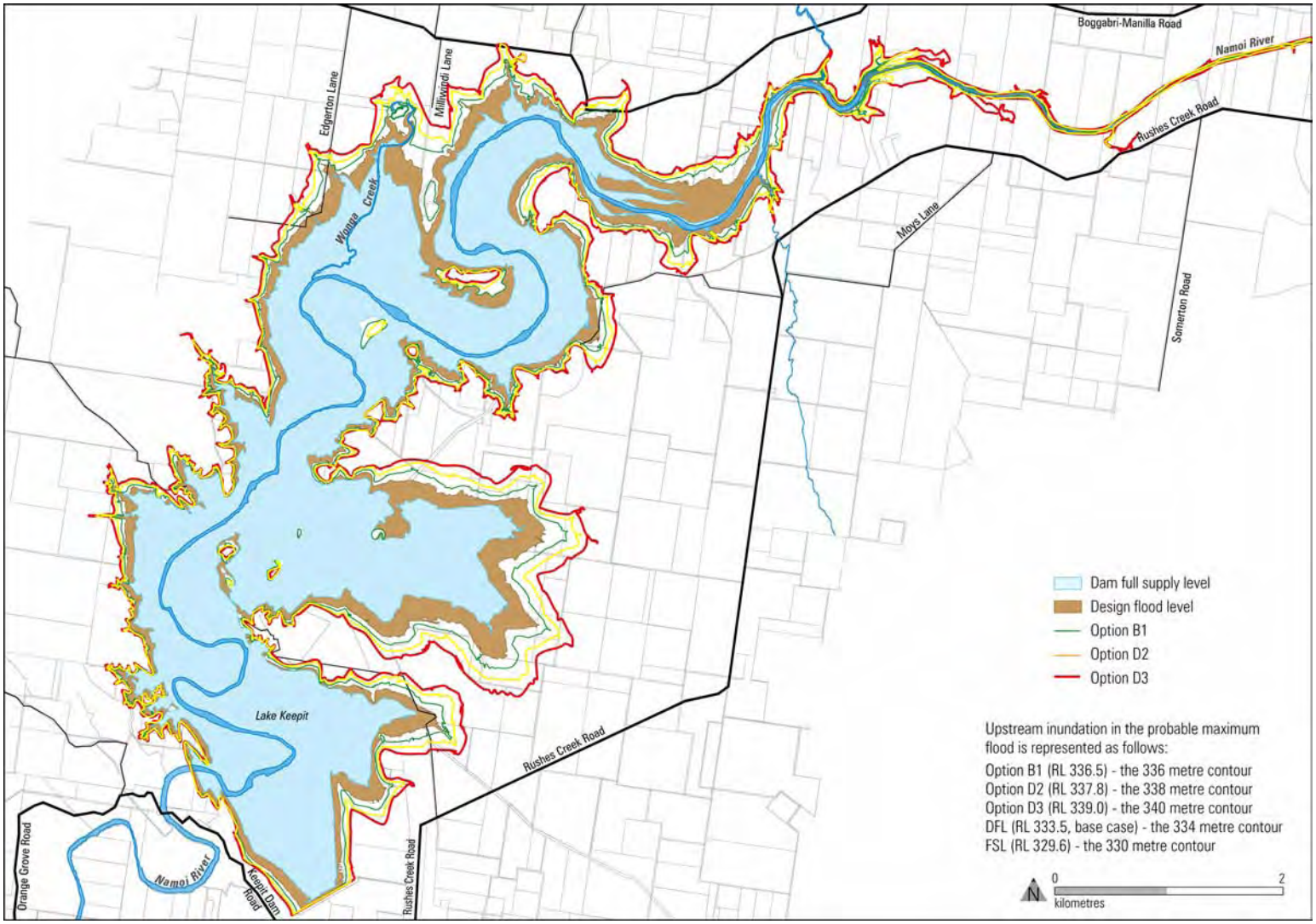

Figure 2 Upstream flood levels for the probable maximum flood (extent of study area).
(Map supplied by Parsons Brinckerhoff)

Figure 3 Downstream flood levels for the probable maximum flood (extent of study area).
(Map supplied by Parsons Brinckerhoff)

2. ABORIGINAL PARTICIPATION

The Keepit Dam study area which has been assessed in this report is located within the boundaries of the Tamworth Local Aboriginal Land Council (LALC). However, as part of the broader public consultation within the communities surrounding Keepit Dam and the Namoi River, State Water has also consulted with Red Chief LALC at Gunnedah. At the request of State Water, both Land Councils were invited to participate in the archaeological field survey. Tamworth LALC kindly gave permission for representatives of Red Chief LALC to be involved in field surveys.

Tamworth LALC was represented by Ivan Johnson, Rod Johnson and Greg Johnson. Red Chief LALC was represented by Peter Beale, Bruce Porter, Matt Strachan and Peter Shoobert.

The identification of interested Aboriginal stakeholders was conducted through implementation of the Department of Environment and Conservation's (2004) *Interim Guidelines for Aboriginal Community Consultation*.

Letters were sent to both Local Aboriginal Land Councils, the Department of Environment and Conservation (DEC), and other statutory bodies including the Office of the Registrar, Aboriginal Land Rights Act. Advertisements were placed in the Public Notices section of two local newspapers, the Namoi Valley Independent and the Northern Daily Leader, and the national newspaper, the *Koori Mail*. The advertisement invited appropriate persons or groups to contact the consultants and register their interest in the project.

Two responses were received by the close of registrations. A letter from the Gunida Gunyah Community Development Employment Project (CDEP) expressed an interest in being involved in the heritage assessment. The Office of the Registrar indicated that there were no registered Aboriginal Owners in the study area.

The Gunida Gunyah CDEP group was contacted and it was agreed to involve the organisation in ongoing consultation about the project, along with the two Local Aboriginal Land Councils. Subsequent to these discussions, details of the Min Min Aboriginal Corporation of Gunnedah were provided to the consultant with a request from the client that this group also be contacted and consulted about the project.

Draft copies of the heritage report were forwarded for discussion and review to the Tamworth and Red Chief Land Councils, the Gunida Gunyah CDEP group and the Min Min group in November 2006. Phone calls were made to the groups in December 2006 and faxes requesting a response from the groups were forwarded in February 2007. Follow up phone calls were made and additional faxes were sent in May 2007 to obtain final responses.

Written responses from the Tamworth LALC, the sites officers on behalf of the Red Chief LALC and the Gunida Gunyah CDEP are provided in Appendix 1. A verbal response was also received from the Gunida Gunyah CDEP and the Min Min Aboriginal Corporation.

The DEC also expressed an interest in receiving information about the project. This information will be provided to Mr Phil Purcell of the Dubbo Regional Office of the DEC.

Native Title

A search of the Native title Register was also undertaken. The results identified that the Nucoorilma Clan of the Gamilaaroy Aboriginal People have made a claim over a large area of NSW. The claim area is from Wallangra south to Manilla east to Bendemeer north to Clarkes Mountain then east to Wallangra, an area of approximately 14,490 km^2. The claim area does not extend to Lake Keepit and does not include land within Figures 2 and 3. For the purposes of this investigation therefore, the group has not been consulted. The claim was accepted for registration from 18/12/2001 and is now in mediation.

3. STUDY METHODOLOGY

3.1 Literature and Database Review

A range of documentation was used in assessing archaeological and historical knowledge for the study area and its surrounds. The background research was compiled for the previous reports and updated as required for the current assessment. This background research was used to determine if known Aboriginal and historical sites were located within the area under investigation, to facilitate site prediction on the basis of known regional and local site patterns, and to place the area within an archaeological and heritage management context. The review of written and documentary sources included heritage registers, local histories, a geomorphological study and archaeological reports.

Aboriginal literature sources included the DEC Aboriginal Heritage Information Management System (AHIMS) and associated files and catalogue of archaeological reports.

The following heritage registers and schedules were searched:

- The National Heritage List (Australian Heritage Council)
- The Commonwealth Heritage List (Australian Heritage Council)
- The Register of the National Estate (Australian Heritage Council)
- Aboriginal Heritage Information Management System (AHIMS) (NSW Dept Environment and Conservation)
- The State Heritage Register (NSW Heritage Office)
- The State Heritage Inventory (NSW Heritage Office)
- Heritage Schedule(s) from the Gunnedah Local Environmental Plan 1988
- Heritage Schedule(s) from the Manilla Local Environmental Plan 1988
- Heritage Schedule(s) from the Parry Local Environmental Plan 1987
- Section 170 Heritage and Conservation Registers compiled by State Water
- Register of the National Trust of Australia (NSW) 1988

The background research also included a review of previous archaeological and heritage assessment reports within the Keepit Dam region. A review of historical mapping of the Keepit Dam region, and in particular the early editions of the parish maps for Keepit, Namoi, Dowe, Dinawirindi, Baldwin, and Manilla (all of County Darling) was undertaken.

Discussions with representatives of the Aboriginal organisations were also undertaken to identify areas of cultural significance. Information was also obtained from representatives in relation to known historic sites of the study area.

3.2 Fieldwork

The field survey was undertaken in two stages. Stage 1, undertaken in July 2005, was a targeted survey of areas to identify potential construction and operational impacts on cultural heritage values associated with each option, and in particular, those components which differentiated each option. Survey coverage was focused in areas which were either exclusive to particular options, or differentiated option groupings. Survey areas included the construction ('footprint') areas of the saddle dams, their associated works (such as spillways), and areas between spillways and receiving waters. A broader assessment was also made of the general impacts of each option, such as flooding downstream of the dam and upstream of the existing storage.

Stage 2, undertaken in July 2006, concentrated on construction and operation areas that were common to all options and that had not been inspected previously, in particular stockpile and laydown areas. This

survey also examined more areas downstream of the main and subsidiary dam walls and potential upstream inundation areas.

Field survey for Aboriginal sites involved walking across each area of potential impact, searching for evidence of Aboriginal occupation. Assessments were also made regarding the potential for undetected Aboriginal sites.

The field methods for historic survey were more targeted. Locations of known or potential historic sites were examined but opportunistic survey was also carried out concurrently with the Aboriginal heritage survey in order to maximise survey coverage.

3.3 Recording Parameters

The archaeological survey aimed at identifying material evidence of Aboriginal occupation as revealed by surface artefacts and areas of archaeological potential unassociated with surface artefacts. Potential recordings fall into three categories: isolated finds, background scatter and sites.

3.3.1 Isolated finds

An isolated find is a single stone artefact, not located within a rock shelter, and which occurs without any associated evidence of Aboriginal occupation within a radius of 60 metres. Isolated finds may be indicative of:

- random loss or deliberate discard of a single artefact,
- the remnant of a now dispersed and disturbed artefact scatter,
- an otherwise obscured or sub-surface artefact scatter.

Except in the case of the latter, isolated finds are considered to be constituent components of the *background scatter* present within any particular landform.

The distance used to define an isolated artefact varies according to the survey objectives, the incidence of ground surface exposure, the extent of ground surface disturbance, and estimates of *background scatter* or *background discard* densities. In the absence of baseline information relating to background scatter densities, the defining distance for an isolated find must be based on methodological and visibility considerations. Given the varied incidence of ground surface exposure and deposit disturbance within the study area, and the lack of background baseline data, the specification of 60 metres is considered to be an effective parameter for surface survey methodologies. This distance provides a balance between detecting fine scale patterns of Aboriginal occupation and avoiding environmental biases caused by ground disturbance or high ground surface exposure rates. The 60 metre parameter has provided an effective separation of low density artefact occurrences in similar south-east Australian topographies outside of semi-arid landscapes.

3.3.2 Background scatter

Background scatter is a term used generally by archaeologists to refer to artefacts which cannot be usefully related to a place or focus of past activity (except for the net accumulation of single artefact losses).

There is however no single concept for background discard or 'scatter', and therefore no agreed definition. The definitions in current use are based on the postulated nature of prehistoric activity, and often they are phrased in general terms and do not include quantitative criteria. Commonly agreed is that background discard occurs in the absence of 'focused' activity involving the production or discard of stone artefacts in a particular location. An example of unfocused activity is occasional isolated discard of artefacts during travel along a route or pathway. Examples of 'focused activity' are camping, knapping and heat-treating stone, cooking in a hearth, and processing food with stone tools. In practical terms, over a period of thousands of years an accumulation of 'unfocused' discard may result in an archaeological concentration that may be identified as a 'site'. Definitions of background discard comprising only qualitative criteria do not specify the numbers (numerical flux) or 'density' of artefacts required to discriminate site areas from background discard.

3.3.3 Sites

A site is defined as any material evidence of past Aboriginal activity that remains within a context or place which can be reliably related to that activity.

Frequently encountered site types within southeastern Australia include open artefact scatters, coastal and freshwater middens, rock shelter sites including occupation deposit and/or rock art, grinding groove sites, stone quarry or procurement sites and scarred trees. For the purposes of this section, only the methodologies used in the identification of these site types are outlined.

Most Aboriginal sites are identified by the presence of three main categories of artefacts: stone or shell artefacts situated on or in a sedimentary matrix, marks located on or in rock surfaces, and scars on trees. Artefacts situated within, or on, a sedimentary matrix in an open context are classed as a site when two or more occur no more than 60 metres away from any other constituent artefact. The 60 metre specification relates back to the definition of an isolated find (refer Section 3.3.1).

Any location containing one or more marks of Aboriginal origin on rock surfaces is classed as a site. Marks typically consist of grinding features such as grinding grooves for hatchet heads, and rock art such as engravings, drawings or paintings. The boundaries of these sites are defined according to the spatial extent of the marks, or the extent of the overhang, depending on which is most applicable to the spatial and temporal integrity of the site.

Stone procurement sources/procurement sites/quarry sites are typically exposures of a geological raw material where evidence for human extraction and/or preliminary processing has survived. They are places where stone is obtained for making into artefacts. As a prehistoric site type in Australia, stone procurement sources range on a continuum, from pebble beds in watercourses (where there may be little or no archaeological evidence of human activity) to extensively quarried outcrops of bedrock where there is clear evidence of procurement activity, such as quarry pits, discarded hammerstones and large consolidated cultural deposits of primary flaking debris. Often in archaeological sources, the terms ‘quarry’, ‘stone source’, ‘extraction site’ or ‘procurement site’ are used interchangeably. It is more correct to identify, where possible, actual quarrying processes, that is, excavation of stone material, as different to a stone procurement source where opportunistic exploitation may have occurred. The AHIMS register used by the DEC identifies all such sites simply as quarry sites.

Scarred Trees

Trees with scars of Aboriginal origin form the other major type of artefactual evidence. Each tree is normally considered to be a separate site. The identification of a scar as Aboriginal in origin is dependent on a set of inter-related interpretive criteria. The credibility of alternative causal explanations such as natural traumas and other types of human scarring must be tested for each scar.

A range of diagnostic criteria has been developed to assist in the identification of Aboriginal scarred trees. The following numbered criteria are based on archaeological work conducted by Simmons (1977) and Beesley (1989). It should be noted that these criteria have never been quantitatively tested or quantified using non-relative criteria such as absolute dating or an analysis of pre-occluded scar morphologies. This is because radiocarbon dating or dendrochronology is mostly inconclusive, and the removal of regrowth exposes trees to further damage.

1. *The scar does not normally run to ground level*: (scars resulting from fire, fungal attack or lightning nearly always reach ground level). However, ground termination does not necessarily discount an Aboriginal origin (some ethno-historic examples of canoe scars reach the ground);

1(a). *If a scar extends to the ground, the sides of the original scar must be relatively parallel:* (natural scars tend to be triangular in shape;

2. *The scar is either approximately parallel sided or concave, and symmetrical:* (few natural scars are likely to have these properties except fire scars which may be symmetrical but are wider at the base than their apex. Surveyors marks are typically triangular, and often adzed);

3. *The scar should be reasonably regular in outline and regrowth*: scars of natural origin tend to have irregular outlines and may have uneven regrowth;

4. *The ends of the scar should be 'shaped', either squared off, or pointed* (often as a result of regrowth): (a 'keyhole' profile with a 'tail' is suggestive of branch loss);

5. *A scar which contains adze or axe marks* on the original scar surface is likely to be the result of human scarring. Their morphology and distribution may lend support to an interpretation of an Aboriginal origin: (marks produced after the scarring event may need to be discounted);

6. *The scar must date to the time of Aboriginal bark exploitation within its region:* The traditional Aboriginal exploitation of bark probably ceased in most regions between 100 and 150 years ago. However, in some locations associated with Aboriginal settlement, the Aboriginal removal of bark may have continued to the present day, or restarted as part of new cultural movements.

7. *The tree must be endemic to the region:* (and thus exclude historic plantings).

Field based identification of Aboriginal scars is based on surface evidence only and will not necessarily provide a definitive classification. In many cases the possibility of a natural origin cannot be ruled out despite the presence of several diagnostic criteria or the balance of interpretation leaning toward an Aboriginal origin. For this reason interpretations of an Aboriginal origin are qualified by the recorder's degree of certainty. The following categories were used:

Definite Aboriginal scar This is a scar which conforms to all of the criteria and/or has in addition a feature or characteristic which provides definitive identification, such as diagnostic axe or adze marks, or an historical identification. All conceivable natural causes of the scar can be reliably discounted.

Aboriginal scar This is a scar where an Aboriginal origin is considered the most likely. The scar conforms to all of the criteria and a natural origin is considered unlikely and improbable.

Probable Aboriginal scar This is a scar that conforms to all of the criteria and where an Aboriginal origin is considered to be the most likely. Despite this, a natural origin cannot be ruled out.

Possible Aboriginal scar This is a scar which conforms to all or most of the criteria and where an Aboriginal origin cannot be reliably considered as more likely than alternative natural causes. The characteristics of this scar will also be consistent with a natural cause.

3.3.4 Potential Archaeological Deposits

A potential archaeological deposit, or PAD, is defined as any location where the potential for subsurface archaeological material is considered to be moderate or high, relative to the surrounding study area landscape. The potential for subsurface material to be present is assessed using criteria developed from the results of previous surveys and excavations relevant to the region. Where necessary, PADs can be given an indicative rating of their 'archaeological potential' based on a combined assessment of their potential to contain artefacts, and the potential archaeological value of the deposit. Table 1 illustrates the matrix on which this assessment is based. Locations with low potential for artefacts fall below the threshold of classification. In such cases the potential incidence of artefactual material is considered to be the same as, or close to that for background scatter. Where there is moderate potential for artefacts, the predicted archaeological potential parallels the potential significance of the deposit. For deposits with high potential for artefacts, the assessed archaeological potential is weighted positively.

The boundaries of PADs are generally defined by the extent of particular micro-landforms known to have high correlations with archaeological material. A PAD may or may not be associated with surface artefacts. In the absence of artefacts, a location with potential will be recorded as a PAD. Where one or more surface artefacts occur on a sedimentary deposit, a PAD may also be identified where there is

insufficient evidence to assess the nature and content of the underlying deposit. This situation is due mostly to poor ground surface visibility.

		Potential to contain Aboriginal objects		
		Low	*Moderate*	*High*
Potential archaeological significance	*Low*	---	**low**	**moderate**
	Moderate	---	**moderate**	**high**
	High	---	**high**	**high**

Table 1 Matrix showing the basis for assessing the archaeological potential (shown in bolded black text) of a potential archaeological deposit.

4. ENVIRONMENTAL CONTEXT

The potential flood zone for the probable maximum flood would encompass an area of many hundreds of square kilometres within the region. Only a portion of this was included in the study area for this cultural heritage assessment.

Lake Keepit is formed by the damming of the Namoi River. The Namoi River is a prominent east-west orientated river of the Murray Darling Basin and drains a significant catchment on the Western Slopes of NSW between the Liverpool Range and Walcha. The study area comprises Lake Keepit and part of the Namoi River upstream from the existing full supply level. Downstream of the main dam wall, the study area includes the Namoi River to the confluence with the Peel River. It includes a section of the Peel River upstream of the confluence with the Namoi River to Carroll Gap. The potential overflow area below the subsidiary dam wall to its confluence with the Peel River is also included in the study area.

Keepit Dam is located within the transitional zone between the rangelands of the Western Slopes and the alluvial topography of the Western Plains. The Keepit Dam area is characterised by the substantial plains and valley floor topography of the Namoi, Manilla and Peel Rivers. Much of these landforms would be inundated during river flooding. Colluvial and alluvial fans emerging from the adjacent slopes, abandoned stream courses and alluvial terracing would be characteristic features of these valley floors. The major rivers display moderate meandering. Several lagoons and associated wetlands are associated with the Namoi and Peel Rivers.

Rangelands dominate the river catchments upstream of Manilla. These ranges tend to be parallel, aligned northwest-southeast, and higher toward the east and northeast. They reach a maximum height of 1090 m AHD. Downstream of Manilla, the Namoi River flows with minimal meandering across a broad flood plain, bordered to the north by the basal slopes of Baldwins Range. Toward the current dam site, the river valley becomes more confined and narrow due to its passage through low and undulating rangelands which are a northwestern extension of the Melville Range. This range is most prominent south of the Peel River. The ridges and spurlines of these low ranges form the current points and islands of Lake Keepit. Within the area of Lake Keepit, the Namoi River corridor is characterised by large and often tight meander loops.

The Namoi River leaves the low ranges downstream of its confluence with the Peel River (5 km south of the main dam wall). From this point the river valley broadens into an extensive floodplain, intersected only by a discontinuous single unnamed range to the north of the river (which included Birken Head Rock, Kelvin State Forest and Mount Surprise).

A geomorphological study undertaken by Sinclair Knight Merz (SKM 2006) identified four land units downstream of the dam wall (Figure 4). The Namoi Slopes comprise the area below the sub wall and east of Tulcumbah Ridge. They are characterised by low slopes based on the geological unit of the Namoi Formation of weathered shale, mudstone and siltstone. The area typically has deep soils and merges with the Peel River floodplain.

Tulcumbah Ridge is a narrow linear unit extending in a roughly north-south direction. The Peel and Namoi Rivers cut through this unit which is characterised by steep slopes with some colluvial and fan deposition at the base. The geology of the unit comprises sandstone, mudstone and Rangari Limestone. This unit is well known in the area as a fossil bearing deposit and is used by the University of New England for teaching purposes.

The third land unit identified is the Keepit Rises. This is a large area west of the dam encompassing the landscape north and south of the Peel/Namoi River confluence. It is characterised by dissected ground in the north and east but undulating ground in the west and south. The unit has variable relief with moderate to steep slopes with shallow soils that deepen on the lower slopes and merge with the floodplain. The underlying geological units comprise Keepit Conglomerates of pebble to boulder orthoconglomerates, sandstones and mudstone. The other geological unit is the Noumea Beds which contain siltstone, mudstone and lithic wacke.

The fourth unit identified is the floodplain of the Peel and Namoi Rivers. The Peel River floodplain is restricted to between 80-100 m in width west of Tulcumbah Ridge due to the narrow gorge. However, east of the ridge, the floodplain is wide and up to 9 m deep at Carroll Gap. The Namoi River floodplain starts from about the confluence with the Peel River. Downstream, the floodplain meanders through the

Keepit Rises before extending out onto the vast floodplain near Carroll. The sediments of the floodplain are typically sorted with heavy cobbles at the base, grading upwards through sands to fine silts and clays of the floodplain proper.

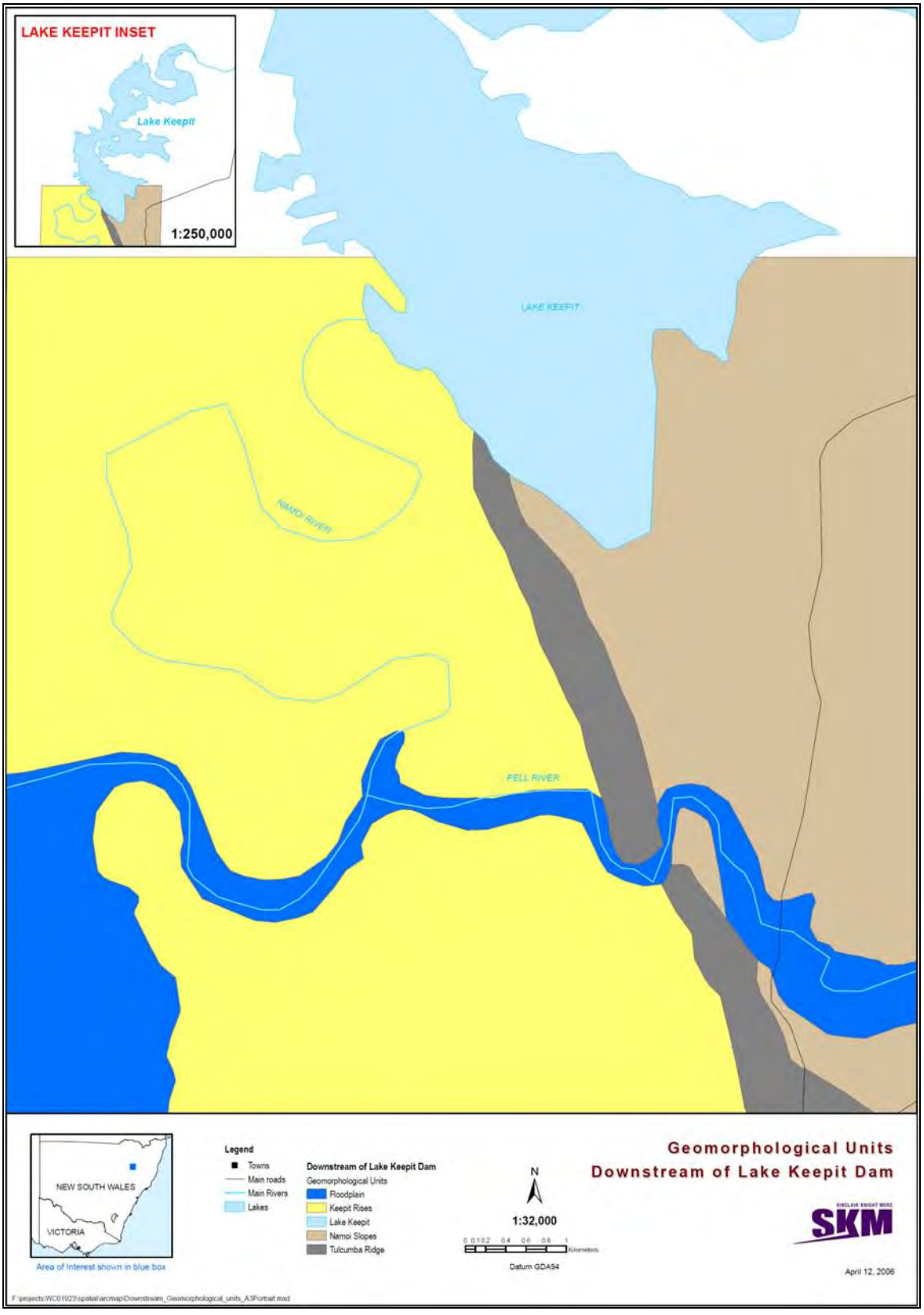

Figure 4 Geomorphological Units downstream of Keepit Dam.
(SKM 2006, map supplied by Parsons Brinckerhoff).

5. ABORIGINAL BACKGROUND

5.1 Regional Archaeological Setting

The Keepit Dam study area is located within the tribal boundaries of the Kamilaroi tribe (Tindale 1974; Howitt 1996) and in the landscape transition between the Western Slopes and Western Plains region of NSW. These broad areas have been the subject of considerable archaeological investigation, both within the context of academic research and environmental impact assessments. A more limited number of studies have been reported for the Keepit Dam region. These are restricted to impact assessment reports and tend to focus on specific development application areas.

Studies within an academic research framework include Bell (1979, 1980, 1982) and Pearson (1981). Impact assessment studies include Lance (1985), Thompson (1981), Haglund (1982, 1985), Navin (1990), Resource Planning (1992), Environmental Resources Management (2002) and Navin Officer Heritage Consultants (2005). In addition some opportunistic surveys undertaken by staff of the National Parks and Wildlife Service (NPWS) have recorded sites.

The resulting corpus of information provides both an inventory of known sites for the region, and most importantly, a set of predictive statements which allow for the assessment of the unrecorded potential archaeological resource.

5.1.1 Studies within the Keepit Dam region

Thompson (1981) carried out a survey of areas north and south of the Namoi River and a corridor across the river approximately mid-way between Gunnedah and Boggabri. Thompson identified two extensive campsites on the Namoi River, several smaller camp sites on Greenwood Creek, nine isolated finds, a grinding groove site and a number of scarred trees. Thompson noted the close association of campsites with water sources and identified two groups of sites: those on relatively permanent streams, and those on intermittent streams. For the latter he noted a preference for areas upstream of where creek channels become poorly defined and spread out on the alluvial flats.

Haglund investigated two large sites on the Namoi River identified by Thompson (Haglund 1984), together with other small areas to the north of Gunnedah (Haglund 1985) and northeast of Boggabri (1983).

Based on her investigations, Haglund proposed a broad site location pattern for the Namoi region. Artefact scatters tend to be close to water – riverbanks, lagoons or even minor erosion channels where water would temporarily collect after rain. Near rivers and lagoons, the sites tend to occur on the higher parts of the banks, above normal flood levels. Near minor drainage channels sites are often found at the foot of a ridge or hill, above those areas where run-off tends to spread out over the plain. Grinding grooves tend to be close to water, where suitable rock is available. Ceremonial grounds, such as Bora rings, tend to be some distance from occupation sites. Stone arrangements, which may also be related to ceremonial activities, are generally found on crests of hills or ridges. She concludes that although few sites have yet been located, ‘the Middle Namoi region with its wide range of habitats and resources important to an Aboriginal economy supported fairly large numbers of Aborigines...' (Haglund 1985:7).

5.1.2 Some assessments conducted elsewhere on the Western Slopes

In 1981 Pearson completed an investigation of Aboriginal and early European settlement patterns within the Upper Macquarie River region of NSW. His study area includes transitional landforms similar to the Keepit Dam region. The majority of his field coverage was directed by information from informants and was thus skewed toward large or obtrusive sites. Pearson excavated three rock shelter sites (Botobolar 5, and Granites 1 and 2) which provided a regional record of Aboriginal occupation dating back to around 7000 years before present.

Pearson's analysis of the patterns of Aboriginal occupation relevant to the Keepit Dam region can be summarised by the following points:

- There is a strong relationship between site location and distance from water sources. Distance to water varied from 10 m to 500 m, but in general the average distance from water decreased as site size increased;
- Sites were found on hilly or undulating places rather than on river flats or the banks of waterways;
- Good drainage and views over watercourses and river flats were important site location criteria;
- Most sites were located in contexts that would originally have supported open woodlands, with small numbers in original grassland or forest contexts;
- Burial sites and grinding grooves were situated as close to habitation areas as geological constraints would allow;
- Ceremonial sites such as earth rings ('bora grounds') were located away from campsites;
- Stone arrangements were also located away from campsites in isolated places and tended to be associated with small hills or knolls or were on flat land;
- Quarry sites were located where stone outcrops with desirable working qualities were recognised and were reasonably accessible;
- Based on ethnohistoric information, Pearson suggests that Aboriginal campsites were seldom used for longer than three nights and that large sites probably represent accumulations of short visits.

Lance (1985) conducted a survey of a proposed 145 km long transmission line from Wellington to Forbes. Lance's survey route traverses similar tableland and watershed topographies to some of the Keepit Dam study areas. He located 16 general artefact scatters, two scarred trees and 14 isolated finds. Most sites contained only small numbers of artefacts with 58% containing 10 or less, and 12% containing over 100.

Lance found that an examination of site patterning according to broad geomorphological land systems revealed only superficial trends. By contrast, zones of archaeological sensitivity were found to be more directly related to landform constraints than land system type and that a micro-topographic approach to sampling provided the most effective survey strategy.

5.1.3 Studies within Keepit Dam Study area

A survey by Steel (Resource Planning 1992) to asses proposed gravel extraction on the Namoi River recorded an isolated artefact (AHIMS 20-4-56). The artefact was amongst a gravel bed on the River and was rounded by water action suggesting it may have been deposited by floods. The site is below the confluence of the Namoi and Peel Rivers and therefore outside the boundaries of the project assessment.

In 2002 Environmental Resources Management Australia produced a cultural heritage assessment for interim safety works on the Keepit subsidiary dam wall (Environmental Resources Management 2002). The study included field survey of areas of potential impact. Field survey did not reveal Aboriginal sites and it was noted that ‘Poor ground surface visibility encountered in the study area, as well as past land uses have contributed to the absence of surface indigenous sites’ (ibid:22). It was further noted that while the majority of the Keepit Dam site had been subject to land uses that would have disturbed the integrity of cultural materials, the most likely locations of archaeological sensitivity within the subsidiary dam wall study area was around Keepit Dam, and the Peel and Namoi Rivers and their tributaries (ibid:21).

Navin Officer Heritage Consultants conducted a field survey for the Keepit Dam Upgrade options development report in 2005. The study involved targeted field inspections of work areas associated with various options for the upgrade of the dam. Nine new Aboriginal sites were identified at locations upstream and downstream of the dam. These comprised four artefact scatters, an isolated find, three scarred trees and a stone procurement source.

5.2 Historical Period

An Aboriginal Reserve, known as Manilla (AR 35745) was located at Borah Crossing at the northern end of the study area. The 20 acre reserve was gazetted on 23 March 1903 on Portion 77, in the Parish of Keepit (McGuigan n.d.) (Figure 5). As with many reserves across NSW, the Reserve was established for the use of local Aboriginal people but was revoked on 17 March 1961.

Annotations to the 1898 and 1909 Keepit Parish maps show the Reserve was notified on 23 May 1903.

The Reserve was situated on the southern side of the Namoi River at Borah Crossing. It was only marginally affected by the flooding of Keepit Dam as the Reserve is mostly beyond above the dam's full supply level It is unlikely that additional impacts to the area would occur as a result of the operation of the proposals under investigation.

No standing structures remain at the site but there may be archaeological features present.

Little information about the Reserve is publicly available but it is known that the area is of importance to the local Aboriginal community. Some information obtained from Aboriginal community members includes:

- Aboriginal people were born and died at the Reserve. Surviving records, such as birth certificates and historical cemetery records, attest to this;
- In historic times, Aboriginal people were continually on the move looking for work and camped at a number of different areas such as Cohens Bridge at Gunnedah and Borah Crossing Reserve;
- A number of families, including the Beales, Tighes, Smiths and Duncans, were resident over time on the Reserve, and when it closed in 1960 they moved to places such as Moree and Caroona; and
- The locality of Borah Crossing is important to the contemporary Aboriginal community.

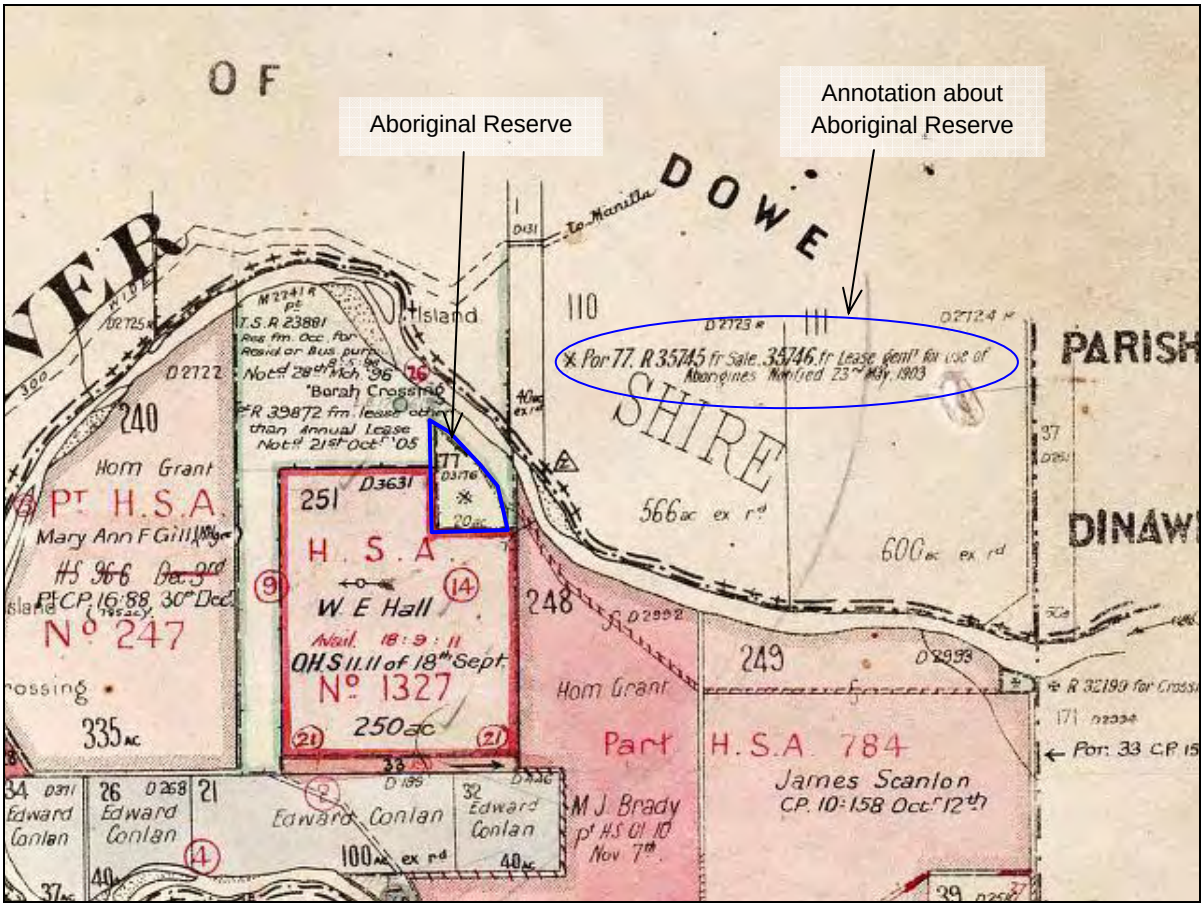

Figure 5 Location of Aboriginal Reserve identified on Keepit 1909 Parish Map.

5.3 Previously Recorded Aboriginal Sites

Up to June 2003, over 100 Aboriginal archaeological sites have been listed on the NSW NPWS Register of Sites (AHIMS) within a radius of 50 km of the town of Gunnedah. The majority of these are open camp sites (around 60%), followed by grinding grooves (around 15%), scarred trees (around 15%), and carved trees (around 5%).

Within a 50 x 50 km search area centred on Lake Keepit, there are 25 sites on the NSW NPWS Aboriginal Register of Sites. The majority of these are open camp sites (10), followed by scarred trees (6), isolated finds (6), and a number of other site types represented by a single recording (grinding grooves, a carved tree and a stone procurement source).

Prior to the 2005 field survey, there were a total of 11 archaeological recordings within a 10 km radius of Lake Keepit. The sites recorded are shown in Table 2.

This relatively small number of site recordings reflects the low degree of systematic archaeological survey that has occurred within the region. It is not a reliable reflection of the likely number and scope of surviving Aboriginal sites.

Table 2 Recorded Aboriginal sites within 10 km of Lake Keepit (prior to 2005 survey)

NPWS Site No.	Site Name	Site Type
20-4-0054	Black Gully 1	scarred tree
20-4-0055	Black Gully 2	scarred tree
20-4-0056	p1	open camp site (artefact scatter)
20-5-0001	Carroll Gap	scarred tree
20-5-0002	Beverly Station	grinding grooves
20-5-0016	Keepit 2	open camp site(artefact scatter)
20-5-0017	Keepit 1	open camp site (artefact scatter), hearths
20-5-0018	Keepit 3	open camp site(artefact scatter), hearth
20-5-0019	Keepit 5	open camp site(artefact scatter)
20-5-0020	Keepit 4	open camp site(artefact scatter), glass, ‘contact’ site
20-5-0021	Tolcumbah Lookout	stone procurement source

6. HISTORICAL CONTEXT

6.1 Historical Overview

6.1.1 Early Exploration

In 1818 the surveyor Oxley headed an expedition which explored the Macquarie, Castlereagh, Peel and Hastings Rivers. He named Port Macquarie, at the mouth of the Hastings, and returned down the coast to Sydney. When Oxley passed through the Liverpool Plains areas around the Peel River during that journey, he declared, ‘it would be impossible to find a finer or more luxuriant country ... no place can afford more advantages to the industrious settler’.

A runaway convict named Clarke started a story about how he started from Liverpool Plains and followed a river called by the natives the *Gnamoi* or *Nammoy*, into which he said that Oxley's river Peel flowed. Crossing this he struck another river, the *Kindur*, and down this stream he traveled no less than 400 miles before it was joined by the *Gnamoi*. Clarke’s story was that the *Kindur* was broad and navigable, flowing through level country and spreading into occasional lakes, until at last he reached the sea. Of course this was a fabrication but the Acting-Governor, Sir Patrick Lindesay, decided on sending out an expedition to find out the truth of this story.

Accordingly, Major Mitchell received instructions to take charge of the party, and on 21 November 1831, took his departure from Liverpool Plains. On 15 December 1831, he came to the Peel, and crossing Oxley's Hardwicke Range, reached the Namoi River the next day. After penetrating some distance into a range, which he called the Nundawar Range, he made back for the Namoi, and proceeded to set up the canvas boats he had with him, intending to try to follow the river in them. His attempt was fruitless, one of the boats was soon snagged, and it became evident that it would be much easier to follow the Namoi on horseback.

Leaving the river, after passing the range he had vainly tried to cross, on 9 January 1832, Mitchell came to the Gwydir River. Turning westward, the party followed this river down for 80 miles, when he again returned to his northern course, and came to the largest river he had yet found. This was called, by the natives, the *Karaula*, and Mitchell descended it until convinced, by its southern course and the junction of the Gwydir, that he was on the upper part of the Darling River.

He now prepared to move once more to the north, anxious to find a river that did not belong to the Darling system. As, however, he was on the point of starting, he was overtaken by his assistant-surveyor, Finch, who was bringing on additional supplies, with the disastrous news that the blacks had attacked his camp during a temporary absence, murdered the two men, robbed the supplies, and dispersed the cattle. This misfortune put a stop to the progress of the party. They returned, and having buried the bodies of the victims, made their way back to the settled districts.

This journey of Major Mitchell's helped greatly to work out the courses of the rivers crossed by Oxley, and more especially those discovered by Cunningham during his trip to the Darling Downs. Mitchell traveled, as it were, a more inland but parallel track, crossing the rivers much lower down. Thus the Field River of Oxley is the *Namoi* of Mitchell, Cunningham's Gwydir is recognised by the Surveyor-General, and is probably the mythical *Kindur* or *Keinder*, whilst the last found river, Mitchell's *Karaula*, is formed by the junction of the Dumaresque and Condamine Rivers (Favenc 1967, Australian Rural History Online 2006, Walkabout 2006, Tourism Tamworth 2006).

6.1.2 Settlement

Shortly after Oxley’s exploratory journeys, the first squatters arrived in the area in the 1820s. At that time, the Baldwin’s of Singleton, occupied land about 10 km south of the present town of Manilla. The family later took up the ‘Dinnawirindi’ station in 1837.

The future town site of Gunnedah arose out of what was originally a principal crossing-place for teamsters on the Namoi River. White settlement began in the mid or late 1830s when John Johnston established the ‘Bulomin’ run on the Namoi River, building his homestead and woolshed by the riverbank. Consequently, the area was known as 'The Woolshed' until about 1860. The property was

later renamed 'Gunnedah'. The Gunn-e-darr people of the Kamilaroi tribe inhabited the area before white settlement. They associated the future town site with a sizeable outcrop of white stone where the public school now stands in Bloomfield Street. At the end of the 18th century they were led by a legendary warrior named Cumbo Gunnerah, known as the 'Red Chief'.

Other squatters soon followed Johnston in the Gunnedah area. A survey of the town site was carried out in 1854 and the first land sales took place in 1857. The soil proved arable and wheat-growing soon commenced. In 1866 the population was recorded as about 300.

The railway arrived in Gunnedah in 1879 and the town subsequently became the commercial centre of the north-west and began to expand. Cohen's Bridge was built over the Namoi in 1884 and the town became a municipality in 1885 with a population of about 1,000.

In 1834, The Australian Agricultural Company took up 313,298 acres on the western side of the Peel River with 6,000 sheep. Other settlers gradually built up a town, later to become Tamworth, on the eastern side of the river. Tamworth was named after Sir Robert Peel's Electorate of Tamworth in Staffordshire England, and was declared a town in 1850. The discovery of gold at Hanging Rock in 1851 brought even more settlers to the area. In 1876, Tamworth became a Borough with its first Mayor, Philip Gidley King. King was Superintendent of the Australian Agricultural Company's Peel River Land & Mineral Company, which had its headquarters at 'Goonoo Goonoo' Station.

In 1853, W. Simms Bell founded 'Keypet' Station on the lower Namoi, which is now inundated by Lake Keepit.

Also in 1853, George Veness selected a property at the confluence of the Namoi and Manilla Rivers, thereby capitalising on what was then a teamsters' campsite known as The Junction. He built a wine-shop, a store and a residence and later became the first postmaster. Veness was asked by the postal department to choose a title for the village and named it after the Manilla River which had originally been called the 'Manellae', either a reference to the tribe which hunted its banks or a Kamilaroi term meaning winding river. It is said an ex-sailor familiar with Manilla in the Philippines instigated the change.

The town of Manilla was laid out in the early 1860s by Arthur Dewhurst and he named its streets after himself, his wife, their English home towns, his chain man and his employer. It was gazetted in 1863 although a major flood the following year swept away a number of buildings and killed four of the 12 residents.

Bushranger 'Thunderbolt' began a regular association with Manilla in 1865, taking two horses from a local property and committing a series of robberies on the Barraba Road. In 1867, he bailed up the Tamworth mail 3 km from Manilla. He then proceeded to Hills public house where he partook of refreshments. At Veness' store and hotel he robbed everyone, pilfering clothes, spirits and groceries. The police arrived and he fled without his pack horse which carried some of his gains. He returned to again rob the mail coach later that year.

In 1866, Manilla was described as a postal town in a pastoral and quartz mining district. There was a hotel, an inn and a district population of 50. However, over the next 35 years there was considerable development and population growth facilitated by closer settlement after the passing of the Robertson Land Act in 1861, the construction of a bridge over the Namoi River, the coming of the railway in 1899, and the development of the wool and especially the wheat industries.

Schools in the area included: Keepit Public School, which opened in December 1875 then closed and re-opened a number of times before finally closing in December 1928; Keepit Dam School, which took over from Keepit school in 1928 and closed in 1966; Gunnenbene Public School, which opened in October 1877 and closed in May 1943; Carroll Gap Public School, which opened in July 1882 and eventually closed in December 1922; and Hawarden Public School, which opened in October 1889 and closed in December 1933 (Fletcher and Burnswood 1983:54, 93, 95, 110).

6.1.3 Keepit Dam

Europeans settled in the Namoi Valley in the 1830s shortly after its discovery by explorer Thomas Mitchell. The rivers would flood one year and run dry the next. After no dam proposals investigated in

1897 gained approval, farmers turned to artesian bores. Thirty years later artesian irrigators reported falling water levels and the dam was proposed (Jeffcoat c1996:40).

Following a conference held in Narrabri in 1935 regarding the problems of domestic and stock water supply on the northwest of NSW, the government commenced investigations for river supply to replace the failing artesian bore supply. These investigations eventuated in the decision to erect the Keepit Dam. Surveys of the site for a future Keepit Dam were underway by 1936. The Keepit Dam Act was passed on 23 December 1937 giving power to the state of New South Wales to erect the dam, making it a charge on the state and on landholders who received the water. The estimated cost of construction was £1,340,000. The dam was to be 1800 feet long and 125 feet above river level and would be able to store 345,000-acre feet of water. The main structure (the main dam wall) would be a gravity concrete wall with spillways for water supply and outlets for hydroelectric power generation, plus an earth embankment on the south end (the left abutment). A subsidiary embankment (the subsidiary dam wall) would be built across a low saddle on the ridge between the Namoi and Peel Rivers. The subsidiary dam wall was designed to cover a low section between the Namoi and Peel River valleys to prevent spill over during floods.

Preparatory works including road works, staff accommodation and the erection of other necessary buildings, water supply for the township and the supply of plant commenced on 18 December 1939. An office for staff was established at Keepit on 18 April 1940. By 30 June 1940, the township had three cottages for married staff, plus two dormitories for 140 employees plus mess rooms. The works township had been partially laid out. Some of the works buildings had been transferred from Wyangala.

The NSW Premier, Alex Mair, fired the first shot to blast the dam wall foundation on 30 April 1941. A temporary power house was in operation by 30 June 1941 while a permanent one was under construction. At that time a diversion channel one mile long was being excavated, cableway platforms were being erected and excavation of the dam foundations had commenced. However, due to World War II the works had to be closed down in 1942. Work recommenced after the war, but when the Water Conservation Commission failed to attract sufficient funding work again ceased. By June 1953, construction works were being wound down but recommenced in October 1953 when more loan money was made available.

In March 1954, the Namoi River was diverted into a temporary channel. Works then included foundations for the main dam wall and for the subsidiary dam wall, the laying of impervious fill in the secondary dam area, diversion works, a new bridge, installation of plant, works building construction and accommodation.

As loan funds did not cover all necessary works, construction again proceeded at a reduced pace in 1956. Increased funding allocations in 1957 enabled work to accelerate.

Two cableways were brought into operation in order to shift increased quantities of concrete, with priority given to the spillway on the main dam wall so that the river could be directed to the eastern side of the valley in order to construct the subsidiary dam wall.

Continued better funding through 1958 enabled the work to proceed at an accelerated pace. Attention was initially given to constructing the spillway section, particularly the apron, dissipater, and eastern training wall, in order to divert the river. The Namoi River was diverted on January 1958 and work on the remainder of the subsidiary dam wall was undertaken. The first of the final crest units were placed on the main dam wall in June 1958.

Construction of a hydroelectric power station commenced in October 1958 and was largely complete by June 1959. In December 1958, the left abutment was complete. By 1959, the subsidiary dam wall, the six-span spillway bridge, and the main dam wall including concrete deck except for one small part and the overflow section were also finished. Two hollow jet outlet valves were installed and a chamber was built around them. The steel pivot pins, weighing 16 tons each, for the radial gates were installed. Erection of the main radial gates commenced in August 1959. The hydroelectric power station was also completed in 1960.

On 10 March 1960, the Keepit Dam commenced operations as a domestic and stock supply dam. A gantry crane, supplied and fitted by Stothert, Pitt-Coates and Co, was installed with a 110-ton lifting capacity plus a 25-ton secondary hoist. It was used to lift the bulkhead gate.

The hydroelectric power station commenced operations on 17 December 1960. By June 1961, most of the construction plant and buildings had been sold, and the construction cableways had been dismantled (Kass 2002:13, Stafford 1962:215-232, WC & IC Annual Reports 1940-1961)

6.1.4 Landuse

Landuse practices over the last 150 years have the potential to impact on the archaeological sites located within the region, especially Aboriginal sites. With white settlement and selection of land, one of the earliest tasks was to clear the ground for stock and pasture. This often involved ringbarking trees and their later removal. This would result in the destruction of scarred trees in particular.

Clearing and ploughing of land also disturbs Aboriginal campsites. While the stone artefacts used by Aboriginal people are themselves resilient, the cumulative impact of ploughing disperses the artefacts and reduces the integrity of the sites.

Naturally the construction of Keepit Dam would also have had a large impact on the archaeological record of the region. The construction of the dam wall itself, with removal of thousands of cubic metres of rock and gravel from the river banks would likely have impacted any sites on the river. Yet it is the drowning of the sites within the lake which has the most impact due to the size of the area involved. While the current investigations have shown that sites can be found on previously inundated ground, the impact on sites within the main lake bed is likely to have been significant.

Scarred trees have undoubtedly been drowned by the lake and subsequently fallen over, while artefact scatters are likely to have been submerged and covered with silt. Realistically, although artefact scatters may still be present beneath the lake, they are inaccessible for research and recording purposes and can therefore be considered as removed from the landscape.

The cumulative effect of European land use practices is therefore to reduce the number of sites and to also reduce the integrity of those sites remaining. Few areas within the region could be considered as undisturbed by European landuse. The Travelling Stock Reserve would be one but even this is likely to have been at least partially cleared and contains evidence of vehicle tracks and fencing.

The implications for the present study are that the majority of archaeological sites in the region have been disturbed and that some have been effectively destroyed. Any sites located during the study are therefore a sample of a smaller population than in pre-European times. Nevertheless, the general expanse of the region would ensure that a broad range of sites still exist.

6.2 Predictive Historical Archaeology Statement

The types of places or items that may form part of the historical archaeology context include:

- Below ground evidence, including building foundations, occupation deposits, features and artefacts;
- Above ground evidence, including buildings, works, industrial structures and relics that are intact or ruined; and
- Areas of land that display evidence of human activity or occupation.

Unrecorded historic sites and features of heritage significance that may occur within the study area include:

- Buildings and structures will be focused along early centres and corridors of occupation, industry, travel and transport;

- Nineteenth century structures such as farm dwellings, outbuildings, selectors' huts and schools may survive as standing buildings, ruins or archaeological deposits and are most likely to survive on less developed rural properties, on early portion numbers, and in or near established farm building complexes;

- Traces of agricultural and industrial processing or extractive sites, such as dairies and quarries may be found throughout the area in association with farm holdings;

- Sites associated with early roads will be closely associated with early cadastral road reserves, watershed ridgelines, and related to early river and creek crossing points;

- Archaeological sites such as the occupation remains of former dwellings including homesteads, houses and huts, will be distributed in close association with land settlement patterns, and correlated with favourable agricultural lands, trading nodes and transport corridors;

- Transport and access routes such as bridle paths, stock routes, and highway alignments of varying forms and ages, may survive as abandoned remnants adjacent to modern transport routes, or as alignments now followed by more modern or upgraded road and track infrastructure; and

- Old fence lines (such as post and rail fencing) may occur along road easement boundaries and farmlands. Other indications of field systems such as drainage channels and ridge and furrow ploughlands are likely to survive in low lying agricultural ground, especially in areas which are now used for grazing, rather than cropping.

6.3 Summary of Historical Heritage Listings for Study Area

There are no places or items listed on any historical heritage listing for the study area.

7. RESULTS

7.1 Aboriginal Sites

7.1.1 Newly Recorded Sites

Combining the results from the 2005 and the 2006 field surveys, a total of twenty eight (28) previously unidentified Aboriginal sites have been recorded within the study area.

Sites include five isolated finds, thirteen artefact scatters, nine scarred trees and one stone source.

A summary of site details are provided in Table 3. Site locations are shown in Appendix 4.

Some of these sites have been recorded as possible scarred trees. All of the scars recorded during the present investigation are assessed as possible Aboriginal scars.

All grid reference coordinates are provided in Australian Geodetic Datum (AGD) format, as per the 1:25,000 topographic maps of the area and were obtained using a Global Positioning System (GPS).

7.1.2 Previously Recorded Sites

Eleven Aboriginal sites have been previously recorded in a 10 km radius of Keepit Dam. Five of these sites were inspected during the 2005 and 2006 field surveys to confirm their locations. The remaining recordings were not inspected due to property access issues or lack of suitable location information and time.

#20-4-0054 **Scarred Tree**

This site is a scarred tree located on the edge of a shallow drainage line on the eastern side of Lake Keepit. The tree is in good condition and the scar is considered to be a 'possible' Aboriginal scar. The tree is potentially only 150 years old and the scar may not be of a sufficient age to have been made by Aboriginal people. It is also adjacent to a fenceline and this introduces the possibility that the scar may be the result of damage during fence construction.

#20-4-0055 **Scarred Tree**

This site is a scarred tree located about 60 m west of site #20-4-54. This tree is in fair condition and the scar is considered to be a 'possible' Aboriginal scar. The scar regrowth is quite shallow and although symmetrical, is situated below a branch tear. There are also steel axe marks on the wood and the top and base of the scar.

#20-4-0056 **Isolated Find**

This site is an isolated artefact that has been heavily water rolled and was found in a gravel bed on the Namoi River. Inspection of the area found that sand and gravel extraction had probably destroyed the artefact.

#20-5-0021 **Stone Procurement Source**

The general location of this recording was inspected in the course of the field investigations. The artefactual content of this site could not be definitively confirmed during the field survey. The site is recorded as a quarry where Aboriginal people took advantage of the exposed conglomerate beds and extracted pebbles of fine grained stone for flaking. The extent of the site was originally identified as 30 m long. No flakes or cores were found during the present investigation although they were noted during the original recording (1987). However, many parts of the spur, on which the conglomerate is situated, were covered in naturally split and broken pebbles. The exposures of conglomerate extend for hundreds of metres along the lake shore and along the spurline north and south of Tolcumbah Lookout. The potential site area could therefore include the crest and slopes of the spurline, or anywhere where conglomerate boulders are exposed.

Sites that were not inspected in the context of the current Keepit study include the following:

#20-5-001 **Scarred Tree**

This site is a tree with a 'canoe scar' located about a kilometre south of the Peel River near Carroll Gap. It was recorded in 1975 and its current condition is unknown.

#20-5-0002 **Grinding Grooves**

This recording consists of a brief sentence referring to a series of grinding grooves on thirteen boulders on 'Beverley Station'. The map grid location may be approximate and refer to the property holding only.

#20-5-0016 to #20-5-0020 **Artefact Scatters**

These recordings consist of five open scatters of stone artefacts, some including hearths and possible glass artefacts which suggest occupation into the time of contact with Europeans. These sites are located on the eastern side of the lake in the vicinity of Goora Bay.

Table 3 Details of Aboriginal sites recorded during field survey

Site Name	Site Type	Environmental Setting	Comments/Features
KDA1	scarred tree	Broad simple slope above Namoi River	Dead, drowned tree, possible Aboriginal origin (Figure 6)
KDA2	artefact scatter	Simple slope above Namoi River	Site area 80 x 20 m, two artefacts
KDA3	artefact scatter	Elevated basal slope of spurline, 250 m east of Peel River	Four artefacts over 50 x 25 m area
KDA4	isolated find	40 m east of bank of drainage line and 250 m north of Peel River, on gentle basal slope	High potential for additional artefacts
KDA5	artefact scatter	On river flats, about 60 m east of Peel River	Three artefacts including utilised flake, area of 100 x 25 m (Figure 7)
KDA6	stone procurement source	On crest of Tulcumbah Ridge, 500 m north of Peel River	Tuff material opportunistically exploited, area of 120 x 50 m containing potentially hundreds of artefacts including two flaked axe blanks (Figure 8)
KDA7	scarred tree	Gentle basal slope, 20 m from ephemeral drainage line in Crown reserve	Possible Aboriginal origin
KDA8	scarred tree	On basal slopes in Crown reserve, 80 m west of KDA7	Possible Aboriginal origin (Figure 9)
KDA9	artefact scatter	Site along exposed bank and flats of Namoi River within lake inundation area	Over 100 artefacts observed over area of 100 x 50 m, including utilised pieces. High potential for many more and site to extend along river bank (Figure 10)
KDA10	artefact scatter	Bench on spur slope above Namoi River, about 300 m from river	Over 20 artefacts including 2 geometric artefacts noted within 40 x 30 m area. (Figure 11)
KDA11	isolated find	Break of slope/basal slope of spur, about 40 m from Namoi River	Artefact (hammer/anvil) within ploughed paddock
KDA12	isolated find	Crest of micro spur elevated above Namoi river, about 60 m from river bank	Small core, moderate potential for additional artefacts
KDA13	isolated find	Crest of micro spur on basal slope of main spur, about 260 m from	Small blade core, high potential for additional artefacts

Site Name	Site Type	Environmental Setting	Comments/Features
		Namoi River	
KDA14	isolated find	Narrow alluvial flat about 25 m south of Peel River	Flake on vehicle track, high potential for additional artefacts and subsurface deposits
KDA15	artefact scatter	Crest of spur elevated above floodplain of Peel River	Two artefacts, 50 m apart
KDA16	scarred tree	Floodplain of Peel River, 250 m east of river	White box with two possible scars, both rated as possibly Aboriginal in origin
KDA17	scarred tree	Floodplain of Peel River, about 250 m east of river	White box with scar, possible Aboriginal origin
KDA18	scarred tree	Floodplain of Peel River, about 250 m east of river	White box with two scars, possible Aboriginal origin (Figure 12)
KDA19	scarred tree	Floodplain of Peel River, about 500 m east of river	White box with a scar of possible Aboriginal origin
KDA20	artefact scatter	Spur crest leading down to flat on bank of Namoi River	Extensive site area, 350 x 100 m containing over 50 artefacts including 3 flaked and 1 edge ground axe. Very high potential for subsurface deposits (Figure 13)
KDA21	artefact scatter	Basal slopes of low spur leading down to flats and bank of Namoi River	About 40 artefacts in area of 350 x 250 m, high potential for additional artefacts and subsurface deposits (Figure 143)
KDA22	scarred tree	Basal slope of low spur 250 m north of Namoi River	White box with scar, possibly of Aboriginal origin (Figure 15)
KDA23	artefact scatter	Basal slope and crest of low spur, about 180 m north of Namoi River	Up to ten artefacts in area of 15 x 10 m, high potential for additional artefacts
KDA24	artefact scatter	Eroded bank of ephemeral creek about 150 m north of Namoi River	Eight artefacts within 30 x 10 m with high potential for additional and subsurface deposits
KDA25	artefact scatter	Floodplain, about 100 m north of Namoi River	3 artefacts in area 20 x 10 m with high potential for subsurface deposits (Figure 16)
KDA26	artefact scatter	Eroded bank of ephemeral creeks within broader floodplain, 250 m north of Namoi River	Over 30 artefacts observed within 80 x 30 m area, high potential for additional artefacts and subsurface deposits (Figure 17)
KDA27	scarred tree	Floodplain of Peel River	White box with scar, possible Aboriginal origin
KDA28	artefact scatter	Slope of low spur, adjacent to ephemeral creekline	Two artefacts in a 2 x 1 m area.

		
Figure 6 KDA1	**Figure 7** View northwest of KDA5	**Figure 8** View north along KDA6
		
Figure 9 KDA8	**Figure 10** View south along KDA9, Namoi River to the left	**Figure 11** View south to KDA10
		
Figure 12 KDA18	**Figure 13** View southeast along KDA20, Namoi River at tree line	**Figure 14** View east along KDA21
		
Figure 15 KDA22	**Figure 16** View southwest to KDA25	**Figure 17** View east to KDA26

7.2 Survey Effectiveness and Limitations

The effectiveness of archaeological field survey is to a large degree related to the obtrusiveness of the sites being looked for and the incidence and quality of ground surface visibility. Visibility variables such as grass or vegetation cover and the impact of previous development activity affect the chance of finding Aboriginal artefact sites in particular. During the field survey, such variables were noted to gauge the effectiveness and potential for finding sites and also the integrity of sites located.

The investigation of the proposed construction related areas showed that most had been heavily disturbed by previous activity including road construction, ground modification through levelling and material extraction, the caravan park, former construction village and other disturbances such as fencing.

The footprint of the construction, stockpile and associated areas for all three options is approximately 80 hectares. The survey sampled about 40% (32 hectares) of the footprint. Taking into consideration the visibility constraints within each survey area, the effective survey coverage is reduced to about 4.8 hectares or 6% of the potential impact area. The sample is considered to be effective in determining the potential for sites to be located in the footprints of the construction areas.

There were however limitations to the assessment of other impact areas, in particular the areas of flooding. Sample survey only could be achieved for flooding areas both downstream of the main and subsidiary dam walls and above the full supply level due to the large size of the study area. The location of surveyed areas is shown in Figure 18.

Downstream from the main dam wall, many of the areas investigated have been subject to past flood events with the consequential potential for the loss of archaeological deposits through scouring, and the potential concealment of sites through sediment deposition. The results of the survey may therefore not be a complete and accurate record of the existence of sites in this section. Similarly within the lake area, sites may now be concealed by silt deposited when the lake was full and also affected by flood events prior to the lake.

Despite these issues, the survey sample achieved is considered to be adequate to identify the range and potential location of sites in these areas.

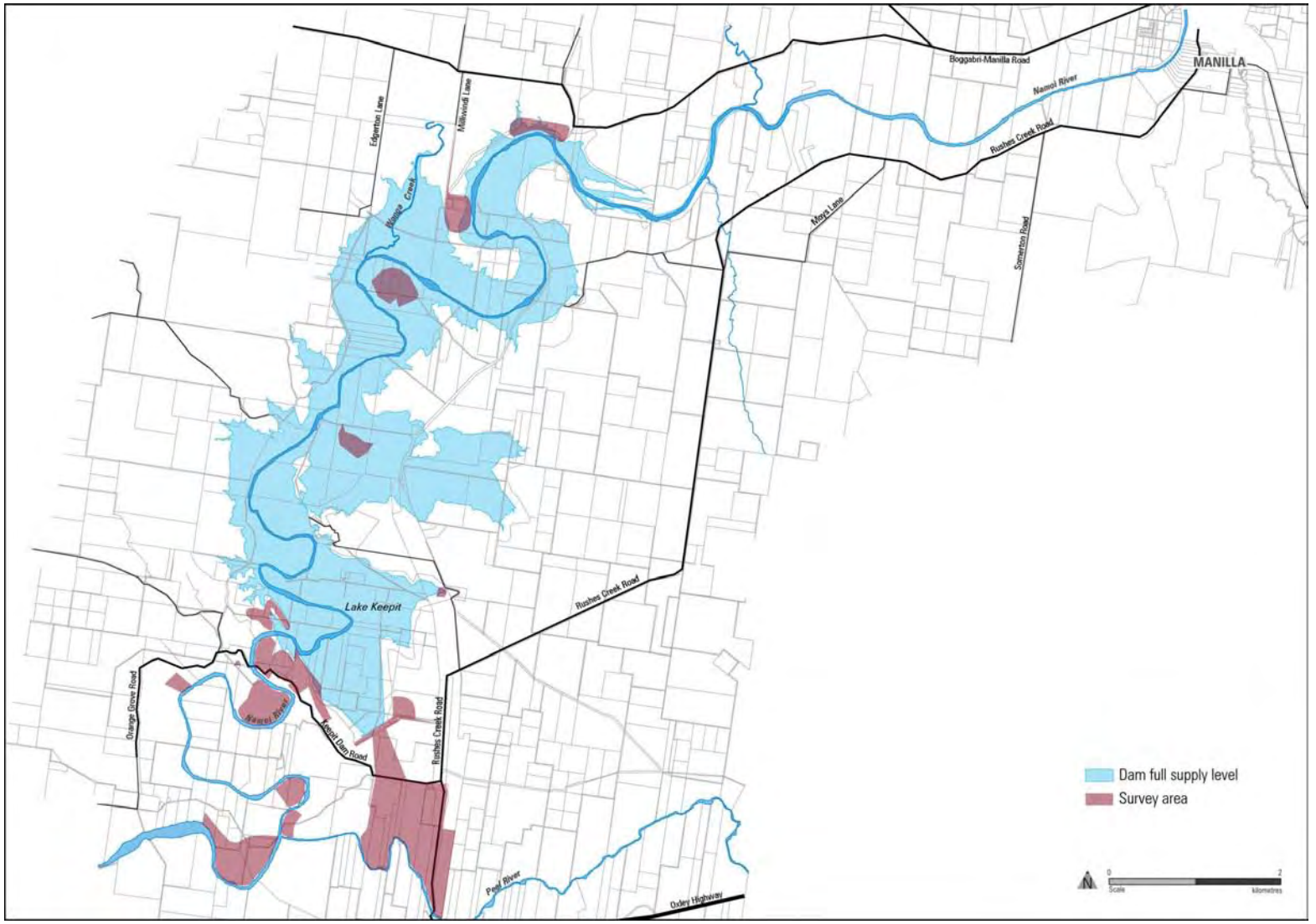

Figure 18 Location of areas surveyed within the study area.

7.3 Geomorphological Site Characteristics

Much of the information in the Aboriginal archaeological record relates to variables which describe the surrounding landscape and its resources. An example is site location which typically relates to both broad and fine scale variables that determine optimal camp locations, such as the presence of well drained flat ground and freshwater. Similarly, the content and function of a site may relate to the surrounding exploitable resources, or to the cultural significance of the landscape. For these reasons, it can be valuable to evaluate and compare survey data against geomorphological variables. The classification of landforms can be based on both large and small scale variables and be applied at varying scales. SKM (2006) has mapped geomorphological units across a portion of the study area at a broad scale, using geology, soils and topography.

These divisions have been used in an analysis of site location and content with the aim of identifying landform related trends in Aboriginal occupation. Four geomorphological units were defined by SKM occur across the study area. Archaeological survey was conducted within each of these units and resulted in site recordings in all units (Figure 19). Smaller scale topographic features such as ridge and spurlines, crests, slopes, floodplains, and the banks of rivers and creeks were also noted during the survey and sampled.

The geomorphological mapping conducted by SKM did not cover the whole study area and a number of extrapolations and corrections were used so that site recordings in unmapped or border areas could be included in the analysis. The Tulcumba Ridge unit was extended along the western margin of the lake to include the ridge on which site #20-5-21 was recorded. This site occurs within an area mapped as the Keepit Rises geomorphic unit, however based on geological and topographic characteristics this location is more correctly included as part of the Tulcumba Ridge unit,..

The northern part of the study area, together with the cluster of sites at the northern end of Lake Keepit was identified as belonging to the Borah Crossing unit. Despite similarities with the Namoi Slopes unit (including gentle undulating topography and a geological base of laminated mudstone, with siltstone and sandstone), a Borah Crossing unit classification was retained in order to avoid making links that may be inconsistent with the SKM study. The Borah Crossing unit comprises low relief bedrock spur and gentle slopes with ephemeral drainage lines and a narrow floodplain.

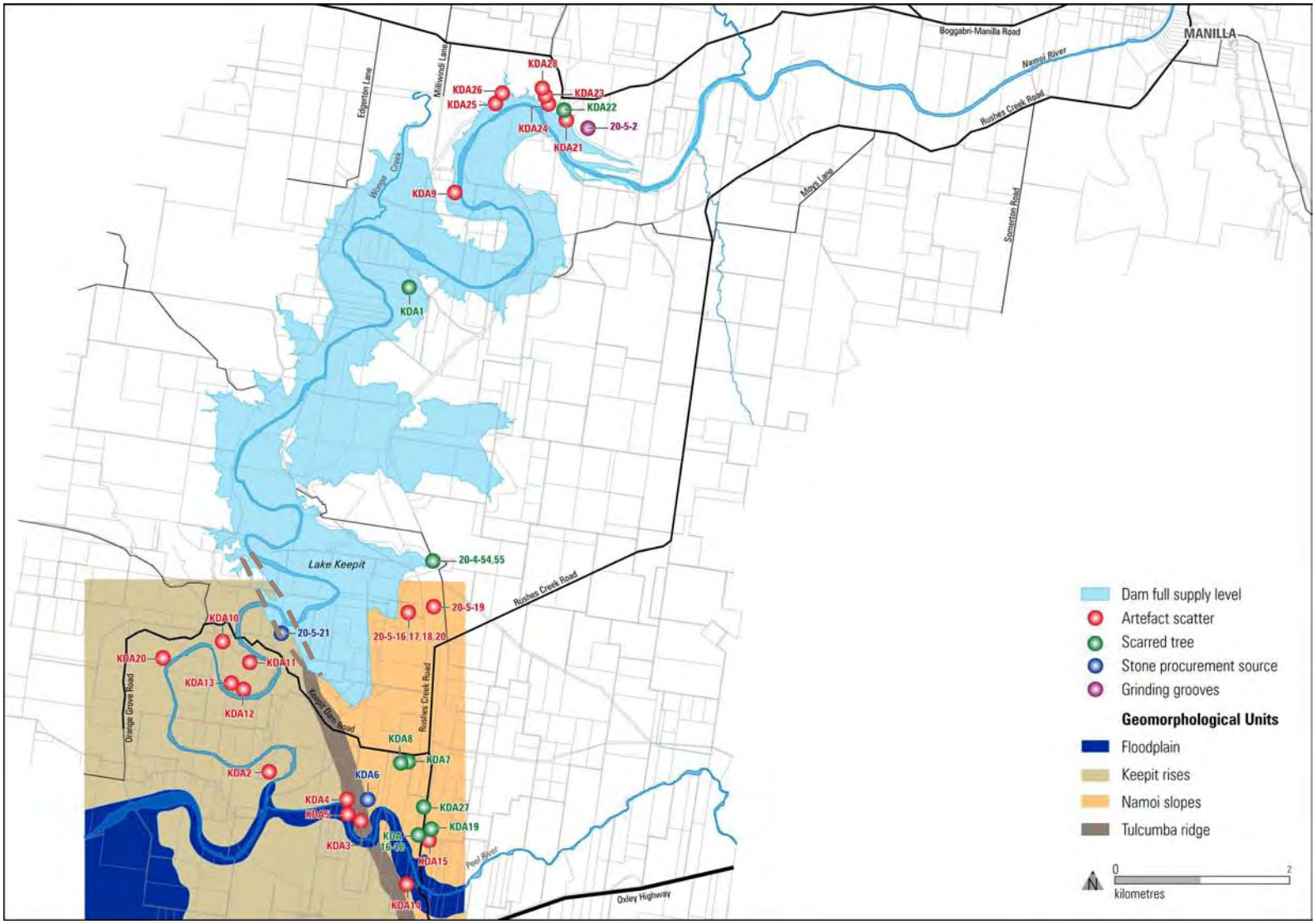

Figure 19 Geomorphological mapping with sites recorded within the study area.

7.3.1 Site Characteristics within a Geomorphological Context

Table 4 shows the breakdown of sites and site types within each geomorphological unit. There are three apparent trends. The first is that the Namoi Slopes contain the largest number of site recordings. Seven of these were recorded prior to the current investigations.

The second trend relates to the distribution of scarred trees. All of the scarred trees were recorded within the Namoi Slopes. , It is considered that this pattern is unrelated to geomorphological variables however because all of the scarred tree recordings occur within a Travelling Stock Reserve (TSR). Stock Reserves typically consist of Crown Land which has remained relatively uncleared, often in contrast to the surrounding farmland. This is the case for the TSR within the study area, which contains a large number of mature trees and is distinct from the surrounding heavily cleared farmland. As a consequence, the potential for finding scarred trees is higher within the TSR. For this reason, the TSR was deliberately targeted in the field survey for the detection of scarred trees. It can be concluded that the distribution of scarred trees is unrelated to the geomorphological setting.

Table 4 Distribution of sites within geomorphological units

Site type/Unit	Keepit Rises	Namoi Slopes	Tulcumba Ridge	Floodplain	Borah Crossing	Total
Artefact Scatter	KDA 2, 10, 11, 12, 13, 20	#20-5-16, 17, 18, 19, 20, KDA15	KDA3, 4	KDA5, 14	KDA9, 21, 23, 24, 25, 26, 28	23
Scarred Tree		#20-4-54, 55, KDA7, 8, 16, 17, 18, 19, 27			KDA22	10
Stone Procurement Source			#20-5-21, KDA6			2
Grinding Grooves					#20-5-2	1
Total	6	15	4	2	9	36

A third trend is that all of the stone procurement sites identified within the study area occur within the Tulcumba Ridge unit. There are two such recordings, one recorded previously and one during the current investigations. This close correlation is due to the underlying geology of the ridge. The ridge comprises the Tulcumba Sandstone, which includes conglomerate, sandstone, siltstone, calcareous mudstone and limestone, together with the Rangari Limestone member, which comprises fine grained oolitic and bioclastic limestone. The narrow, linear nature of the ridge with shallow soils means that the bedrock is exposed in some sections and would have been easily accessible for exploitation by Aboriginal people. This also assisted in the detection of artefacts by the survey team.

Site #20-5-21 relates to the exploitation of exposed conglomerate pebbles, including their extraction from the matrix for reduction. Site KDA6 was identified in the field as relating to the exploitation of tuff. Although tuff is not identified on the geological map for this location, its presence is a reasonable expectation given the proximity of the Nandewar volcano and associated volcanic rocks (Brown et al 1990).

The lesser number of site recordings within the Tulcumba Ridge and Floodplain units is also likely to be related to the smaller size of these units and the limited archaeological survey coverage of these units.

The lack of site recordings in the Floodplain unit in particular may be due to low visibility levels and taphonomic factors. Grass cover was thickest in the floodplain environments along the Peel and the Namoi River. The depositional environment within the floodplain is also likely to have concealed artefacts from the survey team. Only a subsurface testing program would be able to remove this

variable and provide a more complete assessment of the site potential within the Floodplain unit. It is also possible that the lower elevations of the floodplain, particularly immediately adjacent to the River channel has been subject to destructive floods that have swept away evidence of Aboriginal sites.

Another factor to be considered is the level of visibility within each unit. Within the Namoi Slopes unit, the TSR generally had poor visibility, with grass cover inhibiting the detection of artefact scatters in particular. However, survey of a large tract of ploughed ground that extended to the Peel River east of Tulcumba Ridge, within the Namoi Slopes unit, failed to locate a single stone artefact.

Visibility within the Keepit Rises unit was generally good, although variable. Sites in this unit were found in areas of large exposure, such as a ploughed paddock for sites KDA11, 12, and 13 and part of KDA20, while KDA10 was located on intersecting farm tracks which provided a broad exposure. Survey of ploughed ground extending to the Peel River on the western side of Tulcumba Ridge contained three artefact sites, although two of these are mapped within the Tulcumba Ridge unit.

This variation in results either side of the Tulcumba Ridge is difficult to explain based on the current knowledge and database. It is possible that the lack of artefact sites within the Namoi Slopes is a factor of the micro-topography. The ploughed paddock was within a broad drainage line, extending from the subsidiary dam wall to the Peel River. The Keepit/Tulcumba survey area was on basal slopes and adjacent to the confluence of an unnamed creek with the Peel River. A second reason may be linked to the intensity of the survey coverage. The Namoi Slopes survey was in a large paddock and the survey team were necessarily spread out to a greater degree than in the smaller paddock on the west side of the Tulcumbah Ridge. It is unlikely that the geomorphological unit itself is a key determinant for this result.

An analysis of the location of sites in relation to the broader large scale landform of the Namoi and Peel River valleys within the study area shows that in broad terms, 51% of sites recorded were located within the valley floor context, 20% within the basal slopes and 29% within a midslope context.

A breakdown of micro topographic features is shown in Table 5. It reveals that the basal slopes of the spurs, followed by spur crest and the river margins were the most favoured location for sites. These locations typically provided elevated, flat to low gradient ground above the nearby water courses. As can be seen in Figure 19 most of the artefact sites in particular were also situated in close proximity to water courses.

Table 5 Breakdown of sites within micro topographic units

Small scale landform	Artefact sites	Scarred trees	Number of sites	%
Spur crest	7		7	20
Spur mid slope	1		1	3
Spur basal slope	6	3	9	26
Break of slope	3		3	9
Valley floor		5	5	14
Minor stream margin	2	2	4	11
River margin	6		6	17
TOTAL	25	10	35*	100

* Grinding grooves not included due to lack of information.

These results clearly show that there is a preference for artefact sites to be situated on elevated ground and also adjacent to the river.

7.3.2 Artefact Characteristics within a Geomorphological Context

Some preliminary analysis of the content of sites within each of the broad scale geomorphological units was undertaken. This involved stone material types and artefact types. The results from each are limited in application, but may serve as a basis for future work.

A breakdown of the raw materials for each unit is shown in Table 6.

Table 6 Percentage of raw material by geomorphological unit

Material/Unit	Keepit Rises % (n=115)	Namoi Slopes % (n=2)	Tulcumba Ridge % (n=12)	Floodplain % (n=3)	Borah Crossing % (n=80)
Tuff	35	50	67	33	26
Chert	28				36
Volcanic	33	50	25		16
Silcrete	1				8
Chalcedony	3				1
Quartz	1		8	67	6
Quartzite					1
Rhyolite					4
Jasper					1

The comparison of the range of materials encountered across each geomorphic unit (Table 6) is problematic for two main reasons. Firstly, sampling factors such as the selection of survey areas and low visibility effecting the number and type of recorded artefacts may have biased the data away from a representative sample. The second reason is the lack of comparable information from previously recorded sites limiting the total artefacts available for analysis.

It can be seen from Table 6 that the dominant raw materials within each landform unit are tuff, volcanic and chert. There are only minor variations within the geomorphological units but the overall raw material trends are similar although the sites at Borah Crossing contain a wider range of raw materials. The artefact numbers from the Namoi Slopes, Tulcumba Ridge and the Floodplain are too low for meaningful analysis.

During the field survey, a recording of all visible surface artefacts was carried out for sites with less than 20 artefacts. For sites with over 20 artefacts, only a sample was recorded in detail, with counts provided for raw materials and types. A detailed analysis of the sites, the artefact types and their relationship to the geomorphological units is therefore not possible. However, some qualitative observations revealed that the sites contained predominantly small flakes and cores. Some retouched, backed and utilised artefacts were noted but there did not seem to be any obvious differentiation between the geomorphological units.

The microblade industry seemed to dominate the assemblages with small flakes, blades and microblade cores all recorded in both the Keepit Rises and Borah Crossing units. The other units had few artefacts recorded so conclusions about artefact variation cannot be drawn but it is likely that similar flaking technology was employed at those sites.

Of interest to the study was the number of stone axes and axe blanks that were recorded. Site KDA20, in the Keepit Rises, contained one ground edge axe, two bifacially flaked axes and an

unfinished bifacially flaked axe. This site was also the largest within the study area with over 100 artefacts noted. Site KDA6, on the Tulcumba Ridge, was identified as a stone procurement site and contained two axe blanks. The number of axes recorded would seem to support the number of scarred trees recorded within the study area. However, what cannot be explained is that the axes were all found away from the scarred trees.

There is no particular logical reason to account for the distribution of stone axes in the study area. Site KDA6 was probably used as a procurement site and some flaking was undertaken to provide blanks to be completed elsewhere. The relative high number of stone axes at site KDA20 may be related to the general size of the site. It is also possible that this site was a major campsite within the area and therefore contained a large range of activities including the manufacture and use of stone axes. It is also possible that the site area was a focus for wood and timber extraction. The farmland has been cleared of most mature trees and some of these may have been scarred.

7.4 Site Prediction

In the two previous archaeological assessment reports for the Keepit Dam Upgrade project (Navin Officer Heritage Consultants 2003, 2005) there were some limitations in the assessment of Aboriginal archaeological potential within the study area. The assessment of the predicted Aboriginal archaeological resource was based on a generalised model of site location using assumptions about the likely resources and occupation amenity of differing landform types and zones.

The lack of specific models was due to a scarcity of survey information and previously recorded sites at a local level. This precluded the development of a locally specific predictive Aboriginal site location model. The generalised site location model was based on common traits which have been identified from a large body of archaeological research from coastal and inland New South Wales. This generalised model focuses on three key characteristics of site content and location:

- Sites tend to be located on relatively flat, well drained and locally elevated ground, close to permanent water sources. In addition, procurement sites (such as stone quarries and scarred trees) tend to be closely and spatially related to the type and natural occurrence of that resource.

- The size of occupation sites tends to be related to the proximity, size and extent of permanent fresh water. Large sites tend to be located close to large and permanent water sources.

- The content and cultural material contained within sites tends to reflect the local environment, including material for tool manufacture, and resources for food, food procurement and shelter.

The ability of the generalised model to predict site location was found to be variable

Based on the results of the current investigation, the model for site location in the Lake Keepit study area including the Namoi and Peel Rivers can be refined somewhat. The largest four sites recorded (KDA9, KDA20, KDA21 and KDA26), all with over 30 artefacts, show the following characteristics:

- Close proximity to Namoi River or creekline (three within 20 m of the river, one within 10 m of a creek and 250 m from the river);

- Gentle basal slopes extending down to level ground adjacent to watercourse, and

- Silty deposits with little surface gravel evident.

Common characteristics for all artefact sites in the study area are:

- Situated on low gradient slopes to level ground;

- Often slightly elevated above the watercourse;

- Within approximately 200 m of a watercourse;

- Originally within woodland vegetation.

The location of large artefact scatters such as KDA9, KDA20, KDA21 and KDA26, which are situated within major river riparian corridors, are a consistent prediction of the model. Despite this, not all such areas with similar environmental and topographic characteristics contained such sites, despite areas of excellent visibility. For example, in ploughed paddocks adjacent to the Peel River, only eight artefacts were identified across three site recordings (KDA3-5) and in a large ploughed paddock adjacent to the Namoi River, only three isolated artefacts were found (KDA11-13).

The common characteristic of the smaller sites was that the soils were often quite gravelly. The gravels were mostly pebbles that were remnant river bed deposits. In contrast, the larger sites did not contain surface gravels. Another factor may be related to ploughing. The larger sites had not been subject to ploughing, while much of the ground inspected along the Peel and Namoi Rivers was ploughed. Although the ploughed ground offered excellent visibility, the turned soils and the gravels may have reduced the effective archaeological visibility.

It remains to be demonstrated whether the absence of large site recordings downstream of the dam is a real phenomena or due to other factors. Such factors could be loss through flood scouring, concealment of artefacts by alluvial deposition or artefacts being obscured by ploughing and the natural river gravels.

Use of the broad scale geomorphological mapping as shown in Figures 4 and 19 was not adequate for use in precise archaeological site predictions.. Site occurrence is more closely linked to minor topographic and environmental determinants rather than broad landforms. A predictive archaeological model for artefact scatter sites within the study area is shown in Figure 20. The model is based on the riparian corridor being more likely to contain larger sites (more than 50 artefacts) and the wider valley slopes and minor drainage lines containing smaller sites. Of course there will be occurrences of large sites in the broader study area but the highest intensity of occupation is likely to have been within the riparian zone.

Scarred trees appear to occur in a range of environments and it is difficult to predict their location. While scarred trees can potentially occur anywhere, their preservation is likely to be more closely linked to the presence of old growth trees. Areas of uncleared land, including the Travelling Stock Reserve and parts of Lake Keepit State Park, have the highest potential for scarred trees to remain. Such areas would therefore be considered to have moderate potential to contain scarred trees. Isolated examples of old growth trees in otherwise cleared paddocks may also display evidence of Aboriginal scarring.

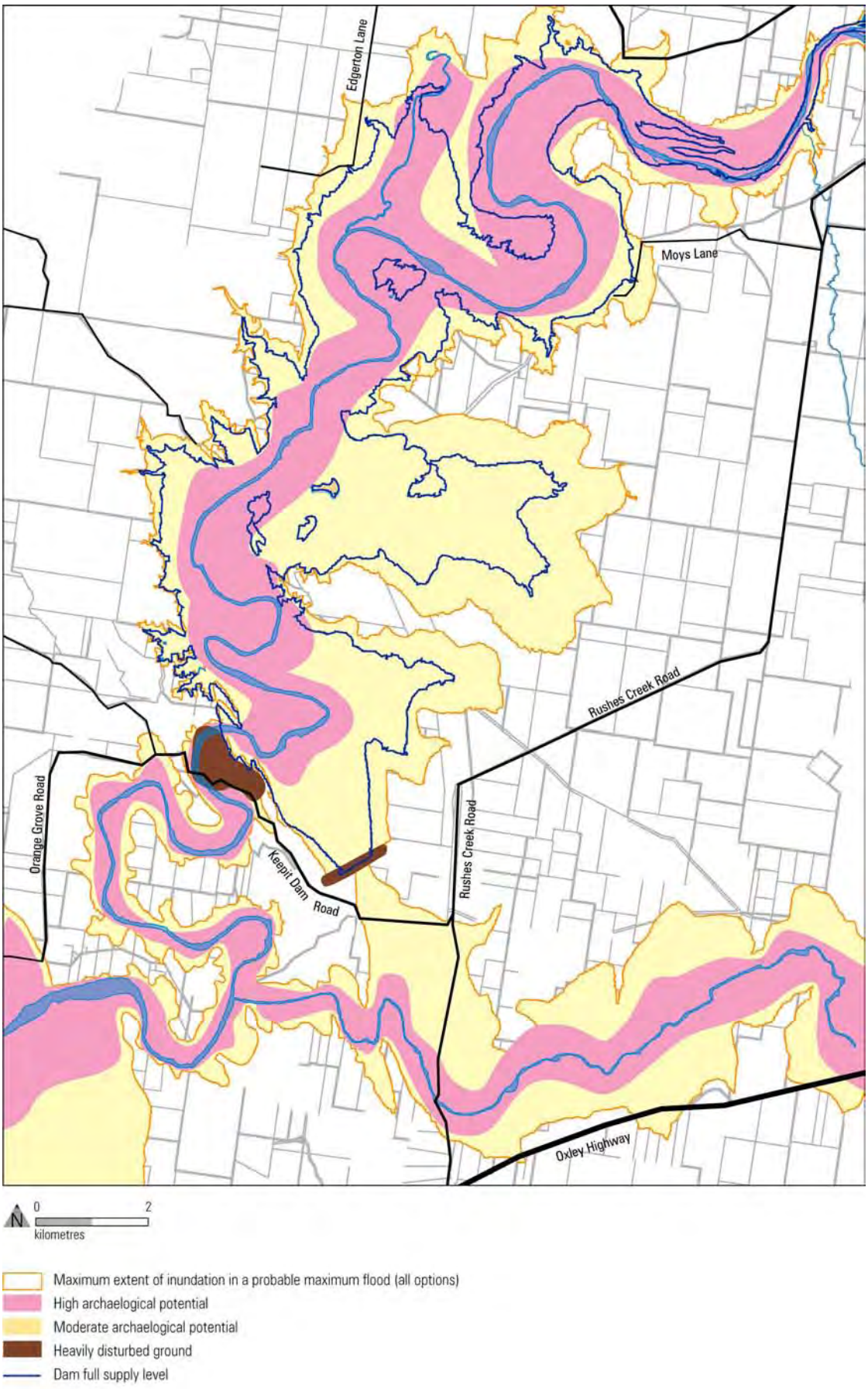

Figure 20 Predicted Aboriginal archaeological sensitivity.
(Base map supplied by Parsons Brinckerhoff)

7.5 European Sites

Thirteen (13) European sites were identified during the Keepit investigation. The location of historic sites is shown in Figure 34 and a summary of sites is provided in Table 7.

Keepit Dam Historic Site 1 (KDH1) **House ruin:** *AGD 264149. 6591043*

This site consists of scattered ruins within an approximate area of 20 m^2, centred on a small mound in a scarified field. The scatter consists of red brick with diamond and heart-shaped frogs with cement mortar, tin, galvanised iron with nail holes, fallen and scattered timbers. Both types of brick are dry pressed, wire cut bricks with inclusions and striations – both types measured 22.5 x 10.5 x 7 cm. The size of structure that may have existed on the site could not be determined due to extent of scatter and vegetation cover. Artefacts consisted of pieces of twisted single-strand wire, fragments of European ceramics (plain white porcelain tableware), small metal objects and horse paraphernalia. One part of such paraphernalia is embossed with 'CORNSTALK BRAND'.

The remains of a concrete base of a small structure are located approximately 50 m southwest of the above mound. The structure measures about 3 x 2.5 m and has the remains of a small wooden drain at its northwestern end. Although not completely visible due to vegetation cover, the concrete base appears to slope towards the centre of the structure on two sides.

The nature and spatial arrangement of these materials strongly suggest that they are the remains of a former farm house and associated small dairy building. The house and dairy may have been associated with the Hawarden School, which existed on Portions 130 and 131 (the same location) from 1889 to 1933, but there is no evidence of a school at the site or any definitive association.

In summary, the area appears to have been a small homestead complex with a main house and a single cow dairy to its southwest. From the remains and artefacts at the site, the complex probably dates from the late nineteenth to the early-mid twentieth century.

Keepit Dam Historic Site 2 (KDH2) **Ruins on Island in Lake Keepit**

This site consists of a group of four spatially related features – three houses and one shed:

a) House ruin: *AGD 261715. 6585183*

East of hill top. Scattered ruins of approximately 10 m^2 in area. Scatter consists of red brick with rectangular-shaped frogs and cement mortar, tin, galvanised iron with nail holes, tin guttering with screws and bolts, fallen and scattered timbers. Possible fireplace/hearth at southern end. Size could not be determined due to extent of scatter and vegetation cover. Artefacts consisted of pieces of twisted single-strand wire, 2 mm thick window glass, fragments of European ceramics (white porcelain tableware with brown floral motif and plain white porcelain tableware), a desert spoon, a metal bottle opener, and pieces of amber (beer) bottle glass.

b) Shed ruin: *AGD 261805. 6585192*

Approximately 90 m east of (a) above. Large scatter of ruins of approximately 20 x 10 m in area. Scatter consisted of red bricks with rectangular-shaped frogs and cement mortar; fallen timbers (some large timbers with large 15 cm wire (steel) rhomboid nails); large metal 'T'-shaped door hinge; kerosene tins (one with 'IMP GLN' embossed on handle); pair of hand held, manually operated metal shears; and a metal rod against a tree (which had grown over the rod) with the makers mark of 'R W WINFIELD & CO./PATENTEES & MANUFACTURERS/LONDON & BIRMINGHAM' (possibly part of machinery). No domestic artefacts – probably a working shed.

c) House ruin: *AGD 261892. 6585118*

Large scatter of ruin of approximately 30 x 10 m in area. Scatter included red bricks with rectangular-shaped frogs and cement mortar, and a cream-coloured painted sawn timber piece. Artefacts consisted of galvanised tin roofing, pieces of twisted single-strand wire, and fragments of European ceramics (plain white porcelain tableware).

d) House ruin: *AGD 262012. 6585142* (probably ruin noted on topographic map)

Located on the crest of a small hill. Appeared to be the main house of the complex. Large scatter of ruins of approximately 40 x 15 m. Scatter included red bricks with rectangular-shaped and 'mask'-shaped frogs and cement mortar (both bricks are dry pressed, wire cut bricks with inclusions and striations – both measured 22.5 x 10.5 x 7 cm); fragments of European ceramics (white porcelain tableware with green floral motif and plain white porcelain tableware); galvanised iron and tin; 11 cm wire (steel) rhomboid nails; fallen timbers; pieces of concrete; fragments of clear bottle glass; etc. At the west of the site was a rectangular-shaped concrete slab, which measured 3 x 1.7 m, and was probably a platform for a small structure. To the east of the site was a dump area, on the southern slope of the small hill, which measured approximately 3 m^2. The dump consisted of a myriad of artefacts, including European ceramic shards; shotgun casings; men's metal braces adjuster; bottle and window glass; remains of batteries (approximately DD size); glass bottle stoppers; pieces of wire and metal, etc. Further to the east of the dump site, and lower on the southern slope of the hill, there was an elongated mound of stone and part bricks, which measured approximately 2 x 0.5 m.

In summary, the area appears to have been a small homestead complex with a main house (d) above, two smaller dwellings (a) & (c) and a working shed (b). From the remains and artefacts at the site, the complex probably dates from the late nineteenth to the early-mid twentieth century.

Keepit Dam Historic Site 3 (KDH3) **School/Scout Hall:** *AGD 260296. 6580060*

The site consists of a Scout Hall and ancillary buildings (Figure 21). It is a complex of buildings containing 5 structures. The largest structure is a rectangular-shaped white painted weatherboard hall set on concrete piers with a red painted galvanised sheet iron roof, with a partially enclosed verandah on its northern end. It has timber flooring and a timber ceiling. The second largest building, immediately south of the hall, is a rectangular-shaped white painted weatherboard cottage on brick piers with unpainted (grey) galvanised sheet iron roof, with a partially enclosed verandah on its western side. To the east of the hall there is a rectangular-shaped brick and weatherboard 'boys' and 'girls' toilet and shower block with a galvanised sheet iron roof. A white painted weatherboard outhouse with a red painted galvanised sheet iron roof is located immediately south of the toilet block. A small rectangular-shaped galvanised sheet iron shed is located south of the outhouse.

The complex has been identified as the original school complex for dam construction workers' children (pers. comm. Russell Easey). It appears the school ceased operations in 1966 (Fletcher and Burnswood 1983:110) following which the complex was used as a scout hall.

From the remains and artefacts at the site, the complex probably dates from the mid to late 1940s.

Figure 21 Views of the School/Scout Hall complex.

Top left**:** Schoolhouse/scout hall; ***Top right*****:** Probable school teacher's house to the south of the school house/scout hall; ***Bottom left*****:** 'Boys' and 'Girls' toilet block; ***Bottom right*****:** shed.

Keepit Dam Historic Site 4 (KDH4) **'Tulcumbah':** *AGD 257600. 6579775*

This site is 'Tulcumbah' homestead which was shown as a 'head station' on the 1884 Namoi Parish map. A survey of the area showed a relatively modern house (probably 1970s/1980s) situated on the probable site of the original nineteenth century homestead site. Examination of the site indicated that the area of the nineteenth century dwelling had been levelled to provide a platform for the more modern building. Artefact scatters on the downhill slopes surrounding the house included nineteenth century artefacts, such as 'Ewbanks' nails and spikes, fragments of thick 'black' and clear bottle glass, and European ceramic shards.

The only structural evidence of nineteenth century occupation at the site was a dilapidated and abandoned partial stone wall structure to the south of the site. From its location, built into the side of a hill, it may have been used as a cool storage area probably for fresh dairy products.

Keepit Dam Historic Site 5 (KDH5) **Shearing shed and house ruin**

a) Derelict shearing shed: *AGD 260288. 6577050*

Remains of shearing shed with timber floor and frame, and galvanised iron sheeting for walls and roofing. Several sheets of galvanised iron have come away from the walls and roof of the shed and lie on the ground around the shed. Shed contains a two-stand shearing station and remains of Koerstz wool press (In the 1890s, Christian Koerstz developed a cheap wool press which could be operated by two men, allowing even small graziers to build their own wool sheds, where previously they had taken their sheep to large landholders for shearing – ABS 1988 Year Book Cat No. 1301.0.1988. Such presses were still available for sale in the 1930s).

b) House ruin: *AGD 260238. 6577250*

On hill top. Scattered ruins of approximately 10 m^2 in area. Scatter consists of part red brick with rectangular-shaped frogs and cement mortar, tin, scattered timbers. Size of ruin could not be determined due to extent of scatter and vegetation cover. Artefacts consisted of pieces of twisted single-strand wire, and fragments of European ceramics (plain white porcelain tableware).

In summary, the area appears to have been a small homestead complex with a main house (b) above, and a shearing shed (a). From the remains and artefacts at the site, the complex probably dates from the late nineteenth to the early-mid twentieth century.

Keepit Dam Historic Site 6 (KDH6) **House ruin:** *AGD 262797. 6576454*

This site is a standing house ruin (Figure 22). The ruin comprises a partially demolished and derelict rectangular-shaped, single storey, six room, double brick house with attic and cellar in southern end, and a small brick porch on the northeastern side. The structure measures approximately 10 x 6 m on a northeast/southwest orientation and is built on a concrete pad with tree trunk bearers, timber floors and ceilings and timber framed windows and doors. Timber remains contain wire (steel) rhomboid and modern nails. Galvanised iron sheet roofing and galvanised iron gutters. Part Flemish and part Colonial brick bond. Bricks consist of rectangular-shaped and diamond-shaped frogs with cement mortar (both types of bricks are dry pressed, wire cut bricks with inclusions and striations – both measured 22.5 x 10.5 x 7 cm). Internal walls have been rendered with concrete and painted. Two brick fireplaces – one at northeastern end in northeastern room and one at southwestern end in southeastern room (this room also contains the cellar). Approximately 2 m northwest of the ruin is the remains of a brick lined, cement rendered base for a water tank/ water receptacle, which measured about 5 m in diameter. Artefact scatter around ruin mainly comprised whole and part bricks and fallen timbers.

In summary, the ruin appears to have been family home. From the remains and artefacts at the site, the house probably dates from the late nineteenth to the early-mid twentieth century.

Figure 22 Views of the house ruin on T. Woolaston's property.

Keepit Dam Historic Site 7 (KDH7) **Residence (Former School) – Carroll Gap:** *AGD 264000. 6574075*

The residence is currently used as a private domestic dwelling (Figure 23). Previously it was Carroll Gap Public School 1882-1922/23. Important dates and events associated with the School are listed in Appendix 2.

The original single level brick building was constructed using a colonial bond with a wood shingle roof in 1882 at an estimated cost of £750. It had a wooden verandah on its western side and timber,

double hung sash windows, timber floor and ceiling boards. Since its construction it has been significantly altered. For example, the wood shingle roof has been replaced with galvanised corrugated iron, it now has aluminium framed windows, a dormer window has been added, a number of doorways have been opened inside the building, and it has been extended through the addition of several rooms during the early to mid twentieth century.

Figure 23 Views of the former school/house at Carroll Gap.

Keepit Dam Historic Site 8 (KDH8) **Keepit Dam, Namoi River:** *AGD 260100. 6581000*

Description (Figures 24 to 27)

Wall type:	Mass concrete gravity type with earth embankment at one abutment
Spillway type:	Overflow with 6 radial gates
Storage capacity:	420,000 mega litres
Surface area:	43.7 square kilometres
Catchment Area:	5,700 square kilometres
Main wall height:	55 metres
Length of crest:	533 metres
Maximum width:	43 metres

Figure 24 View of water storage area from spillway (facing east).

Figure 25 View of spillway (facing northwest).

Figure 26 View of commemoration plaques (southwestern end of dam wall).

Figure 27 View of Water Conservation and Irrigation Commission plaque (southwestern end of dam).

Keepit Dam Historic Site 9 (KDH9) **Keepit Dam Workshop Equipment:** *AGD 260020. 6580700*

Description (Figures 28 to 33)

A. Metal Lathe – parts constructed by 'Purcell England Company Pty Ltd, Sydney (1940)' and 'Demco Machinery Co. Pty Ltd, Sydney – Melbourne'. Identifying mark of 'I A C 8026' (Figure 28).

B. Wood Shaper – 'McPherson's Pty Ltd Melbourne, Sydney, Adelaide and Perth/ Made in England'. (Figure 29).

C. Drill Press – 'Allen West & Co. Ltd., Brighton England' (Figure 30).

D. Early 1950s Wood plane in remains of old carpenter's shop within workshop (Figure 31).

E. Early 1950s Combination saw/plane in remains of old carpenter's shop within workshop (Figure 32).

F. Early 1950s Wood saw in remains of old carpenter's shop within workshop (Figure 33).

History

On 18 December 1939, preparatory works for Keepit Dam commenced. These included road works, staff accommodation and the erection of other necessary buildings (workshops), water supply for the township and the supply of plant. Some of the works buildings had been transferred from Wyangala.

The plant included and equipment acquired in the 1940s included a metal lathe (A above), a wood shaper (B) and a drill press (C). Equipment acquired in the early 1950s included a wood plane (D), a combination saw/plane (E) and a wood saw (F).

Figure 28 A – Metal lathe (1940)

Figure 29 B – Wood shaper (c1940s)

Figure 30 C – Drill Press (c1940s)

Figure 31 D – Wood plane (early 1950s)

Figure 32 E – Combination saw/plane (early 1950s)

Figure 33 F – Wood saw (early 1950s)

Keepit Dam Historic Site 10 (KDH10) **'Violet Banks':** *AGD 259170. 6580150*

This site is a property containing a residence and sheds. It is now called 'Violet Banks' but was previously known as 'Illawong', which may have been an outstation for the 'head station' of Tulcumbah (discussed above under KDH4) in the late nineteenth century.

A survey of the area revealed an early to mid twentieth century single level, light green coloured weather board private residence with a galvanised iron roof. From an inspection of the residence with the current owner, Mrs Marie Lyne, it was clear that the original building was a single level, rectangular-shaped weatherboard structure, which had undergone substantial extension through the addition of other similar type, size and shaped buildings. From information provided by Mrs Lyne, it appears those buildings may have been obtained from the construction camp at Keepit Dam following its abandonment in the 1950s/1960s.

The integrity of the building(s) had also been significantly altered through the addition of modern windows, verandah enclosures, new doorways, timber decking and other structural additions/changes.

Keepit Dam Historic Site 11 (KDH11) **Former School site – Gunnenbeme/Gunnenbene Public School:** *AGD 257450. 6576965*

This site is the location of the former Gunnenbeme/Gunnenbene Public School. The school is shown situated on Lot 140 on Gunnenbeme Parish Maps of 1891, 1908, 1918 and 1931. It is described on those maps as 'Gunnenbeme Public School' (underline added for emphasis). However, Fletcher and Burnswood's *Government Schools of New South Wales 1848-1983*, published by the New South Wales Department of Education in 1983, describe it as 'Gunnunbene' Public School (underline added for emphasis).

The school operated from 1877 until 1943, with several closures and re-openings during that period. It was first established as a provisional school in October 1877 and continued as such until September the following year. In October 1880, it re-opened as a public school, which operated until again closing in December 1890. From February 1891 until December 1892 the school operated half-time with Keepit Public School. From June until December 1894 it again functioned as a provisional school. From January 1895 until November 1923 it again operated as a full public school. In January 1932, it re-opened as a provisional school, which closed for the last time in May 1943 (Fletcher and Burnswood 1983:93).

There is no structural evidence of the late nineteenth/early twentieth century school on the site, which is now occupied by a number of modern corrugated galvanised iron farm sheds. In addition, it is considered there is negligible potential for subsurface archaeological resources at the site, as the earthworks undertaken for construction of the sheds would have destroyed the context of any archaeological deposit. This site is outside the boundaries of the project and would not be affected by any of the scenarios being assessed.

Keepit Dam Historic Site 12 (KDH12) **Former Roman Catholic Church/Cemetery site:** *AGD 261800. 6582250*

This site is a former church, presbytery and graves which are now drowned by the lake. The land for the church and presbytery was dedicated on February 4, 1876. There is no other information available on the site. It is possible that some of the headstones were removed recently after they were exposed by the low level of the lake.

Keepit Dam Historic Site 13 (KDH13) **Former Keepit School:** *AGD 263200. 6584700*

The former Keepit School was first established as a provisional school in 1875. For that time it was variously a provisional school or was a part time or full time school until 1928. It then moved from its original location on the eastern side of the river to the construction camp at Keepit Dam. The school was known as Keepit Dam and continued until 1966 (Fletcher and Burnswood 1983:110).

Table 7 Summary of Historic sites recorded during field survey

Site Name	Location (AGD grid reference)	Feature
KDH1	*264149. 6591043*	House ruin, farm and outbuilding (dairy)
KDH2	*261715. 6585183*	House ruin
	261805. 6585192	Shed ruin
	261892. 6585118	House ruin
	262012. 6585142	House ruin
KDH3	*260296. 6580060*	School/scout hall and outbuildings
KDH4	*257600. 6579775*	"Tulcumbah" homestead
KDH5	*260288. 6577050*	Shearing shed
	260238. 6577250	House ruin
KDH6	*262797. 6576454*	House ruin
KDH7	*264000. 6574075*	Former Carroll Gap school
KDH8	*260100.6581000*	Keepit Dam Wall
KDH9	*260020.6580700*	Keepit Dam workshop equipment
KDH10	*259170. 6580150*	"Violet Banks" homestead
KDH11	*257450.6576965*	Former Gunnenbeme school
KDH12	*261800.6582250*	Former Roman Catholic Church/cemetery
KDH13	*263200.6584700*	Former Keepit school

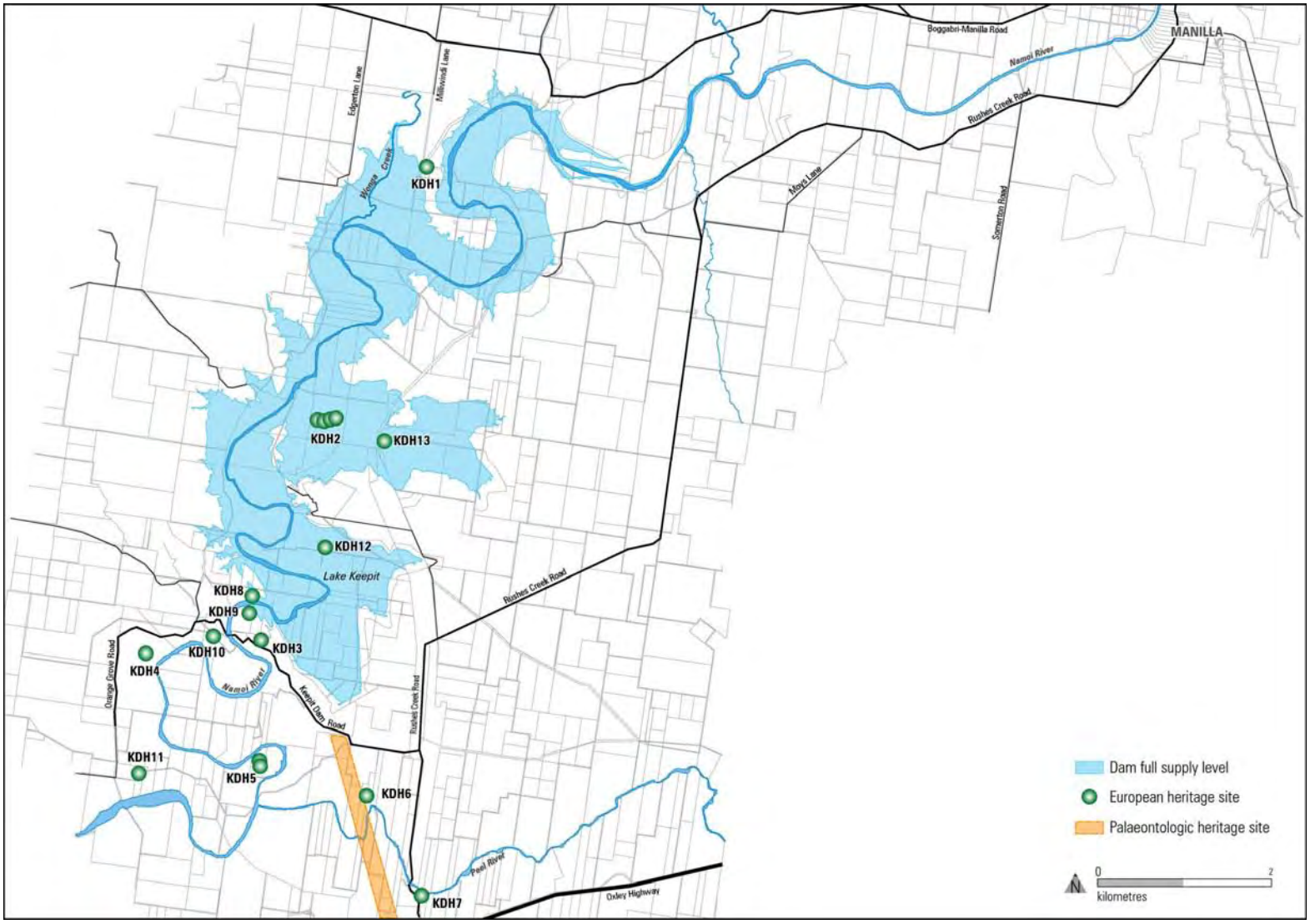

Figure 34 Location of historic sites within the study area.

7.6 Palaeontological Sites

While on the property of Peter Hook, at the location of the stone source, KDA6, Mr Hook advised the survey team about the presence of an outcropping limestone geological feature. Mr Hook indicated that this feature, known as *Rangari Limestone* was a well known fossil bearing deposit. Mr Hook indicated that the University of New England visited the feature and used it as a teaching and possibly research site.

The outcrop extends for many kilometres along a north-south ridge but is only exposed at various locations in the district. The fossil bearing sections are not consistent but there are good fossil deposits just south of the Peel River near Carroll Gap (Hook 2005: Pers Com).

This site has potential to be significant but would not be directly affected by construction works. It may be affected by flooding although this is unlikely to have a major impact on the deposits.

8. SIGNIFICANCE ASSESSMENT

8.1 Aboriginal Heritage

8.1.1 Assessment Criteria

The Burra Charter of Australia defines cultural significance as 'aesthetic, historic, scientific or social value for past, present and future generations' (Aust. ICOMOS 1987). The assessment of the cultural significance of a place is based on this definition but often varies in the precise criteria used according to the analytical discipline and the nature of the site, object or place.

In general, Aboriginal archaeological sites are assessed using five potential categories of significance:

- significance to contemporary Aboriginal people,
- scientific or archaeological significance,
- aesthetic value,
- representativeness, and
- value as an educational and/or recreational resource.

Many sites will be significant according to several categories and the exact criteria used will vary according to the nature and purpose of the evaluation. Cultural significance is a relative value based on variable references within social and scientific practice. The cultural significance of a place is therefore not a fixed assessment and may vary with changes in knowledge and social perceptions.

Aboriginal significance can be defined as the cultural values of a place held by and manifest within the local and wider contemporary Aboriginal community. Places of significance may be landscape features as well as archaeologically definable traces of past human activity. The significance of a place can be the result of several factors including: continuity of tradition, occupation or action; historical association; custodianship or concern for the protection and maintenance of places; and the value of sites as tangible and meaningful links with the lifestyle and values of community ancestors. Aboriginal cultural significance may or may not parallel the archaeological significance of a site.

Scientific significance can be defined as the present and future research potential of the artefactual material occurring within a place or site. This is also known as archaeological significance.

There are two major criteria used in assessing scientific significance:

1. The potential of a place to provide information which is of value in scientific analysis and the resolution of potential research questions. Sites may fall into this category because they: contain undisturbed artefactual material, occur within a context which enables the testing of certain propositions, are very old or contain significant time depth, contain large artefactual assemblages or material diversity, have unusual characteristics, are of good preservation, or are a constituent of a larger significant structure such as a site complex.

2. The representativeness of a place. Representativeness is a measure of the degree to which a place is characteristic of other places of its type, content, context or location. Under this criteria a place may be significant because it is very rare or because it provides a characteristic example or reference.

The value of an Aboriginal place as an educational resource is dependent on: the potential for interpretation to a general visitor audience, compatible Aboriginal values, a resistant site fabric, and feasible site access and management resources.

The principal aim of cultural resource management is the conservation of a representative sample of site types and variation from differing social and environmental contexts. Sites with inherently unique

features, or which are poorly represented elsewhere in similar environment types, are considered to have relatively high cultural significance.

The cultural significance of a place can be usefully classified according to a comparative scale which combines a relative value with a geographic context. In this way a site can be of low, moderate or high significance within a local, regional or national context. This system provides a means of comparison, between and across places. However it does not necessarily imply that a place with a limited sphere of significance is of lesser value than one of greater reference.

The following assessments are made with full reference to the scientific, aesthetic, representative and educational criteria outlined above. Reference to Aboriginal cultural values has also been made where these values have been communicated to the consultants. It should be noted that Aboriginal cultural significance can only be determined by the Aboriginal community, and that confirmation of this significance component is dependent on written submissions by the appropriate representative organisations.

8.1.2 The Study Area

Table 8 provides the significance rating of all Aboriginal (and possible Aboriginal) sites identified within the Keepit Dam study area. The significance assessment is based on the scientific criteria listed above. The cultural significance can only be determined by the relevant Aboriginal people.

Three sites (KDA6, KDA20 and 20-5-0002) are assessed high archaeological significance at a local level and the Borah Crossing Aboriginal Reserve is assessed high archaeological significance at a regional level, based on their general rarity. Each is discussed separately below.

The remainder of the recorded sites are assessed as low or moderate archaeological significance at a local level.

The scarred trees are considered to be only of moderate significance as their exact origin cannot be determined from present evidence. If the scars could be definitely attributed to Aboriginal activity then their significance would increase.

KDA6

The site is a stone procurement source that has definite evidence of Aboriginal exploitation. Numerous cores and flakes were observed as well as two possible axe blanks. Stone procurement sources are generally rare as they are dependent upon the location of accessible stone of suitable quality and usefulness.

No obvious Aboriginal flaked material was identified during the survey of the other stone procurement source identified in the study area, site #20-5-0021. This reduces the scientific value and research potential of the site.

KDA20

The site is an artefact scatter containing a large number of artefacts in an environment with high potential for subsurface deposits. The research potential of the site was therefore high. In addition the presence of four axes at the one site is a rare occurrence and possibly indicates a favoured Aboriginal campsite.

#20-5-0002

The site consists of grinding grooves on 13 separate boulders over a farming property. This is the only set of grinding grooves located around Lake Keepit and is therefore a rare site type. This increases its value and significance.

Borah Crossing Aboriginal Reserve

The site was an Aboriginal Reserve and used by a number of families for about 60 years. It has significant contemporary value to the local Aboriginal community and is an uncommon site type.

Table 8 Significance Assessment of Aboriginal Sites

Site Name	Site Type	Significance (Context)
KDA1	scarred tree	moderate (local)
KDA2	artefact scatter	low (local)
KDA3	artefact scatter	low (local)
KDA4	isolated find	low (local)
KDA5	artefact scatter	low (local)
KDA6	stone procurement source	high (local)
KDA7	scarred tree	moderate (local)
KDA8	scarred tree	moderate (local)
KDA9	artefact scatter	moderate (local)
KDA10	artefact scatter	low (local)
KDA11	isolated find	low (local)
KDA12	isolated find	low (local)
KDA13	isolated find	low (local)
KDA14	isolated find	low (local)
KDA15	artefact scatter	low (local)
KDA16	scarred tree	moderate (local)
KDA17	scarred tree	moderate (local)
KDA18	scarred tree	moderate (local)
KDA19	scarred tree	moderate (local)
KDA20	artefact scatter	high (local)
KDA21	artefact scatter	moderate (local)
KDA22	scarred tree	moderate (local)
KDA23	artefact scatter	low (local)
KDA24	artefact scatter	low (local)
KDA25	artefact scatter	low (local)
KDA26	artefact scatter	moderate (local)
KDA27	scarred tree	moderate (local)
KDA28	artefact scatter	low (local)
20-4-0054	scarred tree	moderate (local)
20-4-0055	scarred tree	moderate (local)
20-4-0056	isolated find	low (local)
20-5-0001	scarred tree	moderate (local)
20-5-0002	grinding grooves	high (local)
20-5-0016	artefact scatter	low (local)
20-5-0017	artefact scatter	low (local)
20-5-0018	artefact scatter, hearth	moderate (local)
20-5-0019	artefact scatter	low (local)
20-5-0020	artefact scatter glass, ‘contact’ site	moderate (local)
20-5-0021	stone procurement source	moderate (local)
Borah Crossing Aboriginal Reserve	historical reserve	high (regional)

8.2 European Heritage

8.2.1 Assessment Criteria

The NSW Heritage Office has defined a methodology and set of criteria for the assessment of cultural heritage significance for items and places, where these do not include Aboriginal heritage from the pre-contact period (NSW Heritage Office & Department of Urban Affairs and Planning 1996, NSW Heritage Office 2000). The assessments provided in this report follow the Heritage Office methodology.

The following heritage assessment criteria are those set out for Listing on the State Heritage Register. In many cases items will be significant under only one or two criteria. The State Heritage Register was established under Part 3A of the *Heritage Act 1977* (as amended in 1999) for listing of items of environmental heritage that are of state heritage significance. Environmental heritage means those places, buildings, works, relics, moveable objects, and precincts, of state or local heritage significance (Section 4, *Heritage Act 1977*).

An item will be considered to be of State (or local) heritage significance if, in the opinion of the Heritage Council of NSW, it meets one or more of the following criteria:

Criterion (a) an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area);

Criterion (b) an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area);

Criterion (c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area);

Criterion (d) an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons;

Criterion (e) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);

Criterion (f) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);

Criterion (g) an item is important in demonstrating the principal characteristics of a class of NSW's

- cultural or natural places; or
- cultural or natural environments.

(or a class of the local area's

- cultural or natural places; or
- cultural or natural environments.)

An item is not to be excluded from the Register on the ground that items with similar characteristics have already been listed on the Register. Only particularly complex items or places will be significant under all criteria.

In using these criteria it is important to assess the values first, then the local or State context in which they may be significant.

Different components of a place may make a different relative contribution to its heritage value. For example, loss of integrity or condition may diminish significance. In some cases it is constructive to note the relative contribution of an item or its components. Table 9 provides a guide to ascribing relative value.

Table 9 Guide to ascribing relative heritage value.

Grading	Justification	Status
Exceptional	Rare or outstanding item of local or State significance. High degree of intactness Item can be interpreted relatively easily.	Fulfils criteria for local or State listing.
High	High degree of original fabric. Demonstrates a key element of the item's significance. Alterations do not detract from significance.	Fulfils criteria for local or State listing.
Moderate	Altered or modified elements. Elements with little heritage value, but which contribute to the overall significance of the item.	Fulfils criteria for local or State listing.
Little	Alterations detract from significance. Difficult to interpret.	Does not fulfil criteria for local or State listing.
Intrusive	Damaging to the item's heritage significance.	Does not fulfil criteria for local or State listing.

8.2.2 The Study Area

Table 10 summarises the significance of the historical sites within the Keepit Dam study area. Five sites have moderate to high integrity and therefore fulfil the criteria for at least local listing. The other six sites are assessed as of little heritage value based on their poor preservation and do not meet the threshold for local of State heritage listing. The sites that meet the threshold are discussed further below.

KDH3 Former Lake Keepit School/Scout Hall

The school/scout hall complex has a high level of integrity and is generally in good condition. It is considered:

- Important in the course of the local area's cultural history and therefore historically significant at a local level because of its association with significant historical events (construction of Keepit Dam) (Criterion a);
- An item that has strong and special association with the life and works of a group of persons of importance (Keepit Dam construction workers) in the cultural history of the local area and as such has historical association significance at the local level (Criterion b); and
- To be important in demonstrating the principal characteristics of a class of the area's cultural places (early twentieth century school complexes) (Criterion g).

Overall, as the school/scout hall has a high degree of original fabric and alterations to it do not detract from its significance it fulfils the criteria for local heritage listing.

KDH6 House Ruin

The house remains have a poor level of integrity and are in a derelict and unsafe condition. Nevertheless, the remains are considered to:

- Possess uncommon aspects of the area's cultural history, in particular the attic and the cellar, that provide evidence of a defunct process and demonstrate designs and techniques of exceptional interest (Criterion f); and

- Be important in demonstrating the principal characteristics of a class of the area's cultural places (late nineteenth/early twentieth century house design) (Criterion g).

Overall, as the house has a high degree of original fabric and alterations to it do not detract from its significance it fulfils the criteria for local heritage listing.

KDH7 Former Carroll Gap School

The school/house has a good level of integrity and is in relatively good condition. It is considered to be:

- An item that has a strong and special association with the life of a group of persons of importance (schoolteachers) in the cultural history of the local area (Criterion b); and

- Important in demonstrating the principal characteristics of a class of the local area's cultural places (late nineteenth/early twentieth century school design) (Criterion g).

In general, as the school/house has altered or modified elements and elements with little heritage value but which contribute to its overall significance it is considered to have moderate heritage significance and fulfils the criteria for local heritage listing.

KDH8 Keepit Dam

Keepit Dam is in current use, has a high level of integrity and is generally in excellent condition. It is considered:

- Historically significant at a local level because of its impact on the local economy and agriculture. The dam has caused the area's economy to shift from cattle and sheep to cotton. It is also significant at a State level for its strong association with the philosophy of the NSW State Government during the pre- and post-World War II period. (Criterion a);

- To have historical association significance at the State level for its association with the NSW Government and with the NSW Premier Alex Mair, who fired the first shot to blast the dam wall foundation on 30 April 1941 (Criterion b);

- A significant aesthetic feature in the local area. Construction of the dam has had a high impact on the aesthetic values on the rural landscape and has developed a new aesthetic, which is highly valued by the local community for recreational purposes (Criterion c);

- To have significant social significance to the local community for its recreational facilities. The dam has had a social impact on the town of Wyangala providing employment and resources that have had a positive impact on the local community. In addition, the school house from the construction village is still evident on the site. (Criterion d);

- To have technical/research significance, given the machinery in the dam workshops is from the original construction phase of the dam (Criterion e); and

- To be important in demonstrating the principal characteristics of a class of NSW's cultural places (Criterion g).

Keepit Dam falls within a number of national, State and local historical themes, as follows:

Level	Theme	Sub-Theme	Sub-Theme
National	Developing local, regional and national economies.	Moving goods and people.	Making economic use of inland waterways.
		Altering the environment.	Irrigating land.
			Establishing water supplies.
	Building settlements, towns and cities.	Planning urban settlements.	Selecting township sites.
		Making settlements to serve rural Australia.	
State	Agriculture.		
	Townships: aborted settlements.		
	Technology.	Building the dams.	
	Utilities: water, electricity.	Building the dams.	
		Evolution of water management policy and practice.	
	Accommodation.	Building the dams.	
Local	Controlling rural water supply.		
	Developing irrigation schemes.	Constructing dams/weirs.	
		Planning irrigation strategies and schemes.	
		Delivering water to the user.	
		Harnessing the energy of water.	

The condition and integrity of the dam are considered intact. The condition, or physical state of the fabric of the dam and its potential for survival, is such that the material evidence allows a complete recording of the dam without archaeological hypothesis. The integrity, or the degree to which the material evidence is an appropriate representation of the dam in its original form, is such that the dam has remained virtually unchanged and its form, design and function can be totally discerned from the material evidence.

The above findings agree with and enhance the results of the previous heritage study of Keepit Dam (McBeath 2002). It is therefore concluded that, overall, as the dam has a high degree of original fabric and alterations to it do not detract from its significance, it fulfils the criteria for both local and State heritage listing.

KDH9 Keepit Dam Workshop Equipment

All of the items of equipment are in current use, have a high level of integrity and are in excellent condition. As they relate to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and are 50 or more years old, they are classified as relics under Section 4 of the *Heritage Act 1977*, and are therefore afforded protection under that Act.

It is considered that they:

- Are important items in the course of the local area's cultural history and are historically significant at a local level because of their use during the original construction phase of the dam (Criterion a);
- Have a strong historical association significance at the local level with a group of persons (Keepit Dam construction workers) of importance in the cultural history of the local area and for their association with the historical event of the construction of the dam (Criterion b);
- Have potential to yield information that will contribute to an understanding of the local area's cultural history (Criterion e); and
- Possess uncommon and rare aspects of the local area's cultural history (Criterion f).

Overall, as the items of equipment have a high degree of original fabric and alterations to them do not detract from their significance they fulfil the criteria for local heritage listing.

Table 10 Significance assessment of European sites

Site Name	Site Type	Grading	Assessment
KDH1	House ruin	little	Does not meet threshold for listing
KDH2	Ruins on island in lake	little	Does not meet threshold for listing
KDH3	School/Scout Hall	high	Fulfils criteria for local listing
KDH4	'Tulcumbah' Homestead	little	Does not meet threshold for listing
KDH5	Shearing shed and house ruin	little	Does not meet threshold for listing
KDH6	House ruin	high	Fulfils criteria for local listing
KDH7	Former Carroll Gap school	moderate	Fulfils criteria for local listing
KDH8	Keepit Dam	high	Fulfils criteria for local and State listing
KDH9	Keepit Dam workshop equipment	high	Fulfils criteria for local listing
KDH10	'Violet Banks'	little	Does not meet threshold for listing
KDH11	Former Gunnenbene School	little	Does not meet threshold for listing
KDH12	Former Church and Presbytery and cemetery	little	Does not meet threshold for listing
KDH13	Former Keepit School	little	Does not meet threshold for listing

9. OPTION ASSESSMENT

9.1 General Outline of Potential Impacts to Heritage Sites

Construction activities associated with upgrading the dam would include bulk earthworks such as excavations, permanent placement of fill, or temporary stockpiling, and the subsequent construction of roads, new dam walls, spillways and other infrastructure. These actions would result in the destruction of any heritage items that may occur within these zones.

The operational impacts of the project would include additional temporary upstream inundation during very large to extreme flood events of 1:17,300 annual exceedance probability (AEP) or less, 1:6,700 AEP or less and 1:5,000 AEP or less for Options B1, D2 and D3 respectively. The maximum extent and duration of additional temporary upstream inundation would occur during a probable maximum flood of 1:500,000 AEP or less. During a probable maximum flood, the maximum marginal increase in upstream inundation around the edge of Lake Keepit, relative to a base case of inundation up to the existing design flood level would affect 955 hectares, 1,385 hectares and 1,795 hectares for Options B1, D2 and D3, respectively. The duration of the increase for a probable maximum flood would be 19 hours, 23 hours and 27 hours for Options B1, D2 and D3, respectively. The actual period of inundation would depend on the location of each site. Sites may potentially be impacted by the deposition of sediment, and/or from erosion of the soil profile through water flow and shoreline wave action.

The potential for Aboriginal archaeological sites in the area affected by the maximum marginal increase in upstream inundation is likely to be greatest along major riparian corridors, and least in mid-valley or moderate to steeply graded contexts. As a consequence, the potential for impact is greatest along the riparian corridors of the Namoi River and its tributary streams. The sensitivity of these corridors was confirmed by the recording of nine Aboriginal sites in this zone. The riparian corridor in particular is also likely to have been already affected by previous flood events and during lake full conditions. Apart from these zones, a majority of any expanded lake shoreline could be expected to have relatively low archaeological sensitivity due to the gradient of the effected terrain and its distance from a natural water source.

The passage of floodwaters downstream of the various spillways, would include some high velocity flow areas where scouring of surface sediments to bedrock could be expected. These impacts are likely to occur in various locations down to the confluence of the Peel and Namoi Rivers. Scour is likely to be focused along the immediate riparian corridor (approximately 300 m either side of the riverbed) of the Namoi River. Scouring along the Namoi River between the main dam wall and the confluence with the Peel River would be reduced for all floods of 1:2,800 or less as a result of the project as the existing wall is estimated to fail during these flood events. This section may have experienced such occurrences prior to the construction of the dam.

Severe scouring is predicted for Option B1 for the section between the subsidiary dam wall and Peel River when the proposed spillway at this dam wall operates in very large floods of approximately 1:10,000 AEP or less. Scouring would also occur immediately downstream of the proposed sailing club and boat ramp spillways in very large floods of approximately 1:10,000 AEP or less and 1:100,000 AEP or less respectively for Options D2 and D3.

This level of scour would result in the large scale destruction of subsurface archaeological material in the effected profiles, together with the dispersal and loss of any surface artefacts. Any standing heritage structures within the path of the high velocity flood waters would also be destroyed. It is considered probable that downstream flood impacts would be greater in severity than upstream effects. This is due to the substantially higher energy levels associated with flood scour, in contrast to wave action.

The assessments of flood scour areas made in this report are based on predicted downstream flooding inundation provided by Parsons Brinckerhoff as shown in Figure 3. While it is not possible to define the area of scour accurately, water velocities are expected to be lower at the edges of the inundation extent. The area most likely to be scoured would be the overland flow paths immediately

downstream of the spillways and the Namoi River channel. Also, floodwater velocities at the receiving waters would be reduced below those at the spillway, but scour may still occur.

9.2 Construction Impacts

9.2.1 Option B1

This option involves: construction of a right-hand abutment spillway; widening of the entry flow to the abutment spillway; raising the main and subsidiary dam walls by 3.4 m; and construction of small dam walls at the boat ramp, sailing club and caravan park saddles and a new access road north of the main dam wall. There would also be the construction of a spillway at the subsidiary dam wall.

Additional works areas include construction and stockpile areas, site workshops and a clay borrow pit. Figure 35 shows the location of the extent of proposed works areas for Option B1.

Table 11 provides a summary of the potential impacts associated with this option.

The Keepit Dam wall, historical site KDH8, would be directly impacted by the proposed works through raising of the wall.

The previously recorded Aboriginal stone procurement source (#20-5-21) may be indirectly impacted by the proposed works. The site is recorded on the crest of the ridge adjacent to the location of the boat ramp saddle dam. The extent of the site may include wherever conglomerate outcrops occur along the crest or flanks of the spur. Any excavation or work undertaken in the area therefore has the potential to impact the site. The extent of works proposed at the boat ramp saddle for Option B1 is considered small and likely to be only of an indirect impact to the site.

The potential for unrecorded sites is generally low in most of the construction areas. The potential is considered low to moderate for the northern stockpile area near the right hand abutment, due to the presence of an ephemeral water course in the area. But the steep nature of the terrain prevents the threshold for subsurface testing being reached.

The southern stockpile area, to the north east of the subsidiary dam wall, is considered to have moderate archaeological potential. This is based on the occurrence of sites in a similar topographic environment about 1.5 km to the north. However, the presence of any site is likely to be of low significance and the area is disturbed by an existing stockpile, which reduces the archaeological potential. It is considered the area does not meet the threshold for conducting subsurface investigations.

The extended area of construction work area south west of the subsidiary dam wall includes part of the golf course, with low archaeological potential. However, it also extends onto the low gradient side slopes of a ridgeline and as such has possibly moderate archaeological potential. This area was not inspected during the field surveys and therefore equivocal management recommendations are difficult to provide.

Table 11 Summary of Heritage Impacts for Option B1 Construction Areas

Construction Area	Direct Impact to Known Sites	Indirect Impact to Known Sites	Potential for Unrecorded Sites
Right-hand abutment spillway	nil	nil	low
Raise main dam wall (3.4 m)	dam wall (KDH8)	nil	low
Flow entry to right-hand abutment (peninsula reshaping)	nil	nil	low
Right-hand abutment (northern) stockpile area	nil	nil	low-moderate
Alternative construction site office, storeyard and workshop	nil	nil	low
Clay borrow pit	nil	nil	low
New gravel road to peninsula	nil	nil	low
Sailing club saddle dam	nil	nil	low
Boat ramp saddle dam	nil	#20-5-21	low
Caravan park saddle dam	nil	nil	low
Raise subsidiary dam wall (3.4 m)	nil	nil	low
Subsidiary dam spillway	nil	nil	low
Subsidiary dam wall (southern) stockpile area	nil	nil	moderate
Construction work area surrounding subsidiary dam wall	nil	nil	low-moderate

Option B1 has a slightly lower impact to known cultural heritage sites within construction areas than Options D2 and D3. However, there are two potential construction areas associated with the subsidiary dam wall that have moderate archaeological potential.

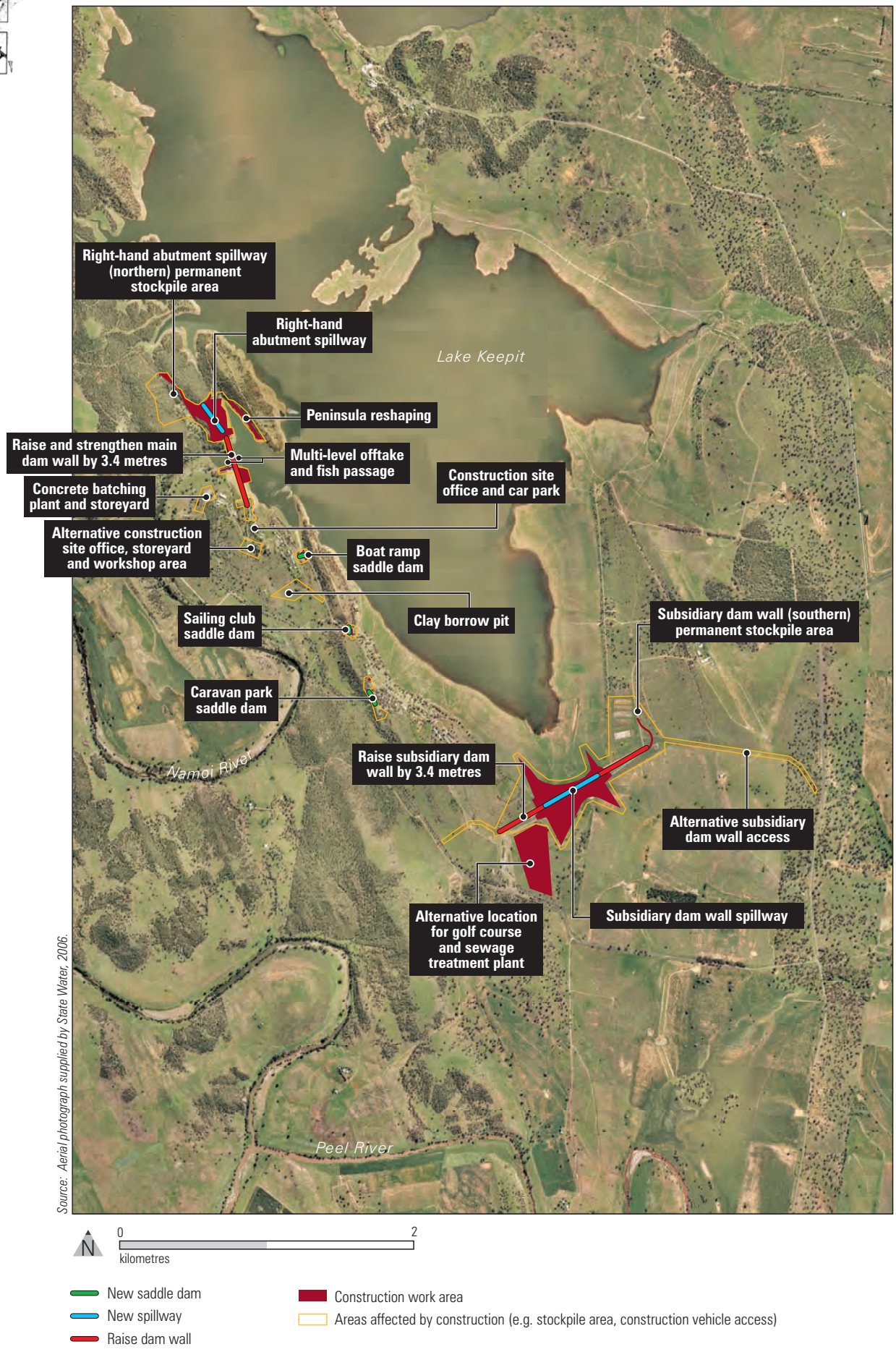

Figure 35 Construction impacts for Option B1.
(Map supplied by Parsons Brinckerhoff)

9.2.2 Option D2

This option involves: construction of a right-hand abutment spillway; widening the flow entry to the abutment spillway; a dam at the caravan park saddle; and spillways at the sailing club saddle and the boat ramp saddle. The main and subsidiary dam walls would be raised by 4.6 m. The road to the boat ramp and the sailing club would be realigned.

Additional works areas include construction and stockpile areas and site workshops and a clay borrow pit. Figure 36 shows the location of the extent of proposed works areas for Option D2.

Table 12 shows a summary of the potential impacts associated with this option.

The Keepit Dam wall, historical site KDH8, would be directly impacted by the proposed works through raising of the wall. The central stockpile area encroaches into part of the site complex of KDH3.

The previously recorded Aboriginal stone procurement source (#20-5-21) may be directly impacted by the proposed work. The site is recorded on the crest of the ridge adjacent to the location of the boat ramp saddle spillway. The extent of the site may include wherever conglomerate outcrops occur along the crest or flanks of the spur. Any excavation or work undertaken in the area therefore has the potential to impact the site. The extent of works proposed for Option D2, particularly the boat ramp access and trailer parking, extends into the western side and towards the crest of the spur and has potential therefore to impact a part of the site.

The potential for unrecorded sites is generally low in most of the construction areas. The potential is considered low to moderate for the northern stockpile area near the right hand abutment, due to the presence of an ephemeral water course in the area but the steep terrain prevents the threshold for subsurface testing being reached.

The southern stockpile area, north east of the subsidiary dam wall, is considered to have moderate archaeological potential. This is based on the occurrence of sites in a similar topographic environment about 1.5 km to the north. However, the presence of any site is likely to be of low significance and the area is disturbed by an existing stockpile, which reduces the archaeological potential. It is considered the area does not meet the threshold for conducting subsurface investigations.

Table 12 Summary of Heritage Impacts for Option D2 Construction Areas

Construction Area	Direct Impact to Known Sites	Indirect Impact to Known Sites	Potential for Unrecorded Sites
Right-hand abutment spillway	nil	nil	low
Raise main dam wall (4.6 m)	dam wall (KDH8)	nil	low
Flow entry to right-hand abutment (peninsula reshaping)	nil	nil	low
Right-hand abutment (northern) stockpile area	nil	nil	low-moderate
Alternative construction site office, storeyard and workshop	nil	nil	low
Boat ramp and sailing club (central) stockpile area	KDH3	nil	low
Clay borrow pit	nil	nil	low
New gravel road to peninsula	nil	nil	low
Sailing club saddle spillway	nil	nil	low
Boat ramp saddle spillway	#20-5-21	nil	low
Caravan park saddle dam	nil	nil	low
Raise subsidiary dam wall (4.6 m)	nil	nil	low
Subsidiary dam wall (southern) stockpile area	nil	nil	moderate

Option D2 represents a similar impact to known sites within the construction areas as Option D3 but a slightly greater impact than Option B1. There is one potential construction area associated with the subsidiary dam wall that has moderate archaeological potential.

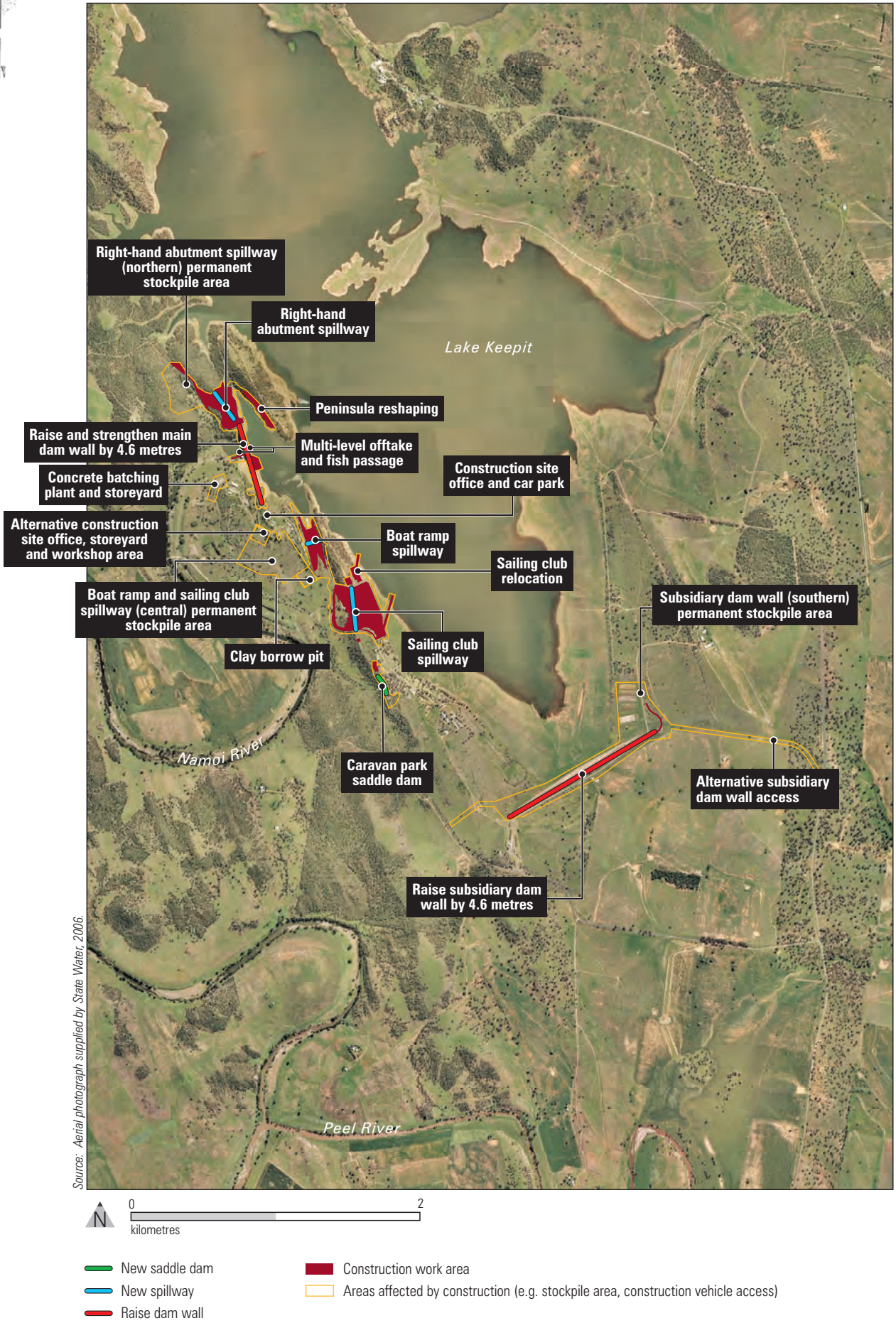

Figure 36 Construction impacts for Option D2.
(Map supplied by Parsons Brinckerhoff)

9.2.3 Option D3

This option involves: construction of a right-hand abutment spillway; widening the flow entry to the abutment spillway; a dam at the caravan park saddle; and spillways at the sailing club saddle and the boat ramp saddle. The main and subsidiary dam walls would be raised by 5.5 m.

Additional works areas include construction and stockpile areas and site workshops and a clay borrow pit. Figure 37 shows the location of the extent of proposed works areas for Option D3.

Table 13 provides a summary of the potential impacts associated with this option.

The Keepit Dam wall, historical site KDH8, would be directly impacted by the proposed works through raising of the wall. The central stockpile area encroaches into part of the site complex of KDH3.

The previously recorded Aboriginal stone procurement source (#20-5-21) may be directly impacted by the proposed work. The site is recorded on the crest of the ridge adjacent to the location of the boat ramp saddle spillway. The extent of the site may include wherever conglomerate outcrops occur along the crest or flanks of the spur. Any excavation or work undertaken in the area therefore has the potential to impact the site. The extent of works proposed for Option D3, particularly the boat ramp access and trailer parking, extends into the western side and towards the crest of the spur and has potential therefore to impact a part of the site.

The potential for unrecorded sites is generally low in most of the construction areas. The potential is considered low to moderate for the northern stockpile area near the right hand abutment, due to the presence of an ephemeral water course in the area but the steep terrain prevents the threshold for subsurface testing being reached.

The southern stockpile area, north east of the subsidiary dam wall, is considered to have moderate archaeological potential. This is based on the occurrence of sites in a similar topographic environment about 1.5 km to the north. However, the presence of any site is likely to be of low significance and the area is disturbed by an existing stockpile, which reduces the archaeological potential. It is considered the area does not meet the threshold for conducting subsurface investigations.

Table 13 Summary of Heritage Impacts for Option D3 Construction Areas

Construction Area	Direct Impact to Known Sites	Indirect Impact to Known Sites	Potential for Unrecorded Sites
Right-hand abutment spillway	nil	nil	low
Raise main dam wall (5.5 m)	dam wall (KDH8)	nil	low
Flow entry to right-hand abutment (peninsula reshaping)	nil	nil	low
Right-hand abutment (northern) stockpile area	nil	nil	low-moderate
Alternative construction site office, storeyard and workshop	nil	nil	low
Boat ramp and sailing club (central) stockpile area	KDH3	nil	low
Clay borrow pit	nil	nil	low
New gravel road to peninsula	nil	nil	low
Sailing club saddle spillway	nil	nil	low
Sailing club saddle spillway scour	nil	nil	low
Boat ramp saddle spillway	#20-5-21	nil	low
Boat ramp saddle spillway scour	nil	nil	low
Caravan park saddle dam	nil	nil	low
Raise subsidiary dam wall (5.5 m)	nil	nil	low
Subsidiary dam wall (southern) stockpile area	nil	nil	moderate

Option D3 represents a similar impact to known sites within construction areas as Option D2 but a slightly greater impact than Option B1. There is one potential construction area associated with the subsidiary dam wall that has moderate archaeological potential.

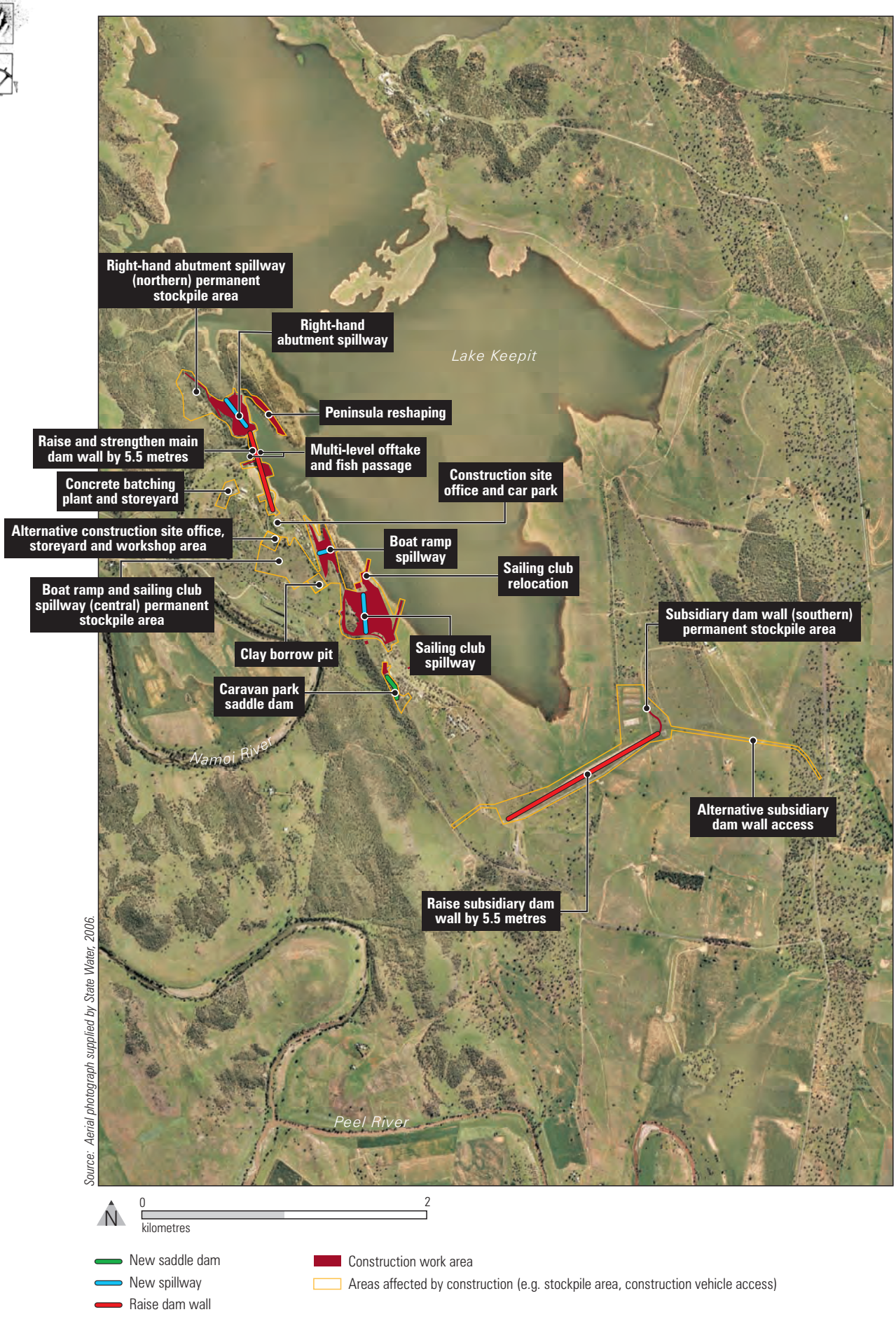

Figure 37 Construction impacts for Option D3.
(Map supplied by Parsons Brinckerhoff)

9.2.4 Summary of Construction Impacts

The construction impacts to heritage sites are very similar for each option. All options involve impact to the main dam wall (site KDH8) with Option D3 causing the greatest impact as it would raise the wall by a greater height (5.5 m) than Options D2 (4.6 m) and B1 (3.4 m). It is considered that the differences between the heights for all three options are only slight and that they all equate to a moderate impact to the heritage of the existing dam structure.

The boundary of the permanent central stockpile area under Options D2 and D3 also encroaches into the school/scout hall complex of site KDH3. The boundary lies between some of the outbuildings and the main school building. The entire complex is considered to be one site so any impact to part of the site impacts the rest of the complex. Option B1 does not impact on this area.

The main differences between the options therefore relate to the footprint for construction of the boat ramp saddle dam and spillway and the central stockpile area. These elements of Options D2 and D3 have the potential to impact the Aboriginal stone procurement source #20-5-21 and the school/scout complex KDH3. The potential for impact to these sites is highest with Options D2 and D3 and less for Option B1.

No other sites that fall within the construction areas will be impacted.

In terms of possible impacts to potential heritage sites, Option B1 is least favourable, having impacts to two areas of moderate archaeological potential. Options D2 and D3 each have impacts to only one area of moderate archaeological potential.

On balance, it is considered that each of the options has a low to moderate impact on known and potential heritage sites. Overall, Option B1 is likely to have the least impact with Options D2 and D3 indistinguishable but greater than Option B1.

9.3 Operational Impacts

Operation of the proposal would result in increased upstream inundation and, compared to dam failure, reduced downstream flooding during very large to extreme flood events.

The proposal would result in an increase to the design flood level of Keepit Dam and would cause an increase in temporary upstream inundation during very large to extreme flood events compared to the existing dam. There are a number of both Aboriginal and European heritage sites that would be affected by the marginal increase in temporary upstream inundation caused by the project. The base case for measurement of increased upstream inundations is the existing design flood level. The assessment of the impacts of increased upstream inundation is based on a map provided by Parsons Brinckerhoff and shown in Figure 2.

The proposal would result in a decrease in flooding downstream of Keepit Dam during very large to extreme flood events compared to the existing dam. The existing main dam wall is estimated to fail in a large flood event of approximately 1:2,800 AEP. In the event of current dam failure in a probable maximum flood, there would be six known Aboriginal and six known European heritage sites impacted downstream of the main dam wall in the Namoi River valley to the confluence with the Peel River. There is considerable potential to remove or severely impact potentially occurring archaeological deposits under dam failure conditions.

For all flood frequencies below this, the options would result in reduced downstream flooding compared to the base case of dam failure.

There would be no change to the existing flood operational procedures for Keepit Dam up until a large flood event of approximately 1:2,400 AEP, at which point the first release plugs/gates in the right-hand abutment spillway would activate. There would be very little difference in downstream inundation impacts between the options for large flood events with a frequency of occurrence between 1:2,400 AEP to 1:10,000 AEP when the right-hand abutment spillway would be the only additional spillway operating.

There are a number of both Aboriginal and European heritage sites that would be affected by downstream inundation during very large to extreme flood events, however, the impacts to these sites would be reduced compared to the base case of dam failure during these events.

The following is an assessment of the potential operational impacts for each option. It should be remembered that the exact nature of the impacts may differ with the unpredictable variables associated with extreme events.

The flooding impacts are based on the contour mapping provided by Parsons Brinckerhoff. For downstream areas, the flood impacts include the area mapped as impacted by existing dam failure up the confluence with the Peel River. It should be noted that the sites listed are only those known and recorded from this, or previous, field surveys. The archaeological sensitivity for additional Aboriginal sites is noted for each option.

9.3.1 Option B1

As noted above, the right-hand abutment spillway would commence operation during a large flood of 1:2,400 AEP for all options.

Under Option B1, the release plugs/gates in the subsidiary dam spillway would start to activate during a very large flood of approximately 1:10,000 AEP.

Option B1 would raise the design flood level by 3.4 m and would result in inundation of a number of topographic features with high archaeological potential above the current design flood level that have not previously been inundated. Under Option B1, upstream inundation would occur above the existing design flood level during very large floods of 1:17,300 AEP or less.

Table 14 identifies sites upstream of Keepit Dam that would be inundated during operation of Option B1 in a probable maximum flood of 1:500,000 AEP or less. For very large to extreme floods with higher frequencies of occurrence the extent and duration of upstream inundation would be reduced. Table 14 is therefore a worst case scenario for upstream inundation caused by Option B1.

Table 14 also identifies sites in the scour zone downstream of the subsidiary dam spillway. This area would be affected during a very large flood of approximately 1:10,000 AEP or less. Impacts to these areas would also include impacts from simultaneous flooding in the Peel catchment. A simultaneous large flood of approximately 1:200 AEP is expected to occur in the Peel catchment at the time of a 1:10,000 AEP event in the Namoi catchment. For a probable maximum flood in the Namoi catchment, a simultaneous large flood of approximately 1:1,400 AEP is expected to occur in the Peel catchment.

Impacts to these areas through back-up of flood waters in the Peel valley would also occur in the base case scenario of dam failure and, to a lesser extent, during operation of Option B1 (see Figure 3). However, back up flood waters are expected to be of low velocity and have a minor impact, while the high velocity flood waters from the subsidiary dam spillway and also the simultaneous flooding of the Peel catchment would cause a high impact to heritage sites.

Table 14 Summary of Heritage Impacts during Operation of Option B1 in the Probable Maximum Flood relative to Dam Failure

Flood Area	Potential Impact to Known Sites		Potential for Unrecorded Sites
	Aboriginal Sites	Other Sites	
Upstream inundation			
Greater duration of inundation (sites between the full supply level and existing design flood level)	KDA23, KDA28, #20-4-54	Borah Crossing Aboriginal Reserve	High
Increase in inundation (above the existing design flood level)	None	KDH1, Borah Crossing Aboriginal Reserve	High
Additional downstream flooding			
Subsidiary dam spillway scour zone	KDA6, KDA7, KDA8, KDA14-19, KDA27	KDH6, KDH7, Rangari Limestone	Moderate
Increased floodwater velocities in the Peel River valley	KDA3, KDA4, KDA5	None	High

Three upstream Aboriginal sites and part of the former Borah Crossing Aboriginal Reserve would be impacted by longer periods of flooding through operation of Option B1. These sites would be subject to longer periods of inundation, of up to 19 hours, compared to the existing design levels.

During the probable maximum flood, Option B1 would potentially impact two historic sites located above the existing design flood level: KDH1, a house ruin; and part of the former Aboriginal Reserve. As these sites are above the existing design flood level they do not have the potential for temporary inundation by the existing dam.

The potential for upstream inundation impact to unrecorded sites is proportional to the extent of sensitive riparian corridor that would be affected. The likely impact of this option to the predicted upstream resource therefore is lower than for Options D2 and D3.

An additional ten Aboriginal and two European sites, as well as the Rangari Limestone formation would be in the path of high velocity of flows from the subsidiary dam spillway. These sites would likely suffer severe impact during operation of the spillway.

Scouring impact is likely to occur across a fan shaped area downslope of the subsidiary dam spillway which joins a 3 kilometre interval of the Peel River corridor. This constitutes a broad area of potential impact including a wide spectrum of valley floor and basal slope topographies.

The potential for scour erosion downstream of the subsidiary wall spillway to affect unrecorded Aboriginal sites in these areas is rated as moderate. Scour erosion from this option has potential to remove or severely impact potentially occurring archaeological deposits that would be less affected by flooding associated with Options D2 and D3 and even in the event of dam failure.

The operation of the subsidiary dam spillway would result in higher velocity floodwaters in the Peel River between the subsidiary dam wall and the confluence with the Namoi River. Three Aboriginal sites in this section of the Peel River valley would potentially be impacted by additional scouring caused by higher velocity floodwaters.

9.3.2 Option D2

As noted above, the right-hand abutment spillway would commence operation during a large flood of 1:2,400 AEP for all options. The additional spillway at the sailing club would start to activate in a very large flood of approximately 1:10,000 AEP, followed by the boat ramp spillway at extremely large floods of approximately 1:100,000 AEP or less.

Option D2 would raise the design flood level by 4.6 m and would result in inundation of a number of topographic features with high archaeological potential above the current design flood level that have not previously been inundated. Under Option D2, upstream inundation would occur above the existing design flood level during large floods of 1:6,700 AEP or less.

Table 15 identifies sites upstream of Keepit Dam that would be inundated during operation of Option D2 in a probable maximum flood of 1:500,000 AEP or less. For very large to extreme floods with higher frequencies of occurrence the extent and duration of upstream inundation would be reduced. Table 15 is therefore a worst case scenario for upstream inundation caused by Option D2.

Table 15 also identifies sites in the scour zone downstream of the boat ramp and sailing club spillways. These areas would be affected during very large floods of approximately 1:10,000 AEP or less and approximately 1:100,000 AEP or less respectively. Impacts to these areas would only occur through flooding in the base case scenario of dam failure or through the possible maximum flood of 1:500,000 years (see Figure 3).

Table 15 Summary of Heritage Impacts during Operation of Option D2 in the Probable Maximum Flood relative to Dam Failure

Flood Area	Potential Impact to Known Sites		Potential for Unrecorded Sites
	Aboriginal Sites	Other Sites	
Upstream inundation			
Greater duration of inundation (sites between the full supply level and existing design flood level)	KDA23, KDA28, #20-4-54	Borah Crossing Aboriginal Reserve	High
Increase in inundation (above the existing design flood level)	None	KDH1, Borah Crossing Aboriginal Reserve	High
Additional downstream flooding			
Sailing club and boat ramp spillway scour zone	None	None	Low

Three upstream Aboriginal sites and part of the former Borah Crossing Aboriginal Reserve would be impacted by longer periods of flooding through operation of Option D2. These sites would be subject to longer periods of inundation, of up to 23 hours, compared to the existing design levels.

During the probable maximum flood, Option D2 would potentially impact two historic sites located above the existing design flood level: KDH1, a house ruin; and part of the former Aboriginal Reserve. As these sites are above the existing design flood level they do not have the potential for temporary inundation by the existing dam.

The potential for upstream inundation impact to unrecorded sites is proportional to the extent of sensitive riparian corridor that would be affected. The likely impact of Option D2 to the predicted upstream resource therefore is higher than for Option B1 but lower than for Option D3.

Below the dam, the reduced extent of inundation and velocity of floodwaters in the Namoi and Peel Rivers would result in reduced impacts to the sites that would be affected by dam failure. Impacts to the Aboriginal procurement source KDA6 would be avoided entirely.

No sites were recorded in the flow path of either the sailing club or boat ramp spillways. Scouring impact is likely to occur from the base of the spillway for approximately 750 m and 500 m for the boat ramp and sailing club spillways respectively to the Namoi River. Scouring effects may also continue downstream along the riparian corridor. The potential for scour erosion downstream of the spillways to affect unrecorded Aboriginal sites in these areas is rated as low. This is based on the lack of sites identified and the mostly disturbed nature of each flow path. Scour erosion from this option has less potential to remove or severely impact potentially occurring archaeological deposits than Option B1 but similar to Option D3.

9.3.3 Option D3

As noted above, the right-hand abutment spillway would commence operation during a large flood of 1:2,400 AEP for all options. The additional spillway at the sailing club would start to activate in a very large flood of approximately 1:10,000 AEP, followed by the boat ramp spillway at extremely large floods of less than approximately 1:100,000 AEP.

Option D3 would raise the design flood level by 5.5 m and would result in inundation of a number of topographic features with high archaeological potential above the current design flood level that have not previously been inundated. Under Option D3, upstream inundation would occur above the existing design flood level during large floods of 1:5,000 AEP or less.

Table 16 identifies sites upstream of Keepit Dam that would be inundated during operation of Option D3 in a probable maximum flood of 1:500,000 AEP or less. For very large to extreme floods with higher frequencies of occurrence the extent and duration of upstream inundation would be reduced. Table 16 is therefore a worst case scenario for upstream inundation caused by Option D3.

Table 16 also identifies sites in the scour zone downstream of the boat ramp and sailing club spillways. These areas would be affected during very large floods of approximately 1:10,000 AEP or less and approximately 1:100,000 AEP or less respectively. Impacts to these areas would only occur through flooding in the base case scenario of dam failure or through the possible maximum flood of 1:500,000 years (see Figure 3).

Table 16 Summary of Heritage Impacts during Operation of Option D3 in the Probable Maximum Flood relative to Dam Failure

Flood Area	Potential Impact to Known Sites		Potential for Unrecorded Sites
	Aboriginal Sites	Other Sites	
Upstream inundation			
Greater duration of inundation (sites between the full supply level and existing design flood level)	KDA23, KDA28, #20-4-54	Borah Crossing Aboriginal Reserve	High
Increase in inundation (above the existing design flood level)	KDA22	KDH1, Borah Crossing Aboriginal Reserve	High
Additional downstream flooding			
Sailing club and boat ramp spillway scour zone	None	None	Low

Three upstream Aboriginal sites and part of the former Borah Crossing Aboriginal Reserve would be impacted by longer periods of flooding through operation of Option D3. These sites would be subject to longer periods of inundation, of up to 27 hours, compared to the existing design levels.

During the probable maximum flood, Option D3 would potentially impact three historic sites located above the existing design flood level: KDH1, a house ruin; part of the former Aboriginal Reserve; and KDA22, a scarred tree. As these sites are above the existing design flood level they do not have the potential for temporary inundation by the existing dam. Only KDH1 and the Aboriginal Reserve would be similarly impacted by Options B1 and D2.

The potential for upstream inundation impact to unrecorded sites is proportional to the extent of sensitive riparian corridor that would be affected. The likely impact of Option D3 to the predicted upstream resource therefore is higher than for Options B1 and D2.

Below the dam, the reduced extent of inundation and velocity of floodwaters in the Namoi and Peel Rivers would result in reduced impacts to the sites that would be affected by dam failure. Impacts to the Aboriginal procurement source KDA6 would be avoided entirely.

No sites were recorded in the flow path of either the sailing club or boat ramp spillways. Scouring impact is likely to occur from the base of the spillway for approximately 750 m and 500 m for the boat ramp and sailing club spillways respectively to the Namoi River. Scouring effects may also continue downstream along the riparian corridor. The potential for scour erosion downstream of the spillways to affect unrecorded Aboriginal sites in these areas is rated as low. This is based on the lack of sites identified and the mostly disturbed nature of each flow path. Scour erosion from this option has less potential to remove or severely impact potentially occurring archaeological deposits than Option B1 but similar to Option D2.

9.3.4 Summary of Operational Impacts

The operational impacts to heritage sites during very large to extreme flood events are very similar for all options. All the options would result in reduced impacts to downstream heritage sites in the Namoi River valley compared to dam failure. The main differences relate to the level of upstream inundation and the potential impacts on unrecorded sites and the impact of scouring downstream of the additional spillways.

Option B1 has the highest potential to impact known and unrecorded sites due to the effects of scouring below the proposed subsidiary dam spillway. Scouring in this area would likely destroy 12 heritage sites and impact the palaeontological site. Three additional sites in the Peel River valley would also potentially be impacted by higher velocity floodwaters. All these sites would also be impacted by simultaneous flooding in the Peel catchment and back up flood waters from the Namoi river for dam failure and all the options. However, the severity of impact would be much greater under Option B1 owing to the scouring caused by flood waters released through the subsidiary dam spillway. Overall for Option B1, operational downstream impacts for the probable maximum flood would result in greater impacts to 15 sites and the palaeontological site compared to dam failure.

Option D2 has a reduced operational impact compared to Options B1 and D3. The upstream inundation impacts of Option D2 would be slightly worse than Option B1 due to a marginally greater period of inundation in extreme floods. However, Option D2 would have a marginally shorter period of inundation in these events than Option D3 and would avoid inundation of scarred tree KDA22. Downstream, Options D2 and D3 perform similarly. They would avoid impacts to the Aboriginal procurement source KDA6 that would be affected by dam failure. While sites in the Peel River valley would be inundated, Options D2 and D3 avoid the severe impacts to heritage sites associated with Option B1 and operation of a spillway at the subsidiary dam wall.

Option D3 has a reduced operational impact compared to Option B1 but a greater impact than Option D2. The upstream inundation for a probable maximum flood would impact one additional site not impacted by other options. The downstream flooding would affect the same number of sites as Option D2, that is, three fewer than the base case of dam failure and avoids the severe impacts associated with Option B1 and operation of a spillway at the subsidiary dam wall.

The potential impacts to the identified and potential heritage sites are dependent upon very large to extreme flood events. The probability for such events occurring is extremely low. Impacts from upstream inundation for the options identified have a frequency of occurrence of 1:17,300 years or less, 1:6,700 years and 1:5,000 years for Options B1, D2 and D3, respectively. Impacts from scouring below the subsidiary dam wall under Option B1 would occur for large floods with a frequency of approximately 1:10,000 years or less. Under Options D2 and D3, scour impacts below the sailing club and boat ramp saddle spillways would occur in very large floods with a frequency of approximately 1:10,000 and 1:100,000 years, respectively.

Under the current configuration, dam failure would occur in a large flood with a frequency of approximately 1:2,800 or less. Dam failure would result in higher degrees of impact to heritage sites than under any of the proposed upgrade options except downstream of the additional spillways. Any of the proposed upgrade options would therefore provide an improved preservation outcome for heritage sites compared to the current situation.

10. CONCLUSIONS

The Keepit Dam Upgrade project would have an impact on recorded Aboriginal and historical heritage sites. The impacts would mostly be associated with the construction aspects of the project. Operational impacts would occur only in low probability circumstances of very large to extreme flood events with a frequency of occurrence of approximately 1:10,000 years or less.

Assessment of impacts has been made for both construction and operation for each option. Combining the results of these assessments allows for a potential grading of options.

Under Option B1, the construction footprint has potential to directly affect only one site. Two areas of moderate archaeological potential may be affected, and one site potentially indirectly affected. During operation in a probable maximum flood, 15 downstream sites would be impacted, 12 of which would be impacted severely by scour from the subsidiary dam spillway. Only two sites would be subject to new upstream inundation.

For Option D2, construction is likely to directly impact three sites and impact only one area of archaeological potential. Operation of this option in a probable maximum flood would result in new inundation to two upstream sites but no additional downstream sites compared to dam failure.

Under Option D3, construction would impact three known sites and one area of archaeological potential. Operation of this option in a probable maximum flood would result in new inundation to three upstream sites but no additional downstream sites compared to dam failure.

The total number of sites impacted by the construction and operation of each option is not necessarily the best means of rating the various options. This is because the operational impacts would generally occur only in the most extreme event. It is considered that the potential for very large to extreme flood events is part of the natural history of the continent. It is therefore not feasible, nor is it necessarily warranted, to mitigate impacts to heritage sites during operation of the project under these exceptionally rare circumstances. Nor is it warranted to mitigate against site impact prior to such low probability circumstances.

The mitigation of impacts to heritage sites should therefore focus on the activities of the upgrading that may impact the sites in the short term. The construction impacts are much more likely to happen and site impacts are more easily mitigated. While the operational impacts are considered, the construction impacts are therefore used as the determining factor in the ranking.

There are similar development proposals and construction footprints for each option. The main differences relate to the extent and location of construction work areas, Options D2 and D3 being similar but Option B1 different. Impact would occur to the existing Keepit Dam wall (KDH8) under all options.

The other potential construction impact is to the stone procurement source #20-5-21 and the school/scout complex (KDH3). Options D2 and D3 both potentially impact these sites but the impact also has potential to be avoided or reduced through correctly defining the site boundaries and mitigation. Option B1 is unlikely to impact these sites.

Other impacts relate to the potential to affect unrecorded Aboriginal sites. The stockpile areas at the subsidiary dam wall (southern stockpile) under all options and the construction work area south of the subsidiary dam wall under Option B1 have moderate archaeological potential, although any site present is likely to be of only low significance. The southern stockpile area has already been disturbed by previous placement of material. Additional stockpiling is therefore unlikely to add significant disturbance above what has already occurred. Potential impacts by the proposed construction area under Option B1 south of the subsidiary dam wall could also be mitigated once any sites are identified.

It is considered that if construction impacts can be mitigated for the stone source #20-5-21 and KDH3 under both Options D2 and D3, then Option D2 is likely to have the least impact to heritage sites in both construction and operational scenarios, followed by Option D3. While Option B1 has less impact

on known sites, it has a greater potential to impact unrecorded sites during construction and combined with the operational impact is considered to be least favoured.

10.1 Response from Aboriginal Community

After a request to the Aboriginal groups to specifically address the issue of the management of the sites downstream of the subsidiary dam wall, the Gunida Gunyah CDEP and Min Min Aboriginal Corporation both verbally indicated that there should be active management of the sites.

Jane Bender, coordinator of Gunida Gunyah CDEP indicated by phone (18/5/07) that their organisation would prefer to see recovery of the artefacts to be impacted by potential 1:10,000 floods. This was a decision reached by the members of the Gunida Gunyah organisation. Ms Bender indicated that they do have secure storage facility and also noted that the Red Chief LALC has a museum where the artefacts could be stored.

Michael Steadman, Secretary/Treasurer of the Min Min Aboriginal Corporation indicated by phone (18/5/07) that he would prefer to see the artefacts removed and kept in a safe location such as museum or keeping place than have them washed away by a flood.

Despite numerous attempts, the Tamworth LALC could not be contacted regarding this issue. However, their official response to the draft report was that they were happy with the original recommendations. This included that it was not considered warranted to mitigate sites to be impacted only by extreme flood events.

No formal response from the Red Chief LALC was obtained. However, two of the four field participants did provide a written response. They both indicated that they preferred to see the artefacts left as they were found.

There is clearly no consensus for site management between the Aboriginal groups consulted for this project. Leaving the artefacts and sites *in situ* would provide a more complete landscape setting and allow for future research. However this may also see them further degraded by future low intensity floods or destroyed by extreme flood events. It is also unlikely that the complete site in each instance could be salvaged as they are likely to contain hundreds of artefacts spread over sizeable areas.

Further consultation regarding this issue with the DEC, which has the statutory obligation on the management of the sites, would be beneficial.

11. RECOMMENDATIONS

Based on the results of the sample field surveys, the assessment of the significance of the identified heritage items and the potential impacts to heritage items, the following management recommendations are provided for heritage sites.

1. Minimise impact to the main dam wall - Minimise disturbance to the condition of the existing main dam wall, ie minimise disturbance to the physical state of the fabric of the dam wall and its potential for survival. Minimise disturbance to the integrity of the existing dam wall, ie minimise the degree to which changes will be made to the dam wall, thereby allowing it to maintain its status as an appropriate representation in its original form.

   Subject to detailed design, impact to the dam wall may be minimised by:

   a. Use of materials that are sympathetic to those that are present in the existing main dam wall.

   b. Use of the existing spillway gate lifting gear.

   c. The removal and refurbishment, as necessary, of the gantry crane on top of the existing main dam wall and its replacement on top of the raised main dam wall.

   d. The removal and secure storage of historic items located on the top of the existing main dam wall, including the metal dedication and commemorative plaques and the metal 'Water Conservation and Irrigation Commission, NSW', insignia, and their relocation to similar locations on top of the raised main dam wall.

   e. Archival recording of the existing main dam wall in accordance with best practice outlined in the NSW Heritage Office 1998 guidelines 'How to Prepare Archival Records of Heritage Items' (NSW Heritage Office 1998) before construction work begins.

2. Avoid direct impact to the Aboriginal stone procurement source #20-5-21 by:

   a. Fencing off the crest area of the ridge on which the site is situated.

   b. Avoiding excavation of ridge deposits for fill in the boat ramp saddle dam wall.

   c. Avoiding excavation of ridge deposits and rock for the boat ramp saddle spillway.

   d. If Option D2 or D3 is adopted, an archaeological survey of the impact area of the boat ramp saddle dam should be undertaken to determine if there would be impacts to the stone procurement source site.

3 If Aboriginal stone procurement source #20-5-21 cannot be avoided, then archaeological salvage of the site would be required. This would include detailed site recording and collection and analysis of a sample of artefacts from the site. If this work was carried out prior to Part 3A approval, then a permit from the DEC would be required.

4. Restrict the area of the stockpile north east of the subsidiary dam wall to the existing area of disturbance (as mapped). If additional disturbance is to occur, then subsurface investigations may be required to determine impacts to potential archaeological deposits.

5. If Option B1 is adopted, conduct a field survey of the construction work area south of the subsidiary dam wall.

6. If the central stockpile area is to be used under Options D2 and D3, then a buffer of at least 10 metres should be formed around the site complex of KDH3. All of the associated buildings at this site should be avoided by construction and stockpiles.

7. If other heritage items/Aboriginal Objects are discovered during construction works, then a qualified heritage specialist should be contacted to inspect the find/s and provide advice on appropriate management requirements.

8. It is not considered warranted to mitigate impacts to the sites that only have potential to be affected by extreme flood events. However, further consultation with the DEC on long term management should be undertaken considering the views of at least two of the Aboriginal groups consulted.

9. Consultation with relevant Aboriginal communities should continue with regard to the assessment and management of Aboriginal sites potentially affected by the upgrade proposal.

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APPENDIX 1

CORRESPONDENCE FROM ABORIGINAL GROUPS

TAMWORTH LOCAL ABORIGINAL LAND COUNCIL

Ph: 02 67669028
E-mail: mfl30749@bigpond.net.au

123 Marius Street
Tamworth NSW 2340
Fax: 02 6799036
ABN: 38 919 784 345

Mr Matthew Barber
Navin Officer
Heritage Consultants Pty Ltd
Number 4
71 Leichhardt St
Kingston ACT 2604

Dear Mr Barber,

Re: Keepit Damp Upgrade Aboriginal Heritage Assessment

The Tamworth Local Aboriginal Land Council wish to advise you that we have received the Report in regards to the above.

We also would like to advise you that after reading the report, the Tamworth LALC have no discrepancies with the report.

We take this opportunity to thank you for your business and wish you luck in your endeavours.

Yours sincerely

Ivan Johnson
Chairperson
22nd February 2007

Chairperson: Ivan Johnson
Secretary: Narelle White
Treasurer :Rod Johnson

From: Gunida Gunyah [gunidagunyah@iinet.net.au]
Sent: Thursday, 25 January 2007 3:55 PM
To: mbarber@navinofficer.com.au
Subject: FW: Keepit Dam Upgrade

Gunida Gunyah Aboriginal Corporation
34/36 Farrar Road
Gunnedah NSW 2380
02 6742 7038

Matthew Barber
Heritage Consultants Pty Ltd

Dear Matthew

All members of Gunida Gunyah Aboriginal Corporation were given a copy of the Keepit Dam Upgrade Aboriginal Heritage Assessment paper for review.
At the next general meeting this was discussed and the following was the consensus:

- All Aboriginal sites are to be preserved in accordance with **Current Legislation.**
- Any labour work that is available to be in consultation and negotiation with Gunida Gunyah Aboriginal Corporation.
- Any site work to be carried out to be in consultation and negotiation with Gunida Gunyah Aboriginal Corporation.

I have one comment to make regarding a common used phrase through out the paper that I find offensive, it is as follows and I quote:
This reduces the scientific value and research potential of the site.
This may be the, and I quote *scientific value*. But under no circumstances does this over ride the cultural significance of a 50,000 year old culture.
If you would like to discuss this matter with any Gunida Gunyah Aboriginal Corporation's members please feel free to contact us.

Yours Sincerely
Tracy Goodwin
Secretary

Date: 17/05/2007

Red Chief Local Aboriginal Land Council

LAKE KEEPIT SURVEY

A site survey was done at lake keepit dam and surrounding properties. The find was excellent, it range from scared trees, scattered flakes and axe heads.

Advice

My thoughts are everything should be left as they were found and untouched so they won't get destroyed in the future. And also to keep the respect of the Aboriginal lore and Aboriginal Elder's.

Thank you

Bruce Porter

Bruce Porter

Date: 17/05/2007

Red Chief Local Aboriginal Land Council

LAKE KEEPIT SURVEY

Site survey was done in the lake keepit area and surrounding properties where that we found scared trees, axe heads and scattered flakes.

Advice

They should be fenced off around the scared trees to decrease damages from live stock and machinery. We prefer to leave the artefacts where they are to decrease damage to them.

Thank you

Peter Shoobert

APPENDIX 2

CARROLL GAP SCHOOL DATES

Important Dates for Carroll Gap School

	Date	Event
1880	February	Parents ask the Government for a new school on the Peel River.
	March	The Government asks the Armidale inspector to report back quickly.
	May	A school site is suggested by a local farmer (Mr Winter).
	August	The Armidale inspector says the school should be built.
	September	The Government agrees to build a school at Carroll Gap.
	October	A brick building with wood shingle roof is planned. The estimated cost is £750
1881	May	The Government asks for tenders to build a school and teacher's residence.
	August	Mr F. Wilson is the chosen tenderer and he starts building.
1882	July	The [primary] school opens with Mr Arthur Redfern as the teacher.
1883	February	Some parents ask the Government to provide a boat so their children can cross the river [Peel River] when it is high.
	April	The Government does not provide a boat.
1884	December	The teacher, Mr Arthur Redfern, is promoted to standard 111A.
1886	March	The new teacher is Mr William E. Armstrong.
1888	April	The Government takes court action against Mr and Mrs James Smith for not sending their children to school often enough. They are fined 10 shillings.
	July	The new teacher is Mr Samuel B. Serjeant.
1890	October	The new teacher is Mr Angus McDonald.
1892	April	The Chief Inspector reports that Mr Angus McDonald is not a good teacher. Mr McDonald explains 'the low attainment of the pupils' to the Chief Inspector
1897	January	The teacher is Mr William G. Rae.
1899	October	The new teacher is Mr John J. Emery.
1904	July	Mr Alfred Gates is the new teacher.
1906	July	Mr John P. Ward is the new teacher.
1910	February	A big flood comes into the building. More than a metre above the floor.
	May	After the flood Mr Ward gives up. The new teacher is Mr John Mitchell.
1911	October	The school is closed probably because pupil numbers drop.
1913	October	The school opens again with a new teacher, Mr John Bendeich. But is only open for six months, then it closes again (in April 1914).
1915	March	The school opens again. This time it is a part time school sharing the teacher, Mr E. L. Gaffney, with Keepit School (until December 1922).
1923	January	The school is downgraded to subsidised status; the teacher is Mrs Vera M. Riley. Mr J. C. Riley operates the Post Office in the same building.
1928	November	The school is closed again, when the Rileys move away.
1933	February	The school opens again, but only for a few months, the teacher is N. E. Nolan.
1933	From July	The school does not open again, but the Post Office operates until 1962.

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APPENDIX 3

STATUTORY INFORMATION

The National Parks and Wildlife Act 1974

The following summary is based on:

- The provisions of the current *National Parks and Wildlife Act 1974* (NP&W Act) as amended. It should be noted that amendments to this Act were passed by both houses of the NSW State Government in 2001 (no.130, assented 19/12/2001). Some of these amendments are yet to be proclaimed.

- Department of Environment and Conservation (DEC) policy as presented in the 1997 Standards and Guidelines Kit for Aboriginal Cultural Heritage provided by the (then) NSW NPWS, and as communicated orally to the consultants on a periodic basis. The 1997 Standards and Guidelines Kit is currently under review and subject to change in the near future.

The guideline documents presented in the 1997 Standards and Guidelines Kit were stated to be working drafts and subject to an 18 months performance review. The Standards Manual was defined not to be a draft and subject to periodic supplements.

With the exception of projects subject to the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), the NP&W Act (as amended) provides the primary basis for the legal protection and management of Aboriginal sites within NSW. The implementation of the Aboriginal heritage provisions of the Act is the responsibility of the DEC.

The rationale behind the Act is the prevention of unnecessary or unwarranted destruction of relics, and the active protection and conservation of relics that are of high cultural significance.

With the exception of some artefacts in collections, or those specifically made for sale, the Act generally defines all Aboriginal artefacts to be 'Aboriginal objects' and to be the property of the Crown. An Aboriginal object has a broad definition and is inclusive of most archaeological evidence The Act then provides various controls for the protection, management and disturbance of Aboriginal objects.

An Aboriginal object is defined as:

> 'any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.' [Section 5(1)].

In practice, archaeologists use a methodology that groups 'Aboriginal objects' into various site classifications according to the nature, occurrence and exposure of archaeological material evidence. The archaeological definition of a site may vary according to survey objectives, however a site is not recognised or defined as a legal entity in the Act. It should be noted that even single and isolated artefacts are protected as Aboriginal objects under the Act.

The investigation, use or destruction of Aboriginal objects is managed through a system of Permits and Consents under the provisions of Sections 87 and 90 of the Act. Section 87 relates to actions which do not involve direct damage to Aboriginal objects, and Section 90 relates to damage or defacement of Aboriginal objects.

Under Section 87 of the Act, it is an offence to do any of the following without a Permit from the Director-General of the DEC: disturb or excavate any land for the purpose of discovering an Aboriginal object; disturbing or moving an Aboriginal object; take possession of or removing an Aboriginal object from certain lands; and erecting a building or structure to store Aboriginal objects on certain land (Section 86). The maximum penalty is $11,000 for individuals and $22,000 for corporations.

Under Section 90 of the Act, a person who, without first obtaining the consent of the Director-General knowingly destroys, defaces or damages, or knowingly causes or permits the destruction or defacement of or damage to, an Aboriginal object or Aboriginal Place is guilty of an offence against the Act.

Where salvage actions (such as collection or re-positioning) are proposed in conjunction with an application to destroy Aboriginal objects, then an application for a Section 87 permit must accompany the Section 90 application. This is because a consent issued solely under Section 90 of the Act is not considered to permit actions other than those which destroy, deface or damage Aboriginal objects.

In January of 2005, the DEC introduced Interim guidelines for Aboriginal Community Consultation with regard to the preparation of applications for a consent or permit under Part 6 (Sections 87 and 90) of the NP&W Act. The DEC anticipates that the guidelines will be replaced with a more detailed policy later in 2005 following consultation with the Aboriginal community and other stakeholders. The Interim guidelines include a required process of notification of intended applications in the local media, an invitation for stakeholder groups to register interest, and various time periods providing an opportunity for registered stakeholders to comment and review proposed methodologies and assessments. A transition phase has been specified for the application of the Interim guidelines. Any project where a Planning Focus Meeting was held before the 1st of January 2005, or where the proponent can demonstrate that cultural heritage assessment work commenced prior to this date, may continue to prepare Part 6 applications according to the former processes. Alternatively a proponent may choose to comply with the new guidelines.

It should be noted that Section 75U of the EP&A Act (as amended) establishes an exception to the application of Sections 87 and 90 of the NP&W Act. It states that a Permit under Section 87 or a Consent under Section 90 of the NP&W Act is not required for an approved project subject to the provisions of Part 3A of the EP&A Act.

Section 175B of the NP&W Act outlines circumstances where corporation directors may be taken to have contravened these provisions, based on the acts or omissions of that Corporation.

The processing and assessment of Permit and Consent applications is dependent upon adequate archaeological review and assessment, together with an appropriate level of Aboriginal community liaison and involvement (refer Standards for Archaeological Practice in Aboriginal Heritage Management in 1997 NPWS Standards and Guidelines Kit).

The Minister may declare any place which, in his or her opinion, is or was of special Aboriginal significance with respect to Aboriginal culture, to be an Aboriginal place (Section 84). The Director-General has responsibility for the preservation and protection of the Aboriginal place (Section 85). An area declared to be an Aboriginal place may remain in private ownership, or be acquired by the Crown by agreement or by a compulsory process (Section 145).

The Director-General may make an interim protection order and order that an action cease where that action is, or is likely to, significantly affect an Aboriginal object or Aboriginal place. Such an order is current for 40 days (Section 91AA, Schedule 3[10]). Such an order does not apply to certain actions, such as where they are in accordance with development consents or emergency procedures.

General Management Constraints and Requirements

Except where a project is subject to the provisions of Part 3A of the EP&A Act, the NP&W Act, together with the policies of the DEC provide the following constraints and requirements on land owners and managers:

- It is an offence to knowingly disturb an Aboriginal object (or site) without an appropriate permit or consent (Sections 87 and 90).

- Prior to instigating any action which may conceivably disturb an Aboriginal object (this generally means land surface disturbance or felling of mature trees), archaeological survey

and assessment is required (refer Standards for Archaeological Practice in Aboriginal Heritage Management in 1997 NPWS Standards and Guidelines Kit).

- When the archaeological resource of an area is known or can be reliably predicted, appropriate landuse practices should be adopted which will minimise the necessity for the destruction of sites/Aboriginal objects, and prevent destruction to sites/Aboriginal objects which warrant conservation (refer Standards for Archaeological Practice in Aboriginal Heritage Management in 1997 NPWS Standards and Guidelines Kit).

- Documented and appropriate consultation with relevant Aboriginal Community representatives is required by the DEC as part of the prerequisite information necessary for endorsement of consultant recommendations or the provision of Consents and Permits by the DEC (refer Standards for Archaeological Practice in Aboriginal Heritage Management in 1997 NPWS Standards and Guidelines Kit).

Statutory Constraints Arising from Artefacts which Constitute Background Scatter

Background scatter is a term used generally by archaeologists to refer to artefacts that cannot be usefully related to a place or focus of past activity. There is no single concept for background 'scatter' or discard, and therefore no agreed definition. The recognition of background material within a particular study area is dependent on an appreciation of local contextual and taphonomic factors. Artefacts within a 'background' scatter can be found in most landscape types and may vary considerably in density.

Standard archaeological methodologies cannot effectively predict the location of individual artefacts within background scatters. Surface survey may detect background material either as individual artefacts ('isolated finds'), or even as small, low-density 'sites'. Subsurface testing may sample, and through analysis, characterise background material. However, beyond the scope of archaeological sampling, the potential to encounter background artefacts within the context of development related ground disturbance will always remain.

Most previous cultural resource management archaeological methodologies have acknowledged that there is little scientific justification for the conduct of archaeological salvage or ground disturbance monitoring to effect the recovery of background artefacts. The intrinsic scientific value of any recovered artefacts does not, in general, outweigh the expense of conducting the monitoring. However, low density distributions of artefacts are a current subject of interest by some heritage practitioners and DEC policy regarding this issue may change in the future. The monitoring of construction related ground works by Aboriginal groups is now increasingly practiced. The recovery of background scatter artefacts is often a probable outcome of such monitoring exercises.

Given the nature of statutory and DEC policy requirements in NSW, the detection of background artefacts during monitoring can be problematic. Except where a project is subject to the provisions of Part 3A of the EP&A Act, or where an Aboriginal object is covered by a current Consent or Permit (or Heritage Impact Permit (HIP)), from the DEC, all further impact to an Aboriginal object detected during development works, and to the ground in its immediate vicinity, must cease until an appropriate Permit or Consent is gained. It may take up to eight weeks for this to occur. In the past, however, the DEC has not as a general rule granted Consents to cover artefacts within background scatters which remain undescribed and undetected. This is because the DEC sought to provide Consents where the significance and location of the Aboriginal objects to be impacted could be reliably defined. By their very nature, this may not be possible for artefacts that constitute a background scatter.

The present application of policy by the DEC does not provide for a consistent or proactive means of dealing with the statutory constraints posed by the detection of background scatter artefacts during development works. In those cases where the provisions of Part 3A of the EP&A Act do not apply, an option is the provision by the DEC of a Section 87 Permit or Section 90 Consent which includes all Aboriginal objects situated within the defined development site rather than specific sites or finds within it. This approach has been adopted by some DEC branch jurisdictions where an assessment has been provided which suitably investigates the known and predicted incidence of Aboriginal

objects potentially subject to disturbance. Other DEC jurisdictions do not accept this approach and only provide Permits and Consents for known and defined Aboriginal object occurrences.

It should therefore be noted, that in the event that an Aboriginal artefact ('Aboriginal object') is detected during ground disturbance within a development study area, and that area or Aboriginal object is not covered by a Permit or Consent to Destroy (or Heritage Impact Permit), there may be considerable delays to development works while an application for a Consent to Destroy is processed.

The National Parks and Wildlife Amendment Bill 2001

Although this Act was passed by both houses of the NSW parliament in 2001, a number of its provisions with regard to Aboriginal cultural heritage have yet to be gazetted and are not yet law. These include the following provisions:

- The requirement for a Section 90 'Consent to Destroy' from the Director-General will be replaced by a 'heritage impact permit' (Schedule 3[1], 3[3-8]).

- The offence under Section 90 of the Principal Act of 'knowingly' destroying, defacing or damaging Aboriginal objects and Aboriginal Places without Consent will be changed so that the element of knowledge will be removed (Schedule 3 [2]). The amended Section 90, subsection 1 will read:

  'A person must not destroy, deface, damage or desecrate, or cause or permit the destruction, defacement, damage or desecration of, an Aboriginal object or Aboriginal place.'

- Section 90 subsection 1 will not apply when an Aboriginal object or Aboriginal place is dealt with in accordance with a heritage impact permit issued by the Director-General (Schedule 3[3], Section 90(1B) in amended Act).

- It will be a defence to a prosecution for an offence against subsection 1 if the defendant shows that:

  (a) 'he or she took reasonable precautions and exercised due diligence to determine whether the action constituting the alleged offence would, or would be likely to, impact on the Aboriginal object of Aboriginal place concerned, and

  (b) the person reasonably believed that the action would not destroy, deface, damage or desecrate the Aboriginal object or Aboriginal place.' (Schedule 3[3], Section 90(1C) in amended Act).

- A court will be able to direct a person to mitigate damage to or restore an Aboriginal object or an Aboriginal place in appropriate circumstances when finding the person guilty of an offence referred to in Section 90 of the Principal Act (Schedule 3[9]).

- Schedule 4[8] of the Bill provides for the Director-General to withhold in the public interest specified documents in the possession of the DEC which relate to the location of Aboriginal objects, or the cultural values of an Aboriginal place or Aboriginal object.

The NSW Heritage Act 1977

Overview

The purpose of the NSW *Heritage Act 1977* is to ensure that the heritage of New South Wales is adequately identified and conserved. In practice the *Heritage Act 1977* has focussed on items and places of non-indigenous heritage to avoid overlap with the NP&W Act, 1974 which has primary responsibilities for nature conservation and the protection of Aboriginal relics and places in NSW.

The *Heritage Amendment Act 1998* came into effect in April 1999. This Act instigated changes to the NSW heritage system, which were the result of a substantial review begun in 1992. A central feature of the amendments was the clarification and strengthening of shared responsibility for heritage management between local government authorities, responsible for items of local significance, and the NSW Heritage Council. The Council retained its consent powers for alterations to heritage items of state significance.

The *Heritage Act 1977* is concerned with all aspects of conservation ranging from the most basic protection against damage and demolition, to restoration and enhancement. It recognises two levels of heritage significance, State significance and Local significance across a broad range of values. Some key provisions of the Act are:

- the establishment and functions of the Heritage Council (Part 2),
- interim heritage orders (Part 3), the State Heritage Register (Part 3A),
- Heritage Agreements (Part 3B),
- environmental planning instruments (Part 5),
- the protection of archaeological deposits and relics (Part 6), and
- the establishment of Heritage and Conservation Registers for state government owned and managed items (Part 7).

Generally this Act provides protection to items that have been identified, assessed and listed on various registers including State government Section 170 registers, local government LEPs and the State Heritage Register. The Interim Heritage Order provisions allow the minister or his delegates (local government may have delegated authority) to provide emergency protection to threatened places which have not been previously identified. The only 'blanket' protection provisions in the Act relate to the protection of archaeological deposits and relics greater than 50 years old.

Protection of Archaeological Relics and Deposits

Section 139 of the Act specifically provides protection for any item classed as a relic. A relic is defined as "...any deposit object or material evidence -

(a) which relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement; and

(b) which is 50 or more years old."

(*Heritage Act 1977*, Part 1, Section 4)

Section 139 of the Act disallows disturbance of a relic unless in accordance with an 'excavation permit' from the Heritage Council. This section also allows the Heritage Council to create exceptions to the requirement for an excavation permit with respect to certain types of relic, contexts, or types of disturbance (refer below).

Section 146 of the Act requires that the discovery of a previously unknown relic be reported to the Heritage Council within a reasonable time of its discovery.

Permits and Approval Requirements

The Act includes two key approval requirements;

- A permit must be obtained for works which have the potential to interfere with a heritage item or place which is either listed on the State Heritage Register or the subject of an interim heritage order (Section 57); and

- A permit must be obtained to disturb or excavate land where it is known (or there is reasonable cause to suspect) that such action will or is likely to uncover or affect a relic (Section 139). This permit is known as an excavation permit and can be applied for under Section 140 of the Act.

> Current interpretation of the Act by the Heritage Office indicates that excavation permits are only applicable to relics which are situated below the ground surface.

It should be noted that Section 75U of the EP&A Act (as amended) establishes an exception to the requirement for an excavation permit. It states that an approval under Part 4, or an excavation permit under Section 139 of the *Heritage Act 1977* is not required for an approved project subject to the provisions of Part 3A of the EP&A Act.

Exemptions from Permit Requirements

Certain activities are exempted from the Sections 57 and 139 permit approval requirements. Exemptions from Section 57 requirements may be granted by the Minister, and the NSW Heritage Council may provide exemptions from Section 139 requirements.

A schedule of Section 57 exemptions has been formulated which includes activities such as certain types of maintenance and repair, minor excavations, changes of use, some temporary structures and 'anything which in the opinion of the Director is of a minor nature and will not adversely affect the heritage significance of the item'. In many cases notification of such proposed activities must be made by the applicant to the Director, and written notification from the Director received regarding his satisfaction that the exemption criteria have been met.

A series of exemptions have also been established for Section 139 Permit approval requirements. This includes demolition and maintenance of bridges not listed on the State Heritage Register, some forms of excavation and maintenance of underground services, conservation and repair of monuments and grave markers, and the exposing of survey marks in the course of survey operations.

On the 5th March of 2003, the following Section 139 exemptions were notified:

> Excavation or disturbance of the following land does not require an excavation permit under Section 139, provided that the Director is satisfied that the criteria in (a), (b) or (c) have been met and the person to undertake the excavation or disturbance has received a notice advising that the Director is satisfied:
>
> (a) where an archaeological assessment has been prepared in accordance with Guidelines published by the Heritage Council of NSW which indicates that there is little likelihood of there being any relics in the land or that any relics in the land are unlikely to have State or local heritage significance;
>
> (b) where the excavation or disturbance of land will have a minor impact on the archaeological resource;
>
> (c) where the excavation or disturbance of land involves only the removal of fill which has been deposited on the land.

A person proposing to excavate or disturb land according to the above criteria must write to the Director and describe the proposed excavation or disturbance and set out why it satisfies the criteria. The Director shall notify the applicant if he or she is satisfied that one or more of the criteria have been met.

The Heritage Council of NSW

The role of the Heritage Council is to provide the Minister with advice on a broad range of matters relating to the conservation of the heritage of NSW. It also has a role in promoting heritage conservation through research, seminars and publications. The membership of the Heritage Council is designed to reflect a broad range of interests and areas of expertise.

Interim Heritage Orders

Under the provisions of Part 3 of the Act, the Minister can make an interim heritage order (IHO). A recommendation with respect to an order can come from the Heritage Council, either based on a

request for the Minister, or the Council's own considerations. The Minister can also authorise Local Councils to make IHOs within their area. An interim conservation order may remain in force for up to 12 months, until such time as it is revoked or the item is listed on the State Heritage Register. A heritage order may control activities such as demolition of structures, damage to relics, places or land, development and alteration of buildings, works or relics.

The State Heritage Register

Changes to the *Heritage Act 1977* in the 1998 amendments established the State Heritage Register which includes all places previously protected by permanent conservation orders (PCOs) and items identified as being of state significance in heritage and conservation registers prepared by State Government instrumentalities. Sites or places which are found to have a state level of heritage significance should be formally identified to the Heritage Council and considered for inclusion on the State Heritage Register.

Heritage Agreements

Under Section 39 of the Act, the Minister can enter into an Agreement with the owner of a heritage item listed on the State Heritage Register to ensure its conservation. Such an Agreement can cover a range of responsibilities including financial or specialist assistance and can be attached to the title of the land.

Environmental Planning Instruments

Part 5 of the Act gives the Heritage Council the authority to request that an environmental planning instrument be prepared covering certain lands. It also directs that the Heritage Council shall be consulted by others when preparing a draft planning instrument affecting land to which an interim heritage order applies or which includes an item listed on the State Heritage Register. In addition it gives the Heritage Council the authority to produce guidelines for the preparation of such planning instruments.

Heritage and Conservation Registers

Section 170 of the Act requires all state government instrumentalities to establish and maintain a Heritage and Conservation Register that lists items of environmental heritage. The register is to include items which are, or could potentially be, the subject of a conservation instrument, and which are owned, occupied or otherwise under the control of that instrumentality.

Environmental Planning & Assessment Act 1979

The project at Keepit Dam is subject to Part 3A of the EP&A Act. As such, Part 6 provisions under the NP&W Act and Part 6 of the *Heritage Act 1977* do not apply.

Where heritage sites and objects/relics have been identified in the project area then their effective management must be defined in a Statement of Commitments, which forms part of the project approval. The Statement of Commitments is subject to review and approval by the DEC and Heritage Office, as part of the review of applications by the Department of Planning.

Aboriginal Objects (as defined under the NP&W Act) have been identified within the Keepit Dam Upgrade Study Area. The presence of these objects means that where the NP&W Act applies to the development, no activities can occur in the proposed development area that may disturb either known surface artefacts or subsurface archaeological deposits, without the receipt of an appropriate permit from the DEC. However, if the project is approved under Part 3A of the EP&A Act, the NP&W Act does not apply and such permits are not required.

The EP&A Act and its regulations, schedules and associated guidelines require that environmental impacts are considered in land use planning and decision making. Environmental impacts include cultural heritage assessment. The Act was recently reformed by the passage of the Environmental Planning and Assessment Amendment (Infrastructure and other Planning Reform) Act in June 2005.

There are four main areas of protection under the Act:

- Planning instruments allow particular uses for land and specify constraints. Part 3 governs the preparation of planning instruments. Both Aboriginal and Historic (Non-Indigenous) cultural heritage values should be assessed when determining land use.

- A separate streamlined and integrated development assessment and approvals regime for major infrastructure and other projects of significance to the State is defined by Part 3A.

- Section 90 lists impacts which must be considered before development approval is granted. Part 4 relates to the development assessment process for local government authorities. Impact to both Aboriginal and Historic (Non-Indigenous) cultural heritage values are included.

- State Government agencies which act as the determining authority on the environmental impacts of proposed activities must consider a variety of community and cultural factors in their decisions, including Aboriginal and Historic (Non-Indigenous) cultural heritage values. Part 5 relates to activities which do not require consent but still require an environmental evaluation, such as proposals by government authorities.

Under the EP&A Act the Minister for Planning may make various planning instruments such as regional environmental plans (Section 51) and local environment plans (Section 70). The Minister may direct a public authority such as a Local Council, to exercise certain actions within a specified time, including the preparation of draft LEPs and appropriate provisions to achieve the principles and aims of the Act (Section 117).

These planning instruments may identify places and features of cultural heritage significance and define various statutory requirements regarding the potential development, modification and conservation of these items. In general, places of identified significance, or places requiring further assessment, are listed in various heritage schedules that may form part of an LEP or a Regional Environmental Plan (REP). Listed heritage items are then protected from certain defined activities, normally including demolition, renovation, excavation, subdivision, and other forms or damage, unless consent has been gained from an identified consent authority. The consent authority under a LEP is normally the local Shire or City Council.

In addition to the development of these environmental planning instruments, the Director of the Department of Planning (DoP) or a local Council may prepare a Development Control Plan (DCP), where it is considered that more detailed provisions or guidelines are required over any part of land covered by an REP, LEP or their Drafts (Sections 51A and 72).

Recent amendments to the Act require a single LEP to be prepared according to a standard template, for each local government area within the next five years

In determining a development application (DA), a consent authority, such as a local Council, must take into consideration any of the following which are relevant to the subject application (Section 79C(1) Potential Matters for Consideration):

- the provisions of any environmental planning instrument, or draft environmental planning instrument (which has been placed on public exhibition); any development control plan; and the regulations;
- the likely impacts of that development on the natural and built environments, and the social and economic impacts on the locality;
- the suitability of the site for the development;
- any submissions made in accordance with the Act or the regulations; and
- the public interest.

Best Practice Guidelines have been issued by DoP on the use of Section 79C(1) and include an assessment of how the proposed development will affect the heritage significance of the property, or

adjacent properties, in terms of the historic, scientific, cultural, spiritual and archaeological of Aboriginal, non-Aboriginal and natural heritage.

If a development consent is required from council under the provisions of a LEP and a permit or license is also required from a State Government Agency an integrated development must be submitted to the consent authority. A development is an 'integrated development' if it requires an approval under Section 90 of the NP&W Act or if the Director-General of the DEC is of the opinion that consultation with an Aboriginal group or organisation should be consulted prior to a determination being made. Any development approval issued for an integrated development of this kind must be consistent with the general terms of approval or requirements provided by the relevant State Government Agency.

The EP&A Act, as amended, provides for the listing of heritage items and conservation areas and for the protection of these items or areas through environmental planning instruments (like LEPs and REPs) at the local government and State planning levels. These statutory planning instruments usually contain provisions for the conservation of these items and areas as well as an assessment process to reduce the impacts of new development on the heritage significance of a place, building or conservation area.

Part 3A of the Act is a recent amendment and establishes a separate streamlined and integrated development assessment and approvals regime for major State government infrastructure projects, development that was previously classified as State Significant development, and other projects, plans or programs declared by the Minister for Planning.

Part 3A removes the stop-the-clock provisions and the need for single-issue approvals under eight other Acts, including the NP&W Act and the *Heritage Act 1977*. Environmental planning instruments such as the heritage provisions within LEPs and REPs, (other than State environmental planning policies) do not apply to projects approved under Part 3A.

Where warranted the Minister may declare any project subject to Part 3A to be a critical infrastructure project. These projects only require a concept approval in contrast to other Part 3A projects which require project approval. In most circumstances, a concept approval will be obtained to establish the environmental performance requirements and consultation requirements for the implementation of the subsequent stages of the project.

Under the provisions of Part 3A, proponents of major and infrastructure projects must make a project application seeking approval of the Minister. The application is to include a preliminary assessment of the project. Application may be for concept plan approval or full approval. Following input from relevant agencies and council(s), DoP will issue the proponent with requirements for the preparation of an Environmental Assessment and a Statement of Commitments. The Statement of Commitments will include how the project will be managed in an environmentally sustainable manner, and consultation requirements.

Following submission of an Environmental Assessment and draft Statement of Commitments to DoP, these documents are variously evaluated, reviewed, circulated and exhibited. The proponent may modify the proposal to minimise impacts in response to submissions received during this process. The proponent then provides a Statement of Commitments and, following any project changes, a Preferred Project Report. An assessment report is then drafted by the Director-General and following consultation with relevant agencies, a final report with recommendations for approval conditions or application refusal is submitted to the Minister. The Minister may refuse the project, or approve it with any conditions considered appropriate.

NSW Aboriginal Land Rights Act 1983

This Act recognises that land in NSW was traditionally owned and lived on by the Aborigines and that land is particularly important to Aborigines for spiritual, social, cultural and economic reasons.

The Act was designed to give control over land, where possible, to local Aboriginal communities. The principal objectives of the Act are to:

- constitute Land Councils as Aboriginal land holding and managing bodies corporate;

- facilitate the acquisition of land by transfer (of existing Aboriginal reserves), and open market purchase;
- define a process for the processing of land claims against certain forms of Crown land;
- define which crown lands were open to claim;
- and provide for Land Council funding (7.5% of the previous years land tax, to end after 15 years ie.1998).

The Act defines claimable land as Crown Land which is not lawfully used or occupied and which is not needed nor likely to be needed for "an essential public purpose" (Section 36). The Lands Department includes the following as lands which need to be retained for future public purposes: lands needed or likely to be needed for conservation reserves, dams, forestry, flood mitigation, urban commercial and industrial development, public recreation, and public access.

Once granted, Section 42 exempts Aboriginal land from compulsory acquisition except by a special Act of Parliament.

The Act provides for a three tiered structure of Aboriginal Land Councils at the Local, Regional and State level. The aim of the Council system is to provide Local Council representation across the whole of NSW. Land Council membership is open to any Aboriginal person over 18 who lives within the defined boundaries of a Council area, or has since moved elsewhere. In the latter case membership is subject to a vote by Council members. Council executive positions are elected from and by the membership. Representatives from each of the Local Land Councils form the Regional Councils (or Branch Officers), and representatives from each of the Regional Councils form the State or NSW Aboriginal Land Council.

The Land Council system of representation was originally to be complemented by an Aboriginal Heritage and Culture Commission with responsibility for the protection and management of Aboriginal sites. This never eventuated however and these legal responsibilities remain with the NPWS.

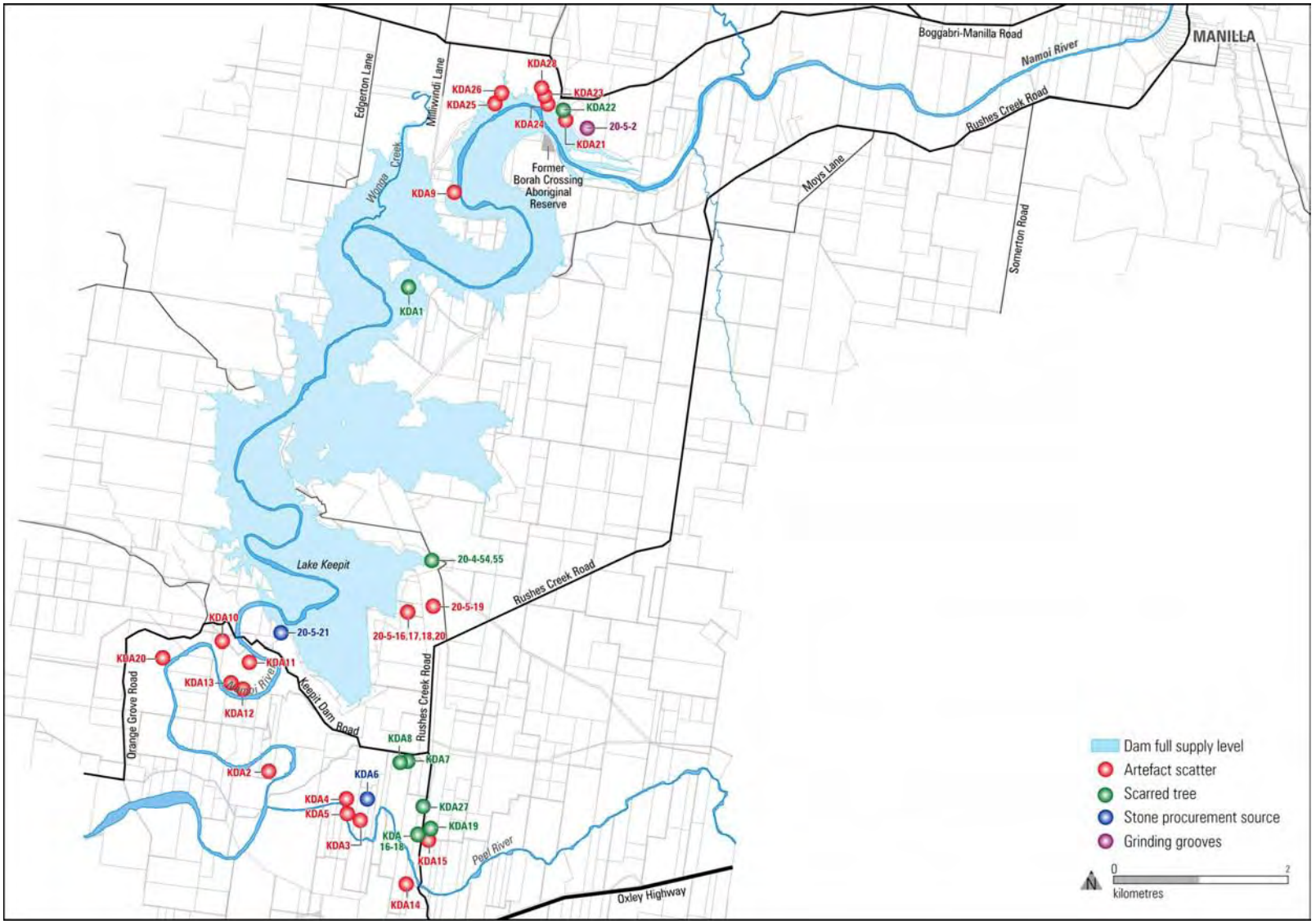
In the absence of any purposefully constituted system of representation for Aboriginal cultural heritage management, the Land Councils have, until recently, acted as the most accessible and representative bodies for providing community comment on cultural site management and development assessment investigations.

A criticism of the use of the Land Council system in consultation on cultural heritage issues has been the lack of formal representation for people with local tribal and cultural affiliations. Land Council office bearers are elected from contemporary resident Land Council members and need not have traditional ties to the Council area. Similarly, Land Council boundaries do not necessarily relate to tribal or traditional boundaries. For these reasons, and particularly following the recognition of native title rights, additional Aboriginal organisations have developed which specifically seek to represent traditional cultural interests and rights according to various tribal group criteria.

APPENDIX 4

ABORIGINAL SITE INFORMATION

(Confidential information removed from Public Exhibition Document)



Location of Aboriginal sites within the study area.

Table Appendix 4-1 Details of Aboriginal sites recorded during field survey

Site Name	Grid Reference (AGD)	Site Type	Environmental Setting	Comments/Features
KDA1	263454. 6588365	scarred tree	Broad simple slope above Namoi River	Dead, drowned tree, possible Aboriginal origin
KDA2	260290. 6577165	artefact scatter	Simple slope above Namoi River	Site area 80 x 20 m, two artefacts
KDA3	262390. 6576119	artefact scatter	Elevated basal slope of spurline, 250 m east of Peel River	Four artefacts over 50 x 25 m area
KDA4	262149. 6576517	isolated find	40 m east of bank of drainage line and 250 m north of Peel River, on gentle basal slope	High potential for additional artefacts
KDA5	262182. 6576213	artefact scatter	On river flats, about 60 m east of Peel River	Three artefacts including utilised flake, area of 100 x 25 m
KDA6	262552. 6576435 to 262492. 6576495 to 262518. 6576415	stone procurement source	On crest of Tulcumbah Ridge, 500 m north of Peel River	Tuff material opportunistically exploited, area of 120 x 50 m containing potentially hundreds of artefacts including two flaked axe blanks.
KDA7	264043. 6577394	scarred tree	Gentle basal slope, 20 m from ephemeral drainage line in Crown reserve	Possible Aboriginal origin
KDA8	263973. 6577360	scarred tree	On basal slopes in Crown reserve, 80 m west of KDA7	Possible Aboriginal origin
KDA9	264560. 6590638	artefact scatter	Site along exposed bank and flats of Namoi River within lake inundation area	Over 100 artefacts observed over area of 100 x 50 m, including utilised pieces. High potential for many more and site to extend along river bank
KDA10	259106. 6580220	artefact scatter	Bench on spur slope above Namoi River, about 300 m from river	Over 20 artefacts including 2 geometric artefacts noted within 40 x 30 m area.
KDA11	259965. 6579677	isolated find	Break of slope/basal slope of spur, about 40 m from Namoi River	Artefact (hammer/anvil) within ploughed paddock

Site Name	Grid Reference (AGD)	Site Type	Environmental Setting	Comments/Features
KDA12	259633. 6578930	isolated find	Crest of micro spur elevated above Namoi river, about 60 m from river bank	Small core, moderate potential for additional artefacts
KDA13	259417. 6579304	isolated find	Crest of micro spur on basal slope of main spur, about 260 m from Namoi River	Small blade core, high potential for additional artefacts
KDA14	263829. 6574335	isolated find	Narrow alluvial flat about 25 m south of Peel River	Flake on vehicle track, high potential for additional artefacts and subsurface deposits
KDA15	264011. 6574966	artefact scatter	Crest of spur elevated above floodplain of Peel River	Two artefacts, 50 m apart
KDA16	263887. 6575062	scarred tree	Floodplain of Peel River, 250 m east of river	White box with two possible scars, both rated as possibly Aboriginal in origin
KDA17	263892. 6575087	scarred tree	Floodplain of Peel River, about 250 m east of river	White box with scar, possible Aboriginal origin
KDA18	263921. 6575090	scarred tree	Floodplain of Peel River, about 250 m east of river	White box with two scars, possible Aboriginal origin
KDA19	264088. 6575160	scarred tree	Floodplain of Peel River, about 500 m east of river	White box with a scar of possible Aboriginal origin
KDA20	257798. 6579875	artefact scatter	Spur crest leading down to flat on bank of Namoi River	Extensive site area, 350 x 100 m containing over 50 artefacts including 3 flaked and 1 edge ground axe. Very high potential for subsurface deposits
KDA21	266775. 6592601 to 266430. 6592605	artefact scatter	Basal slopes of low spur leading down to flats and bank of Namoi River	About 40 artefacts in area of 350 x 250 m, high potential for additional artefacts and subsurface deposits
KDA22	266784. 6592575	scarred tree	Basal slope of low spur 250 m north of Namoi River	White box with scar, possibly of Aboriginal origin
KDA23	266334. 6592736	artefact scatter	Basal slope and crest of low spur, about 180 m north of Namoi River	Up to ten artefacts in area of 15 x 10 m, high potential for additional artefacts

Site Name	Grid Reference (AGD)	Site Type	Environmental Setting	Comments/Features
KDA24	266365. 6592631	artefact scatter	Eroded bank of ephemeral creek about 150 m north of Namoi River	Eight artefacts within 30 x 10 m with high potential for additional and subsurface deposits
KDA25	265674. 6592515	artefact scatter	Floodplain, about 100 m north of Namoi River	3 artefacts in area 20 x 10 m with high potential for subsurface deposits
KDA26	265654. 6592701	artefact scatter	Eroded bank of ephemeral creeks within broader floodplain, 250 m north of Namoi River	Over 30 artefacts observed within 80 x 30 m area, high potential for additional artefacts and subsurface deposits
KDA27	263923. 6575721	scarred tree	Floodplain of Peel River	White box with scar, possible Aboriginal origin
KDA28	266296. 6592805	artefact scatter	Slope of low spur, adjacent to ephemeral creekline	Two artefacts in a 2 x 1 m area.

Previously identified Aboriginal sites

Eleven Aboriginal sites have been previously recorded in a 10 km radius of Keepit Dam. Five of these sites were inspected during the 2005 and 2006 field surveys to confirm their locations. The remaining recordings were not inspected due to property access issues or lack of suitable location information and time.

#20-4-0054 **Scarred Tree** *AGD 264100. 6581970*

This site is a scarred tree located on the edge of a shallow drainage line on the eastern side of Lake Keepit. The tree is in good condition and the scar is considered to be a 'possible' Aboriginal scar. The tree is potentially only 150 years old and the scar may not be of a sufficient age to have been made by Aboriginal people. It is also adjacent to a fenceline and this introduces the possibility that the scar may be the result of damage during fence construction.

#20-4-0055 **Scarred Tree** *AGD 264053. 6581930*

This site is a scarred tree located about 60 m west of site #20-4-54. This tree is in fair condition and the scar is considered to be a 'possible' Aboriginal scar. The scar regrowth is quite shallow and although symmetrical, is situated below a branch tear. There are also steel axe marks on the wood and the top and base of the scar.

#20-4-0056 **Isolated Find** *AGD 258800. 6575600*

This site is an isolated artefact that has been heavily water rolled and was found in a gravel bed on the Namoi River. Inspection of the area found that sand and gravel extraction had probably destroyed the artefact.

#20-5-0021 **Stone Procurement Source** *AGD 260700. 6580400*

The general location of this recording was inspected in the course of the field investigations. The artefactual content of this site could not be definitively confirmed during the field survey. The site is recorded as a quarry where Aboriginal people took advantage of the exposed conglomerate beds and extracted pebbles of fine grained stone for flaking. The extent of the site was originally identified as 30 m long. No flakes or cores were found during the present investigation although they were noted during the original recording (1987). However, many parts of the spur, on which the conglomerate is situated, were covered in naturally split and broken pebbles. The exposures of conglomerate extend for hundreds of metres along the lake shore and along the spurline north and south of Tolcumbah Lookout. The potential site area could therefore include the crest and slopes of the spurline, or anywhere where conglomerate boulders are exposed.

Sites that were not inspected in the context of the current Keepit study include the following:

#20-5-001 **Scarred Tree** *AGD 264000. 6574000*

This site is a tree with a 'canoe scar' located about a kilometre south of the Peel River near Carroll Gap. It was recorded in 1975 and its current condition is unknown. The site is located on the "Moana" property.

#20-5-0002 **Grinding Grooves** *AGD 267000. 6592000*

This recording consists of a brief sentence referring to a series of grinding grooves on thirteen boulders on 'Beverley Station'. The map grid location may be approximate and refer to the property holding only.

#20-5-0016 to #20-5-0020 **Artefact Scatters**

These recordings consist of five open scatters of stone artefacts, some including hearths and possible glass artefacts which suggest occupation into the time of contact with Europeans. These sites are located on the eastern side of the lake in the vicinity of Goora Bay.