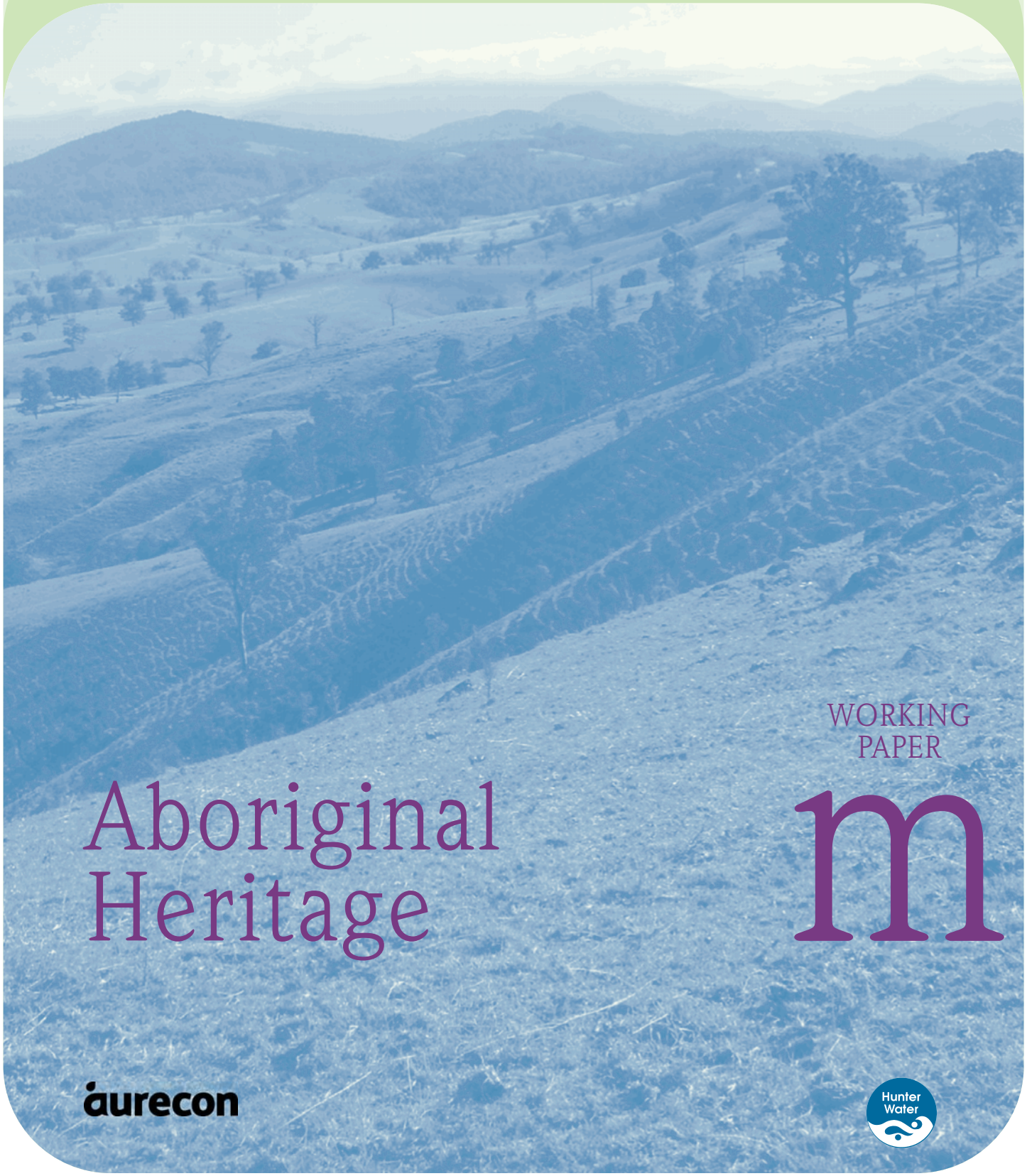
Tillegra Dam

Planning and Environmental Assessment



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CULTURAL HERITAGE CONNECTIONS

Tillegra Dam
Aboriginal Archaeology
Environmental Assessment Report

By Vanessa Hardy

August 2008

Report Prepared for

Connell Wagner and Hunter Water Corporation

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EXECUTIVE SUMMARY

Hunter Water Corporation (HWC) is proposing to construct a 450 GL dam at Tillegra near the town of Dungog in the Hunter Valley. Cultural Heritage Connections Pty Ltd (CHC) was engaged by Connell Wagner on behalf of HWC to undertake archaeological investigations for indigenous archaeology as part of the environmental assessment for proposed Tillegra Dam (the Project).

The main aims of the Stage 2 Aboriginal archaeological assessment were to comply with the Director-General's Environmental Assessment Requirements and to address the findings of the Preliminary Environmental Assessment Report (PEA) in order to develop appropriate recommendations for the successful management of Aboriginal archaeology and heritage in the context of the proposed dam development.

The PEA identified ground surface visibility as a major limiting factor in the archaeological assessment. No Aboriginal archaeological sites were identified during the surveys. As a result, a scope of works for the detailed EA was designed to provide information about the extent and nature of archaeological sites and areas of archaeological potential that included:

- analysis of geomorphology and post-depositional processes
- additional consultation with the Aboriginal community
- archaeological testing
- further analysis of potential impacts

A targeted preliminary testing program was developed with the aim of addressing the following questions:

1. Is there evidence of Aboriginal occupation within the study area?
2. What is the likelihood of archaeological material being preserved within the impact zones?
3. What can the distribution of evidence (or lack of it) tell us about the likely impacts to Aboriginal heritage values in the study area from the proposed development?

Aboriginal consultation for the Project was undertaken in accordance with the Department of Environment and Climate Change (DECC) endorsed *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (2005). The following individuals and organisations were registered as interested parties during the consultation process:

- Mr Michael Chenery
- Upper Hunter Wonnarua Council Inc
- Lower Hunter Wonnarua Council
- Mr Arthur Fletcher
- Karuah Local Aboriginal Land Council (LALC)

Analysis of environmental and archaeological background was undertaken and a geomorphological assessment of the study area was undertaken to assist in locating areas

of archaeological potential. The following broad predictions for the distribution of artefact sites were made for the study area:

- Sites would be expected in areas of lower angle slopes, in close proximity to water but above average flood levels.
- Stream order is not likely to be a helpful predictive tool for past occupation patterns in this study area (Mitchell 2008).
- Outside of the main river channel sites may be small and sparsely distributed.
- Sites would be expected to date to the more recent past (<10,000BP). Older sites are not expected as it has been assessed as unlikely that any Pleistocene land surfaces were ever preserved within the floodplain patches (Mitchell 2008).
- No sites would be expected to be preserved at the 1:100 year flood level (Mitchell 2008). Although mapping is not available for this area, low-lying areas of floodplain adjacent to the river could be discounted from further investigations.
- Slope areas are unlikely to have preserved material due to impacts from agricultural activity, soil creep and erosion.
- Ridgelines may contain areas where sites could be preserved, particularly if there is easy access to water. Sites in such areas may be small and sparsely distributed.
- Burials are most likely to have occurred in groups. Local history suggests that the local known burial grounds are outside the study area. However, there is a possibility that unknown burial grounds or isolated burials could occur in undisturbed sandy deposits. The likelihood of such sites, if they were present, remaining intact has been reduced due to the nature of flooding and erosion through the area.

A testing program was undertaken for five days between 31 March and 4 April 2008 with the stated aim of providing further information on the likely presence of surface or subsurface archaeological material in areas that would be subject to impact by the proposed development across a variety of landforms.

A total of 20 trenches were excavated across a variety of landforms. Eight separate site locations containing flaked stone Artefacts were recorded during the testing. Artefacts were recovered from each of the tested locations suggested by the geomorphological analysis.

As predicted, sites seem to be present in areas of lower angle slopes, in close proximity to water but above average flood levels. It is likely that further material will be preserved within the vicinity of areas already tested and within the other areas identified during the geomorphological assessment as archaeologically sensitive but not tested during the investigations.

An assessment of archaeological significance was undertaken. One site (Tillegra 1) was assessed as having high scientific significance. All the other recorded sites (Tillegra 2 - Tillegra 8) were assessed as moderately significant.

A detailed assessment of inundation impacts as well as a consideration of the construction footprint suggests that all eight recorded sites may be subject to impact from the Project. To mitigate the potential impacts to heritage values the following is recommended:

1. Undertake recording of oral history and information about culturally significant places.

2. Consider the request of Aboriginal community representatives to undertake further consultation about past Aboriginal cultural activity in the study area.
3. Undertake salvage and recording of a sample of archaeological sites preserved in the study area by means of focusing excavations on known sites and identified areas of archaeological potential.
4. If additional impacts outside the defined study area are identified prior to construction, additional archaeological impact assessment may be required.
5. Consider development, in consultation with stakeholders, of a local display of information and artefacts relating to the study area.
6. Copies of this report should be provided to the registered Aboriginal community groups, the Dungog Historical Society, the Dungog local studies library, the DECC local office and the DECC AHIMS registrar

1. INTRODUCTION

1.1 OVERVIEW

HWC is proposing to construct a 450 GL dam at Tillegra near the town of Dungog in the Hunter Valley. Figure 1.1 shows the location of the proposed dam.

Connell Wagner was engaged by HWC to undertake an environmental assessment and to assist in securing development approval for the Tillegra Dam project. The Project will be assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

To obtain approval from the Minister for Planning under Part 3A of the EP&A Act HWC is required to assess the potential environmental impact of the proposed construction works and operation of the dam. This has been done in two discrete stages:

1) A PEA to support a Major Project Application; and a

2) More detailed Environmental Assessment Report (EA).

As part of this process, assessment of the potential impact of the proposal on both historical (non-Aboriginal) and Aboriginal cultural heritage is required.

CHC was engaged by Connell Wagner on behalf of HWC in July 2007 to undertake archaeological investigations for contemporary and indigenous archaeology as part of a preliminary environmental assessment (PEA) for the proposed Tillegra Dam.

A PEA report was prepared and submitted to the Department of Planning together with an application to the Director-General for the requirements for the EA report. Two heritage reports were prepared to accompany the PEA report: an indigenous archaeology and significant place report prepared by CHC (see Hardy 2007) and a separate stand-alone contemporary archaeology and heritage assessment prepared by Archaeological and Heritage Management Solutions (AHMS) in collaboration with CHC (Leslie & Paterson 2007).

Following on from this CHC were engaged to continue to Stage 2 Aboriginal archaeological assessment and to undertake a more detailed EA report. The Director-General's Environmental Assessment Requirements for the EA were issued on 8 January 2008.

1.2 DESCRIPTION OF THE PROJECT

Tillegra Dam would approximately double the total existing water storage capacity of the lower Hunter region. The dam is deemed an important component of the NSW Government's State Plan to secure the water future of the region for at least the next 60 years.

The development proposed includes the following components:

- dam wall and spillway construction
- installation of a multi-level off-take tower
- a hydro-power generation plant

- relocation and reconstruction of Salisbury Road (including construction of three waterway crossings) and provision of alternative access currently provided from Quart Pot Creek Road
- a water pipeline and pump station from Tillegra Dam to the Chichester Truck Gravity Main (CTGM)
- electrical and telecommunication installations
- relocation/upgrade of other public infrastructure
- heritage conservation works (including a cemetery and historic house re-location)
- significant tree planting as part of a carbon emissions offsetting strategy
- ancillary works as required (potential recreational access areas, lookouts and related facilities)

Tillegra Dam would be used as a drought storage and would be operated between 90 per cent and 100 per cent capacity outside of drought periods. In droughts, water would be delivered to Grahamstown Dam by controlled releases to the Williams River. Water could also be supplied to the Dungog water treatment plant via the CTGM.

Principal components of the development are shown in Figure 1.2.

1.3 SCOPE AND OBJECTIVES OF THE ASSESSMENT

The main aims of the Stage 2 Aboriginal archaeological assessment were to comply with the Director-General's Environmental Assessment Requirements and to address the findings of the PEA in order to develop appropriate recommendations for the successful management of Aboriginal archaeology and heritage in the context of the proposed dam development.

The Director-General's Environmental Assessment Requirements require HWC to undertake an assessment of the indigenous cultural heritage values that may be impacted by the Project and to provide details on subsurface investigations undertaken. They also require the information and consultation requirements of the draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation* to be addressed.

Additional supporting information also requires an assessment of the archaeologically sensitive areas of the subject site and consultation to determine the significance of the site to the local Aboriginal community. The EA report should also include:

- mapping of Aboriginal objects, Aboriginal places and areas identified by the Aboriginal community as significant
- a discussion of the results of the assessment
- identification of the nature and extent of impacts on Aboriginal cultural heritage values
- recommendations for measures to avoid, mitigate or compensate impacts of the Project on Aboriginal cultural heritage values

The PEA identified a number of areas where further investigation was necessary.

The PEA identified ground surface visibility as a major limiting factor in the archaeological assessment. No Aboriginal archaeological sites were identified during the surveys. As a result, a scope of works for the detailed EA was designed to provide information about the extent and nature of archaeological sites and areas of archaeological potential that included:

- analysis of geomorphology and post-depositional processes
- additional consultation with the Aboriginal community
- archaeological testing
- further analysis of potential impacts.

A targeted preliminary testing program was developed with the aim of addressing the following questions:

1. Is there evidence of Aboriginal occupation within the study area?
2. What is the likelihood of archaeological material being preserved within the impact zones?
3. What can the distribution of evidence (or lack of it) tell us about the likely impacts to Aboriginal heritage values in the study area from the proposed development?

This report documents the results of the testing program as well as the additional analysis undertaken for the EA and the results of the Aboriginal community consultation.

1.4 LIMITATIONS AND REPORT OUTLINE

This assessment is limited to a consideration of the Aboriginal archaeology of the study area and documentation of cultural significance where supplied by the Aboriginal community representatives.

Definitions of the study area and impacts are based on information supplied by Connell Wagner. No areas outside the proposed inundation area, dam construction area and road diversion shown on Figure 1.2 were included in the assessment. While it may be possible to extrapolate the predictive model into some adjacent areas, this report does not purport to be an assessment of areas outside those described. If significant impacts would occur as a result of the Project in areas outside those assessed, they would require further archaeological assessment.

The following section of this report outlines the legislative framework for the protection and assessment of Aboriginal Objects and Places in NSW. Detail of the consultation undertaken with the Aboriginal community is detailed in Section 3.

The environmental context is presented in Section 4 and the archaeological and historic context in Section 5. Section 6 presents an analysis of the contextual information and provides a predictive model for archaeological sensitivity in the study area. The results of the archaeological sub-surface testing are discussed in Section 7. Section 8 documents the significance assessment undertaken for the sites recorded in the study area. Section 9 describes the potential impacts of the Project on the Aboriginal cultural heritage of the study area. Section 10 presents the recommendations for impact mitigation and

management of the Aboriginal archaeology of the study area in the context of the Project.

1.5 STUDY TEAM AND ACKNOWLEDGEMENTS

Analysis of the archaeological background, design of the testing methodology and reporting for the assessment was undertaken by Vanessa Hardy (BA Hons), archaeologist and Director of Cultural Heritage Connections Pty Ltd. Vanessa was excavation director during the testing phase. Additional archaeologists on the testing team were Benjamin Streat and Kylie McDonald. Vanessa, Ben and Kylie are fully qualified archaeologists with relevant experience in archaeological assessments. This report was reviewed by Ben Streat.

The Aboriginal representatives who collaborated in the sub-surface testing were Tom Miller, Arthur Fletcher, Adam Fletcher and Tracey Skene. Other invaluable team members were Lyonel Everett (backhoe operator) and Ray Forbes (water cart).

Peter Mitchell of Groundtruth Consulting undertook the review of geomorphological information used to help identify areas for testing. Post-excavation analysis of stone material recovered was analysed by Dr Trudy Doelman of the Department of Archaeology, University of Sydney.

The author would also like to thank the following for advice and/or input into this assessment:

- Christine Chapman, Chris Masters and Martin Russell (Connell Wagner)
- Roland Bow (HWC)
- Kerriann Tranter and Lyndon Everett (Rural and Industrial Contracting)
- Lea-Anne Ball (Lower Hunter Wonnarua Council)
- Tillegra Dam Community Reference Group Cemetery Sub-Committee
- Maureen Kingston
- James Hopson
- David Moore
- Allan Nash
- Bill Dowling

Figure 1.1: Study area location

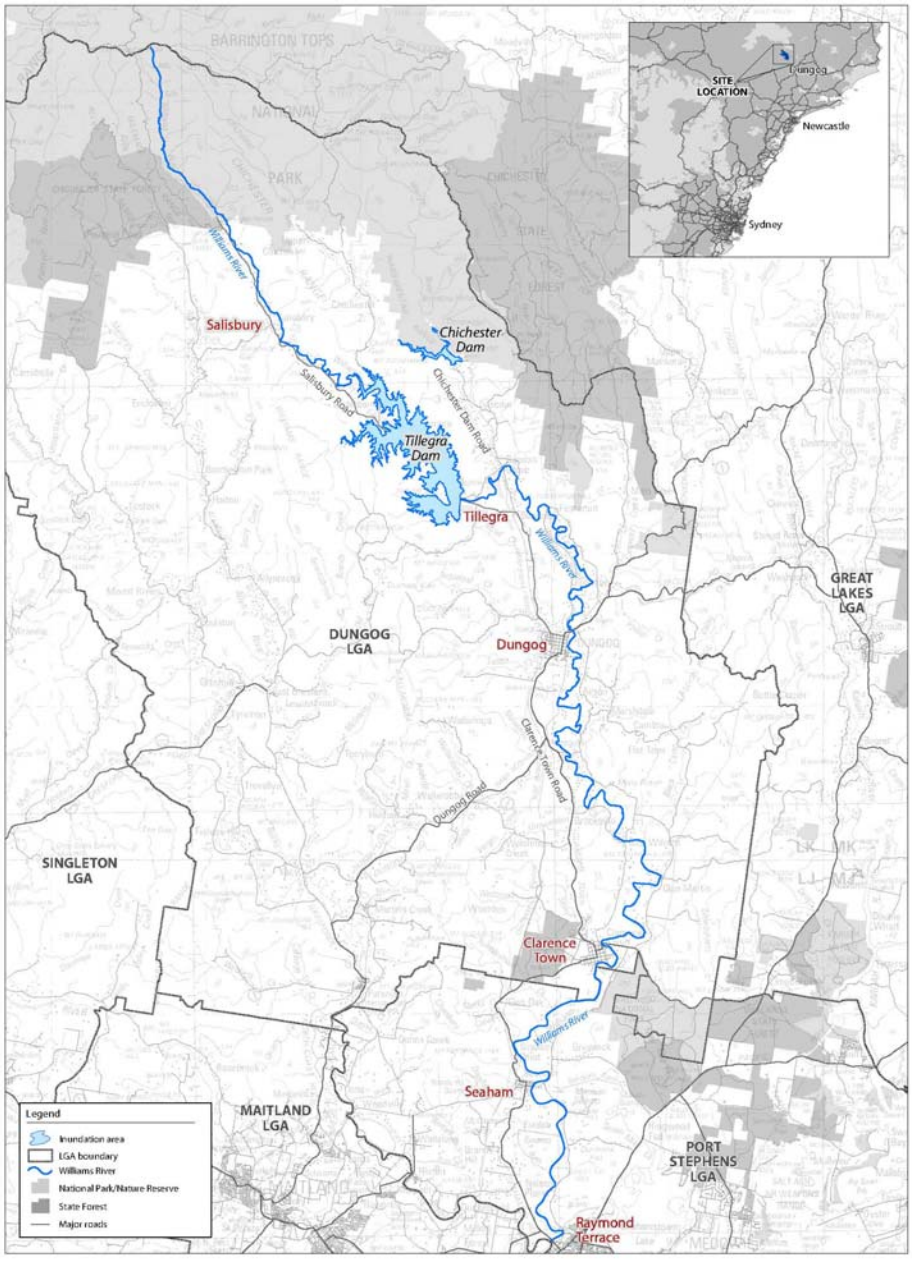
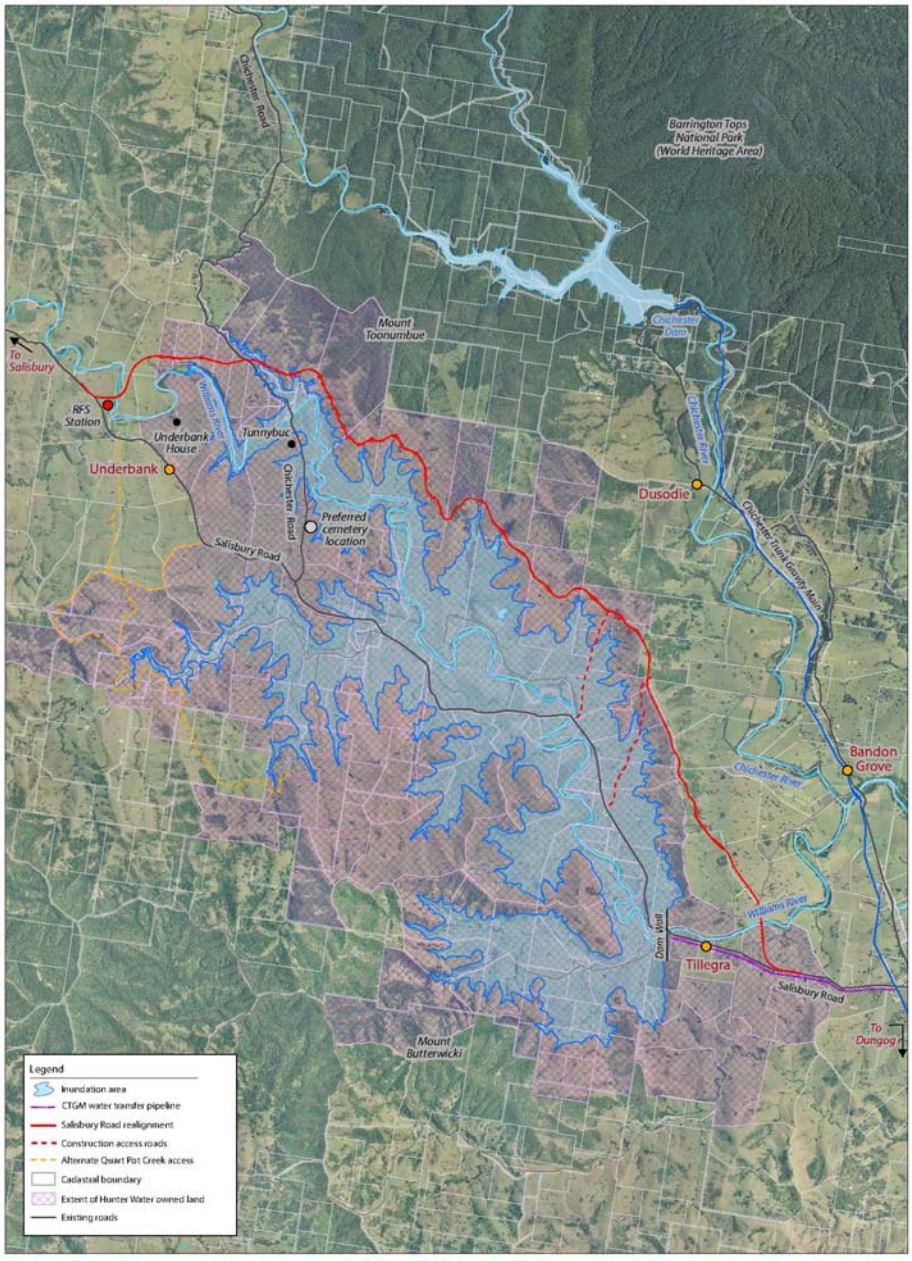


Figure 1.2: Key components of the development



2. LEGISLATIVE CONTEXT

This section outlines the legislative framework protecting archaeological heritage sites in NSW in general, and the study area in particular. It does not purport to be legal advice. It presents an interpretation of the implications for the management of archaeological sites within NSW and the study area as understood by the consultants.

2.1 COMMONWEALTH HERITAGE LEGISLATION AND LISTS

The Commonwealth legislation protecting heritage comprises three Acts:

- *Environment and Heritage Legislation Amendment Act (No. 1) 2003*
- *Australian Heritage Council Act 2003*
- *Australian Heritage Council (Consequential and Transitional Provisions) Act 2003*.

and their associated Regulations:

- *Environment Protection and Biodiversity Conservation Amendment Regulations 2003 (No. 1) 2003*
- *Australian Heritage Council Regulations 2003*

The heritage system is overseen by the Australian Heritage Council.

Three heritage lists are maintained: the National Heritage List; the Commonwealth Heritage List and the Register of the National Estate.

Heritage values of places on the first two of these lists are offered additional protection under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act includes provisions to protect matters of national environmental significance.

Items on both the Commonwealth and National Heritage Lists are protected under the EPBC Act. Approval is required from the Federal Minister for the Environment, Heritage and the Arts prior to any impact on items of national environmental significance.

2.1.1.1 National Heritage List

The National Heritage List is a list of places that are determined to have outstanding heritage value to the nation. Places may have indigenous, historic or natural heritage values or any combination of the three. Anyone can nominate a place for inclusion on the list and a list of criteria and guidelines has been developed. The Australian Heritage Council makes recommendations about proposed listings, with the final decision made by the Federal Minister for the Environment, Heritage and the Arts.

2.1.1.2 Commonwealth Heritage List

The Commonwealth Heritage List can also include places with indigenous, historic or natural heritage values, but is limited to places within Commonwealth lands and waters. The list was established via amendments to the EPBC Act. In effect it means that Commonwealth agencies are obliged to develop management plans for heritage items on their lands, and that prior to any impact on such items, advice must be sought from the Federal Minister for the Environment, Heritage and the Arts.

2.1.1.3 Register of the National Estate

The Register of the National Estate was established under the now repealed *Australian Heritage Commission Act 1975*. It is a list of over 13,000 heritage places. Consistent with the former Act, statutory obligations relating to the register only apply to Commonwealth government agencies. It continues to be a significant source of information on heritage items and has been retained under the *Australian Heritage Council Act 2003*.

2.1.2 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* can be called upon to provide protection for indigenous cultural property in a broad sense. It is rarely relevant in the management of cultural heritage items, but does provide the ability to protect places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'.

2.2 NSW HERITAGE LEGISLATION

2.2.1 National Parks and Wildlife Act 1974

Under Section 90 of the *National Parks and Wildlife Act 1974* (NP&W Act), it is an offence to destroy, damage or deface an Aboriginal object or Aboriginal place without prior approval from the Director-General of the DECC. Section 91 of the Act also obliges any person who discovers an Aboriginal object to report it to the DECC.

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."

"Aboriginal Places" are defined by their presence on a list maintained by the DECC. Objects are legally protected irrespective of land tenure, the significance of the object and whether or not it has been recorded.

Prior to issuing a Section 90 consent permit to disturb an object or site the DECC will consider:

- the significance of the Aboriginal object(s) or Aboriginal place(s) to be affected

- the effect of the potential impact and the mitigation measures proposed
- the justification for the proposed impacts
- the outcomes of the Aboriginal community consultation regarding the potential impact and conservation outcomes.

In practice this means that an archaeological assessment must be carried out in partnership with the relevant indigenous community representatives. In cases where the full extent of the site to be affected cannot be determined (such as when a site is likely to extend below the surface) archaeological testing must be carried out prior to a Section 90 consent being approved. Archaeological testing also requires a permit.

Any activity likely to disturb or excavate land with the purpose of discovering an Aboriginal object, or likely to move or disturb an Aboriginal object, requires a permit under Section 87 of the Act. An application under Section 87 is also usually accompanied by an archaeological assessment and a research design to direct the excavation procedures.

Procedures now also regulate the consultation process that is required as part of permit applications.

2.2.2 Environmental Planning and Assessment Act 1979

The EP&A Act requires that environmental impacts are considered in land use planning and decision-making. The definition of 'environmental impacts' includes impacts on the cultural heritage of the project area. The Act sets out three specific statutory assessment processes:

- Part 3A: A single assessment and approval system for major development and infrastructure projects.
- Part 4: Development that requires consent under consideration of environmental planning instruments.
- Part 5: An assessment process for activities undertaken by public authorities and for developments that do not require a development consent but an approval under another mechanism.

Part 3A of the Act essentially makes provision for a single assessment and approval process by incorporating relevant matters to be addressed within an assessment of the project, thereby removing the need to seek subsequent approvals, pursuant to the Minister for Planning's determination.

As this development will be assessed under Part 3A there is no longer a requirement to seek permits under Sections 87 or 90 of the NP&W Act.

Notwithstanding this, matters and issues relevant to cultural heritage are required to be addressed during development planning for a project subject to determination under Part 3A of the EP&A Act to ensure that unacceptable or adverse environmental impacts do not occur. In general terms, the standard of assessment required should be

equivalent to that required if the project was not designated a Major Project under Part 3A.

2.3 ASSESSMENT GUIDELINES

A number of best practice guidelines for heritage assessment are available for the assessment and reporting for Aboriginal sites. This assessment has been undertaken with reference to the following:

- *Draft Guidelines For Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2004)
- *Ask First: A Guide to Respecting Indigenous Heritage Places and Values* (Australian Heritage Commission 2002)
- *Aboriginal Cultural Heritage Standards and Guidelines Kit* (NSW NPWS 1997)
- *Draft Guidelines for Aboriginal Heritage Impact Assessment* (NSW NPWS n.d.)
- Australia International Council on Monuments and Sites (ICOMOS) *'Burra' Charter* for the conservation of culturally significant places (Australia ICOMOS 1999)

3. ABORIGINAL CONSULTATION AND PARTICIPATION

This section documents results of the Aboriginal consultation undertaken as part of this cultural heritage assessment. Consultation for the Project was undertaken in accordance with the DECC endorsed *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (2005).

3.1 DECC CONSULTATION REQUIREMENTS

Interim guidelines issued by the former Department of Environment and Conservation (now DECC) in December 2004 apply to approvals under Part 6 of the NP&W Act. Although there is no legal requirement to follow the guidelines when approval under Part 6 (Section 87 or Section 90 approvals) is not required, the guidelines represent best practice as currently recommended by the DECC. For the Project the Director-General's Environmental Assessment Requirements also require that the consultation guidelines are addressed.

3.2 STAGE 1 HERITAGE ASSESSMENTS

As part of the Stage 1 heritage investigations, members of the community were invited to contribute knowledge of any specific heritage items or special places in and around the study area

Members of the Dungog Historical Society also provided assistance in identifying heritage items. The Dungog Historical Society put out a request for photographs and information relating to the area for input into the Project and to be placed in a Tillegra Dam album that will be held by the Society at the Dungog Museum and provided to the Dungog Library Reserve.

Representatives of the Karuah LALC were involved in the field assessment for the PEA and a draft report was provided for their comment. Priscilla Mason of the Karuah LALC was contacted in December 2007 to see if there would be any written comment forthcoming on the draft. She indicated that the LALC was satisfied with findings and recommendations of the report and did not wish to supply written comments. A copy of the final version of the report was sent to the Karuah LALC for their records. A copy of the report was also provided to the Dungog Historical Society.

3.3 STAGE 2 HERITAGE ASSESSMENTS

As part of the Stage 2 heritage investigations, HWC and Connell Wagner undertook the design, organisation and delivery of a targeted community consultation process, which aimed to address the DECC guidelines.

3.3.1 Notification advertising

Notification of the Project seeking Expressions of Interest from relevant Aboriginal parties was placed in various print media including the *Dungog Chronicle* and *Newcastle Herald*. A major aim of the notification was to provide the opportunity for individuals

and organisations to contribute cultural knowledge about the study area region. The closing date for registrations was 21 December 2007.

In addition, as required by the consultation guidelines, notification letters were sent to the following organisations in December 2007:

- Karuah LALC
- Dungog Shire Council
- Executive Director Operations, DECC
- Registrar of Aboriginal Owners, NSW Department of Aboriginal Affairs
- NSW Native Title Services

The following individuals and organisations were registered as interested parties as a result of the notifications:

- Mr Michael Chenery
- Upper Hunter Wonnarua Council Inc
- Lower Hunter Wonnarua Council
- Mr Arthur Fletcher
- Karuah LALC

3.3.2 Research methodology

A proposed methodology for undertaking the sub-surface testing was provided on 31 January 2008, to all registered parties as well as to Mr Brett Nudd, Acting Manager, Planning and Aboriginal Heritage - North East, DECC. A copy of the PEA Aboriginal heritage assessment was also provided to all parties. Comments on the methodology were requested by 18 February 2008 with the possibility for extensiton if formally requested.

A written response was received from DECC which provided useful comments and endorsed the methodology as an adequate initial subsurface investigation.

No written comments were received from any of the other interested parties. Follow up calls were made and messages left during the week of 18 February, but no alterations or additions to the methodology were forthcoming.

3.3.3 Open day

A Heritage Open Day was held at Munni House on 5 March 2008. The aim of the day was to:

- gather additional heritage information from the local community
- validate information on heritage already identified
- provide the opportunity to present and discuss the findings of the preliminary heritage assessment to the local community

- establish an oral history register for members of the local community who may be interested in participating in oral history interviews
- support HWC's ongoing community consultation and engagement processes
- continue to establish and build good relationships with the local community
- enable members of the local community to participate, communicate, discover and discuss their own history of the area.

Members of the Historical Society were available throughout the day, as were HWC representatives and Connell Wagner's heritage consultants ERM and CHC.

Around 15 people attended the open day, providing the heritage consultants with the opportunity to hear first hand a range of stories about people and places in the area. Participants also provided material, such as personal letters and photos, for recording as part of the area's history.

Consultation about Aboriginal sites was undertaken with members of the Dungog Historical Society. Tom Miller of the Wonnarua people attended the open day to discuss the Project with the archaeologist and representatives of HWC. Mr Miller was provided with information and asked if he could give some thought to recommending individuals who may have information about the area and be willing to be part of the oral history project.

3.3.4 Field assessment

As part of the Stage 2 Aboriginal archaeological assessment HWC offered a contract to two Aboriginal representatives to assist the heritage consultants with their field investigations. Two applications were received in response to a competitive tendering process from Wonn 1 Sites Officer, Arthur Fletcher and the Lower Hunter Wonnarua Council, represented by Tom Miller and Lea-Anne Ball.

HWC invited interested parties who did not wish to, or were unable to actively participate in the fieldwork an escorted tour of the work sites. No responses were received.

At the commencement of the fieldwork the archaeologists met with the Aboriginal representatives and discussed the background to the Project. Maps were provided and the aims and outline of the testing methodology were reiterated.

CHC tries, wherever possible to use a collaborative approach during fieldwork. While it is usually essential that the archaeologists have pre-determined to a large extent the locations for testing prior to entering the field, efforts are made to make sure everyone understands why those locations have been chosen and has the opportunity to contribute to the process.

During the course of the week in the field, numerous fruitful discussions were had relating to the broad study area and the likely presence of evidence of past Aboriginal occupation. The participating individuals contributed to decision-making relating to the nature and location of testing trenches and the archaeologists accommodated requests for testing of particular areas.

It was also agreed by all parties that in some matters archaeological importance and cultural importance may differ. The archaeologists encouraged the Aboriginal participants to think about contributing as broadly as possible to the Project by providing information relating to the cultural significance of the area, either through comments to the archaeologist or more generally as part of HWC's community consultation process.

3.3.5 Reporting and assessment

All registered interested parties were provided with a copy of the draft assessment report between 2 and 4 June 2008. As a courtesy all parties were also contacted via telephone in the week of 16 June to follow up on comments. An initial period of two weeks was given for comment on the draft report. The consultant also stated in writing that an option extend the comment period was possible provided the consultant was contacted to schedule this. No requests for a time extension were received. One written and one verbal response were received by the 23rd June 2008, these are discussed below.

3.4 CONSULTATION OUTCOMES

One written response was received from Wonn 1 Sites Officer, Arthur Fletcher. Mr Fletcher comments that he feels more time could have been allowed for consultation with the Aboriginal community and that further work needs to take place. He does not offer any specific cultural assessment nor detail what outcomes he would like to see from further work, but notes that he is in general agreement with the findings of the report.

The archaeologist spoke to Victor Perry of the Upper Hunter Wonnarua Council Inc on 20 June 2008. Mr Perry noted that there were post-contact historic references mentioning an Aboriginal settlement at Underbank and suggested that further oral history investigation occur in respect to post contact Aboriginal archaeological sites thought to be in the area. Mr Perry also indicated that he is in general agreement with the findings of the report.

The archaeologist spoke to Tracey Skene of the Lower Hunter Wonnarua Council Inc on 20 June 2008. Ms Skene reiterated Mr Perry's comments on further oral history investigation occurring relating to the post contact Aboriginal archaeological sites thought to be in the area. Ms Skene also indicated that she is in general agreement with the findings of the report.

4. ENVIRONMENTAL CONTEXT

An understanding of the environmental background to a study site is essential for any thorough archaeological assessment. The need for a focus on environmental conditions was particularly great for this project as there has been limited previous archaeological work done in the local region. Background environmental review and geomorphological studies were undertaken to assist in forming predictions about the likely presence and location of evidence of past Aboriginal occupation of the landscape. A thorough environmental review can help to illuminate two areas important for making archaeological predictions and proposing models of occupation.

Firstly, the past physical environment influences the ways in which areas were used and what types of sites may be located there. For example, campsites are most often located on level ground with good access to resources, especially water. Different parts of the landscape would have been useful for different things and this may change through time. An understanding of how the landscape looked and behaved in the past can help us to predict where Aboriginal people may have undertaken various activities.

Secondly, environmental processes directly influence the way in which sites are or are not preserved. Heavy erosion or acidic soils are likely to destroy or damage sites, reducing the likelihood of locating evidence of past occupation. Areas where soil accumulates may contain evidence of occupation, but it may be necessary to explore the sub-surface in order to locate material. An understanding of the geomorphological processes at work can also help to determine where past land surfaces may be preserved intact. Such areas can be especially significant if they contain relatively undisturbed evidence of past occupation.

In addition to both these aspects, environmental characteristics of a given area can also contribute to its value and play a role in the cultural significance of a place for many communities.

The remainder of this section outlines the analysis of the landscape and environmental conditions undertaken for this assessment. It includes work for the PEA undertaken by Sam Player (Hardy 2007) and descriptions from the geomorphological study undertaken for the EA (Mitchell 2008). Peter Mitchell's report is included in full as Appendix A. The focus of this Section is on descriptions of the landscape and relevant past changes. The implications of the environmental setting and changes for locating past occupation evidence are discussed in Section 6.

The study area is located within the Dungog Hills physiographic region as defined in Henderson (2000), between the Williams Range and Barrington-Chichester Mountains.

4.1 GEOLOGY

Geologically the study area is within the Northeastern Mountains sub-region of the Hunter Valley region. The Hunter region is situated geologically on the Tamworth Belt (the southern edge of the New England Fold Belt), and is composed predominantly of moderately deformed rocks derived from continental and shelf sediments of Devonian and Carboniferous age. Igneous intrusions of Permian granitoids also occur, forming the parent material for the Barrington Tops National Park, overlain by Tertiary Basalts (Roberts *et al* 1991).

The proposed Tillegra Dam site is located on the Gresford Block and the proposed inundation area inundated is underlain by Carboniferous lithic sandstones, siltstones and some thin limestone units. Where these were observed exposed in road cuttings or stream beds they tended to be moderately to steeply dipping (40° to 60°)and have been faulted (Mitchell 2008). The inundation area covers geology consisting predominantly of undifferentiated Flagstaff Formation, and Bonnington Siltstone. Salisbury Sandstone along with differentiated members of the Flagstaff Formation occur in the southwest of the inundation area. Summary descriptions of the various formations and members have been extracted from Roberts *et al* (1991) and presented in Table 1 below.

Table 1: Geology of the study area

Map Unit	*Formation/Member*	*Description*
Cef	Flagstaff Formation	Thickly bedded green lithic sandstone with varying proportions of brown mudstone and conglomerate, and minor oolitic, skeletal and coralline limestone
Ceg	Bonnington Siltstone	Grey, thinly bedded siliceous siltstone, cherty mudstone, and minor lithic sandstone
Cefd	Bandon Grove Limestone Member	Brown to Yellow biogenic limestone with interbeds of cross-stratified calcareous lithic sandstone, and pebbles of volcanic origin
Cefb	Brownmore Sandstone Member	Brown, massive, crossbedded or laminated lithic sandstone with interbeds of conglomerate, mudstone and lenses of shelly and coralline limestone
Cefu	Underbank Mudstone Member	Grey to Black, thinly bedded fossiliferous mudstone and minor interbedded lithic sandstone
Cefa	Allyn River Member	Green to brown, medium to thickly bedded lithic sandstone with turbiditic sedimentary structures and interbeds of brown thinly bedded mudstone
Ces	Salisbury Sandstone	Brown to orange, medium to thickly bedded lithic sandstone with rare cross-stratification and minor conglomerate, with thin interbeds of green, red, or purple siltstone in upper parts of the formation

The diversity of geology is a consequence of intensely folded and faulted sedimentary rocks eroded locally by the Williams River.

4.2 LANDSCAPE CONTEXT

The local physiography of the study area is characterised high ridges and steep slopes with short colluvial lower slopes and small floodplain elements including oxbows, scrolls, small levee deposits and occasional low terraces, variably distributed along a

narrow valley. The terrain becomes less steep and colluvial lower slopes less frequent, to the northwest and west (i.e. away from the site of the proposed dam wall).

Short dendritic first and second order drainage lines are regularly distributed around the hill slopes and exhibit moderate gully erosion at their confluence with the Williams River. Minor to moderate sheet erosion and small landslips and slumps are reported as erosional problems for the area (Henderson 2000). Accelerated soil creep due to livestock movement has been observed directly within the impact area (Figure 4.1). No obvious sediment traps apart from the colluvial lower slopes and floodplain elements are evident in the impact area suggesting eroded materials are transported rapidly away from the area.

Figure 4.1. Accelerated soil creep on slopes within the impact area

A description of the fluvial geomorphology of the entire Williams River channel has been provided by Gippel and Anderson (2007). For the reaches up-stream of the proposed dam site they draw on work by Brooks *et al* (2004; 2006) and Erskine (2001). Above the proposed dam site the Williams River has a moderately steep gradient and carries a coarse bedload of pebbles and cobbles. The active depositional environment is demonstrated by features such as bars, which are common. Brooks *et al* (2006) suggest that the capacity of the river to transport material is greater than can be sustained by the long-term sediment yield from the catchment. It is likely this has always been the case and therefore all of the valley floor geomorphology is young and active. Given this and the hydraulic regime operating in today it has been assessed as unlikely that any Pleistocene land surfaces were ever preserved within the floodplain patches. (Mitchell 2008).

Deposition of eroding material is likely to occur on the alluvial plains of the Lower Williams and also around its confluence with the Hunter River. The Williams River has only been a tributary to the Hunter River since the Last Interglacial Maximum (c.130-120,000 BP), previously flowing into an estuary which subsequently filled with sediments (Drysdale *et al* 2000).

4.3 SOILS

Soil development in the area is largely controlled by topography and parent material making geological maps potentially a better guide to soil distribution than the soil landscape series (eg Henderson 2000). The impact area is mapped variously as the Williams Range, Tillegra, Salisbury and Black Camp Creek soil landscapes.

The Williams Range landscape occurs on the crests and upper to middle slopes of the ranges that occur in the east and south west of the study area. The Tillegra erosional landscape occurs in the majority of the study area. It largely occurs on rolling hills forming the transitional slopes between the steeper Williams Range landscape and the river flats. Along river and creek flats alluvial or stagnant alluvial landscapes occur.

All the soils have high erosion risk and are generally moderately to highly acidic. Table 2 provides a summary of the characteristics of the soil landscapes of the study area and is taken from Henderson (2000).

Table 2: Soil landscapes of the study area

Soil Landscape	Landscape description	Soils	Qualities & limitations
Williams Range Colluvial	Steep hills and mountains on Carboniferous sediments in the Barrington-Chichester Mountains. Relief 100 - 380 m; elevation 200 - 650 m; slopes 25 - >50%. Regular banded sandstone rock outcrop is common along with small scarps, common boulders and cobbles, and terracettes. Cleared tall open-forest. **Landscape Variant--wia**--dry exposed slopes in the centre of the catchment with mainly dry sclerophyll forest. **wib**--Red Dermosols (Kraznozem-Red Podzolic Soil intergrades) and some Yellow Kurosols (Yellow Podzolic Soils) formed on ancient and some recent landslip deposits.	Shallow to moderately deep, well to rapidly drained Bleached-Leptic Tenosols (Bleached Loams) and well-drained Chernic-Leptic Tenosols (Structured Loams) on siltstone. Shallow to moderately deep, well to rapidly drained Orthic Tenosols (Lithosol/minimal Brown Earths) on sandstone. Moderately deep, well-drained Red Kurosols (Red Podzolic Soils) on shoulders of crests on siltstone. Moderately deep, well-drained Red Dermosols (Terra Rossa Soils) on limestone outcrops.	Steep slopes; high mass movement hazard; high sheet erosion risk. Shallow, stony
Tillegra Erosional	Rolling hills on Carboniferous sediments in the Williams Range and Dungog Hills regions. Relief 40 - 120 m; elevation 100 - 400 m; slopes 5 - 25%. Mainly cleared tall open-forest. **Landscape Variant--tia**--undulating low hills.	Moderately deep to deep, well to imperfectly drained Brown Sodosols (Soloths) with moderately deep, moderately well-drained Brown Kurosols (Yellow Podzolic Soils) on sandstone. Shallow to moderately deep, well to moderately well-drained Palic Leptic Tenosols (Lithosols) and Melanic Leptic Tenosols (nsg) on siltstone. Deep, well-drained Red Kurosols (Red Podzolic Soils) on shoulders of crests.	Sheet erosion risk; localised steep slopes; mass movement hazard. Strongly acid soils with potential aluminium toxicity.
Salisbury Alluvial	Narrow to moderately broad alluvial plains on recent (Quaternary) sediments along the upper reaches of the Williams River in the Tillegra Hills region. Relief 1 - 10 m; elevation 80 - 300 m; slopes <3%. Terraced land, low-level terraces, floodplains, stagnant alluvial plains and alluvial fans. Completely cleared. **Landscape Variant--saa**--moderately broad alluvial terraces. **sab**--moderately broad, low gradient alluvial fans.	Deep, well-drained Brown Kandosols (minimal Prairie Soils and Brown Earths) on floodplains with deep, well-drained Orthic Tenosols (Alluvial Soils) on low level terraces and deep, moderately well to imperfectly drained Brown Chromosols (Soloths; Brown Podzolic Soils) on elevated terraces and alluvial fans.	Flood hazard; productive arable land; complex terrain; gully erosion hazard; localised high run-on; seasonal waterlogging; permanently high watertables. Highly erodible soils.
Black Camp Creek Stagnant alluvial	Low level terraces and valley flats on Quaternary alluvium derived from Carboniferous sediments in the Clarencetown Hills and Dungog Hills regions in the centre of the catchment. Relief <2 m; elevation 50 - 180 m; slopes 1 - 3%. Mainly cleared tall open-forest.	Deep, imperfectly drained Natric Brown Kurosols (Soloths) on stagnant alluvial plains.	flood hazard; seasonal waterlogging; sheet erosion risk; gully erosion risk; poor drainage and permanently high watertables (localised swamps); high run-on (localised). Strongly acid soils of low fertility and low permeability.

4.4 RECENT LANDSCAPE IMPACTS

The location of flood debris and recorded changes in the valley demonstrate that the modern flood regime has changed significantly as a consequence of European land management. Vegetation clearing of the hillslopes has been a large contributor to these changes (Mitchell 2008). Brooks *et al* (2004) described the river channel near Munni as being a discontinuous floodplain style with alternating reaches of bedrock confinement and small floodplain patches (Mitchell 2008). The entire upper catchment was subject to 'river training scheme works' during the period 1966 to 1991 (Erskine 2001). This work involved re-shaping the riverbed, which in turn, frequently exacerbated bank erosion.

A study of sediment cores at Tocal Homestead Lagoon (about 35 km south of Tillegra) demonstrates that initial environmental disturbance by Europeans occurred there between 1818 and 1822. A 13-fold increase in the average sedimentation rate occurs when compared to the two millennia prior to European settlement (Cook 2006). A similar study was conducted at Little Llanothlin Lagoon by Gale and Haworth (2002) who suggest that the majority of disturbance by Europeans occurred within the first few years of arrival.

4.5 FLORA AND FAUNA

The vegetation within the study area has changed dramatically since European settlement of the area. The majority of old-growth timber has been cleared. Cleared grazing land with some improved pasture dominates the landscape. In the past the area would have provided a wide variety of flora and fauna resources for the Aboriginal communities who lived there.

Undulating terrain around the Tillegra–Salisbury area would have been characteristically dominated by cabbage gum (*Eucalyptus amplifolia*), spotted gum *Corymbia maculate*), grey box (*E. moluccana*) and rough barked apple (*Angophora floribunda*). Forest red gum (*E. tereticornis*) and grey gum (*E. punctata*) are also found.

Tree bark, sap and other plant products were used in tool manufacture for items such as shields, spears and carrying containers. Reeds such as the mat rush (*Lomandra longifolia*) found in the study area could be used for making baskets (Clarke 2007). Many plants were exploited as a minor food resource, for example berries or plant nectars. Fewer plants were likely to form a major food source.

Aboriginal firing of the landscape may have resulted in opening up of grasslands in the valleys and ridge tops which, in turn, increased the habitat for large macropods.

Animal resources were important to the Aboriginal people of the region, not only as a food source but because they could also be used for manufacturing. The use of animal skin clothing and animal bone tools has been well documented.

Most Australian land mammals are available all year around as they are not migratory; however, some may be easier to catch at certain times, for example possums are less active in the winter months. Ethnographic sources suggest that in addition to land resources the local Aboriginal people made good use of fish and shellfish. Freshwater mussel shells were observed during recent surveys of the area.

The resources available to inhabitants of the study area region could have provided a varied and generally reliable resource to sustain relatively large groups.

5. ARCHAEOLOGICAL AND HISTORICAL CONTEXT

It is generally accepted that the earliest Aboriginal habitation of Australia dates back at least 60,000 years, but this date may change as further research is carried out. Dates for the earliest habitation of specific regions are generally less precise, but in general terms Aboriginal people have occupied the entire continent for many thousands of years. This has led to the deposition of a range of evidence widely across the landscape. Anywhere where undisturbed ground is present in a landscape, there is some potential for locating evidence of past occupation. This evidence comes in a variety of forms such as stone artefacts; modifications to trees, remains of meals in the form of bones, campfires or shells, art sites and stone quarries or manufacturing places.

When considering where to look for evidence of past occupation, previous site recordings and archaeological assessments provide one potential guide. The combination of historical records and ethnographic studies of more recent indigenous communities can also help by suggesting likely past behavioural patterns. In combination with archaeological evidence, this enables predictive models for the occupation of an area to be proposed. Such models can be used to provide a picture of behaviour in the past and can then be tested against evidence of that past behaviour preserved in the archaeological record.

While ethnographic descriptions of the Aboriginal groups in areas further afield such as the Hunter Valley or closer to the coast may provide information on aspects of past lifestyle, only a limited amount of previous archaeological work has been undertaken in the region immediately surrounding the study area. The archaeological evidence from areas such as the Hunter is very different from that seen in and around Dungog. The landscape and resources also vary considerably. For these reasons it is unlikely that regional models developed for the Hunter Valley or the coastal areas will be applicable to the study area. The following presents a summary of relevant research in the region. The implications of the evidence for modelling archaeological potential in the study area are discussed in Section 6.

5.1 ETHNOHISTORY

Much of our knowledge of the pre-contact social organisation and behavioural patterns of indigenous people comes from early non-indigenous historical records and is, therefore, subject to the historical and cultural biases of the recorders. It is also important to remember that at the time many of the observations were made, the lifestyles of indigenous communities may have already been dramatically altered by the presence of non-indigenous settlement.

The Aboriginal people with modern-day association with the study area are the Gringai clan of the Wonnarua people. Discussions with local residents who have collected stories also suggest Gringai (or Gringhi) people were the group living in the area at the time of non-indigenous settlement. Some of these references are discussed below.

Early European explorers and anthropologists did not always understand and record information that was consistent with how people viewed themselves. Some of the references may suggest, for instance, that different groups were in a particular area or

that place names and words from one language may have been used by Europeans in another language group's area.

Howitt (1904) suggests that the groups inhabiting both the Williams and the Paterson River valleys were affiliated with each other and belonged to the broader 'Gringai' group. This may have referred to the groups on the Williams in the area below Dungog. Brayshaw (1984) suggests that the people around Dungog were affiliated with the Worimi people of the area around Port Stephens. There is some evidence, however of Aboriginal people of the Dungog area fighting with those in Port Stephens (Tucker 1933 cited in Koettig 1986). People to the west of Port Stephens have also been described as belonging to the Geawal (Bennett n.d.).

During the thousands of years of occupation, climate and resources would have changed and inevitably alliances and groupings would have also changed. The complexity of social interaction is in some ways indicated by the variety of languages that were in use across the continent.

It is estimated that around 250 distinct languages and over 700 distinct dialects were in use at the time of contact. The exact number cannot be known for certain, but 250 is a conservative estimate. The 250 languages fell within two language groups: the *Pama-Nyungan* and *Non Pama-Nyungan* languages. Of these, maybe only about 30 are still spoken (Mulvaney and Kamminga 1999: pp69-70).

Early European recordings noted the names of Aboriginal individuals and groups, but were not always clear about which named groups represented a language rather than some other social grouping.

Linguistic groupings were probably not the main social or political entities in day-to-day life for Aboriginal people. Land and resource ownership was centred on smaller units. These various groupings and affiliations in social organisations have been described in differing terms. These groups are often referred to as 'tribes' in historical accounts, although they are generally not 'tribes' in the current anthropological use of the word, rather they are smaller named groups. In the following the terms defined by Attenbrow (2002) have been used.

In general, resource and land ownership was focused on extended family groups or *clans*. These groups are sometimes called local clans, territorial clans or local descent groups. Such clan groups would have varied in size but are likely to have included between 25 and 60 individuals. As there were strict rules about finding acceptable sexual partners and incest was punishable by death, as well as for other reasons such as resource sharing, a number of clans would often travel together in a larger group. These groups are referred to as *bands*. Whether the clan or the band was the most important group politically to an individual is likely to have varied from place to place. Group borders were generally physical characteristics of the landscape inhabited, such as waterways or the limits of a particular resource. Groups would be likely to include members of different clans and possibly speakers of different dialects (Attenbrow 2002).

Writing in the Dungog Chronicle, Brian Brock (1957, cited in Koettig 1986) relates some information about the naming of places in the area. He suggests that the name Dungog comes from an "Awabakal dialect word" *Tunkok/Tungog* and means 'the place of thinly wooded hills'. *Munni* was recorded as the Aboriginal name for the area and is said to mean 'a good hunting ground'.

There is evidence that Aboriginal people lived in relatively large numbers along the Williams River (Koettig 1986). References to specific behaviours give some indication of potential remains that could be located in the study area. In 1801, Grant (cited in Brayshaw 1984) observed a group of Aboriginal people who fled at his party's arrival but he continues to say

> '…we came to a spot which they had just quitted, and observed the marks of children's feet. The ground was covered with the shells of fresh water fish, of the sort found in the rivers of England and Scotland, and called the horse muscle, having sometimes small pearls in them.'

Aboriginal people were also observed in the Paterson River Valley cutting notches into trees to climb them to extract native honey from hives (Koettig 1986).

Dr E McKellar McKinlay lived in Dungog in the first half of 19th century and recorded many details about the local Aboriginal people. Bennett (n.d.) had access to his papers and compiled a considerable amount of information about the region's earliest inhabitants. An article by A P Forster (in Muddle and Hucherko 1988 eds, pp149-151) also recounts information from early historic records. These sources as well as information gleaned from discussions with Dungog residents form the basis of the information presented below. While a great deal of additional material is contained in the sources, the following discussion focuses on information that can assist in modelling Aboriginal land use and material culture in the area.

It appears that early relations between the local Aboriginal people and the incoming European settlers were relatively peaceful. Some of the settlers employed Aboriginal people to help clear properties. Captain Thomas Cook who was the commandant for the area north of Newcastle was, on many occasions, an advocate for the Aboriginal people of the area and doubtless contributed to ongoing good relations.

Dr McKinlay took a census of Aboriginal people living in the Williams valley in the early 1830s and recorded approximately 230 individuals.

Groups were distributed through the district in local groups known as 'Nurra'. Specific groups were recorded in places such as Burnt Gully Creek, Dungog and at Tillegra. Brock (cited in Koettig 1986) notes that Aboriginal campsites were known (near the Dungog showgrounds and rifle range) and that plenty of kangaroos, wallabies, possums and other game were hunted in the area. It was noted that they constructed shelters or 'mia mias' using bark sheets against a log or by placing bushes along a large tree. As long as the old ways of life largely persisted the Aboriginal people seem to have been well off and healthy. Their diet consisted largely of possums, wallabies, birds and fish. It was said that hunting was a big part in the life of the men of the group.

A lot of information about the Gringai lifestyle came from an individual known as Brandy who was born around 1830 and lived in and around Dungog. He was well known to all the white settlers, commonly staying at particular homesteads and also taking wild game and honey to certain individuals. He was said to be an expert at hunting pigeons and obtaining wild honey. He could also catch mullet with green river moss. A photo of him hangs in the Dungog museum.

The spread of white settlement had a great impact on the ability of the local people to gain access to previously abundant resources and numbers began to dwindle in the 1840s and beyond.

Information about the rich social and ceremonial life of the Gringai people was also recorded. There was considerable interest amongst the new settlers in the continuing ceremonial life of the local inhabitants. McKinlay and others recorded details of ceremonies such as a 'bumbat' or initiation ceremony, although, as Bennett notes, it is unlikely that they would have been allowed to witness all of the ceremony or its most important elements. People were called to the ceremony from surrounding groups by a messenger. The safe passage of such individuals between tribal lands was always assured and they were generally well known. It is recorded that in this region messengers did not carry message sticks, but work a red-coloured net around the forehead when summoning groups for particularly important occasions such as a bumbat.

McKinlay records around 200 individuals gathering for a bumbat, painted in red, white and yellow ochre and fully armed. He also notes that a large tree was deeply carved to mark the location of the place so that future generations would know that a bumbat had occurred. The ceremonial area itself was a "circle of eighty to ninety feet in diameter… dug or scratched, on a level piece of ground, leaving space of four or five feet undisturbed to enter the circle by. In the centre of this circle there was a fire of moderate dimensions and attended by one of the men". There are local stories of such 'bora grounds' in the hills above the study area and at Burnt Gully behind the Dungog hospital. No known sites exist within the study area.

The burial practices of the Gringai seem to have focused on group burial grounds or cemeteries. People were carried, sometimes for miles, to be buried in these special places. Important men of the tribe were given more elaborate burials than lesser individuals, women or children. Dr McKinlay records the following description of an important man's burial in the Dungog area

> *The body was doubled up, heels to hips and face to knees, and the arms folded. It was then wrapped in sheets of ti-tree secured by cords of string-bark fibre. A hole was dug in easy soil in a well shaded locality, about two feet deep and circular. The body was dropped in sideways and after a stone hatchet and a club were placed beside it the grave was filled in and the ceremonies ended* (Bennett n.d.: 9).

He also described "violent" grief associated with such ceremonies.

The evidence of local oral history and early European historic records helps to build a picture of the complex and well-organised lifestyle of the Gringai people. In association with the archaeological evidence detailed below, this information can be used to assist in forming predictions about the likely nature and extent evidence of past occupation within the study area boundaries.

5.2 ARCHAEOLOGICAL EVIDENCE

Prior to the archaeological assessments for the Project, the study area region has been the subject of a limited number of archaeological studies. An overview of the Northeastern Mountains geological sub-region undertaken as part of a broad scale study of the Hunter Valley (Koettig 1984) provides a contextual overview.

The study included a vehicle survey , focusing on areas next to creeks and rivers in order to identify potential survey areas. The strategy aimed to include a sample of differing landforms including larger and smaller valleys as wells as hill slopes and ridges. Nine sample survey areas were inspected on foot. The survey areas totalled approximately 6.5 square kilometres and an additional 4.5 kilometres of linear assessment corridor. The assessment of a greater portion of the landscape was impeded by the overall poor ground visibility within the region. A total of 42 artefact scatter sites, 42 isolated artefacts and two scarred trees were recorded. The materials used for artefacts varied at most sites with 'indurated mudstone' and silcrete common. Most artefacts were smaller than 5 cm and around 40 per cent of sites included artefacts with some evidence of usewear or retouch (Koettig 1984: pp24-25).

Koettig noted that findings were consistent with previous studies that had shown that the sparsity of sites recorded in the region does not tally with the evidence that relatively large numbers of Aboriginal people are likely to have inhabited the area (Koettig 1984: p26). She suggests that a major factor in explaining this is the lack of areas with suitable ground surface exposure where artefacts would be expected to occur.

Based partly on other work carried out in the Central Lowlands sub-region of the Hunter Valley and the results of her sample surveys Koettig proposed that landforms within the Northeastern Mountains could be divided into two classes of probability

A. **High probability** of large numbers of artefacts being found (on creeks and river flats and lower footslopes), and

B. **Low probability** of large numbers of artefacts being found (on slopes, ridges, and crests, especially away from creeks and rivers, and very minor tributary creeks) (Koettig 1984: p27).

In addition she categorised ground surface visibility as either **good** or **poor** depending on vegetation cover and exposure as:

- **good** where 'sheet wash and rilling were extensive and the ground was bare'; and
- **poor** 'where there was little erosion and there was patch grass cover.'

It was also noted that, in general, areas with a high probability of containing artefacts almost always had extremely low visibility.

Other studies in the vicinity of the Tillegra study area provide further information about the difficulties of locating sites.

A survey was undertaken (Djekic 1978) for a water supply pipeline between Martins Creek and Paterson. One scarred tree, a 'large Eucalyptus sp.' was recorded although there is some doubt about the tree being of sufficient age for the scar to be of Aboriginal origin. Most of the route surveyed was within cleared farming land or alongside existing roadways. It was noted that "due to extensive flooding the local rivers were seen to have steeply banked and eroded edges, and therefore would not appear to offer favourable conditions for locating archaeological sites" (Djekic 1978). This refers to the Paterson River and Martins Creek.

One kilometre west of the Williams River, Kuskie (2002) undertook a study of a proposed sewerage scheme within the Dungog Shire. The study included a survey area

of approximately 37.8 hectares in total: 3.25 kilometres of pipeline route; 6.5 hectares of area for a treatment plant and a re-use area of 20 hectares. Within the study area 19 'environmentally discrete survey areas' were inspected. Visibility was impeded by vegetation but it was estimated that within a survey of around 16 per cent of the study area ground cover reduced the effective survey area to approximately one per cent. No Aboriginal objects or evidence of Aboriginal occupation were recorded as part of the study. (Kuskie 2002). All the areas surveyed were assessed as being moderate to highly disturbed.

A re-examination of earlier predictive modelling suggested that the poor visibility could not entirely account for not locating any evidence within creek landform areas. Kuskie therefore concluded that there was low potential rather than a moderate potential for medium-high density sites in close proximity to higher order watercourses (in this case Stony and Wallaroo Creeks). He noted that there was still potential for low-density artefact occurrences throughout these landforms. He also suggested that greater densities of occupation evidence might be expected in association with the Williams River Valley approximately 1 kilometre to the east.

Koettig undertook an essentially desktop assessment in 1986 of Aboriginal sites within the whole Dungog Shire. She noted that although a total of only 10 sites were recorded at that time, they were present across various landform areas and represented a wide variety of site types including burials, stone arrangements, scarred and carved trees as well as artefact scatters and grinding grooves (Koettig 1986). The location of ceremonial as well as habitation sites is further testimony to the fact that Aboriginal occupation of the area must have been relatively intense and was certainly not limited to transient use. As a consequence of the low numbers of sites and their distribution across a wide area, Koettig was not able to provide any firm predictions about site type location.

5.2.1 DECC database search

An updated search of the DECC Aboriginal Heritage Information Management System (AHIMS) sites database for sites within the Dungog Local Government Area now results in a list of 33 site features.

The AHIMS is a database of recorded Aboriginal sites within NSW. The data is limited to known sites. The majority of sites have been recorded as part of archaeological surveys or investigations, but many are also known as a result of amateur interest groups or local knowledge. New sites are recorded regularly. If an area has not been the subject of archaeological assessment, or is remote, there may be sites present that have not yet been recorded. While the register can give an indication of the types and variety of sites in a region, its value is limited by the amount of investigation carried out in a particular area.

The recorded location information for sites is also subject to variation in recording methods. Coordinates provided are often indicative rather than exact. The accuracy of locations cannot be relied on. Some sites were only ever recorded approximately without detailed map referencing. Other sites recorded prior to the 1980s were recorded using imperial grid references and converted, adding to the inaccuracy of information.

The features are listed as one art site, 13 artefact sites, three burials, one ceremonial site, two shell deposit features (associated with middens), two 'earth mounds' (sometimes

recorded at midden sites or other areas of deposit), three grinding groove sites, seven scarred trees and one area of potential archaeological deposit (PAD). Again this list is a testament to the variety of types of occupation evidence that may occur in the region.

None of the site features or Aboriginal objects on AHIMS are recorded within the study area boundaries.

5.2.2 Tillegra Dam Stage 1 heritage assessment

Sample surveys of the study area were undertaken during the week of 13 August 2007 as part of the PEA. A total of nine survey units were inspected on foot totalling approximately 175 hectares. Approximately 61.5 hectares of river and creek flats/terraces, 49.8 hectares of slope landform and 52.6 hectares of ridge crest landforms were surveyed. In addition, an area of approximately 10.7 hectares of disturbed mixed terrain was surveyed along Salisbury Road.

In general terms the visibility across the study area was extremely poor. In most areas heavy grass cover reduced effective survey coverage to less than five per cent. The main exception was SU6 where a large portion of the ridgeline included an existing track with approximately 40-60 per cent visibility in many areas.

No Aboriginal archaeological sites were recorded during the survey. One small piece (<20 mm) of silcrete was located in SU8 eroding out of the banks of the upper reaches of a first order creek line. It is likely the silcrete piece is a by-product of artefact flaking. In any case the silcrete piece provides evidence of human activity as it is not stone that is naturally occurring in that location.

Restricted ground surface visibility was a major limiting factor for the survey. It was also concluded that further extensive survey was unlikely to be the most effective way to better characterise the Aboriginal heritage resource in the study area.

As no sites were recorded and visibility was poor, the survey itself did not assist in refining a predictive model for the study area. A different strategy for better assessing the extent, nature and significance of any archaeological resource was required. It was recommended that a more in depth geomorphological assessment, focused on the archaeological potential of the area, should be undertaken and reviewed in conjunction with previous archaeological assessments, local history and survey results to direct a targeted sub-surface testing program.

The geomorphological evidence is presented in Section 4. The implications for predictive archaeological modelling are discussed in Section 6.

6. ANALYSIS OF BACKGROUND ASSESSMENT AND PREDICTIVE MODEL

As part of the Stage 2 Aboriginal archaeological assessment, CHC commissioned a geomorphological assessment from Groundtruth Consulting (Appendix A). The predictive archaeological model discussed below is based on a review of the geomorphological assessment, the known archaeology for the region as well as field observations and the results of the archaeological survey. This predictive model was also used to assist in identifying locations for sub-surface testing.

6.1 PAST ACTIVITY AND SITE TYPES

A variety of site types representing past Aboriginal activity are found across the landscape. Some sites are more common in certain areas. The evidence that does survive is only ever a fraction of the varied and complex material culture that would have been used in the past.

The most common item that survives as evidence is stone in the form of flaked or ground stone artefacts. Stone artefacts can be found in small numbers scattered anywhere across the landscape, but concentrations of artefacts resulting from centralised occupation or manufacturing can potentially tell us more about the nature of occupation in the past.

Artefact scatters, sometimes known as open campsites, can include campfires (hearths) and other evidence of occupation such as animal bone from food remains. Large campsites may result from extended use of an area by a group and/or repeated occupation of the same place of many years. Discrete activity areas may be recorded within larger campsites. Both **isolated artefacts** and **open campsites** are commonly recorded evidence of Aboriginal occupation of an area.

Stone source sites or **quarries** are locations where stone types suitable for stone artefact manufacture are found naturally outcropping.

Grinding grooves are evidence of where ground stone tools have been manufactured and/or sharpened using a soft stone bed and water, most commonly sandstone outcrop along a creek line.

In some places rock overhangs or **rock shelter** sites were used extensively for habitation. Shelter sites are sometimes referred to as 'closed' to distinguish them from 'open' artefact scatters/campsites. Shelter sites can also contain a variety of evidence relating to habitation such as stone artefacts, food remains and hearths. Shelters sometimes also contain **art**, usually in the form of charcoal or pigment applied to the walls. Other **rock art** can include 'rock engravings', more accurately described as **petroglyphs**. These occur most commonly on large flat areas of sandstone.

In coastal areas and less commonly along freshwater streams, **shell midden** sites can be recorded. These sites are (sometimes large) accumulations of shells discarded after meals. They can also include other remains of past meals such as animal bone. In some areas **burials** within middens have also been recorded. Burial customs varied and burial sites can also occur in sandy deposits or in hollow trees.

Trees were often carved with motifs to mark burial grounds or other significant places. **Scarred trees** can result from carved markings or from practical use such as when bark was removed to make objects including canoes and carrying vessels. Notches would also be chipped out with a stone axe to provide footholds for climbing trees to reach other resources such as bee hives.

Ceremonial sites relating to social gatherings and religious practices often leave no physical traces in the landscape. These sites are often known only through the oral history of local communities or early ethnographic recordings of observations. In other cases stone or earth circles, petroglyphs or carved trees may be an indication that a site has ceremonial significance.

It has been determined from reviewing the archaeological and historical evidence that Aboriginal people inhabited the Williams River valley. Given the variety of observations of complex ceremonial activity as well as the persistence of habitation into the post-contact period it is likely that relatively large numbers of people lived in the area. European observations of huts and detail of the local people's relationships with bordering communities would indicate a relatively stable population rather than transient use of the area. The question is therefore: where might evidence of this past occupation be expected to occur?

Two main factors were considered in efforts to answer this question; firstly where would activities likely have taken place in the past and secondly, what is the likelihood of evidence of activities surviving in the landscape.

6.2 ENVIRONMENTAL LIMITATIONS ON PAST HABITATION AREAS

In general terms access to resources and particularly water, will have a role to play in how occupation sites are chosen. The sedimentary rock types observed in the study area are unlikely to have been used by Aboriginal people as raw-material for flaked stone artefacts. No rock shelters are known to be present in the study area and no areas likely to contain rock shelters were observed. It was also assessed as unlikely that any of the coarse grained sedimentary rocks would have been particularly suitable for use in ground-stone tool manufacture such as axe grinding (Mitchell 2008). The geology is therefore not a useful guide to site presence in the landscape.

Other resources such as animals for food, sources bark for shelter etc would have been wide spread and their presence or absence does not assist in forming predictions.

Models of occupation used by many archaeologists in regions such as the Cumberland Plain and the central lowlands of the Hunter valley have frequently used 'stream order' (see Strahler 1952) as a useful indicator of the likely presence of Aboriginal sites.

Almost all areas along streams from first to fourth order are very steep in gradient, have direct hill slope links and bedrock channels. These do not provide suitable ground for campsites. In the smaller tributaries, the channel gradient is as steep as or steeper than the adjacent ridges. It is therefore unlikely that the streams would have been preferred to the ridges as access routes (Mitchell 2008).

The main tributaries - Tunnybuc Creek and Quart Pot Creek - also have narrow incised channels and steep gradients. Only small patches of intact flood plain deposits occur along the length of both creeks (Mitchell 2008).

The first to third order streams flowing into the two creek lines and the Williams River itself are even steeper than Tunnybuc and Quart Pot Creeks. They have gradients of up to 18° and steep side slopes that are directly connected to the stream channels. In general, these would not have been likely places for Aboriginal people to camp (Mitchell 2008). These areas would still have been used by people for the resources they contained such as fauna species for food and trees and plants for food and fibres. Mitchell (2008) suggests that campsites would be unlikely in the upper catchment above Tunnybuc and Quart Pot Cemetery and that access to the resources in this part of the landscape would have been far easier, and therefore more likely, along the ridgelines and the major streams. Any occupation sites would therefore be expect to be small and scattered.

Even along the Williams River true terraces (abandoned floodplains) appear uncommon, predominantly occurring only below Tillegra. Two or three low benches were noted at the river crossing east of Munni House (Mitchell 2008). It appears that in the study area the only stream segments that have any development of floodplain patches (with potential to preserve evidence of occupation) are the highest order segments along the main channel (Mitchell 2008).

6.3 ENVIRONMENTAL LIMITATIONS ON PRESERVATION OF ARCHAEOLOGICAL EVIDENCE

The very steep slopes present within the study area, the extensive water activity in the region and the acceleration of erosion due to more recent disturbances have limited the potential of finding in-situ archaeological materials.

Recent channel migrations are likely a consequence of hydrological response to changes in land use introduced by Europeans. Initial activity included logging of red cedar by convict teams from Newcastle and was followed by cultivation of various crops (Cook 2006), although the predominant land use today is improved pasture. Many, if not all scarred trees are likely to have been removed during European land clearing.

After a series of flood events between 1946 and 1963, bank stabilisation works were instigated along the Upper Williams (Erskine 2001), including revegetation of the stream banks. Specific to the area of the proposed Tillegra Dam was a bank stabilisation program implemented over the period 1966 to 1991. The river training affected the channel along the entire upper catchment and include 1.95 kilometre section at Munni, including half a kilometre of earthworks (Erskine 2001).

Most of the river training works involved considerable reshaping of the riverbed, which in turn, often exacerbated bank erosion. The effect of these modifications and the impacts of erosion and past flooding meant that it is unlikely that any Aboriginal sites that may have been present near the water level of the river would have survived (Mitchell 2008).

While ridges have some potential for preserving archaeological materials, the adjacent steep slopes are likely to have been stripped of much of their topsoil immediately after clearing by Europeans in the early 1800s (Erskine 2001). Many of the ridgelines in the study area do not afford convenient access to water and would have been less likely to be used for regular camping.

As discussed above open campsites in the first to third order stream areas of the catchment are likely to have been small and scattered as a result of transient visits to the area rather than longer term camping. The survival of such sites is also in question as the slope areas have been subject to extensive erosion and the stream lines are frequently eroded to exposed bedrock (Mitchell 2008).

6.4 SUMMARY AND PREDICTIVE MODEL

Although likely to be present in the adjacent ranges, no areas of sandstone or other outcrop suitable for locating rock overhangs were observed in the study area. Therefore it is not considered likely that shelter sites with or without art would occur.

Mitchell (2008) also assessed as unlikely the possibility that any of the coarse grained sedimentary rocks would have been suitable for use in ground-stone tool manufacture such as axe grinding. Therefore, grinding groove sites are not expected to occur. No suitable outcropping stone source sites, for use in manufacturing flaked stone artefacts, have been identified during a review of the local geology.

Scarred trees are unlikely to occur due to extensive land clearing practices.

Although Aboriginal people undoubtedly made use of freshwater resources including shellfish, it is extremely unlikely that any midden sites would be preserved along the existing stream channels.

Ethnographic evidence suggests that burials in the region frequently took place in groups within 'burial grounds'. The most likely places for such sites to occur are within sandy deposits such as along the river and stream banks. The likelihood of preservation of such sites has been greatly reduced due to the extensive flooding and stream bank erosion documented in the study area.

Ceremonial sites such as bora grounds are known within the region. None have been identified within the study area. This does not mean that they were not present, but as such sites frequently have no physical manifestations, in the absence of reliable oral or written evidence, they are extremely difficult to locate.

Open artefact sites are expected to be the most common in the study area. It is likely that artefacts will be located within undisturbed parts of the landscape. The absence of a known reliable raw material source within the landscape might suggest that artefacts may be of a smaller size and a low percentage of cortex will be present in any assemblage located.

The following broad predictions for the distribution of artefact sites can be made for the study area:

- Sites would be expected in areas of lower angle slopes, in close proximity to water but above average flood levels.
- Stream order is not likely to be a helpful predictive tool for past occupation patterns in this study area (Mitchell 2008).
- Outside of the main river channel sites may be small and sparsely distributed.
- Sites would be expected to date to the more recent past (<10,000BP). Older sites are not expected as it has been assessed as unlikely that any Pleistocene land surfaces were ever preserved within the floodplain patches (Mitchell 2008).

- No sites would be expected to be preserved in the 1:100 year flood level (Mitchell 2008). Although mapping is not available for this area, low-lying areas of floodplain adjacent to the river could be discounted from further investigations.
- Slope areas are unlikely to have preserved material due to soil creep and erosion.
- Ridgelines may contain areas where sites could be preserved, particularly if there is easy access to water. Sites in such areas may be small and sparsely distributed.
- Burials are most likely to have occurred in groups. Local history suggests that the local known burial grounds are outside the study area. However, there is a possibility that unknown burial grounds or isolated burials could occur in undisturbed sandy deposits. The likelihood of such sites, if they were present, remaining intact has been reduced due to the nature of flooding and erosion through the area.

Specific areas of archaeological potential identified for sub-surface testing on geomorphic grounds are discussed further in Section 7. A discussion of the predictive model in light of the assessment results is presented in Section 7.4.

7. SUB-SURFACE ARCHAEOLOGICAL TESTING

Stage 1 heritage assessment (Hardy 2007) identified ground surface visibility as a severe limitation on locating archaeological evidence in the study area. It was therefore recommended that sub-surface testing be undertaken in the area as part of a strategy to identify the Aboriginal archaeological potential of the study area and the potential impacts of the proposed development on the cultural heritage resource.

To assist in understanding the extent of potential impacts, further consideration was given to the impacts of inundation within the study area to assist in the formulation of appropriate management recommendations. This analysis is discussed in Section 9.

7.1 AIMS

The central aim of the Stage 2 Aboriginal archaeological assessment was to provide further information on the likely presence of surface or sub-surface archaeological material in areas that may be subject to impact by the Project (impact zones) across a variety of landforms.

7.1.1 Research questions

To achieve the stated aim the following research questions were proposed:

1. Is there evidence of Aboriginal occupation within the study area?
2. What is the likelihood of archaeological material being preserved within the impact zones?
3. What can the distribution of evidence (or lack of it) tell us about the Aboriginal heritage values of the study area?

These broad based questions were necessary for a preliminary phase as there is currently no available archaeological evidence from the study area and little archaeological assessment/testing has been undertaken in the immediate local region. The study area archaeology does not show similar patterns to nearby regions such as the Hunter Valley.

7.2 METHODS

The investigations were undertaken in partnership with the relevant local Aboriginal community representative organisations as identified through consultation undertaken in accordance with the requirements of the DEC *Interim Community Consultation Requirements for Applicants* (2005).

7.2.1 Testing location selection

In order to identify areas with potential for retaining archaeological deposit a geomorphological assessment was undertaken (see Appendix A). Five discrete areas were identified by Mitchell (2008) as being archaeologically sensitive. These locations are shown on Figure 7.1. The areas were identified on the basis of the following criteria:

- having lower angle slopes (<5 degrees)
- being in close proximity to water

- being above the average flood levels

The following descriptions of each area are taken from Mitchell (2008).

Area A.

The left bank slip-off slope of the meander appears to have a lower slope angle than usual and may have provided reasonable ground for a campsite and/or have been used as a short-cut across the river bend.

Area B.

The junction of Tillegra Creek and the Williams River is likely to have been the site of a large waterhole during Aboriginal times and may have low gradient benches suitable for camp sites. Sub-surface testing on any higher benches on the right bank of both the river and Tillegra Creek was suggested.

Area C.

The junction of Quart Pot Creek and the Williams River is likely to have originally had a large waterhole and to retain higher benches on the floodplain.

Area D.

Three low benches occur on the floodplain North of Salisbury Road. These features do not appear to be true terraces and it is possible that each of them have been disturbed by 20th century floods. However surface testing and a deep backhoe pit to check the stratigraphy of the alluvial sequence was recommended.

South of Salisbury Road the river meander defines a long ridge (spur) with a gentle gradient. It was recommended that testing should be conducted along the length of this ridge and should include observations on any low saddle that exists on the ridge where Aboriginal people may have taken a 'short-cut' across the meander.

Area E.

Three targets were suggested within area E.

- The dam site itself would require closer examination as it would be totally modified by construction work. Although the steep slopes and rock outcrops in this area are not likely to contain any Aboriginal sites.
- Two low benches occur on the floodplain of the un-named right bank tributary just upstream of the dam site and these should be tested as for Area D.
- The saddle across the meander loop north of the tributary junction should be tested for the same reasons as the saddle in Area D.

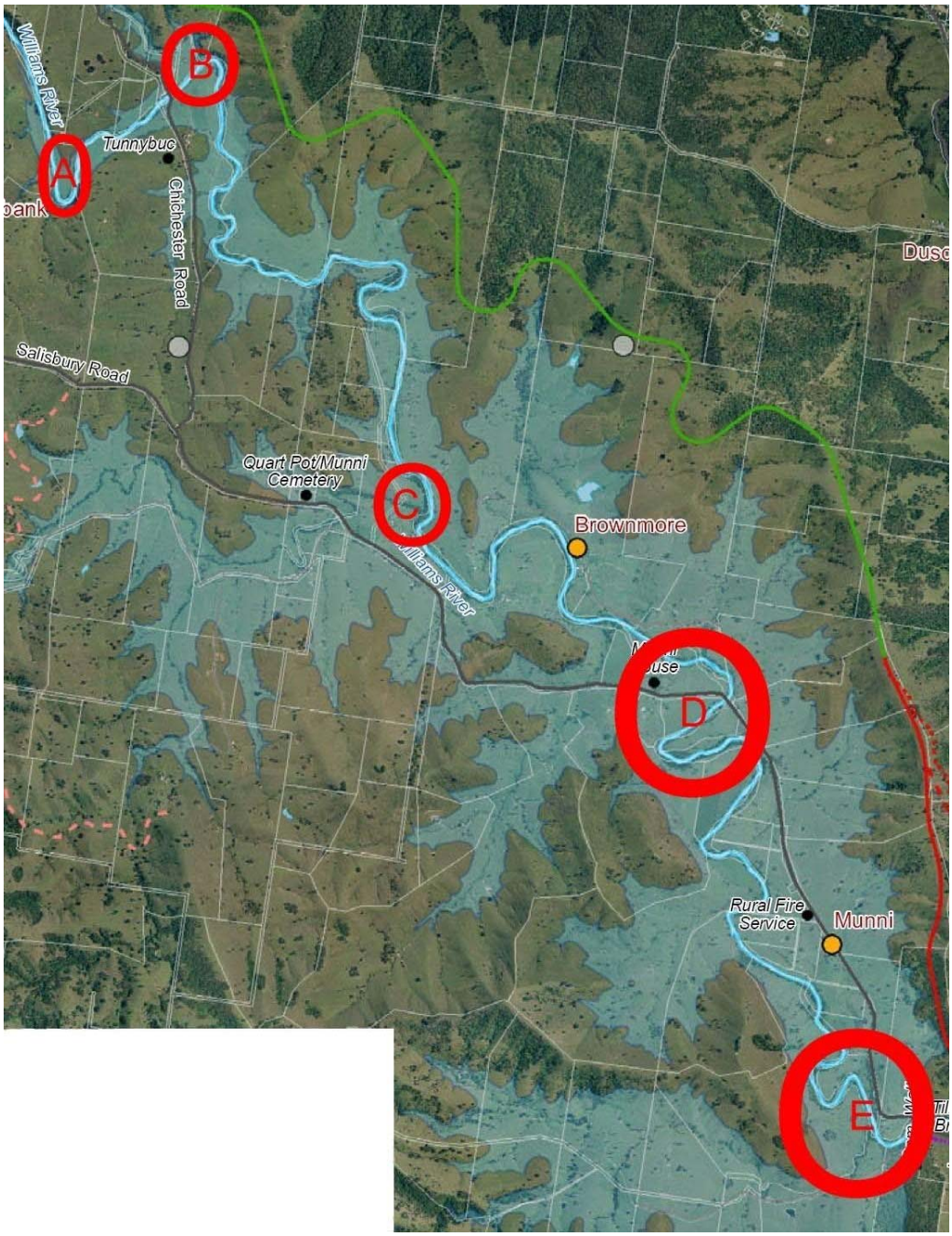


Figure 7.1: Areas A to E identified on geomorphological grounds as being archaeologically sensitive and recommended for further testing

The assessment also recommended that no further work be carried out at the 1:100 flood level at any locality and that sub-surface testing should be undertaken on those parts of the Project where ground disturbance is proposed. No particular

locations for testing in those areas was recommended, with the suggestion that site selection should be made by the archaeologist.

During the course of the fieldwork a flexible approach was taken to target as many of the suggested areas as possible while also covering areas identified as high potential impact. Suggestions for locations for test trenches were also offered by the Aboriginal representatives in the field and these were also included in the testing where possible.

The labelling of the testing areas in the geomorphological assessment (A-E) was retained for the archaeological testing to maintain consistency. Additional test areas were labelled with the next consecutive letter.

Where more than one location or landform was tested in a given area it was labelled with the appropriate letter and a number (Area D1, Area D2 etc.) each trench was labelled commencing with '1' at each discrete location. Trenches are therefore identified as D1-T1 etc.

As with all testing programs, a limit had to be set on the length of the testing program. The allocation of one week for testing reflected the ambiguities about the nature of the Aboriginal heritage resource of the study area. Testing aimed to demonstrate whether or not evidence of past occupation was present and if so to categorise the types of landforms and areas that may be archaeologically sensitive. It was not intended to identify or test every area with some potential for containing archaeological evidence.

Areas A and C were not tested as part of the current assessment. Area A was of a similar landform to other areas tested (Areas B and D). As a major aim was to provide information about a variety of landform areas it was decided to focus testing efforts elsewhere. Area C was inspected during the testing program, but much of the area has been disturbed by a farmhouse, dairy sheds and related activity at the site. While it is still considered likely that archaeological deposit may remain in this area, the disturbance and proximity to a currently operating dairy reduced the area's suitability for testing as part of this phase of assessment.

7.2.2 Excavation methods

The majority of the testing was undertaken using backhoe with a mud (flat-blade) bucket. Trench lengths were selected to be either 10 or 20 metres long depending on the topography. The width of the trenches was 1.2 metres (width of the bucket). On the first day of testing a claw bucket was used and trenches varied between 7.5 and 9 metres in length with widths of between 2.3 and -2.6 metres. Grass was removed by machine over the whole length of the trench and the exposed area examined for evidence of artefacts or other archaeological features. The following methods were then employed:

- Where the depth of deposit and terrain allowed, trenches were excavated in 10 cm spits (arbitrary archaeological units designed to provide some stratigraphic control).
- The scraped area and associated spoil areas were examined after each pass for evidence of artefacts or other archaeological features.
- Deposits were sample sieved (6.5 mm sieves) to allow for further retrieval of any material present.

- Testing of areas was concluded when sterile soils layers were reached, or it was otherwise concluded there is no potential for archaeological material to be preserved below the reached level.
- All trench locations were recorded using a hand-held GPS.
- All trenches were photographed and final depths recorded.
- Archaeological material recovered was retained in plastic clip-lock bags and labelled with the provenance details including: date, excavation trench and spit.
- A standard site recording form was be used for each excavated spit. Details recorded include site name, date, site recorder, spit number and depth, test trench number, description of finds, description of soil and depth of excavation.
- At the conclusion of testing each trench was backfilled with the remaining spoil and where present turf was re-laid.

The methodology also included a provision for hand excavation and 100 per cent sieving of any potential archaeological features such as hearths or knapping floors uncovered during mechanical testing.

Where deemed necessary by the excavation director, testing also included smaller deep trenches to examine the soil profile.

7.2.3 Stone artefact analysis

Retrieved artefacts were cleaned, individually analysed and entered into the software program 'Entrer' loaded with a configuration file written for the specific purpose of artefact analysis. A series of attributes are then recorded, according to the artefact type. The resulting data is then imported into Microsoft Access for further analysis. Detail of the attributes recorded and analysis undertaken are provided in the artefact analysis report included as Appendix B. This report also includes definitions of artefact types and raw materials described in the testing results.

7.3 RESULTS

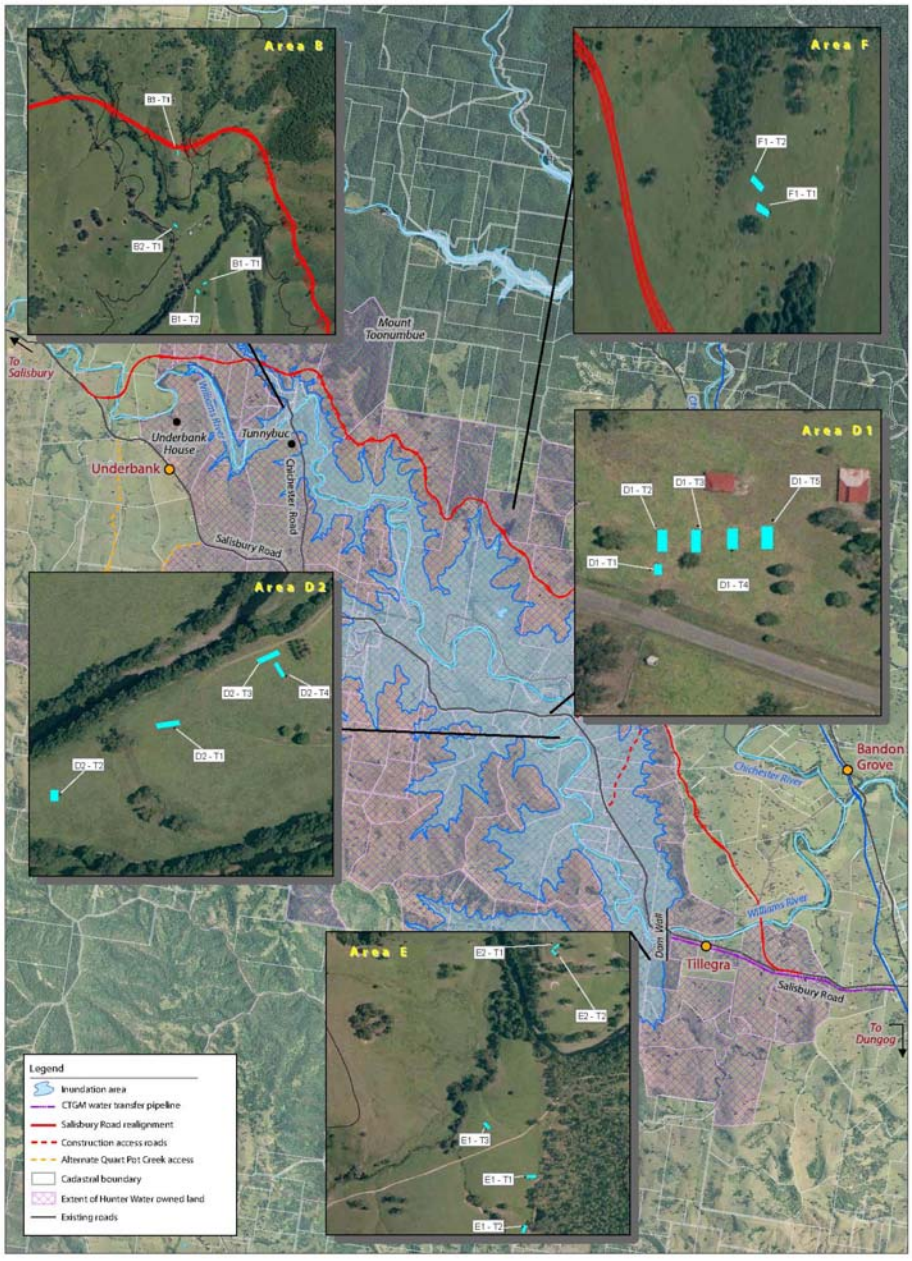
A testing program was undertaken for 5 days between 31 March and 4 April 2008 with the stated aim of providing further information on the likely presence of surface or sub-surface archaeological material in areas that would be subject to impact by the proposed development across a variety of landforms.

The testing was designed to provide information that would not have been available by further detailed survey of the area due to the extensive ground coverage and likelihood of buried areas of archaeological potential.

The testing was not intended to provide a complete coverage or comprehensive salvage of objects potentially subject to impact by the development, rather it was intended to provide information to the archaeologists to enable formulation of a set of recommendations for the ongoing management of the archaeological and heritage resource in the study area in the context of the proposed development.

A total of 34 artefacts were retrieved from eight discrete site locations. The locations of sites are shown in Figure 7.3. Site records of the trenches excavated are included in Appendix C and a summary description is presented below. DECC site cards for the archaeological sites recorded are presented in Appendix D.

Figure 7.2: Archaeological testing locations



7.3.1 Area B

Testing was undertaken in Area B in the vicinity of the junction of Tillegra Creek and the Williams River. The geomorphological assessment indicated that the area is likely to have been the site of a large waterhole during Aboriginal times and has low gradient benches suitable for campsites. Testing was undertaken on the flat above the floodplain near to the waterhole (Plate 1) , on the right bank of river (Area B1), on a terrace on the right bank of Tillegra Creek (Area B2) and on the left bank of the creek in the very elevated area above the confluence (Area B3). In Area B a total of 50 metres of trench length was excavated with all trenches being approximately 1.2 metres wide, making a total of approximately 60 square metres in surface area.

Plate 1: Area B1

Plate 2: Typical alluvial soil profile

Plate 3: Profile of B3-T1

Areas B1 and B2 were characterised by alluvial soils with mottled clays at the base of each trench (Plate 2). Area B3 was in an elevated area away from any flood plain. Outcropping rock was observed near the testing area. Frequent gravels were observed in the trench along with shales and ironstone 'coffee rock' inclusions (Plate 3).

Artefacts were retrieved from all three locations, although at a very low density. Two trenches were excavated in Area B1. Two artefacts both of hornfels, were retrieved from trench B1-T1. This was recorded as site *Tillegra 6*. One artefact was recovered from the trench excavated in Area B2 and this area was recorded as site *Tillegra 7*. Site *Tillegra 8* was recorded in the trench excavated in Area B3. This site consisted of one artefact. All artefacts were received from the uppermost spit in each of the relevant trenches.

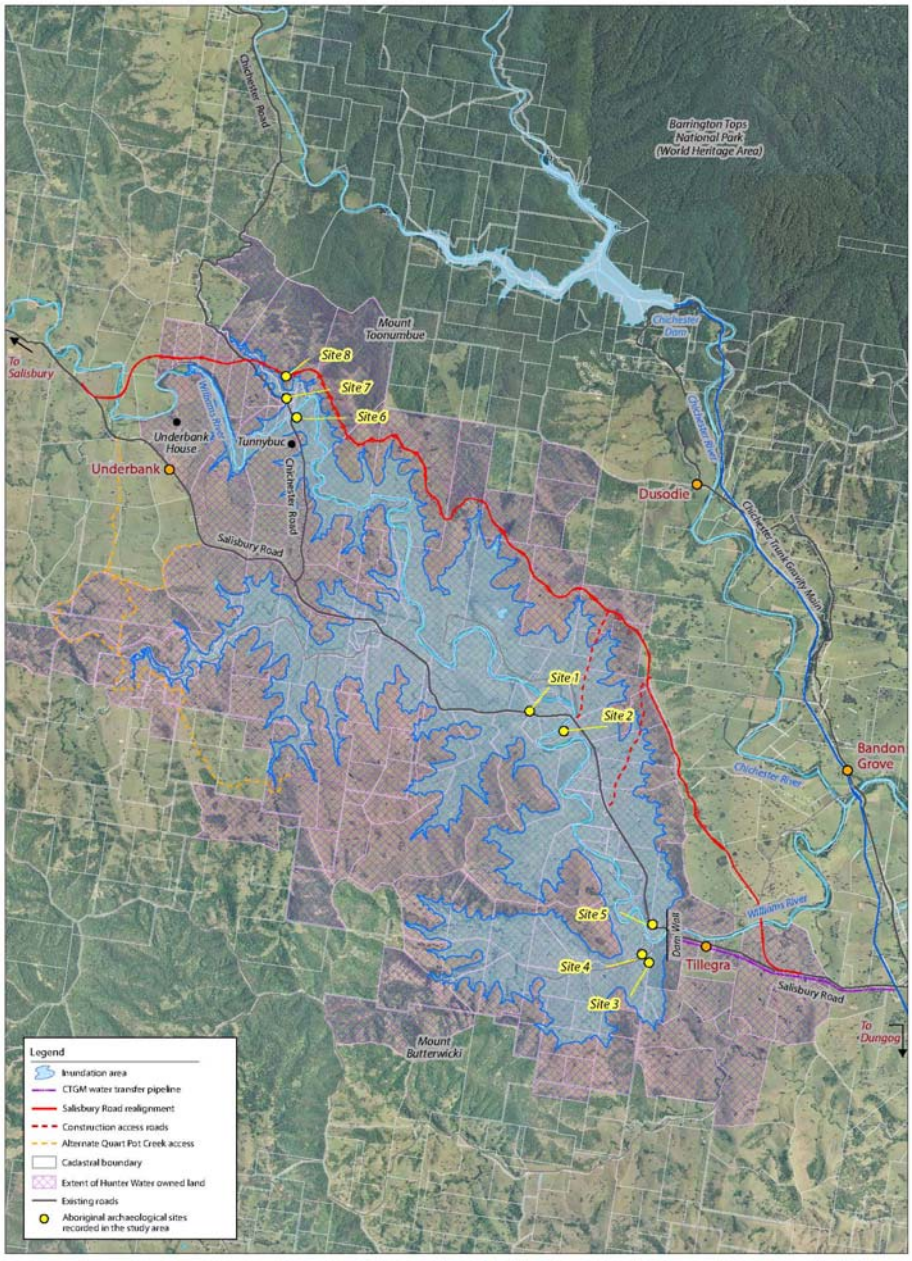
7.3.2 Area D

Two discrete areas were excavated as Area D. Area D1 is an elevated bench above the floodplain of the Williams River adjacent to Munni House (Plate 4). The area offers elevated position and access to the river as demonstrated by the use of a swimming hole and a locally known still existing passage to the river used in historic times. Five trenches were excavated in this area totalling approximately 83.35 square metres in surface area. Trench D1-T1 was a small (2 metre) trench excavated to examine the local stratigraphy. No artefacts were recovered from this trench. All the other trenches (D1-T2, D1-T3, D1-T4 and D1-T5) contained artefacts. The trenches were all sufficiently

close together to warrant being included under the one site: *Tillegra 1*. The site included 21 artefacts. The most common raw material type was hornfels (15 artefacts), with basalt, silcrete and another fine-grained siliceous (fgs) stone also present. Artefact types included flakes and cores.

Plate 4: Trench D1-T3 end level facing north toward the Williams River

Figure 7.3: Aboriginal archaeological sites recorded in the study area



The soil matrix consisted of a texture contrast soil of a mid-dark brown fine-grained loose sandy loam with a sub-layer of more bleached brown to light grey silt also very fine grained. The base of the trenches was a fine-grained mottled orange brown clay. Grass roots continued to depth and very few inclusions were visible. Rounded river pebbles up to 300mm deep occurred intermittently and broken cobbles throughout the area. Some evidence for disturbance was observed. The area is adjacent to Munni house and its associated sheds. Farm tracks existing and disused, were present and telephone cabling has also been laid underground adjacent to the excavated area.

Area D2 was south of Salisbury Road and south of Munni Bridge. The area traverses a long spur defined by a river meander. It was identified that the low saddle of the spur could have been used as a crossing point to avoid the river meander. It is also potentially a campsite with some areas of easy access via a lower gradient to the river itself. The opposite river bank in this area is a sheer rock face in places where the river has been contained by bedrock outcrop. The area was inspected on foot for surface evidence but no artefacts were recovered. This could have been due to the heavy grass cover affording less than one per cent visibility over much of the area. Trench 1 was terminated when a deposit of rounded river cobbles (up to 140 mm in thickness) was reached. The deposit indicated that this area had once been part of a previous riverbed and that the river had meandered through time. Trench 2 was excavated on the existing flood plain and revealed a homogeneous moderately compact fine-grained dark brown alluvial deposit. Occasional small river pebbles appeared in the clayey silt at around 700mm depth. No artefacts were recovered.

Trenches 3 and 4 were excavated on higher ground above the low saddle of the spur. Both were characterised by dark brown fine-grained loamy silt topsoil and undulating mottled sandy clay bases.

Two artefacts were retrieved from Trench 4 (site Tillegra 2); both were hornfels tools.

7.3.3 Area E

Five trenches in two discrete locations totalling approximately 48 square metres surface area were excavated Area E. Three trenches (E1-T1, E1-T2 and E1-T3) were excavated on the terraces above an unnamed tributary creek near its confluence with the Williams River close to the proposed dam wall site (Plate 5). A dark brown silty loam at top of the deposit graded gradually to a light grey fine grained silt with ironstone and manganese inclusions. Some shale was also present.

Plate 5: Area E1 facing north

This area was where one small piece (<20 mm) of silcrete was located during the archaeological survey, eroding out of the banks of the upper reaches of a first order creek line draining into the unnamed tributary. No silcrete was located in the excavations or during an additional survey of exposures adjacent to E1-T1 and E1-T2. One hornfels flake was retrieved from E1-T1 (site *Tillegra 3*). Trench E1-T3 was closer to the unnamed creek line on a terrace overlooking the confluence of the creek and a lower order drainage line. Loamy topsoil was shallower than in the preceding two trenches with a homogenous light grey brown alluvial grading to a mottled brown yellow orange clay occurring almost immediately. River cobble and coarse sandstone cobbles with iron staining were located throughout the deposit. Five artefacts were retrieved from this trench including two cores (site *Tillegra 4*).

Two trenches (E2-T1 and E2-T2) were excavated on a raised saddle landform above Salisbury Road. The area had outcropping bedrock and uneven soils. The area would have provided access to the adjacent high ridgeline, but it is difficult to say how difficult access may have been to the river flats, as the road has involved cutting into the bench. Trench E2-T1 was shallow (base level 110-160 mm) consisting of a mid-brown fine-grained loamy silt grading to a light grey brown. Some large river cobbles were present. One flaked artefact was recovered from Trench E2-T1 (*Tillegra 5*).

Trench E2-T2 included a large number of river pebbles and cobbles in loose fine-grained silty deposit. Degrading sandstone and 'coffee rock' were present as well as unevenly distributed clay and bedrock at the base. No artefacts were observed in this

trench. Maximum depth (between 250 mm and 120 mm) varied according to presence of bedrock or clay.

7.3.4 Area F

Area F was included to test a section of the proposed road diversion on elevated ridge/saddle landforms. One of the local landowners was kind enough to show as how to get access through paddocks to this area. Testing was undertaken in line with pegs on the ground thought to be the proposed road location. Subsequent mapping of the trench locations suggests these are not in line with the current road proposal. Two trenches totalling approximately 36 square metres of surface area were excavated. No artefacts were retrieved from this area. The area is a high saddle providing access to the highest ridgeline to the north with deeply incised creek gullies on either side.

7.4 DISCUSSION

A total of 20 trenches were excavated across a variety of landforms. Eight separate site locations containing flaked stone Artefacts were recorded during the testing. Artefacts were recovered from each of the tested locations suggested by the geomorphological analysis.

The majority of trenches excavated showed some evidence of alluvial soils. Geology was varied with volcanic, shale and sandstone all present. As expected flood plain areas showed signs of considerable disturbance due to water movement through the areas. The raised benches overlooking floodplains appeared to generally have the most material present. No artefacts were retrieved from the elevated ridgeline area tested.

The majority of artefacts (67.6 per cent) were recovered from Site Tillegra 1 adjacent to Munni House. Table 3 provides a summary of artefact counts per trench.

Table 3: Artefact counts per trench

Areas	Trench	Count	%
B1	1	2	5.9
B2	1	1	2.9
B3	2	1	2.9
Sub-total		4	11.8
D1	3	1	2.9
D1	2	8	23.5
D1	4	8	23.5
D1	5	4	11.8
D2	4	2	5.9
Sub-total		23	67.6
E1	1	1	2.9
E1	3	5	14.7
E2	1	1	2.9
Sub-total		7	20.6
Total		34	

While testing results based on such a small proportion of the study area could not hope to be conclusive, valuable information has been obtained. As there was no available archaeological evidence for the study area prior to and very little for the immediate

region, the testing has provided a good base line for predicting the likely nature and extent of archaeological resource in the study area.

Most of the artefacts were made from hornfels, had some cortex, representing an early stage of core reduction, and were made from local cobbles obtained from nearby waterways. That hornfels was obtained locally, probably from the Chichester River, is reflected in the amount of cortex on the artefacts, the type of cortex (i.e. water-rolled) and the large size of the artefacts.

It is unusual to see an assemblage dominated by hornfels although this probably reflects the use of locally available material and the absence of other suitable material. Only four non-local material artefacts were identified; two proximal flakes of silcrete, a distal flake of FGS (fine-grained siliceous) with retouch and a complete flake also made from FGS.

Five artefacts showed evidence of having been retouched to form tools. This represents 14.6 per cent of the assemblage. Three of the tools were made from hornfels, one from FGS and another from basalt. A variety of scrapers were recovered with different types of retouch. Those with step and notch retouch presumably indicate a 'heavy-duty' use. No evidence of backing retouch, generally attributed to the mid-Holocene, was present in the assemblage. This may be a product of the raw material types; e.g. FGS raw materials are more often found with backing retouch, rather than evidence of an earlier date for the artefacts. It is unlikely to be possible to finely retouch material such as hornfels (due to its hardness and texture). It is not possible to assess the age of the sites are no chronological markers are present in the assemblage.

A high number of cores are present in the assemblage. These cores are typically multi-directional with relatively large numbers of flakes removed. These two characteristics indicate that the cores were rotated to remove more flakes and extend their use-life. This is a feature typically found in areas where raw material is scarce and/or where artefacts are manufactured at some distance from the stone source. Although the source of the hornfels is considered local, the distance from the Chichester River to the sampling locations was enough to influence how the cores were reduced.

It is possible that some level of sampling bias has influenced the number of cores and tools present. Due to the coarse nature of the material diagnostic features are not always clearly evident. It is therefore possible that pieces with clear diagnostics such as tools and cores may have been favoured for retrieval, where as other worked pieces may be indistinguishable from naturally block fractured pieces and may have been discarded as non-diagnostic.

As predicted, sites seem to be present in areas of lower angle slopes, in close proximity to water but above average flood levels. It is likely that further material will be preserved within the vicinity of areas already tested and within the other areas identified during the geomorphological assessment as archaeologically sensitive but not tested during the Stage 2 Aboriginal archaeological assessment.

Sites seem to be generally small and sparsely distributed as suggested in the predictive model. The number of artefacts per test trench is very low in all the sampling areas. The densest locations were in Area D, Trenches 2 (one artefact per 2.3 per m^2) and 4 (one artefact per 2.6 per m^2). Only 34 artefacts were recovered from the total excavated area of 263.4 m^2.

The absence within the study area landscape of a source of stone raw material source such as silcrete or FGS (found in adjacent regions) does have an observable effect on the artefact types recorded. Interestingly however, contrary to the artefact types suggested in the predictive model (Section 6.4), artefacts are not smaller in size with a low percentage of cortex. Rather, an unexpected source of material, in cobbles of hornfels and basalt, was readily available and in common use. This has led to larger artefacts with cortex commonly present. Core manufacturing processes show that despite the ready availability of material curation of artefacts was taking place. This was possibly due to either the selection of 'better' examples of material, or the effort required in transporting cobbles in the steep landscape, or both.

7.4.1 Summary

The central aim of the Stage 2 Aboriginal archaeological assessment was to provide further information on the likely presence of surface or sub-surface archaeological material in areas that may be subject to impact by the Project (impact zones) across a variety of landforms.

Evidence of Aboriginal occupation of the study area was recorded at eight separate site locations during the one-week sample testing program. Archaeological material is preserved within both the inundation zone and within the area likely to be subject to impact during dam wall construction. Further discussion about the potential impacts to recorded archaeological sites and areas of archaeological potential is presented in Section 9.

The sample areas, in general, were shown to contain artefacts. There is likely to be further material preserved in the study area both within the areas already tested and elsewhere in areas identified as having archaeological sensitivity. Sites are likely to be mostly small and sparsely distributed. Such small sites could occur in any areas of level ground where intact soils are preserved. It is possible that larger sites may be preserved in the areas of lower angle slope above flood levels with access to water. It is unlikely that large sites would be located in any other landforms. It is unlikely that any intact deposits would be preserved in the areas of regular flooding (likely to be the 1:100 flood level) or on the steep slopes within the study area.

In general, the Gringai Aboriginal people in the Williams Valley were using locally available stone that is relatively difficult to work. It is known from ethnographic references that the region contained highly significant sites and hosted large gatherings. Many of these sites may not be preserved in the archaeological record. However the area does contain important evidence of past Aboriginal occupation that will contribute to the region's heritage value. An assessment of the significance of the sites recorded is presented in Section 8.

8. SIGNIFICANCE ASSESSMENT

Perhaps the most important aspect of cultural heritage management is assessing significance of items to be managed. It is only by evaluating the significance of the resource in a given area that appropriate management for the site or area can be recommended.

The following is a summary of the methods used to assess the significance of Aboriginal archaeological sites. Section 8.3 presents the significance assessment of the sites located and recorded during the field inspections.

8.1 WHAT IS SIGNIFICANCE?

Significance is a concept that helps define the value of an object or place. Different people and communities value things in different ways. The concept of cultural significance seeks to describe the differing values that can contribute to an item's importance. The definition of cultural significance in the ICOMOS Burra Charter is an item which has "aesthetic, historic, scientific or social value for past, present or future generations" (Australia ICOMOS 1999). In general terms this means that significant items are those that either help understand the past, enrich the present, or are likely to be important to future generations. Although a variety of different criteria have been developed to assist in assessing the heritage value of a site, they can generally be encompassed by the four values detailed below.

8.1.1 Aesthetic value

These are values associated with the senses and sensory perception. They may include form, scale, colour, texture, material or the smells and sounds associated with a place. Archaeological sites are not frequently assessed for their aesthetic values, although an obvious exception could be rock art sites.

8.1.2 Historic value

In many ways this underlies the other categories in the sense that it can encompass the history of aesthetics, science and society. An item may also have historic value because of its association with a significant individual or event. Its value will increase according to the evidence remaining; however, some events are so significant that a place can retain high significance even without any physical manifestation.

8.1.3 Scientific value

This refers to the research potential of an item. In general it describes how a site contributes information important to our understanding of an aspect of culture. Most archaeological sites are assessed by their scientific value. The level of scientific significance of an item depends on its rarity and condition, as the quality of remaining information will influence its ability to contribute significant information.

8.1.4 Social value

This deals with the qualities of a place that have made it a focus of sentiment to a particular group. It can apply to either a majority or minority group and refers to spiritual, political, national or other cultural sentiment.

8.2 INDIGENOUS HERITAGE ASSESSMENT CRITERIA

While Indigenous heritage objects and places fall within these general cultural significance values, it is important to acknowledge the special role Indigenous people have in the ongoing custodianship of their heritage, and the particular value this gives the social or cultural significance of sites. It is also important to realise that individual values may stand-alone. What is of value to Indigenous people may not be scientifically significant and vice versa.

8.2.1 Social/cultural significance

The social or cultural value of Indigenous heritage sites can only be assessed by the Indigenous community that speaks for a particular area. In general terms all remaining cultural heritage is significant to Indigenous people. The values placed on sites are not limited to the significance they might have held in the past (such as at a spiritual site), but can also apply to sites that have taken on significance since they were formed and have value in the present for present day communities. A separate section of the NSW DECC guidelines (NPWS 1997) relates to cultural significance assessments for Indigenous communities.

8.2.2 Educational significance

Another element of social significance is the potential of a site to educate people about past or current human behaviour. This may apply to descendants of those who created the site, but equally to other communities that may benefit from learning about past life styles.

8.2.3 Scientific significance

Scientific or research significance is the value most commonly documented in archaeological assessments. The potential of archaeological sites to provide information on past lifestyles is well understood. The level of significance depends in a large part on the content, rarity and preservation of a site. The scientific significance of a site may be increased in situations where archaeological remains are the only source of information about the past habitation of an area when other forms of knowledge have been lost. Sites that are not necessarily rare may also have significance if they are a particularly representative example of a type and sometime the criterion 'representativeness' will also be assessed. The following questions can be used to guide the assessment process (Bickford and Sullivan 1977):

- Can it provide information not available from other sources?
- Can it provide information not available on other sites?
- Can it answer pertinent research questions?

There is no overall accepted threshold or grading standard for assessing the scientific significance of indigenous sites. In general an assessment is made of a site's potential for providing information. One way of trying to produce a more consistent assessment is to use a 'rating system'. The system below has been used to provide a 'score' that relates to an indicative significance level assessment.

Site contents rating

0. no cultural materials remaining
1. site contains a small number (e.g. 0-10 artefacts) or limited range of cultural materials with no evident stratification
2. site contains:
    a. a larger number, but limited range of cultural materials
    b. and/or some intact stratified deposit
3. site contains:
    a. a large number and diverse range of cultural materials: and/or
    b. largely intact stratified deposit; and/or
    c. surface spatial patterning of cultural materials that still reflect the way in which the cultural materials were laid down

Site condition rating

0. site destroyed
1. site in a deteriorated condition with a high degree of disturbance but with some cultural materials remaining
2. site in a fair to good condition, but with some disturbance
3. site in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural material still reflects the way in which the cultural materials were laid

Site rarity rating

Rarity refers to the regional distribution of a site type. It is assessed on whether the site type is common, occasional or rare within a given region. Current knowledge on the number of and distribution of archaeological sites in a region can change according depending on the extent of previous archaeological investigation.

The rarity ratings used for archaeological sites are:

1. common occurrence
2. occasional occurrence
3. rare occurrence

Overall scientific significance rating

An overall scientific significance rating is assigned to the site based on a cumulative score from the assessment. This results in one of the following ratings being assigned for scientific significance:

1-3 Low

4-6 Moderate

7-9 High

8.3 ASSESSMENT OF ITEMS

The eight sites recorded as part of the sub-surface testing have been assessed for their significance. This is discussed below. Table 4 provides the results of the significance rating for each site.

8.3.1 Cultural significance

During discussions with Aboriginal representatives it was made clear that all areas with evidence of past Aboriginal activity are significant to the Aboriginal community and in some cases, landscape or other non-modified features can also hold significance for individuals or groups. However, no assessment of cultural significance for specific items or locations within the study area has been provided by the registered Aboriginal stakeholders at this time.

8.3.2 Educational significance

The material recorded during sub-surface testing of the study area may have some educational value in the sense that it can contribute to informing people about past habitation of the study area. However, this value is linked to the scientific/research value of the sites. Therefore the sites recorded during sub-surface testing have not been assessed to have an educational value that can be separated from their scientific significance as discussed below.

8.3.3 Scientific significance

As very little previous work has been undertaken in the region and only a few sites have been recorded, the rarity value of each of the recorded sites in the study area is relatively high compared to sites with similar numbers of artefacts in other regions. Site Tillegra 1 is assessed as having **high scientific significance** all of the other sites area assessed as having **moderate scientific significance**.

Table 4: Significance level assessment for sites recorded in the study area

Site Name	Site contents	Site condition	Rarity	Overall rating
Tillegra 1	2	2	3	7 – rare
Tillegra 2	1	3	2	6 – moderate
Tillegra 3	1	3	2	6 – moderate
Tillegra 4	1	3	2	6 – moderate
Tillegra 5	1	3	2	6 – moderate
Tillegra 6	1	3	2	6 – moderate
Tillegra 7	1	3	2	6 – moderate
Tillegra 8	1	3	2	6 – moderate

9. DEVELOPMENT IMPACTS

The following section is based on information provided by Connell Wagner to the archaeologist, relating to the likely impacts of the proposed Tillegra Dam Project (DOC 2007). Figure 1.2 shows the locations of the areas of impact discussed in this section.

A consideration of impacts has been divided into two categories; direct construction impacts and inundation impacts. The limits of the impacts considered are the inundation area, diversion of Salisbury Road and the dam wall. No assessment has been made of the impacts resulting from tree planting or any other activity in areas outside these defined study area limits.

Mitigation measures for impacts of the proposal on Aboriginal archaeological sites recorded as well as areas of Aboriginal archaeological potential area discussed in Section 10.

9.1 CONSTRUCTION IMPACTS

The assessed construction related impacts include those associated with building the dam wall and road realignments. These are identified in Figure 1.2. Direct impacts include the construction of the dam wall and the creation of new roads.

The development proposed includes the following components:

- dam wall and spillway construction
- installation of a multi-level off-take tower
- a hydro-power generation plant
- relocation and reconstruction of Salisbury Road (including construction of three waterway crossings) and provision of alternative access currently provided from Quart Pot Creek Road
- a water pipeline and pump station from Tillegra Dam to the Chichester Truck Gravity Main (CTGM)
- electrical and telecommunication installations
- relocation/upgrade of other public infrastructure
- heritage conservation works (including a cemetery and historic house re-location)
- significant tree planting as part of a carbon emissions offsetting strategy
- ancillary works as required (potential recreational access areas, lookouts and related facilities).

As part of the Stage 1 Aboriginal archaeological assessment, a section of Salisbury Road was surveyed with the aim of determining whether one side or the other would be preferable, from an Aboriginal heritage point of view, for the location of a pipeline. The landforms in this area were highly disturbed. The road generally passes through mixed terrain with some creek crossings. All the crossings were highly disturbed by road and culvert construction. Although visibility was poor, the potential for locating Aboriginal objects or areas of potential was greatly reduced in the road verges on both sides of the road. It is unlikely that disturbance of intact archaeological sites would result from the

construction of a pipeline within the existing road easement on either side of Salisbury Road.

Dam construction would extend some distance from the river banks and would involve stripping of alluvial deposits in preparation for construction (DOC 2007). A large area around the proposed dam wall location would be subject to earthworks and considerable disturbance. This is likely to result in destruction of any sites located within the construction footprint.

Diversion of Salisbury Road would involve stripping of topsoil and constructing crossings over a number of gullies. Sites in the direct path of the road diversion would be likely to be destroyed.

Not all areas that would be subject to construction impacts were physically inspected or tested. Based on the results of the archaeological survey, it can be assumed that any construction activities such as work compounds, haul roads or quarries located on lower angle slopes with intact soils but above the 1:100 flood level will have the potential to disturb or damage archaeological deposits. Some of these deposits will need to be examined prior to work being undertaken. Full mitigation measures for impacts are contained and discussed in Section 10.

9.2 INUNDATION IMPACTS

The available information on impacts of inundation in the study area has not been designed to relate specifically to impacts to archaeological sites or areas of archaeological potential. Therefore, additional information has been consulted to assist in determining those impacts. This information has been sourced from archaeological studies of other areas that have been subject to inundation.

Five zones have been described as part of a dam landscape environment and their impacts considered (O'Halloran and Spennemann 2002). A summary of impacts is presented in Table 5.

Potential impacts to archaeological sites in a water storage environment arise from a number of factors. These can include the inundation process itself, the process of covering and uncovering sites, the impact of waves across the reservoir and related changes to the stability of deposits.

Waves or water movement would appear to be more potentially destructive to stone artefact sites than the state of being under water. In general it has been recommended that "the faster cultural resources can be inundated with water, the less wave action and sediment movement can aid erosion. In essence sites should be migrated swiftly through the zone of wave impact" (O'Halloran and Spennemann 2002: 11).

A variety of wave impacts on sites have been identified including:

- Shoreline erosion through sediment loss
- Exposure of sites and artefacts
- Intermingling of site layers
- Artefact transportation (O'Halloran and Spennemann 2002)

A major impact in areas of artificial water storage is related to the high water level area or shoreline fluctuation zone. Erosion is usually greatest in this area and the movement of water can cause major disturbance such as undercutting of banks (Martin *et al* 1994). At Menindee several metres of deposit were removed around the high water level, although this area has a much sandier deposit and greater depths of deposit (Martin *et al* 1994).

Impacts are likely to be less significant in the Tillegra Dam shoreline fluctuation zone due to the shallower deposits on slopes. Erosion in this zone is also less likely to impact archaeological sites as the majority of the high water level coincides with steep ground that is either unlikely to have been a favourable camp site location and/or to have already suffered sufficient erosion to remove any traces of past occupation.

Table 5: Potential dam impact zones

Zone	Description	Potential impacts
Permanent conservation pool	The area permanently under water	Artefact movement during inundation, potential mixing of sediment resulting in loss of stratigraphic context
Shoreline fluctuation zone	Area where repeated inundation and exposure occurs	Erosion and undercutting of banks resulting in disturbance to sites and artefact movement
Upper floodpool zone	Area inundated most of the time but exposed when dam is low	Increased erosion risk when exposed could result in disturbance of sites
Backshore zone	Upstream of the inundation area	Impacts unlikely
Downstream zone	Downstream from the dam wall	Potential changes to downstream channel structure that could result in disturbance or damage to sites

Low dam water levels cause previously inundated areas to be revealed and can result in an increased risk to sites from erosion because of a lack of stabilising vegetation cover (O'Halloran and Spennemann 2002).

Alterations to the landscape and soil layers once inundated are unlikely to be limited to the steep slope areas, but may also include soil movement along river and creek banks and slippage of lower foot slope areas. This would have the potential to disturb archaeological sites located in these areas. Specific impacts to sites could include re-deposition of artefacts, mingling of separate sites due to landslides and loss of stratigraphic information.

The assessment of fluvial geomorphology undertaken for the PEA (Gippel and Anderson 2007) identified downstream changes in the physical channel morphology as a potential impact. Such changes may lead to downstream incision and downcutting of the

channel. Such processes have the potential to disturb Aboriginal sites if any were to be located in the affected areas.

In summary, while it is not possible to precisely identify specific inundation impacts, inundation does pose some risk to any archaeological sites that may be preserved within the inundation area. Although some artefacts may survive in an inundated environment, there may be some damage due to movement and water impacts. Inundation would also be likely to have the effect of disturbing the site context resulting in a loss of stratigraphic information. This, in turn, reduces the archaeological significance of the sites.

9.3 POTENTIAL IMPACTS TO RECORDED ARCHAEOLOGICAL SITES

Sites Tillegra 3, 4 and 5 (Area E) are likely to be subject to impact during construction of the dam wall.

The likely disturbance of depositional context to the remaining sites in the inundation area is likely to equate to considerable disturbance. Although this cannot be predicted with 100 per cent certainty, the risk to sites and areas of archaeological potential warrants mitigation measures. Recommendations for mitigation of impacts and management of the cultural heritage in the study area are discussed in Section 10.

10. CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSIONS

In accordance with the Director-General's Environmental Assessment Requirements, this report has documented the results of the sub-surface archaeological testing undertaken to assist in categorising the study area's archaeological potential. The results of Aboriginal consultation undertaken in accordance with the draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation* have also been outlined.

Sub-surface testing of the study area revealed evidence of past Aboriginal occupation in the form of stone artefacts at eight discrete site locations. It is also likely that additional artefacts are preserved within areas of archaeological potential in the study area (as described in Section 7.4).

A background analysis of the study area and its environmental and archaeological context revealed that the region is at present poorly understood archaeologically. Very few studies have been undertaken and therefore very few Aboriginal sites have been recorded. Partly due to the relative rarity of sites in the region, the sites recorded during sub-surface testing have moderate to high scientific (archaeological) value.

The Stage 2 Aboriginal archaeological assessment identified areas with low or no potential to contain significant archaeological sites. No additional archaeological investigations or mitigation measures are recommended at the 1:100 year flood level. Although the flood level has not been mapped it includes low-lying areas of floodplain adjacent to the river. No further investigations or mitigation measures are recommended in the steep (>18 per cent) slope areas. Any archaeological evidence remaining in these areas is likely to be isolated artefacts or small sites and very sparsely distributed.

The assessment of impact suggests that all the recorded sites and areas of archaeological potential are likely to be subject to some impact from the dam construction or the associated inundation. In order to mitigate these impacts appropriate management of the cultural heritage resource of the study area would be required. The proposed management strategy is discussed below.

10.2 MANAGEMENT AND MITIGATION OF IMPACTS

The following management strategy is based on:

- the relevant legislative requirements
- the results of the archaeological investigations documented in this report
- the available views and recommendations of the Aboriginal community organisations involved
- the potential development impacts.

10.2.1 Recording cultural information

Local residents have retained a lot of knowledge about past Aboriginal activity in the study area region. It is important that efforts are made to record some of this oral historical information for future reference. Aboriginal community responses have also

highlighted the desirability for further consultation relating to past Aboriginal cultural activity in the study area.

10.2.2 Communicating and preserving information

It has been suggested that a positive outcome for the Project would be to create a museum-type display of the artefacts and information compiled during the current study. This could be a valuable educational tool and interesting for locals and visitors alike. Such a display might be able to be housed within a local museum. Consultation would need to be undertaken with the Aboriginal community, any potential venue for the information as well as with DECC. A 'Care and Control' permit from DECC would be required if any artefacts were to be retained in the community rather than be deposited at the Australian Museum (as legal repository for artefacts).

10.2.3 Archaeological salvage

It has been demonstrated that Aboriginal objects are present within the study area and there is potential for further objects and intact archaeological deposit. It is likely that impacts from the Project would disturb or damage the archaeological evidence. If it is not possible to preserve the archaeological material in the study area it is recommended that the impacts be mitigated by undertaking archaeological salvage to retrieve objects and document the archaeology of the area.

A suitably qualified archaeologist should be engaged to formulate a research design for archaeological salvage within the study area prior to any impact. Salvage should occur in areas of direct impact including the dam wall area and sample locations along the proposed road diversion as well as in areas of inundation impact. Salvage in the inundation area should be limited to areas of identified archaeological potential. Once further details about the potential downstream impacts of the Project are considered any affected areas should be included in the research design.

The design should be developed to include more detailed research questions to help focus investigations and retrieve archaeologically useful information. Representatives of the Aboriginal community should be consulted for input into research questions. Consultation already undertaken suggests that post-contact Aboriginal habitation of the study area may also be of interest to the Aboriginal community. Example research questions could include, but not necessarily be limited to:

- **What resources were available to the Aboriginal people of the area?**
- **Where resources brought into the area from elsewhere and if so where?**
- **What activities did Aboriginal groups carry out at the site in the past and is there any relationship between site function(s) and the local distribution of natural resources? Is there evidence for different activities on different landforms or on different soil landscapes?**
- **Is the density and distribution of artefacts within the study area a function of Aboriginal occupation and use or does it reflect site formation processes and the history of European activities in the area?**
- **Can the evidence of Aboriginal occupation of the area be dated?**

- **How does occupation of the Williams River valley differ from other nearby areas such as the Hunter and what can this tell us about Aboriginal occupation patterns?**

An analysis of the range, distribution, density and types of artefacts recovered may indicate the type of activities carried out in the past. An assessment of this evidence in relation to the local topography and distribution of resources such as water, workable stone material and food sources, may indicate a relationship between site activities and the environmental setting. If appropriate material such as hearths or animal bones were to be retrieved from intact archaeological deposits it could be submitted for radiocarbon dating. Conclusions drawn from analysis of material retrieved could be compared to analysis of sites in nearby regions to lay the groundwork for a comparative study of regional differences.

Archaeological excavation should be undertaken in all the areas previously identified as sensitive on geomorphological grounds including areas A and C that were not tested as part of the Stage 2 investigations (see Figure 7.1). In addition, further excavation should be undertaken in the area of impact associated with the dam wall construction, sample areas along the proposed road diversion and, if necessary, downstream of the dam wall.

Excavation should combine machine stripping of grass cover, manual excavation and controlled machine testing. Sieving of all deposits should be undertaken. This could be done using a mechanical sieve where appropriate and water, if necessary. Manual excavation enables detailed examination of any stratigraphic information preserved and should be undertaken in sample locations as well as in identified areas of potential such as known sites. Machine sample testing could also be employed to locate areas of higher archaeological potential or significance. Such areas would include hearths, stone heat-treatment pits or areas of high artefact density. If these features are located, excavation in the area would proceed by hand using shovels and trowels.

In order to provide a context for the research design and to determine an appropriate level of archaeological salvage of the area it may be necessary to consider archaeological evidence from outside the study area.

10.3 SUMMARY RECOMMENDATIONS

The following summarises the recommendations of this report:

1. Undertake recording of oral history and information about culturally significant places.
2. Consider the request of Aboriginal community representatives to undertake further consultation about past Aboriginal cultural activity in the study area.
3. Undertake salvage and recording of a sample of archaeological sites preserved in the study area by means of focusing excavations on known sites and identified areas of archaeological potential.
4. If additional impacts outside the defined study area are identified prior to construction, additional archaeological impact assessment may be required.
5. Consider development, in consultation with stakeholders, of a local display of information and artefacts relating to the study area.

6. Copies of this report should be provided to the registered Aboriginal community groups, the Dungog Historical Society, the Dungog local studies library, the DECC local office and the DECC AHIMS registrar

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APPENDIX A: GEOMORPHOLOGY ASSESSMENT

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Identification of archaeologically sensitive landscape elements based on geomorphic criteria in the inundation area of the proposed Tillegra Dam

Groundtruth Consulting was commissioned by Cultural Heritage Connections Pty Ltd to provide guidance on the geomorphology of the inundation area of the proposed Tillegra Dam on the upper Williams River 12km northwest of Dungog, NSW. The purpose of the review was to assist in the location of Aboriginal sites that are expected to occur within the area but which have not been found by a conventional site survey as reported by Hardy (2007). This report is based on a review of the available literature, examination of an air photo of the area, and a brief field survey conducted on March 3, 2008, that was limited to landscapes visible from areas of public access.

Background.
Hunter Water Corporation is proposing the construction of a new dam and reservoir on the Upper Williams River to supplement Hunter Valley water supplies and provide a small amount of hydro-electricity.

The landscape that will be inundated has been mapped as part of the Wallaroo Land System by Story *et al*., (1963). This is described as hilly country with 750-1000mm of rainfall, steep slopes with skeletal and brown podzolic (texture contrast) soils, that was originally covered by tall mixed woodland and eucalypt forest with elements of gallery rainforest along the streams. Most of the landscape has been cleared and used for intensive cattle grazing. Some of consequences of land use in this environment have been a considerable amount of sheet and gully erosion on the steep slopes, a large increase in peak discharge in the main streams, and extensive modification of the stream channels and floodplains by soil erosion, sediment deposition and engineering works that modified the stream channels.

At the time of inspection the growth of pasture grasses across the entire landscape, including even road cuttings, was so dense that the ground surface was almost invisible. The discovery of Aboriginal sites by field walking in these conditions is an almost impossible task and it is no surprise that Hardy (2007) reports that she was unable to locate any Aboriginal sites during her survey in late 2007 under similar ground cover conditions.

However it is inevitable that Aboriginal sites will be present and this view is confirmed by the limited ethnographic references applicable to the area that are discussed by Hardy (2007). The problem then is how can sites be located if they cannot be seen?

Experience elsewhere in the Hunter Valley and on the Cumberland Plain west of Sydney has shown that the distribution of Aboriginal sites is closely matched to stream order patterns (*sensu* Strahler 1957), and more general models relating sites to distance from known water sources have also been developed. These relationships are not precise enough to pinpoint site locations but if interpreted with experience it should be possible to identify particular landscape features (geomorphic elements) that can be considered to have a high sensitivity for the presence of Aboriginal archaeological sites. After identifying such features particular locations can then be targeted for a more specific examination by subsurface testing.

Geology

The area to be inundated is underlain by Carboniferous lithic sandstones, siltstones and some thin limestone units. Where observed in road cuttings and exposed in stream beds these sedimentary rocks have moderate to steep dips (40 to 60^0) and have been faulted. None of the observed rock types are likely to have been used by Aboriginal people as raw material for artefact manufacture. No rock shelters were seen, and it is unlikely that any of the coarser grained sedimentary rocks were particularly suitable for use as axe grinding sites. Geology therefore does not provide a useful guide to Aboriginal site location.

Geomorphology of the main channels

The fluvial geomorphology of the entire Williams River channel has been described by Gippel and Anderson (2007) and for the reaches above the dam site they draw on work by Brooks *et al*., (2004, 2006) and Erskine (2001).

Above the site of the proposed dam the Williams River has a moderately steep gradient, and carries a coarse bedload of pebbles and cobbles. Active depositional features such as bars are common and it is clear from the location of flood debris and recorded changes in the valley that the modern flood regime has changed significantly as a consequence of European land management especially the extensive clearing of the hillslopes. Brooks *et al*., (2004) described the river channel near Munni as being a discontinuous floodplain style with alternating reaches of bedrock confinement and small floodplain patches. Brooks *et al*., (2006) believe that the transport capacity of the river is greater than can be sustained by the long-term sediment yield from the catchment. This has probably always been the case and suggests that all of the valley floor geomorphology is young and active. Given the hydraulic regime operating in this stream today it is unlikely that any Pleistocene land surfaces were ever preserved within the floodplain patches.

Erskine (2001) noted that the channel along the entire upper catchment has been subject to river training scheme works between 1966 and 1991. Most of this work involved reshaping the river-bed and the effects were often to exacerbate bank erosion. Past flood have substantially modified the bed and banks and it is unlikely that any Aboriginal sites originally present near water level will have survived.

Stream order and topography

Whilst the stream order model applied by Mitchell and others on the Cumberland Plain and the central lowlands of the Hunter Valley has been a useful indicator of the likely presence of Aboriginal sites, it appears unlikely to be helpful in this

environment as the only stream segments that have any development of floodplain patches are the highest order segments along the main channel. Therefore further work should concentrate on the main streams.

All streams up to fourth order have steep gradients, direct hill slope links and bedrock channels. None contain ground suitable for camp sites and the channel gradient in smaller tributaries is as steep or steeper than the adjacent ridges so it is reasonable to suggest that they would not normally have been used as access routes.

The main tributary streams of Tunnybuc Creek and Quart Pot Creek also have steep gradients, and narrow incised channels with only patches of intact flood plain deposits along their length.

First second and third order streams flowing into these creeks and all similar streams flowing directly into the main channel are even steeper (up to 18^0) and the side slopes in these small catchments connect directly to the stream channels. In other words all of the upper catchment above Tunnybuc and Quart Pot Cemetery, and all of the steep side slopes are sources of sediments and contains few (if any) landscape elements where Aboriginal people may have camped. These areas undoubtedly had food and fibre resources valued by Aboriginal people and it is reasonable to expect that they would have been visited but this landscape was probably best traversed along ridge lines and the larger stream lines. Open Aboriginal sites would be expected to be small and scattered. Their survival is also in doubt as these slopes have been stripped of much surface sediment and the stream lines are eroded to long sections of exposed bedrock.

Even along the Williams River true terraces (abandoned floodplains) do not appear to be present above Tillegra, although two or three low benches are noted on the floodplain at the river crossing east of Munni House. It is suggested that each of these benches should be tested for archaeological sites and this work should include backhoe pits into the benches to reveal their stratigraphy. Note however that post-European sediments and flood debris may be present even on the highest bench.

Areas identified on geomorphic grounds as being archaeologically sensitive.
Figure 1 locates five areas that are considered to be archaeologically sensitive on the basis that they have lower angle slopes, are in close proximity to water, but are above average flood levels. It is suggested that further archaeological investigation should be conducted at these locations.

Note that parts of Areas A, D and E are all expected to contain a texture contrast soil and that any archaeological deposit found in these will be shallow (less than 30 to 40cm). The limitations of interpreting open sites in such soils as described by Dean-Jones and Mitchell (1993) will apply.

Area A.
The left bank slip-off slope of the meander appears to have a lower slope angle than usual and may have provided reasonable ground for a campsite and/or have been used as a short-cut across the river bend. Grader scrape testing or equivalent is recommended.

Area B.

The junction of Tillegra Creek and the Williams River is likely to have been the site of a large waterhole during Aboriginal times and may have low gradient benches suitable for camp sites. The original survey partly covered this area as Site SN2 and although no artefacts were found, sub-surface testing on any higher benches on the right bank of both the river and Tillegra Creek is suggested.

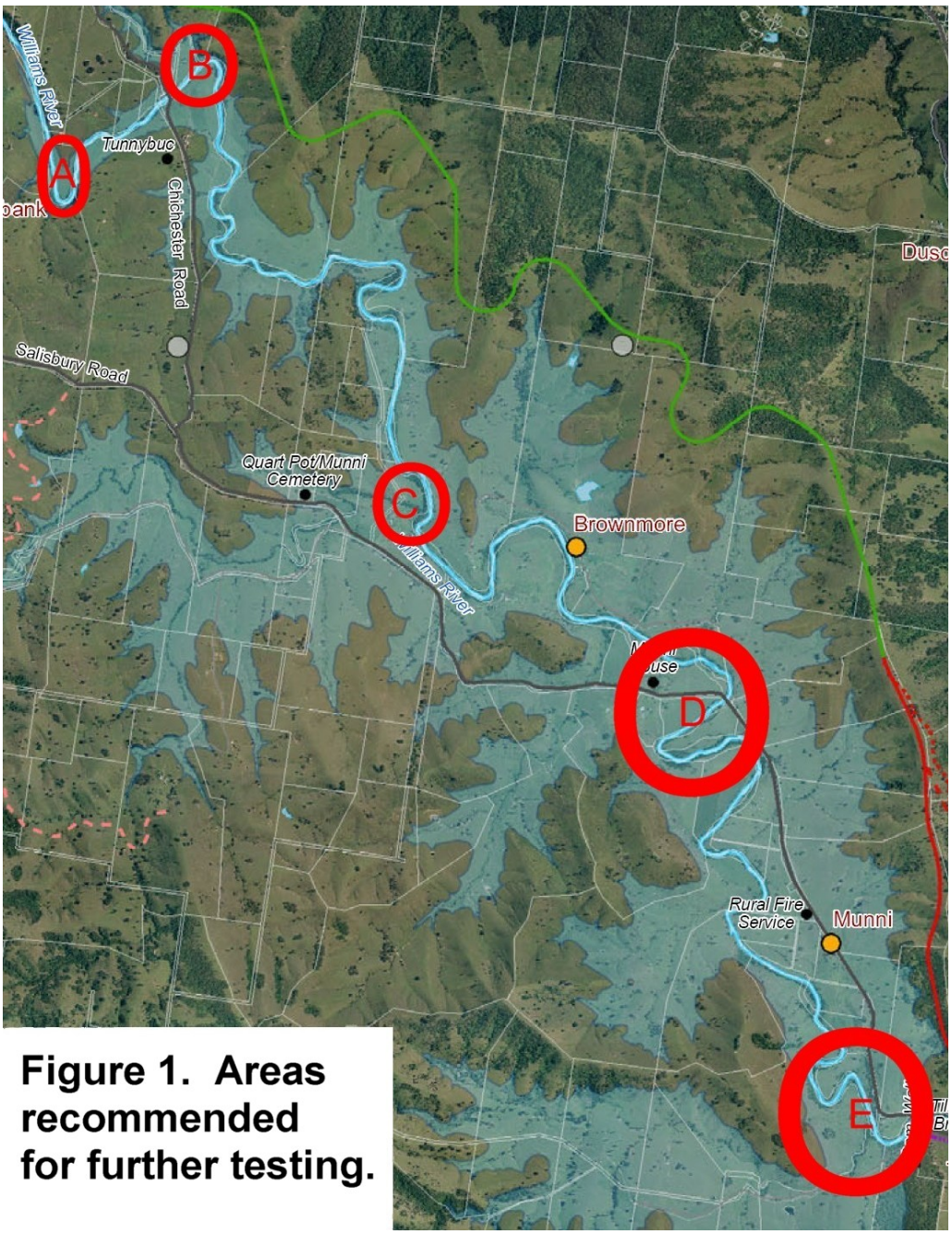

Figure 1. Areas recommended for further testing.

Figure 1. Areas A to E identified on geomorphic grounds as being archaeologically sensitive and recommended for further testing. See text for details.

Area C.

Although this site was not examined on the ground the junction of Quart Pot Creek and the Williams River is likely to have originally had a large waterhole and to retain higher benches on the floodplain. The lower parts of the floodplain are not worth testing but any higher benches present should be tested and this work could include a deeper backhoe pit to check for the presence/absence of any buried land surfaces.

Area D.

Three low benches do occur on the floodplain North of Salisbury Road. These features do not appear to be true terraces and it is possible that each of them have been disturbed by 20th Century floods. However surface testing and a deep backhoe pit to check the stratigraphy of the alluvial sequence is recommended.

South of Salisbury Road the river meander defines a long ridge (spur) with a gentle gradient. Surface testing should be conducted along the length of this ridge. This work should include observations on any low saddle that exists on the ridge where Aboriginal people may have taken a 'short-cut' across the meander.

Area E.

There are three targets within area E.

- The dam site itself will require closer examination as it will be totally modified by construction work. Although the steep slopes and rock outcrops in this area are not likely to contain any Aboriginal sites.
- Two low benches occur on the floodplain of the un-named right bank tributary just upstream of the dam site and these should be tested as for Area D.
- The saddle across the meander loop north of the tributary junction should be tested for the same reasons as the saddle in Area D.

Recommendations.

- Subsurface testing should be undertaken on those parts of the project where extreme ground disturbance is proposed. These include the dam site itself (part Area D) and sample sections of the diverted roads. No particular locations for testing in these areas have been identified and site selection should be made by the archaeologist.

- Subsurface testing and some deeper excavation for stratigraphic purposes as described above should be undertaken in those areas (A to E) identified as archaeologically sensitive on Figure 1. Specific site selection may be made by the archaeologist. The services of a geomorphologist may be required to assist in the interpretation of the stratigraphic pits.

- No further survey for Aboriginal sites is recommended within the 1:100 flood level at any locality.

- Cultural Heritage Connections Pty Ltd should provide copies of this report to their client, the Department of Environment and Climate Change and to all participating Aboriginal groups.

Dr P.B. Mitchell

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APPENDIX B: ARTEFACT ANALYSIS

Analysis of Artefacts Recovered from Sub-surface Testing of the Tillegra Dam Inundation Area

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Contents

1. Introduction

This report provides an analysis of the stone artefact assemblage recovered from sub-surface testing in three locations along the Williams River. Artefacts were cleaned, individually analysed and entered into the software program *Entrer* loaded with a configuration file written for this specific purpose. This program prompts the user to address all relevant criteria through a series of menus based on the artefact type. In this way a comprehensive typological, technological and metrical analysis of the assemblage was undertaken. The resulting data was than be imported into a relational database, Microsoft Access, for further analysis (Appendix A). A definition of the terms used for the artefact types and their attributes can be found in Appendix B of this report.

2. Distribution of the Assemblage

A total of 34 artefacts were identified from the three sampling locations (Area B, D and E). The highest concentration of artefacts occurs in Area D (n=23, 67.6%) with Trenches 2 and 4 having the highest number of artefacts (n=8, 23.5%). Two of the artefacts in this trench were broken, possibly during manufacture, and could be refitting (D4IS-22, proximal flake and D4IS-19, distal flake, Figure 1, Appendix D) reducing the minimum number of artefacts to seven. Recent breaks that would be refitted were counted as complete flakes.

Areas	Trench	m^2	Count	%
B1	1	24	2	5.9
B2	1	12	1	2.9
B3	2	12	1	2.9
Sub-total			4	11.8
D1	3	19.5	1	2.9
D1	2	18.4	8	23.5
D1	4	21.3	8	23.5
D1	5	22.3	4	11.8
D2	4	12	2	5.9
Sub-total			23	67.6
E1	1	12	1	2.9
E1	3	24	5	14.7
E2	1	12	1	2.9
Sub-total			7	20.6
Total			34	

Table 1. Distribution of the Artefacts in the Sampling Areas

3. Raw Material Procurement

The cortex (or weathered surface of stones or the parent rock, Appendix B) can provide information about the type of stone sources used (i.e. a primary or secondary source). Artefacts with a rough cortex were acquired from a primary source (or an *in situ* outcrop). Artefacts with a smooth or water worn cortex originated from a secondary source (such as a river cobble) from a waterway. Similarly, the amount of cortex present on an artefact is often attributed to the distance artefacts were transported from the source (Hiscock and Mitchell 1993:12-17). A high percentage of cortex on an artefact indicates that the source of stone was nearby while artefacts with less cortex or no cortex were transported further from the source. Equally, as cores are transported away from the source they are typically reduced further and the resulting flakes are smaller as the core also reduces in size.

Most of the artefacts were made from hornfels (n=25, 73.5%), had cortex, representing an early stage of core reduction (n=21, 61.8%), and were made from local cobbles obtained from nearby waterways, shown by the presence of water-rolled cortex (n=21, 100%) and their large size (Tables 2 and 3). Five were identified as basalt (e.g. Figure 1, Appendix D). Only four non-local artefacts were identified; two proximal flakes of silcrete, a distal flake of FGS (fine-grained siliceous) with retouch and a complete flake also made from FGS (Table 2, e.g. Figure 2, Appendix D). A description of the raw material types is provided in Appendix C.

% of cortex	Count	%
0	13	38.2
1-25	12	35.3
25-50	2	5.9
50-99	5	14.7
100	2	5.9
Material Type		
Basalt	5	14.7
Hornfels	25	73.5
FGS	2	5.9
Silcrete	2	5.9
Total	34	

Table 2. Characteristics of the artefacts that indicate the source

	Maximum Dimension (mm)	
Material	**Mean**	**STD**
Basalt	37.6	12.6
Hornfels	45.6	13.5
FGS	19.2	4.8
Silcrete	28.9	6.2

Table 3. Maximum dimension of the artefacts in the assemblage

4. Composition of the Assemblage

Table 4 shows the types of artefacts found in the assemblage. Artefacts were classified as cores or flakes, broken or complete and retouched or non-retouched (Table 4, refer Appendix B for definitions). Retouched flakes were presumably used as tools (Table 4). The assemblage shows that broken flakes dominate (n=13) closely followed by complete flakes (n=10) and cores (n=6). A surprisingly high number of proximal flakes occur which may reflect the physical properties of the raw material – hornfels is more likely to break during manufacture due to its fracture toughness. A high frequency of tools also occurs in the assemblage (n=5). Most of the tools, broken flakes and cores were recovered from Area D (Table 5).

	Class	**Count**	**%**
	Core	6	17.6
Non-retouched	Complete flake	10	29.4
	Distal flake	3	8.8
	Broken flake	1	2.9
	Proximal flake	9	26.5
		23	67.6
Retouched	Complete tool	3	8.8
	Proximal tool	1	2.9
	Distal tool	1	2.9
		5	14.6

Table 4. Composition of the assemblage

Class	**D**	**B**	**E**
Core	4		2
Complete flake	2	1	4
Distal flake	2		1
Broken flake	1		
Proximal flake	8	1	
Complete tool	2	1	
Proximal tool	1		
Distal tool		1	

Table 5. Distribution of the different artefact classes

5. Retouched Implements

Five artefacts were retouched to form tools; this represents 14.6% of the assemblage (Table 4). Three of the tools were made from hornfels, one from FGS and another from basalt. A variety of scrapers were recovered with different types of retouch. Those with step and notch retouch presumably indicate a 'heavy-duty' use (Figure 4, Appendix D). No evidence of backing, generally attributed to the mid-Holocene, was present in the assemblage, although this may be a product of the raw material types; e.g. FGS raw materials are more often found with backing retouch.

Area	Trench	Tool type	Count
B	1	Scraper (step retouch)	1
B3	2	Scraper (step retouch)	1
D	4	Denticulate (notch retouch)	1
D2	4	Notch	1
D2	4	Scraper (scalar retouch)	1

Table 6. Retouched implements

6. Reduction Strategies

Six cores were found in the assemblage. Although this number is small it represents a high frequency in the total number of artefacts (Table 4). Only one core was made from basalt and the remaining were hornfels. Three cores still retain a water-rolled cortex and were therefore obtained from a watercourse. Most of the cores were multi-directional indicating that they were rotated to form new platforms for the removal of flakes. Relatively high numbers of flakes were removed from each core, shown by the number of flake scars. The absence of large numbers of flakes in the different areas associated with the cores indicates that the resulting flakes were removed for use elsewhere.

ID	Core Type	Material Type	Core body	Scar form	Platform Number	No of core scars	Length (mm)
D21-33	Bipolar	hornfels		Mixed	2	3	41.2
D21-34	Multi-directional	hornfels	cobble	expanding	4	7	61.8
D35	Multi-directional	hornfels		Mixed	4	7	30.6
D52	Bipolar	hornfels	cobble	expanding	2 - 1 crushed	5	52.3
E31-13	Multi-directional	hornfels		Mixed	4	8	43.8
E31-15	Uni-directional	basalt	cobble	elongated	1	3	52.6

Table 7. Characteristics of the cores

The form of the discarded broken and complete flakes shows that most of the flakes were indeterminate or expanding indicating an unsystematic core reduction (Table 8). Three of the flakes have evidence of platform rejuvenation – this technique shows that the core was rotated to extend its use-life. No evidence of blade manufacture was present in the assemblage. The aim of flake manufacture was to produce a large flake with a suitable working edge.

Form	Count	%
Block	4	14.3
Block/platform rejuvenation	1	3.6
Elongated	4	14.3
Expanding	8	28.6
Expand/platform rejuvenation	1	3.6
Indeterminate	9	32.1
Platform rejuvenation	1	3.6

Table 8. The form of the flakes

7. Summary

- The number of artefacts per square is very low in all the sampling areas. The densest locations were in Area D, Trenches 2 (1 artefact per 2.3 per m^2) and 4 (1 artefact per 2.6 per m^2). Only 34 artefacts were recovered from the total excavated area of 263.4 m^2.

- It is unusual to see an assemblage dominated by hornfels although this probably reflects the use of locally available material from nearby rivers and the absence of other suitable material. That hornfels was obtained locally, probably from the Chichester River, is reflected in the amount of cortex on the artefacts, the type of cortex (i.e. water-rolled) and the large size of the artefacts. Only a limited number of non-local material (FGS and silcrete) were present in the assemblage.

- Identifying raw material types, such as a fine-grained basalt and hornfels, in hand specimen is difficult especially if the artefacts are highly weathered. The only way to positively identify the raw material types is through a petrological analysis. For this report hornfels was identified as having bedding and/or fossils, the colour and texture.

- A high number of cores are present in the assemblage. These cores are typically multi-directional with relatively large numbers of flakes removed. These two characteristics indicate that the cores were rotated to remove more flakes and extend their use-life – typically a feature of raw material scarcity and/or the distance from source. Although the source of the hornfels is considered local the distance from the Chichester River to the sampling lcoations was enough to influence how the cores were reduced.

- Five artefacts were found with retouch. Most of these tools had a 'heavy-duty' retouch but it is not possible to finely retouch this material type (due to its hardness and texture).

- It is impossible to assess the age of the artefacts are no chronological markers are present in the assemblage (e.g. backed artefacts are generally attributed to the mid-Holocene).

APPENDIX A Database

ID	Area	Trench	Spit	Class	Material	Colour	Distal end	% of cortex	Type of cortex	Form	Platform Type	Flake Scars	Scar direction	Tool type	Edge No	Edge 1	Edge 2	Edge 3	Edge 4
D4IS-16	D	4	initial scarpe	complete tool	basalt	grey	feather	50-100	water-rollec	expanding	Unifacial	0-retouched		denticulate	2			notch	notch
E31-15	E	3	1	core	basalt	grey		1-25	water-rollec										
D21-32	D	2	1	proximal flake	basalt	grey		1-25	water-rollec	indeterminate	Cortical								
D4IS-22	D	4	initial scarpe	proximal flake	basalt	grey		1-25	water-rollec	expanding	Unifacial								
D4IS-19	D	4	initial scarpe	distal flake	basalt	grey	hinge	50-100	water-rollec	expanding									
D21-9	D2	4	1(spoil)	complete tool	hornfels	lightgrey	platform	0		platform rejuventatior	Missing	3	radial	notch	1	notch			
E31-14	E	3	1	complete flake	hornfels	grey	feather	25-50	water-rollec	block	Unifacial/rough	2	0						
E31-13	E	3	1	core	hornfels	grey		0											
E31-12	E	3	1	distal flake	hornfels	grey	feather	1-25	water-rollec	expanding/platform rejuventatior									
D51	D	5		proximal flake	hornfels	grey		0		indeterminate	Bifacial								
D21-10	D2	4	1(spoil)	proximal tool	hornfels	red/grey		1-25	water-rollec	indeterminate	Bifacial			scraper					
E21-8	E2	1	1	complete flake	hornfels	grey	platform	0		elongatec	Bifacial	8	180						
E21-7	E	1	1	complete flake	hornfels	grey	overshot	50-100	water-rollec	elongatec	Unifacial	1	0						
D35	D	3	2	core	hornfels	grey		1-25	water-rollec										
D54	D	5		complete flake	hornfels	grey	feather	100	water-rollec	expanding	Missing	0	NA						
D53	D	5		broken flake	hornfels	grey		0		indeterminate									
D52	D	5		core	hornfels	grey		25-50	water-rollec										
E31-11	E	3	1	complete flake	hornfels	grey	feather	100	water-rollec	elongatec	Bifacial	0	N/A						
D21-29	D	2	1	complete flake	hornfels	grey	feather	1-25	water-rollec	indeterminate	Unifacial	2	1						
D4IS-20	D	4	initial scarpe	complete flake	hornfels	grey	hinge	0		indeterminate	Unifacial	3	0						
D4IS-21	D	4	initial scarpe	distal flake	hornfels	grey	feather	1-25	water-rollec	elongatec									
D4IS-23	D	4	initial scarpe	proximal flake	hornfels	grey		1-25	water-rollec	expanding	Cortical								
B11-24	B	1	1	complete tool	hornfels	grey	na	50-100	water-rollec	block	Unifacial	0-retouched	N/A	step	1			step	
B11-25	B	1	1	complete flake	hornfels	grey	hinge	50-100	water-rollec	indeterminate	Bifacial	1	0						
D4IS-18	D	4	initial scarpe	proximal flake	hornfels	grey		0		indeterminate	unifacial/rough								
D21-34	D	2	1	core	hornfels	grey		1-25	water-rollec										
D4IS-17	D	4	initial scarpe	proximal flake	hornfels	red/grey		0		expanding	Unifacial								
D21-30	D	2	1	complete flake	hornfels	grey	feather	1-25	water-rollec	expanding	Unifacial	2	1						
D21-31	D	2	1	proximal flake	hornfels	grey		0		indeterminate	Unifacial								
D21-33	D	2	1	core	hornfels	grey		0											
D21-35	D	2	1	complete flake	fgs	grey	feather	0		expanding	Unifacial	2	90						
B321-27	B3	2	1	distal tool	fgs	lightgrey	cort	1-25	water-rollec	block/platform rejuventatior				step					
D21-36	D	2	1	proximal flake	silcrete	grey		0		block	Unifacial								
B211-26	B2	1	1	proximal flake	silcrete	pink		0		block	Unifacial/rough								

ID	Core Type	Core body	Scar form	Platform No	Maximum Dimensio	Length	Width	Thickness	Platform Width	Platform thickness	no of core scars	Scar length	Scar width	comments
D4IS-16					49.8	37	48	16.7	37.5	13.1				large retouch flakes -core?, unidirectional, 4 scar
E31-15	unidirectional	cobble	elongatec	1	52.6	52.6	41.7	27.4			3	23.5	17.8	
D21-32					31.5				18.5	6.1				
D4IS-22					27.1				10.7	1.4				conjoin with d4is-19
D4IS-19					27.1									burnt, conjoin with d4is-22=-old break
D21-9					56.8	47.2	46.5	21.8						break at proximal enc
E31-14					49	30.1	49	15.6	25.7	12.7				possible scalar retouch q?
E31-13	multidirectional		mixed	4	44.4	43.8	34.1	14.5	33.3	14.5				
E31-12					29.1									
D51					36.3				23.7	8.4				conjoined-recent breal
D21-10					57.3				25.3	8.7				burnt
E21-8					52.8	47.7	24.3	18.4	10	7.5				fossil - weatherec
E21-7					53.7	51.6	35.7	7	9.2	2.2				weathered
D35	multidirectional		mixed	4	36.5	30.6	31.6	11.8			7			retouch?
D54					32.4	28.2	29.7	5.8						
D53					32.2									
D52	bipolar	cobble	expanding	2 - 1 crush	61.4	52.3	36.5	34.3			5	14.3	24.2	overhang
E31-11					76.1	66	42.1	12.9	22.9	12.4				conjoined-recent breal
D21-29					45.9	42.8	26.4	14.2	7.5	6.3				
D4IS-20					40.9	35.7	32.3	9.9	24.5	9.6				burnt
D4IS-21					42.3									burnt
D4IS-23					54.5				54.0	10.9				recent damage
B11-24					63.6	34.1	55.3	27.8	54	23.7				
B11-25					36.5	33.5	26	11.7	10.2	6.5				
D4IS-18					38.6				16.4	8.4				
D21-34	multidirectional	cobble	expanding	4	70.4	61.8	63	42.2			7	14.8	27.2	
D4IS-17					26				18.5	5.1				burnt
D21-30					35.8	17.1	30.9	4.6	6.1	2.2				weathered
D21-31					26.8				10.5	5.2				recent break
D21-33	bipolar		mixed	2	41.6	41.2	36.1	21.9			3	21.1	18	highly weatherec
D21-35					15.8	15	16.4	2.1	8.8	2				potlid
B321-27					22.6									possibly a core
D21-36					24.5	11.7	14.1							burnt
B211-26					33.2				26.4	8.7				burnt

Appendix B Definitions

Attribute	*Value*	*Definition*
Technological type		
	Complete flake	Has a platform and termination
	Proximal flake	Has a platform and no termination
	Distal flake	A termination but no platform
	Broken flake	No platform or termination
	Complete, broken, distal and proximal tool	As above but with retouch
	Core	Negative scars from the removal of flakes
	Core fragment	A broken core showing evidence of flake removal
	Core tool, core fragment tool	As above but with retouch
	Block	No flake characteristics, cubed shape
	Hammer stone	Cobble shaped with evidence of pecking/ crushing
	Broken hammer stone	Broken hammer cobble, shows pecking/crushing
Cortex percentage	0%, 1-25%, 26-50%, 51-99%, 100%	Percentage of cortex on the dorsal surface of flakes
		Percentage of cortex on the total surface of cores
Cortex type	Water-rolled	Smooth surface from secondary source
	Rough	Weathered, angular surface from primary source
Termination	Feather	Tapering termination
	Abrupt	Non-tapering termination
	Plunge	Curves towards the ventral surface
	Hinge	Curves towards the dorsal surface
	Step	Steps at termination
	Cortical	Termination ends in cortex
	Platform	Evidence of old platform at termination
Form	Expanding	Proximal end narrower then distal end
	Block	Cubed form
	Elongated	Twice as long as wide
	Indeterminate	All other flake forms
	Platform rejuvenation	Evidence of an old platform on dorsal surface
Platform type	Unifacial	Struck from a unifacially flaked platform
	Bifacial	Struck from a bifacially flaked platform
	Cortical	Struck from a cortical platform
	Missing	Crushed or missing platform
Flake scars		flakes scars on dorsal surface of complete flake
Flake scar direction	0 degrees	Flakes struck from the platform
	90 degrees	Flakes show a 90 degree core rotation
	180 degress	Flakes show a 180 degree core rotation
	Radial	Flakes from multiple core rotations
Tool type	Scalar	Continuous macroscopic scalar retouch
	Backed	Geometric microlith
	End-scraper	Scalar retouch in Quadrant 3 (Figure 1)
	Notch	Retouch forming a cuspate notch
	Denticulate	Retouch form more than one cuspate notch
	Stepped scraper	Steep, overlapping retouch with step terminations

Core type	Uni-directional	Flaking from one direction
	Bidirectional	Flaking from two directions
	Multi-directional	Flaking from more than two directions
	Microblade	Small parallel flakes scars
	Tranchet	Blade flakes removed from a flake axis
	Prismatic	Blade production rotating from a single platform
	Cobble	One or two minor flakes removed, remaining is cortex
	Bipolar	Flakes removed in opposite directions from two platforms, anvil rested
Flake dimensions	Maximum dimension	Figure 2
	Maximum length	
	Maximum width	
	Maximum thickness	
	Platform width	
	Platform thickness	
Core body	Cobble	Water-rolled cortex present
	Unknown	
	Flake	Evidence of a flake attribute
Flake scars	Elongated	Twice as long as wide
	Mixed	Both expanding and elongated flakes
	Expanding	Wider than long
Core dimensions	Maximum length	Figure 3
(block)	Maximum width	
	Maximum thickness	
	Scar length	Axial length of last complete flake removed
	Scar width	Maximum width of last complete flake removed

Appendix C - Description of Raw Materials

Hornfels is a grey/black, fine-grained metamorphic rock formed by thermal metamorphism in a contact zone surrounding an igneous intrusion (Lapidus 1990:277). Under a hand lens the grains are equal in size and show no preferred orientation. Bedding is sometimes present. The parent rock is a shale and may some times have remanet fossils present in the fabric. It is likely that hornfels is found as a secondary source in the Chichester River which drains from the closest outcrop (Figure 3, Pain 1983:190).

Basalt is a dark-coloured basic, extrusive volcanic rock (Lapidus 1990:53). It is commonly found in the Barrington Tops some of which are fine-grained and suitable for knapping (Graham pers. comm., Pain 1983). It is likely that basalt can be found in both the Chichester River and Williams River due to its large distribution across the Barrington Tops (Figure 3, Pain 1983:190).

Fine Grained Siliceous (FGS) is defineds “rock which may be very fine-grained quartzite, chert or quartz, but could not be correctly classified without petroscopic analysis (Attenbrow 1987, vol 11, Appendix 4:2 as cited in Corkill 1999: Glossary and Abbreviations, p5)

Silcrete is defined as a brittle, intensely indurated rock composed of quartz clasts (ranging from sand to boulders), cemented by a matrix which may be well-crystallised quartz, cryptocrystalline quartz or amorphous silica (Langford-Smith 1978:3). The actual texture of the silcrete reflects the parent rock which may be a claystone, sandstone or siltstone (Watts 1978:41). The parent rock (the size of the quartz grains and the degree of size-sorting) influences the flaking quality of the silcrete (Doelman *et al.* 2001).

Appendix D - Photographs

Figure 1. Refitting artefacts, D4IS-19 Distal fragment (bottom), DAIS-22 proximal fragment (top)

Figure 2. E31-15, basalt unidirectional core

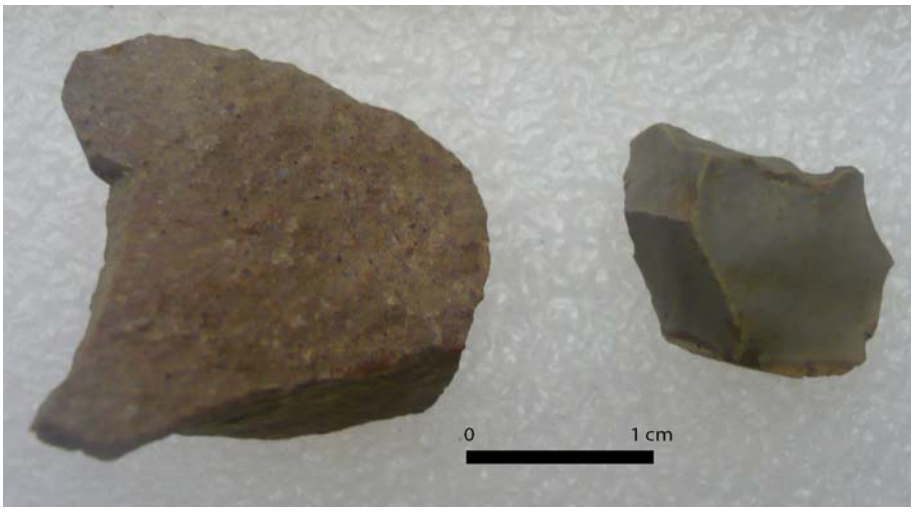


Figure 3. B211-26, Proximal silcrete flake (left), B32-1, distal tool of FGS (right)

Figure 4. B1-24. Ventral view of a complete flake with stepped retouch (left), dorsal view of a complete flake with stepped retouch in Quadrant 3.

References

Corkill, T. 1999. Here and There: Links between stone sources and Aboriginal archaeological sites in Sydney, Australia. MPhil Thesis, Department of Archaeology, University of Sydney.

Doelman, T., J. Webb and M. Domanski 2001. Source to discard: patterns of lithic raw material procurement and use in Sturt National Park, northwestern New South Wales. *Archaeology in Oceania* 36:15-33.

Hiscock, P. and S. Mitchell 1993. *Stone Artefacts Quarries and Reduction Sites in Australia: Towards a Type Profile.* Australian Government Publishing Service, Canberra.

Holdaway, S. and N. Stern 2004. Written in Stone: Decoding the Australian Flaked Stone Record. Museum Victoria, Melbourne.

Langford-Smith, T. (ed.) 1978. *Silcrete in Australia*. Department of Geography Armidale, University of New England,

Lapidus, D. F. 1990. *Collins Dictionary of Geology*. Harpercollins, Glasgow

Watts, S. H. 1978. The nature and occurrence of silcrete in the Tibooburra area of northern western New South Wales. In T. Langford-Smith (ed.), *Silcrete in Australia*, pp.167-186. Department of Geography, University of New England, Armidale.

Pain, C. F. 1983. Geomorphology of the Barrington Tops Area, New South Wales. Journal of the Geological society of Australia 30:187-194.

APPENDIX C: TRENCH EXCAVATION RECORDS

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

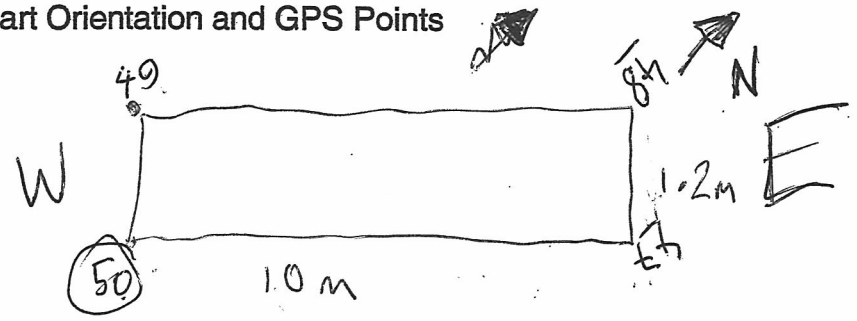
Recorder: VH

Date: 2/4/08

Test Area # E2 Trench 1

Spit # Only 1 Spit

Start Orientation and GPS Points



Description of deposit

Mid brown grading to light grey/brown loamy silt. Some large cobbles fire cracked moderate wood charcoal inclusions visible throughout up to 0mm Ø, less than 1%, deposit continues to base

110 – 160 spit

Include

Colour 7.5YR 3/3

Compaction

Composition/particle size

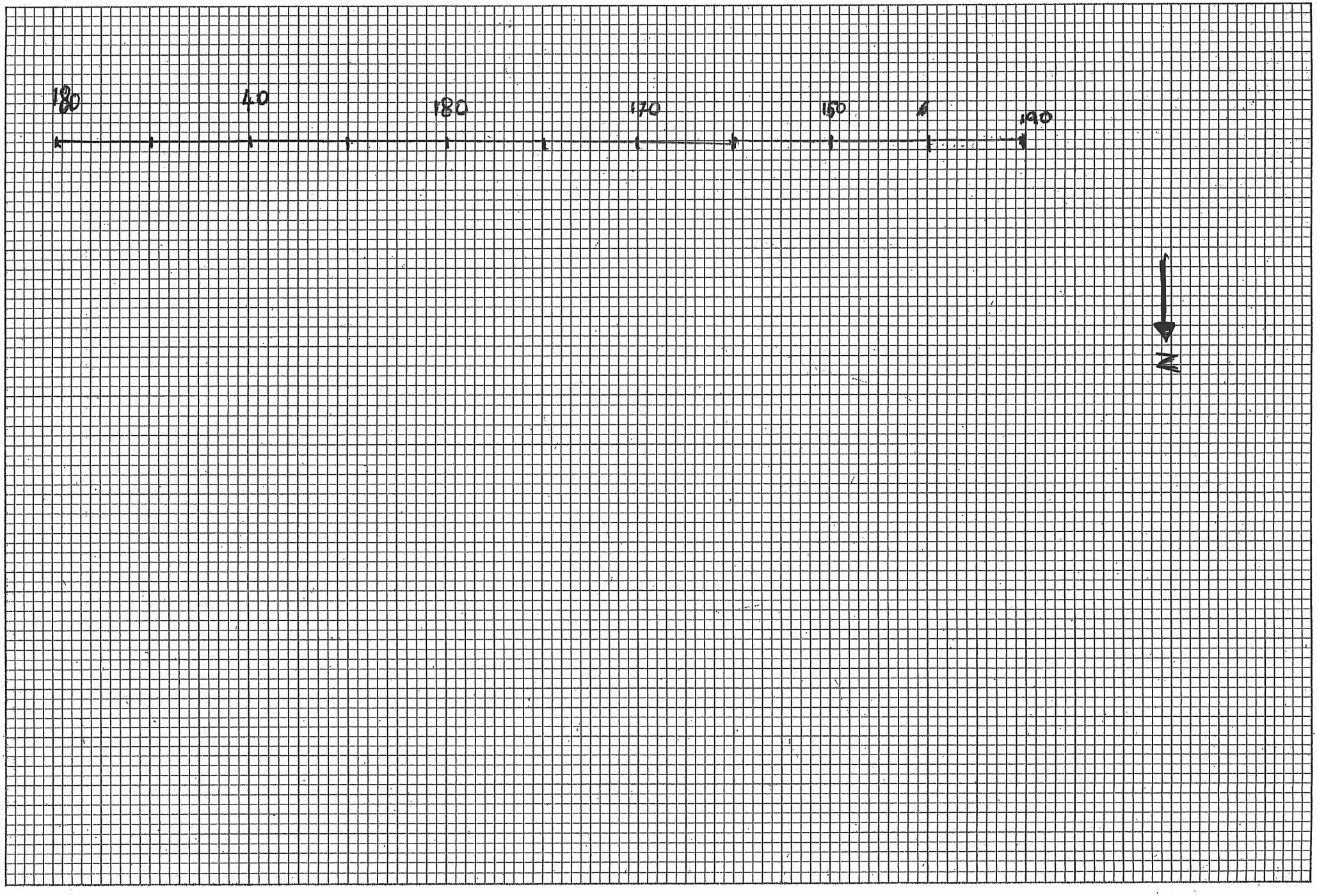
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

grass stripped first – to mid-brown topsoil

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		Sample	flaked cobble.	


180
40
180
170
150
190
N

04092 Tillegra Dam

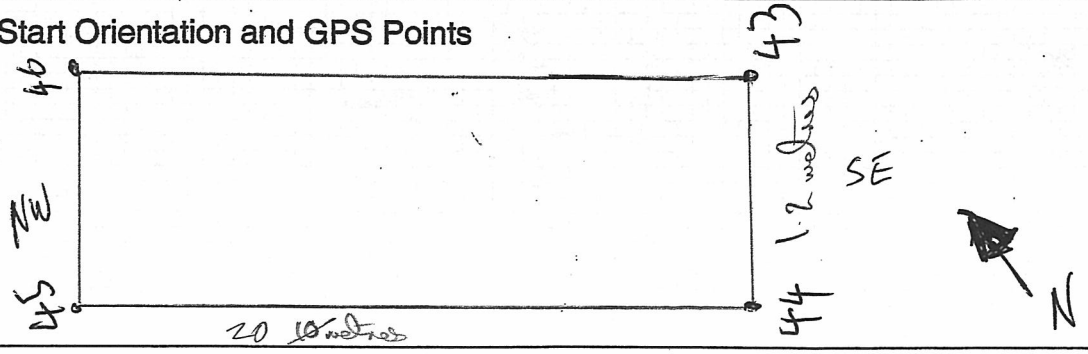
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: BEN Date: 02/09/08

Test Area # AREA E. TRENCH 3 Spit # 1

Start Orientation and GPS Points



Description of deposit

light grey-brown silt very little darker topsoil - well mixed alluvial deposit coming down to mottled brown yellow orange clay -
River cobble + corse sandstone ish cobble
w - Iron Staining

Include

Colour — Very dry @ clay

Compaction

Composition/particle size

Inclusions

Thickness & extent

? Sandstone geology

Methods & Conditions & Other comments (hand excavated/sieved etc.)

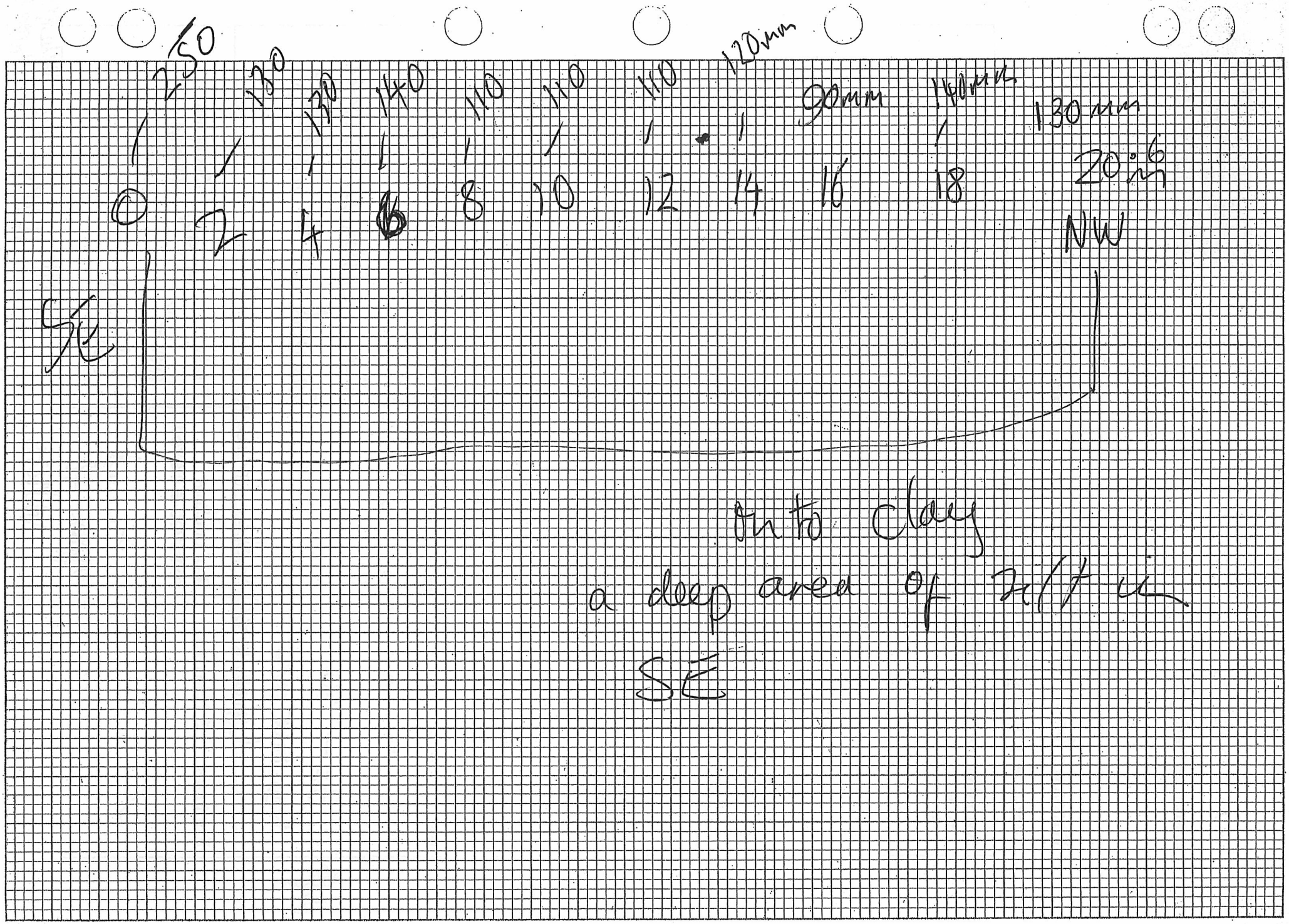
Machine excavated using mud bucket hand sorted when cobbles appearing - sieved a # buckets

depth = 300 - 180 from surface (grass previously removed

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		4 sieved approx 40 buckets	boiler river cobbles	

- silt 10YR 5/2 pale grey brown

Munsell = 10YR 4/3 - clay w mottlings 7.5YR 5/8


250
130
120
140
110
110
110
120mm
90mm
140mm
130 mm
20%
NW
SE
2
4
6
8
10
12
14
16
18
On to clay
a deep area of
SE

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

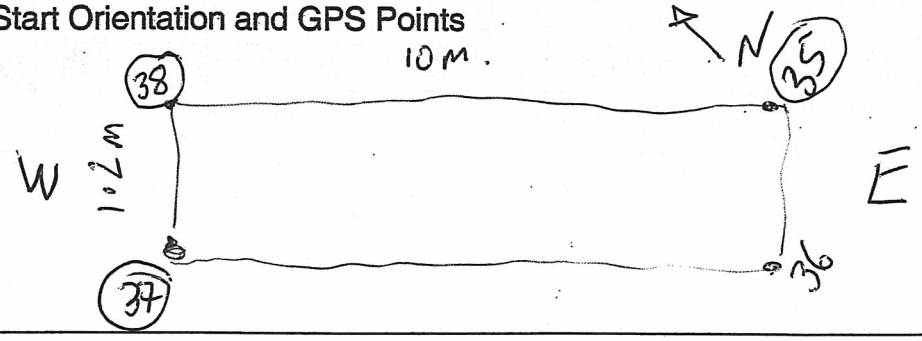
Recorder: VH

Date: 2/4/2008

Test Area # E - Trench 1

Spit # 2

Start Orientation and GPS Points



Description of deposit

light grey silt w ironstone + light brown clay w orange/yellow mottle - some large cobbles.

Include

Colour

Compaction

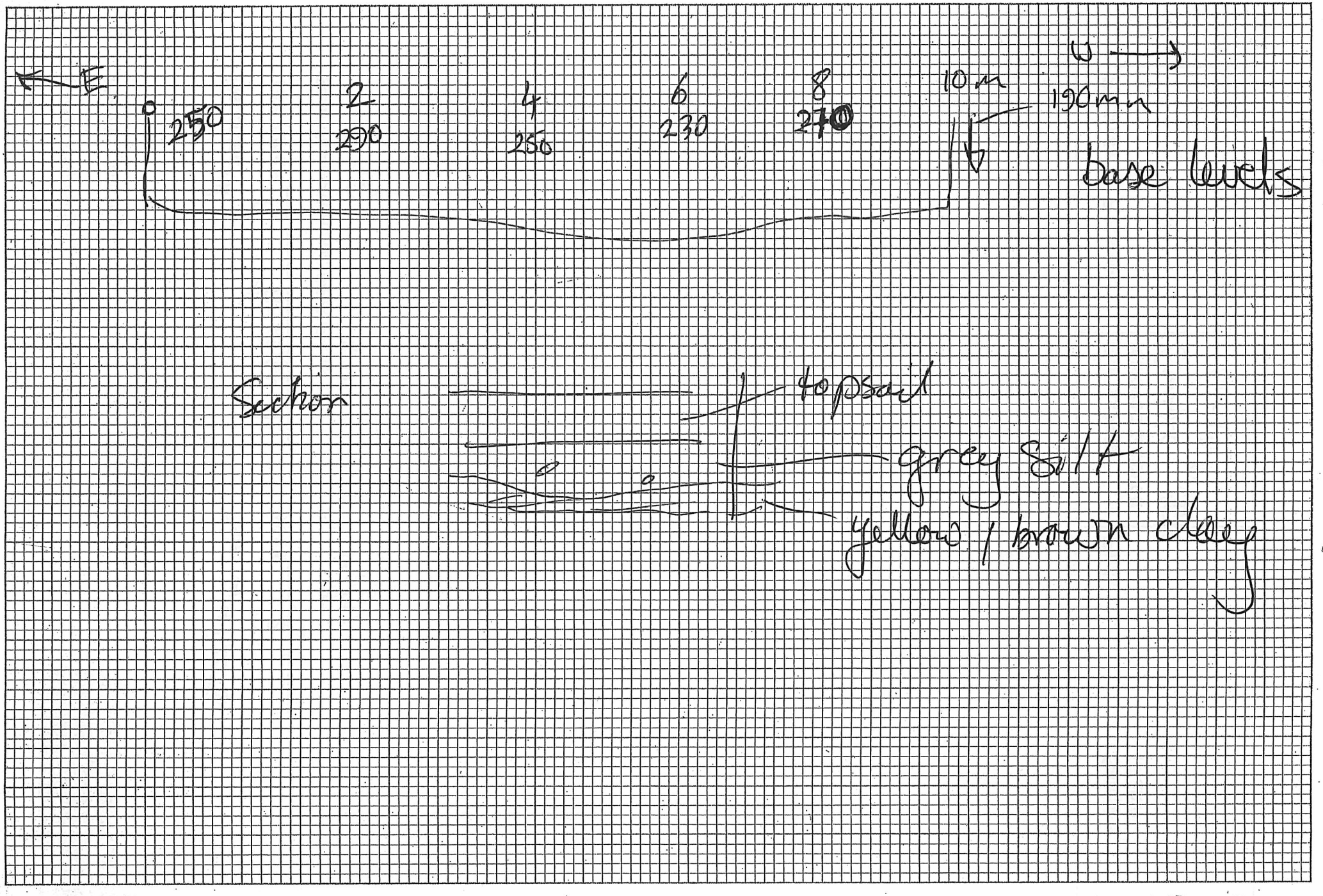
Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		Sample 6-10 buckets		


E
250
2
200
4
250
6
230
8
270
10 m
W
190 m m
base levels
Section
topsoil
grey silt
yellow / brown clay

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

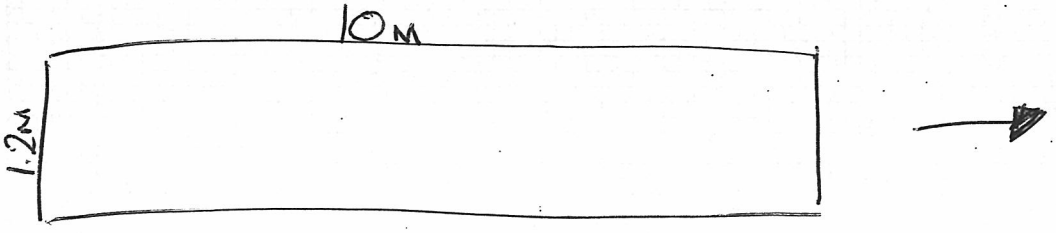
Recorder: KM

Date: 2.4.08

Test Area # E2 TRENCH 2

Spit # (3)

Start Orientation and GPS Points



Description of deposit

continued pale yellow/brown silt; loosely packed, very weakly degraded sandstone cobbles & minor distribution of river cobbles- soft & uneven boty towards Base: mottled orange/yellow clay & silty clay, varying from loose to slightly compact; sandstone & river cobbles continuing from previous layer

Include

Colour

Compaction

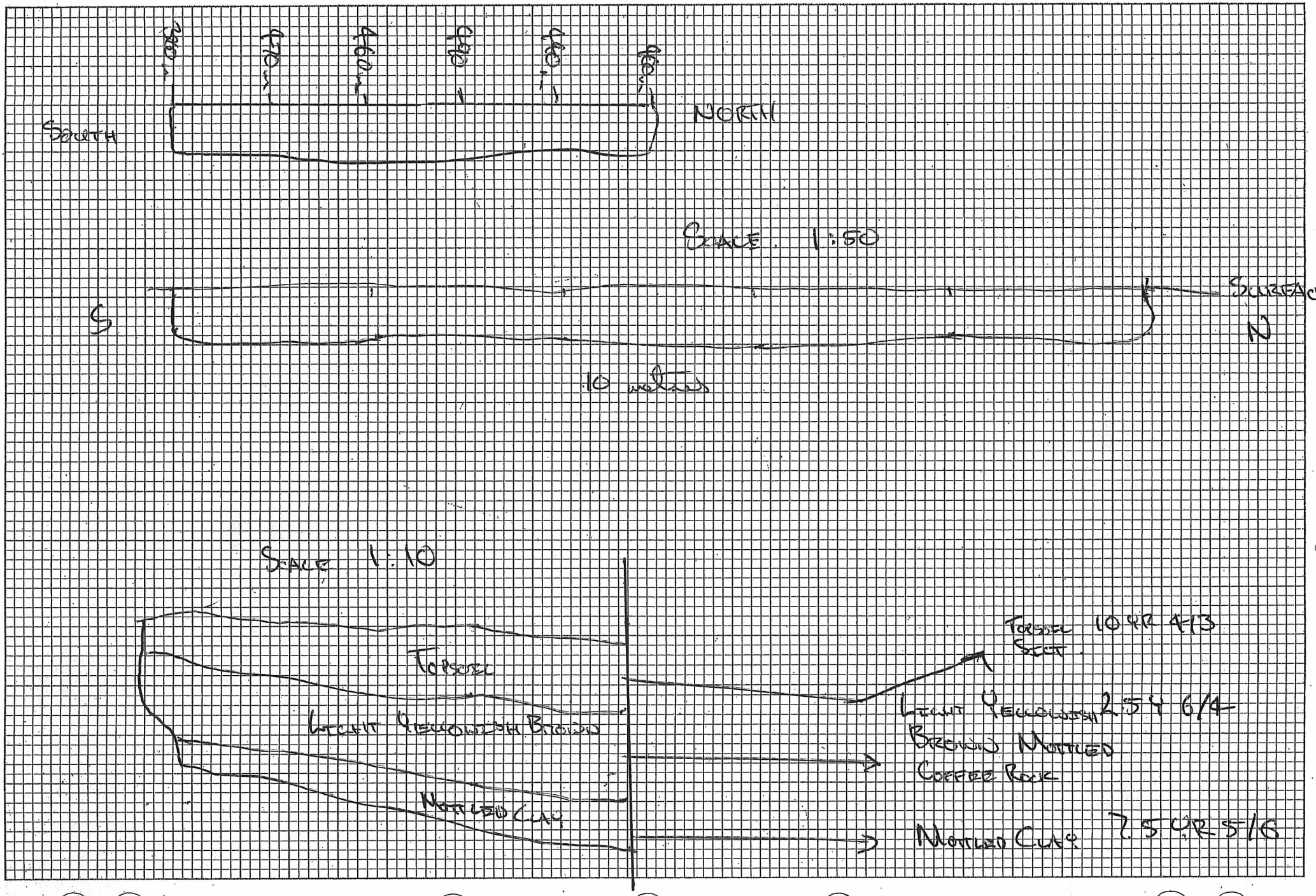
Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓				


SOUTH
NORTH
SCALE 1:50
S
SURFACE
N
10 metres
SCALE 1:10
TOPSOIL
LIGHT YELLOWISH BROWN
MOTTLED CLAY
TOPSOIL 10 YR 4/3
SILT
LIGHT YELLOWISH BROWN MOTTLED COFFEE ROCK 2.5 Y 6/4
MOTTLED CLAY 7.5 YR 5/6

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

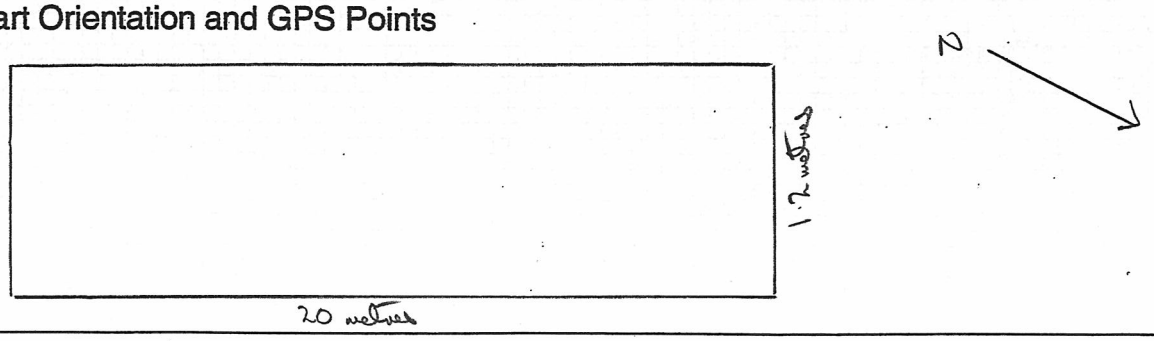
Recorder: BEN

Date: 04/04/09

Test Area # AREA F TRENCH ONE

Spit # TWO

Start Orientation and GPS Points



Description of deposit

This spit consists primarily of a grey brown sandy silt with small ironstone inclusions with a compact texture and a depth of 60-80 cm. Below this is an orange brown sandy clay that is very compact and contains tree roots and some decomposing sandstone.

Include

Colour

Compaction

Composition/particle size

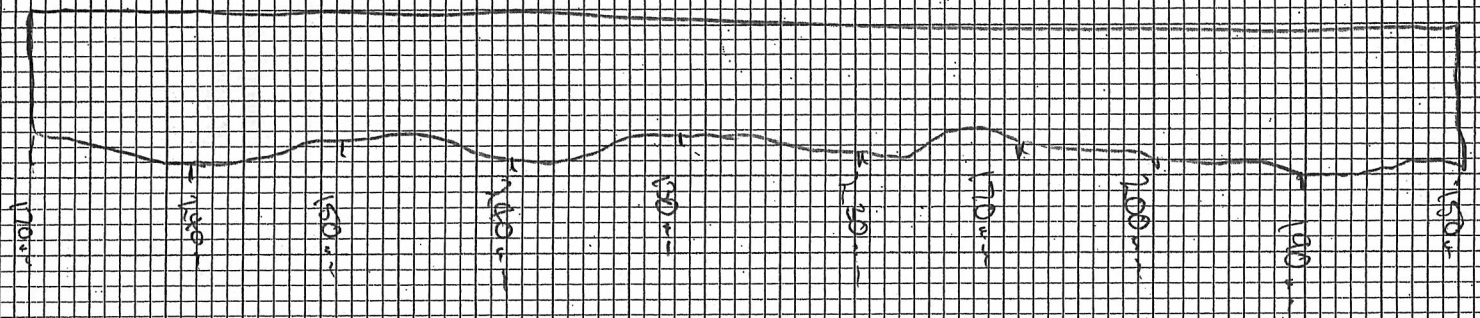
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated using the mud bucket.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		Sample 10 buckets		



MUNSELL HUE

SILTY LOAM: 10YR 4/2

SANDY SILT: 10YR 5/2

10 YR 5/3 - 5/4

CLAY:

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: [illegible] Date: 4.4.08

Test Area # E - Trench 2 Spit # 2

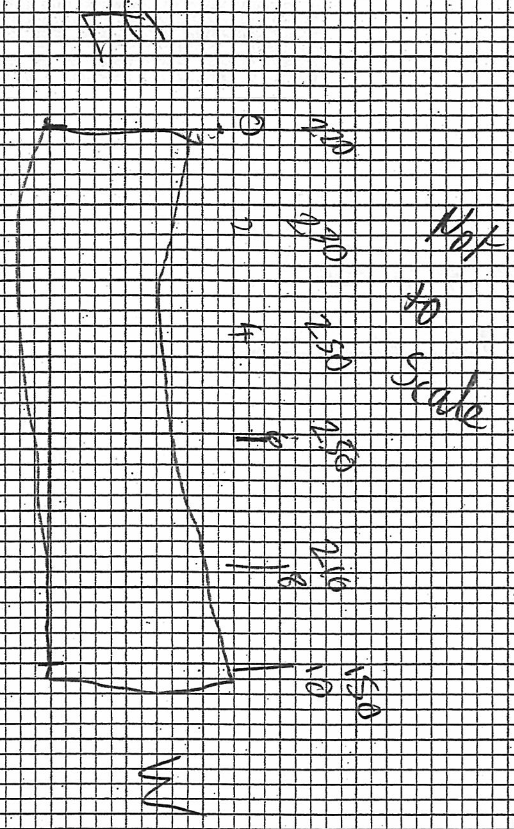
Start Orientation and GPS Points	

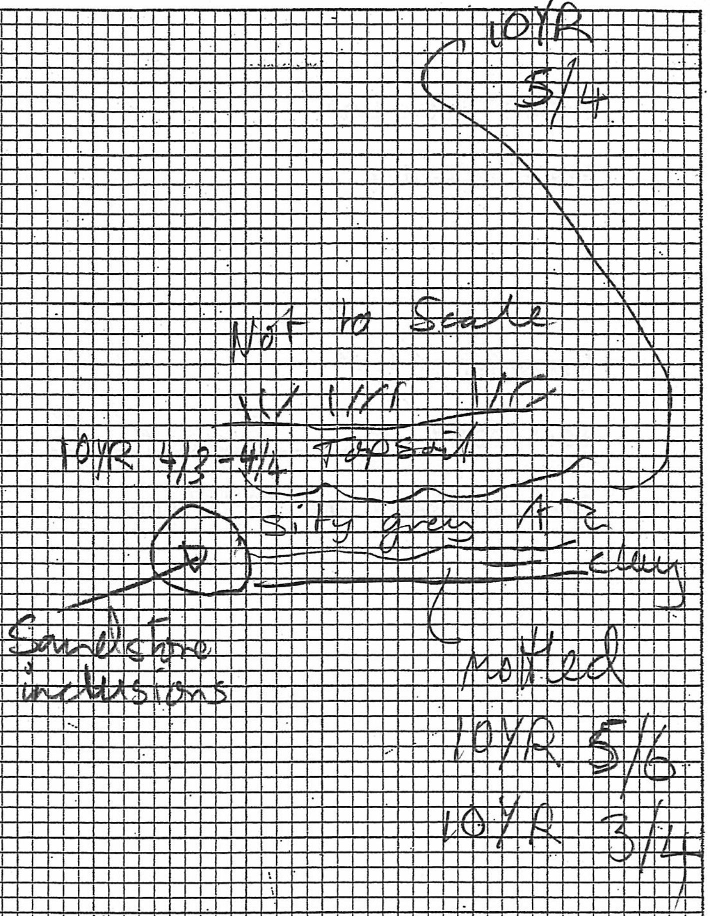
Description of deposit	**Include**
light grey/sL brown ~~silty~~ sandy clayey silt mottled coming down onto light yellow/brown clay – varied inclusions – gravel Sandstone + Shale patches – some heavy iron content rocks fine grained ~~more~~ silt – loose clay compact w cracking	Colour Compaction Composition/particle size Inclusions Thickness & extent

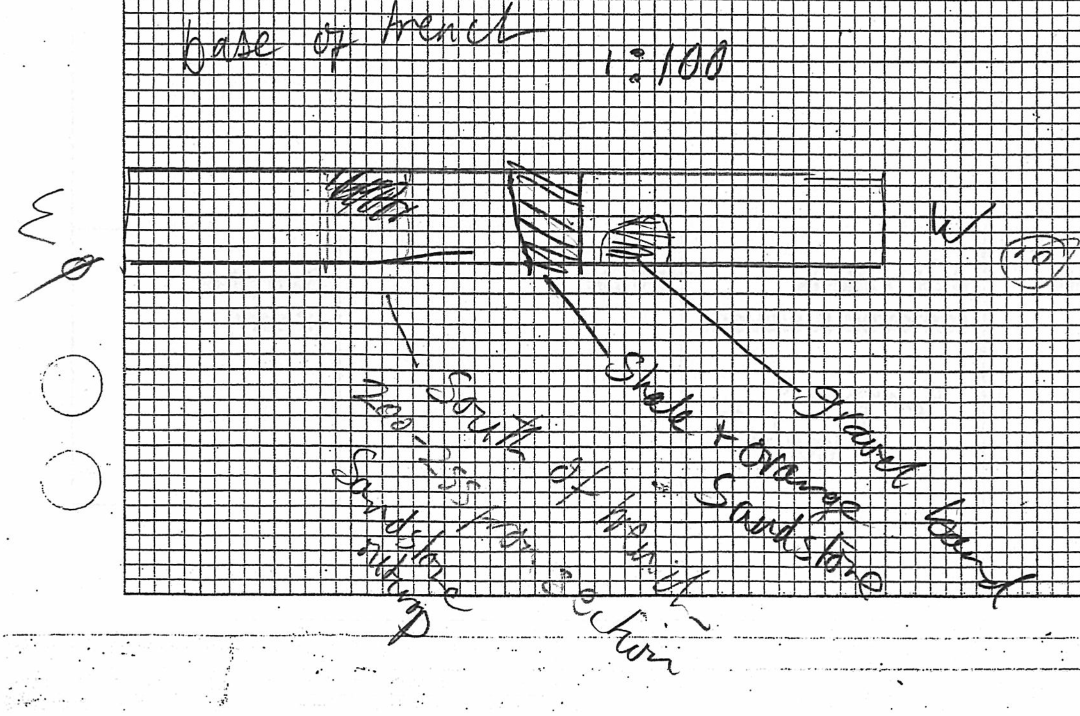
Methods & Conditions & Other comments (hand excavated/sieved etc.)

machine

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		Sample 10 buckets		


N
2.70
2.40
2.50
2.30
2.10
1.50
Not to Scale
E


10YR 5/4
Not to Scale
10YR 4/3-4/4 Topsoil
silty grey clay
Sandstone inclusions
mottled
10YR 5/6
10YR 3/4


base of trench
1:100
E
W
Shale + orange Sandstone
Gravel band
200-255 From section
South of trench
Sandstone outcrop

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

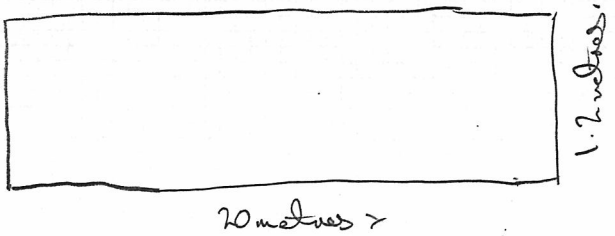
Recorder: BS

Date: 01/03/08

Test Area # AREA D2 TRENCH 3

Spit # 2

Start Orientation and GPS Points



See spit one for waypoints.

Description of deposit

Medium yellow brown sandy clay with small fragments of iron stone and shale firm to comfact in texture with a thickness of between 90mm 110mm.

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

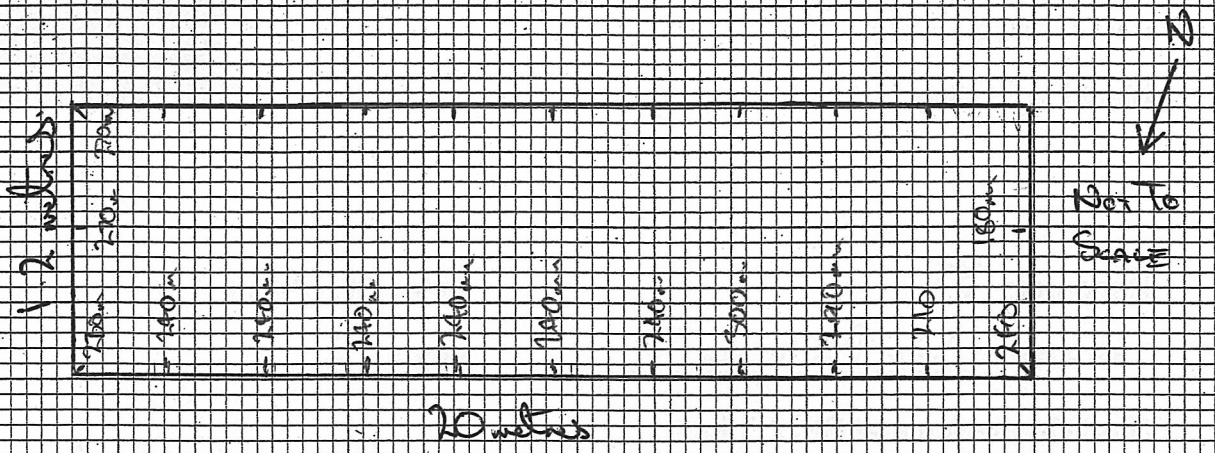
Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated with the mud bucket in approx 100mm spits

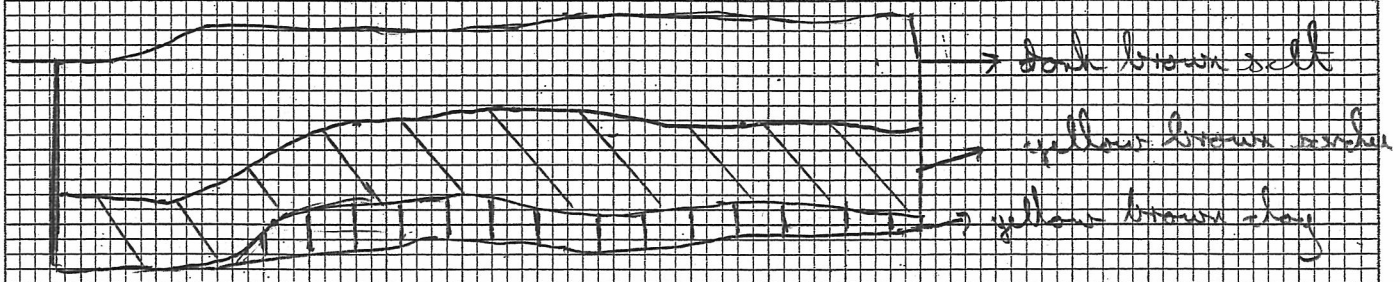
Brown silt 7.5YR 4/2

Clay/Sand 10YR 5/3 mottled 5/6

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
	-	2 buckets sieved	N/A	



TRENCH 3 SOIL PROFILE NORTHERN WALL (PART)



SCALE 1:10

Western End of Trench

04092 Tillegra Dam

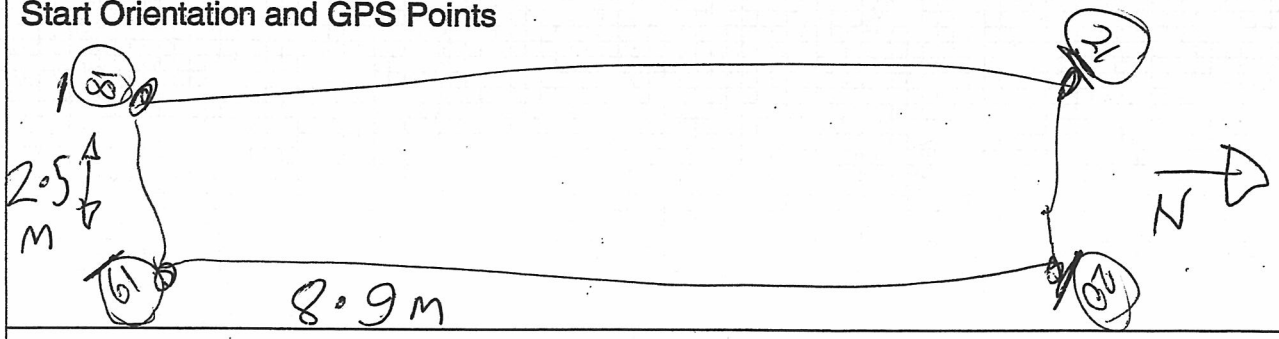
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 31/3/08

Test Area # Munni Horse 'D1' ~~Spit #~~ Trench 5

Start Orientation and GPS Points



Description of deposit

dark brown loamy topsoil

mottled layer

- yellow brown clay - v hard

clay depth approx 140mm start

110 - 160mm

clay breaks apart dried out brick inclusions river pebble et

Include

Colour

Compaction

Composition/particle size

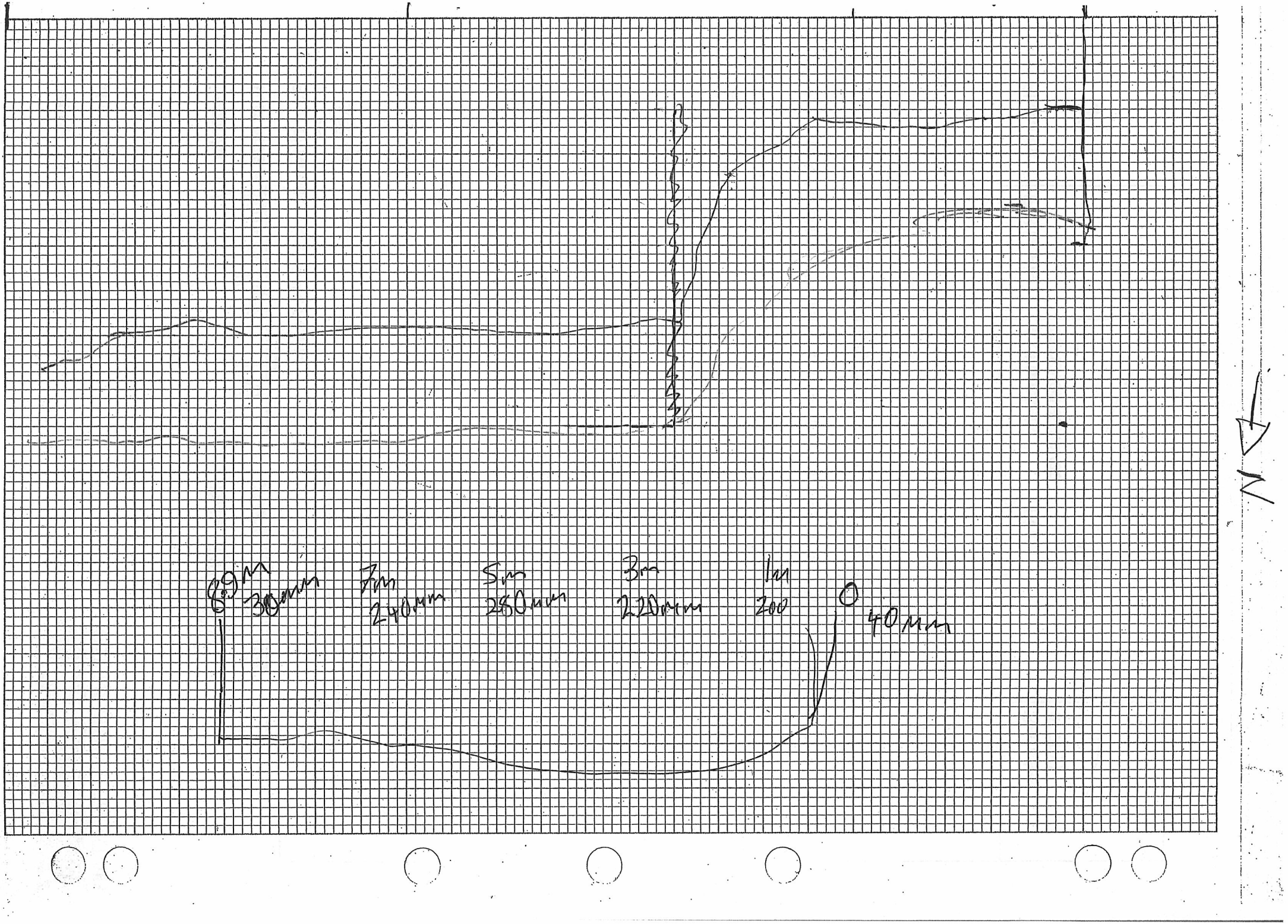
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

2 Scrapes trowled in between

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		✓	yes	-


9m
300mm
7m
240mm
5m
280mm
3m
220mm
1m
200
0
40mm

04092 Tillegra Dam

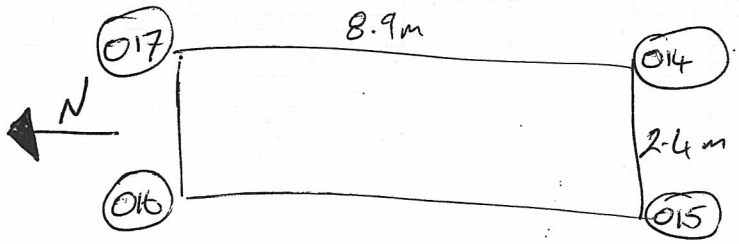
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 31/3/08

Test Area # Mummi House Area Dump Spit # Trench 4

Start Orientation and GPS Points



Description of deposit

(I) Dark brown sandy loam; very loosely packed; small to medium grass roots throughout, rounded river pebbles up to 30mm Ø and broken cobbles throughout deposit; charcoal fragments throughout brick fragments throughout, see below

(II) Mottled dark brown/light brown/orange clay; slightly compact, hard & crumbly; grass roots continue to base; charcoal smears & burnt clay visible throughout; brick fragments still visible in clay.

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

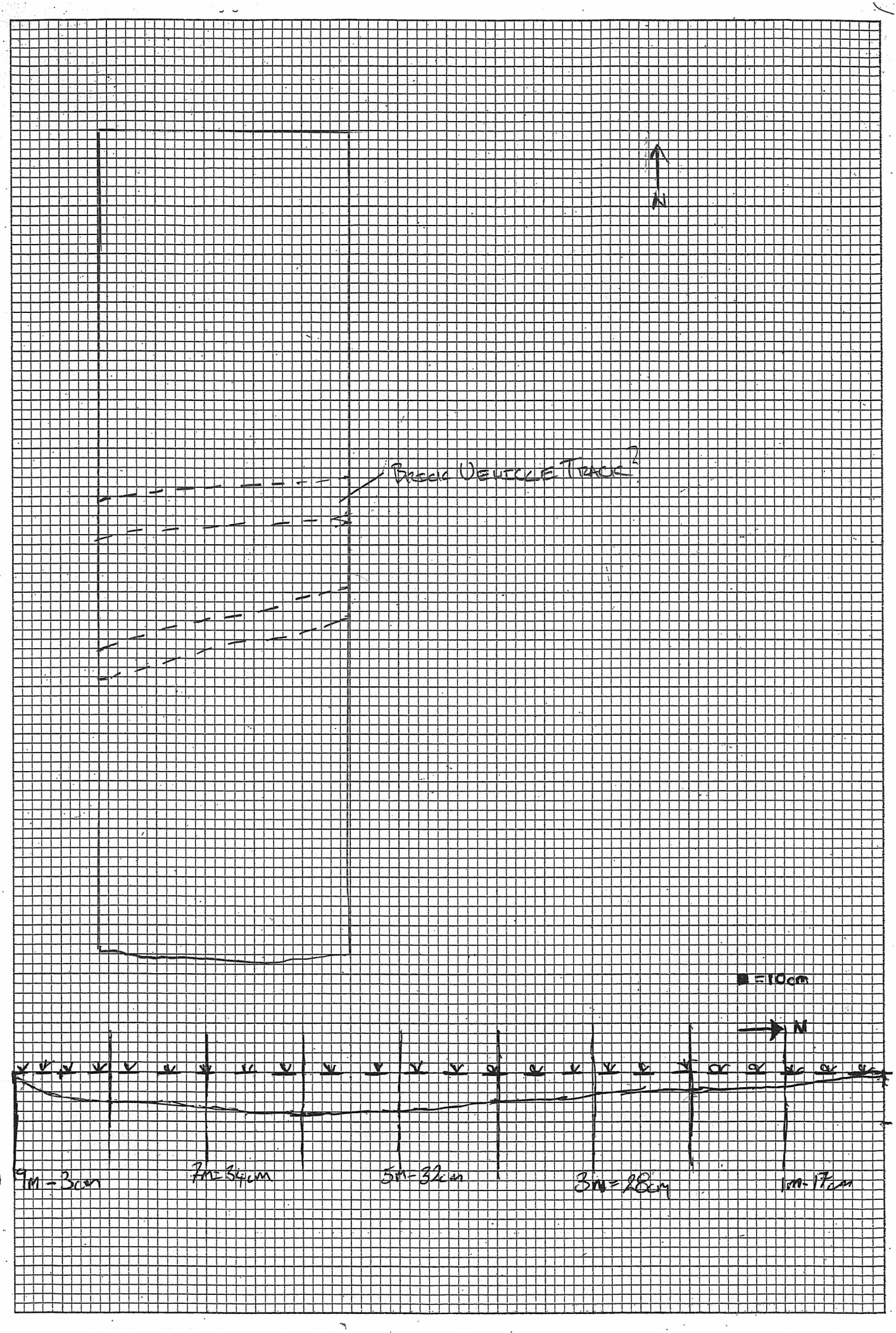
(I) 0 - 16cm

(II) 16 - base (varying, see over)

Methods & Conditions & Other comments (hand excavated/sieved etc.)

A feature was present (as shown over) and was two parallel lines of sandstone brick rubble and some gravel.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)


N
BRECIA VEHICLE TRACK?
■ = 10cm
N
9M - 3cm
7M - 34cm
5M - 32cm
3M = 28cm
1M - 17cm

04092 Tillegra Dam

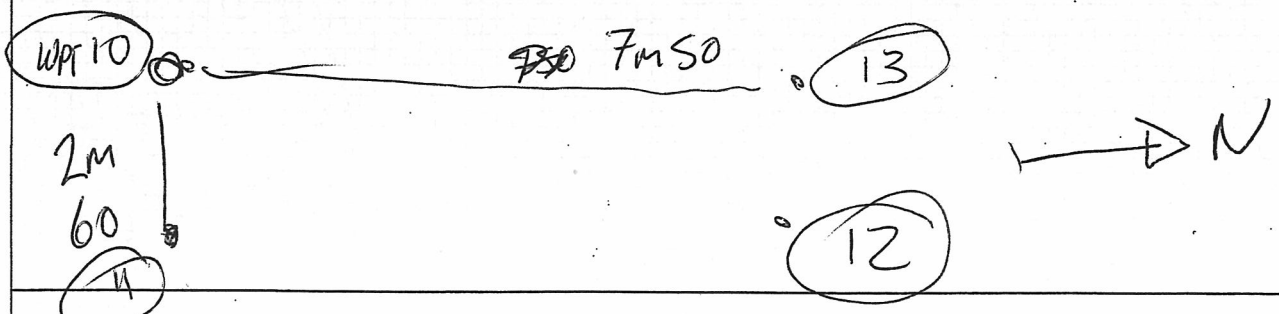
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 31/3/08

Test Area # Munni/Howe D1 Trench 3 Spit # ~~50~~ Not spitted

Start Orientation and GPS Points



Description of deposit

Dark brown loamy topsoil texture contrast soils comes on to mottled clay light brown/yellow V hard

Include

Colour

Compaction

Composition/particle size

Inclusions

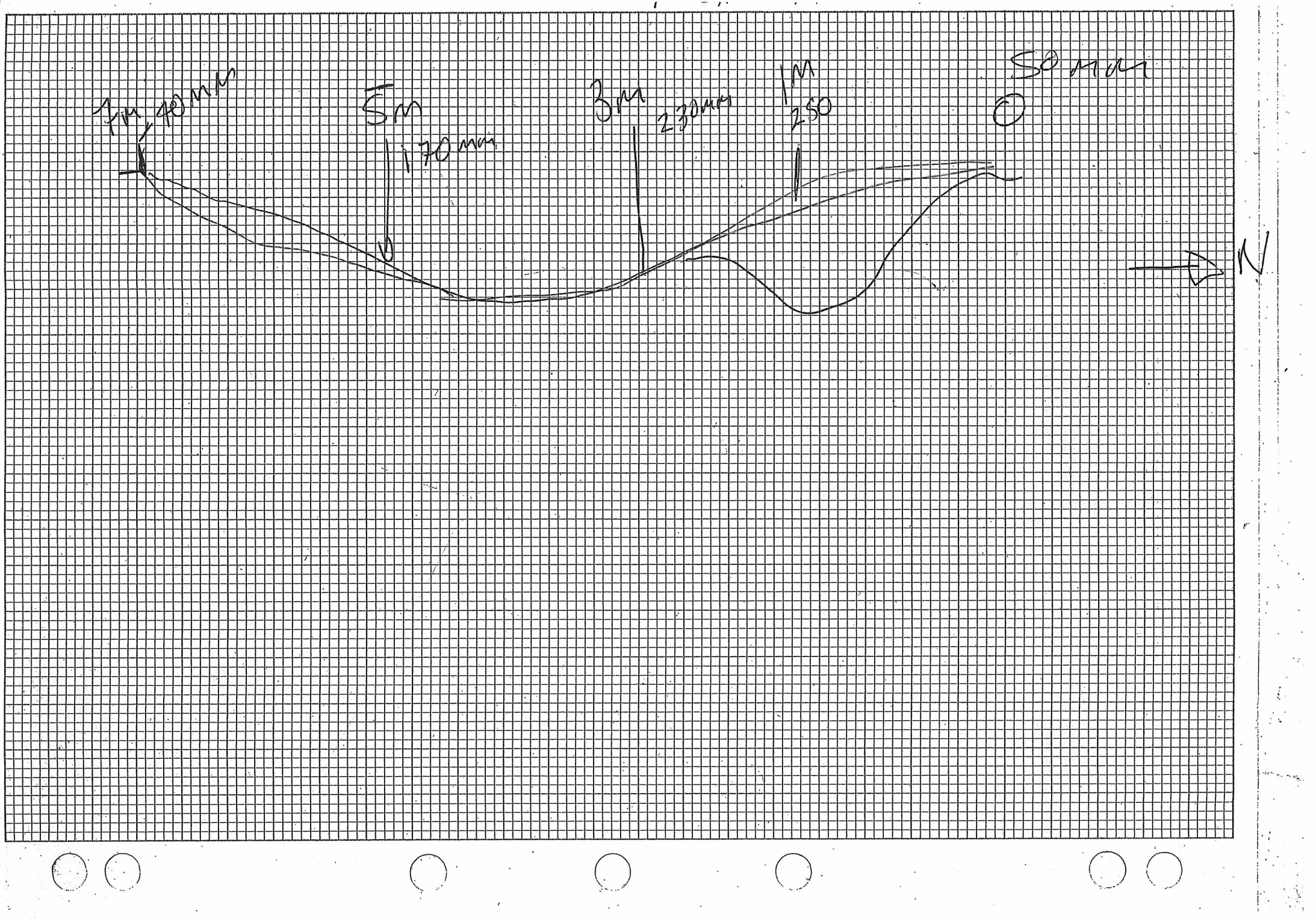
Thickness & extent

No artefacts

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Scraped off grass + then excavated w machine trowelled through spoil

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)


7m
40mm
5m
170mm
3m
230mm
1m
250
0
50mm
N

04092 Tillegra Dam

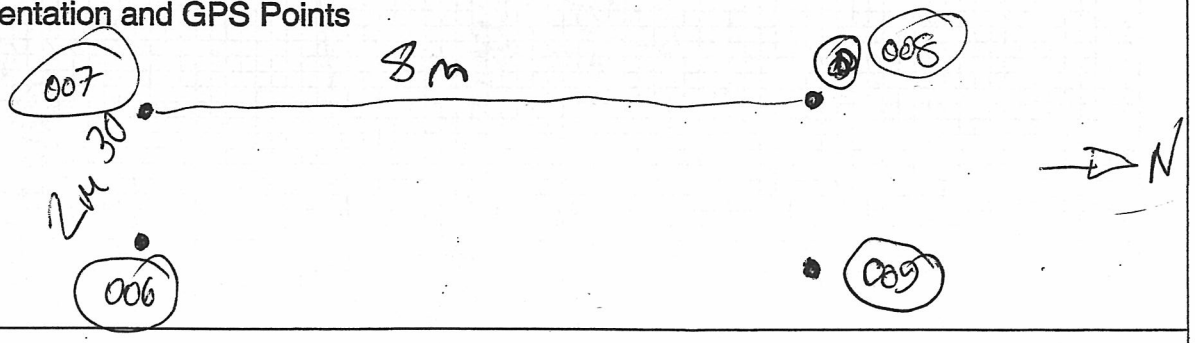
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 31/3/08

Test Area # Munni D1 Trench 2 Spit # Tr1 Not spitted

Start Orientation and GPS Points



Description of deposit

Dark brown loamy topsoil large peds
Some gravel — coming onto clay.
large area of burnt - ?tree stump including burnt clay.
mottled clay grades to yellowy clay

Include

Colour

Compaction

Composition/particle size

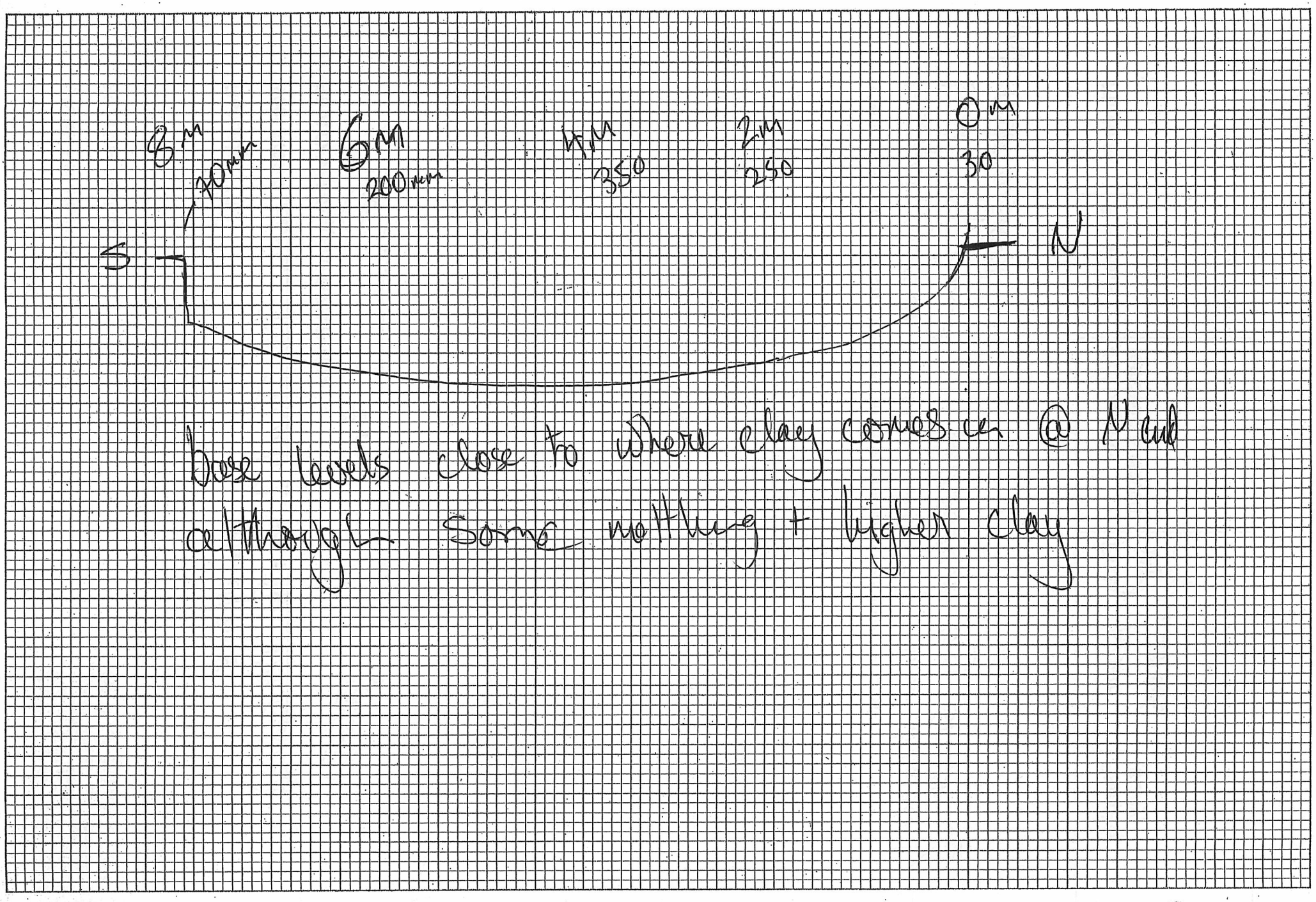
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Scraped grass off w claw bucket - then trowelled/Loe back by hand - followed by scrape w front mud bucket

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
1 ✓		Nil	bagged ?volcanic + FGS = wpt 005	



base levels close to where clay comes in @ N end although some melting + higher clay

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

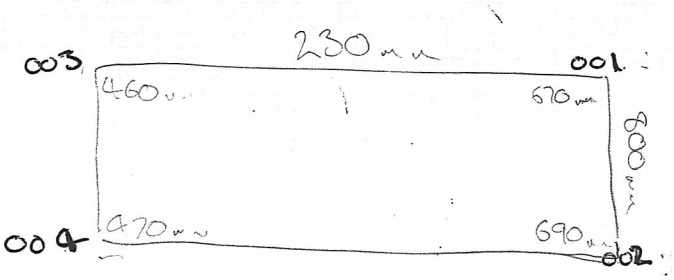
Recorder: VH

Test Area # Munni House D1

Date: 31/3/08

~~Spit #~~ trench 1

Start Orientation and GPS Points



WAYPOINTS as shown

Description of deposit

Light brown to grey silt with a ferric tinge, fine grained with no visible inclusions. Depth between 300 - 340mm. Thick grass cover with roots to a depth of 200mm.

Include

Colour

Compaction

Composition/particle size

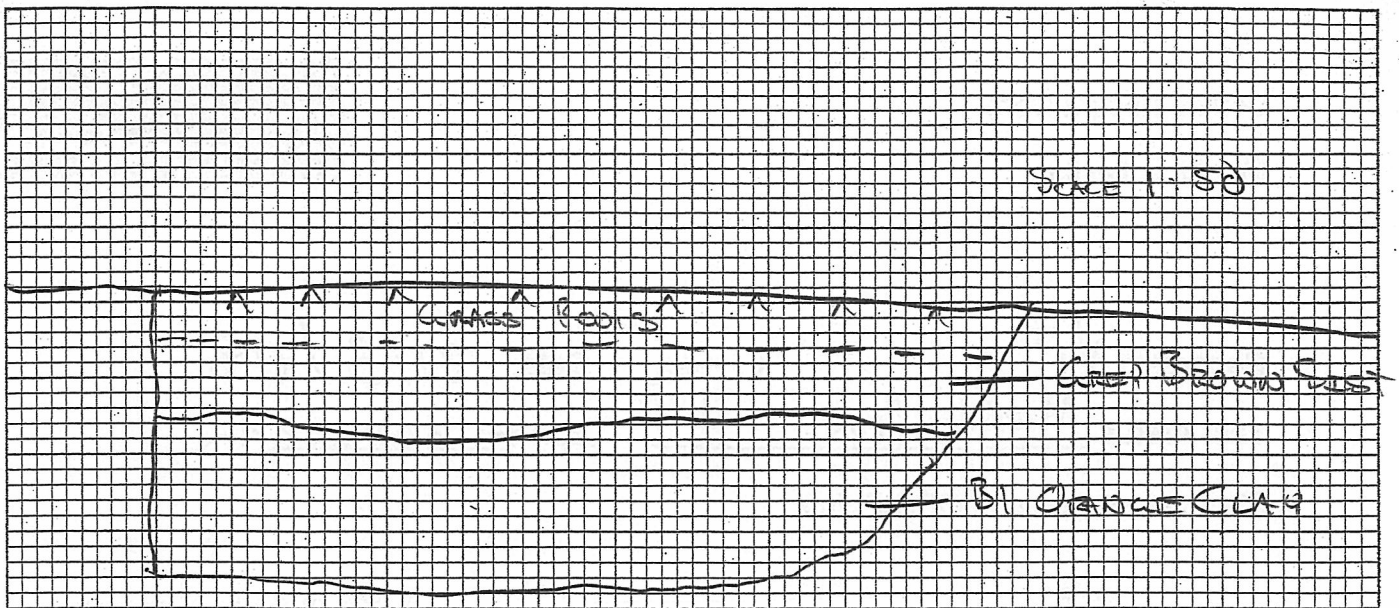
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Test trench to grope soil horizon depth sorted and examined by hand.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		–	None.	



ORANGE BROWN CLAY
VERY FINE GRAINED
NO VISIBLE INCLUSIONS
QUITE SANDY

04092 Tillegra Dam

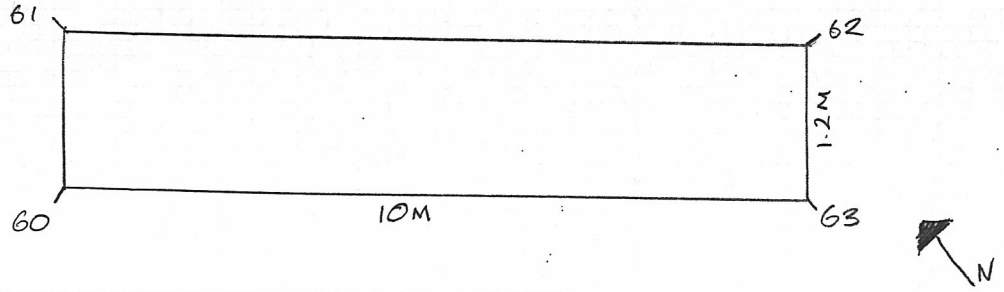
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: Date: 3.4.08

Test Area # AREA B1 TRENCH 2 Spit # 1

Start Orientation and GPS Points



Description of deposit

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

(I) Grey brown fine grained clayey silt (clamp) slightly compact. Very weak; river cobbles up to 25mm(L), varying btwn flat & spherical; pitted iron rich cobbles scattered throughout, degraded sandstone & shale gravels; grass roots throughout layer, no visible evidence of burning. Base of layer btwn 100-150mm

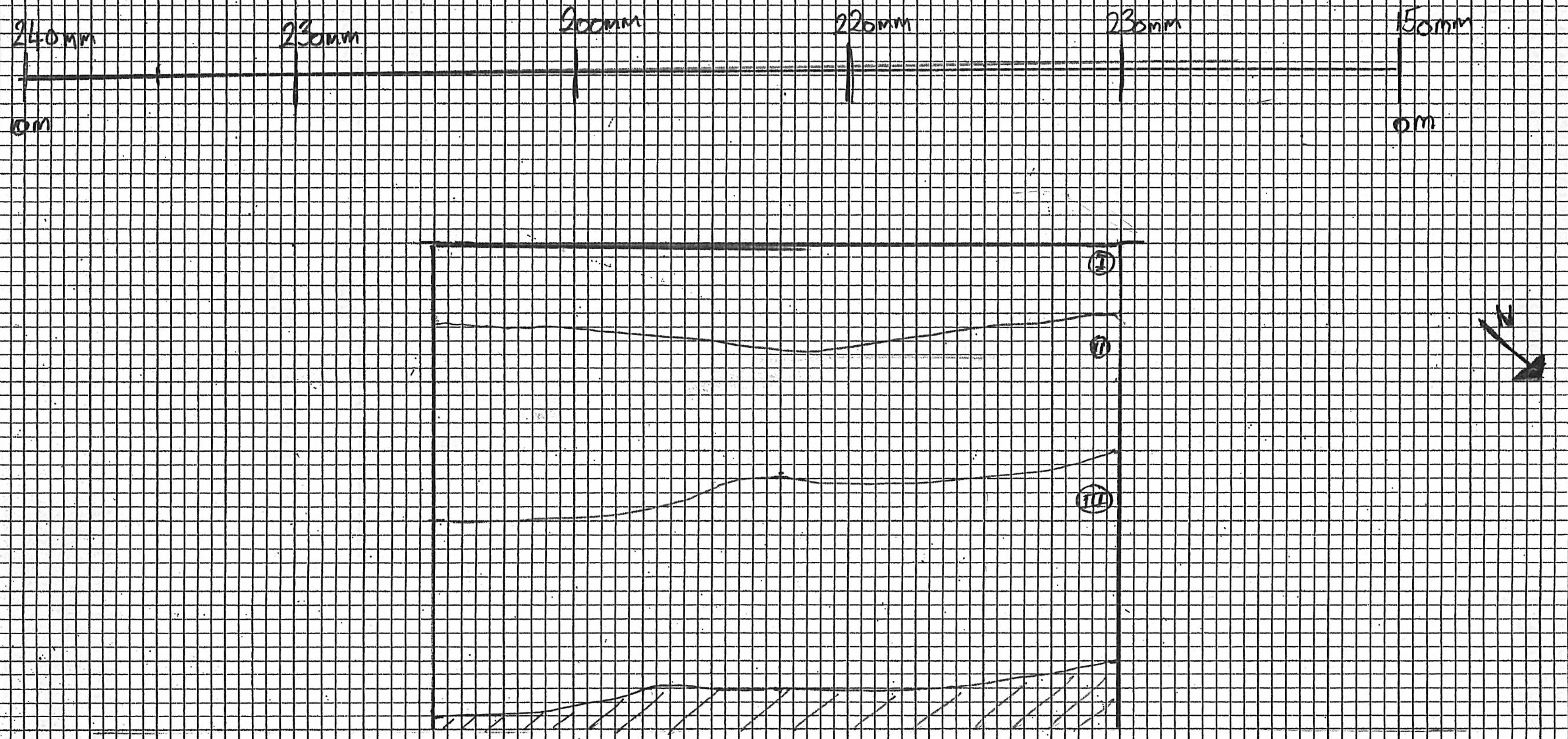
(II) Mottled grey/orangey brown clay; gravels/cobbles continuing from above; grass roots continuing to base.

(III) Yellow/Orange clay with grey brown mottling; large river cobbles & degraded shales, pitted dense ironstone, 2.5YR4/4 as above in (II)

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Grass first removed to a maximum depth of 150mm

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)



240mm
230mm
200mm
220mm
230mm
150mm
0m
0m
I
II
III
N

04092 Tillegra Dam

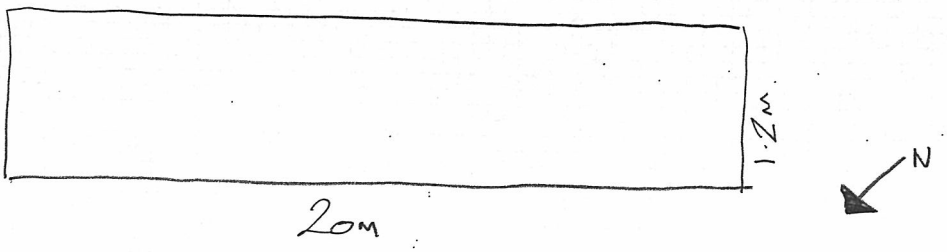
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: K.M. Date: 3.4.08

Test Area # Area B1 TRENCH 1 Spit # 2

Start Orientation and GPS Points



Description of deposit

Pale brownish grey clay & silty clay (clamp) slightly compact; some degraded sandstone inclusions throughout; degraded shale, river cobbles & pebbles, up to 10% maximum diameter 200mm

Munsell: Topsoil – Grey Brown ~~10YR~~ 10YR 4/2

Clay – Grey/brown 10YR 3/2 with mottling of orange brown 10YR 5/6.

Include

Colour

Compaction

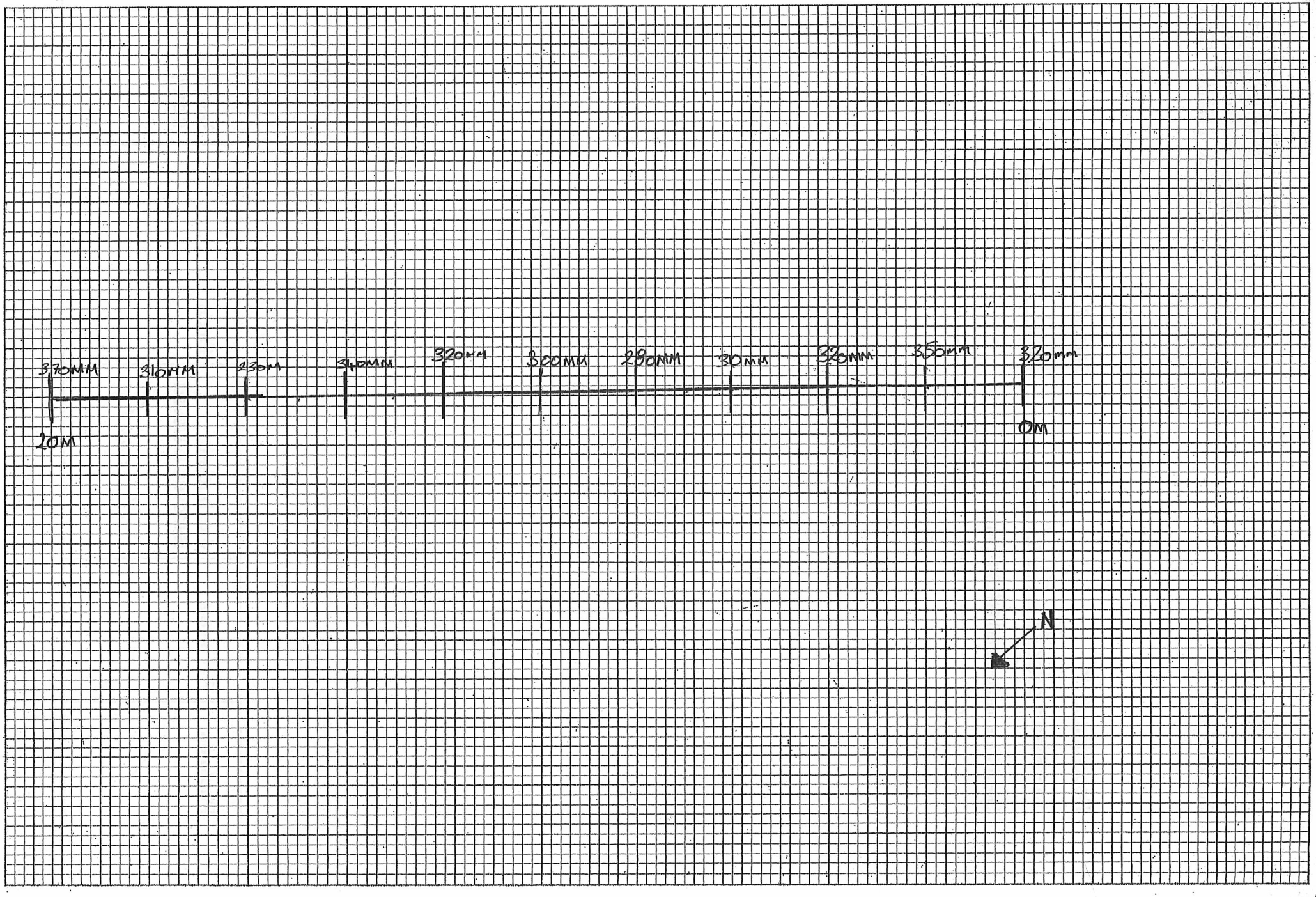
Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		2 sieved		


370MM
310MM
230M
340MM
320MM
300MM
280MM
30MM
320MM
350MM
370MM
20M
0M
N

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: Ben

Date: 03/04/08

Test Area # Area B3

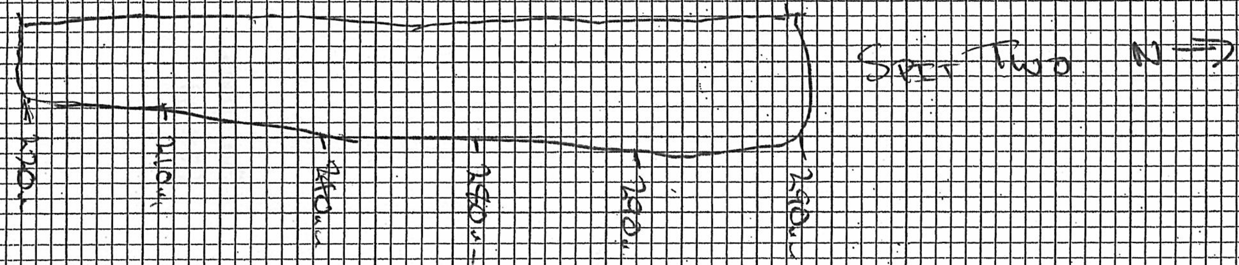
~~Spit #~~ Deep Pit

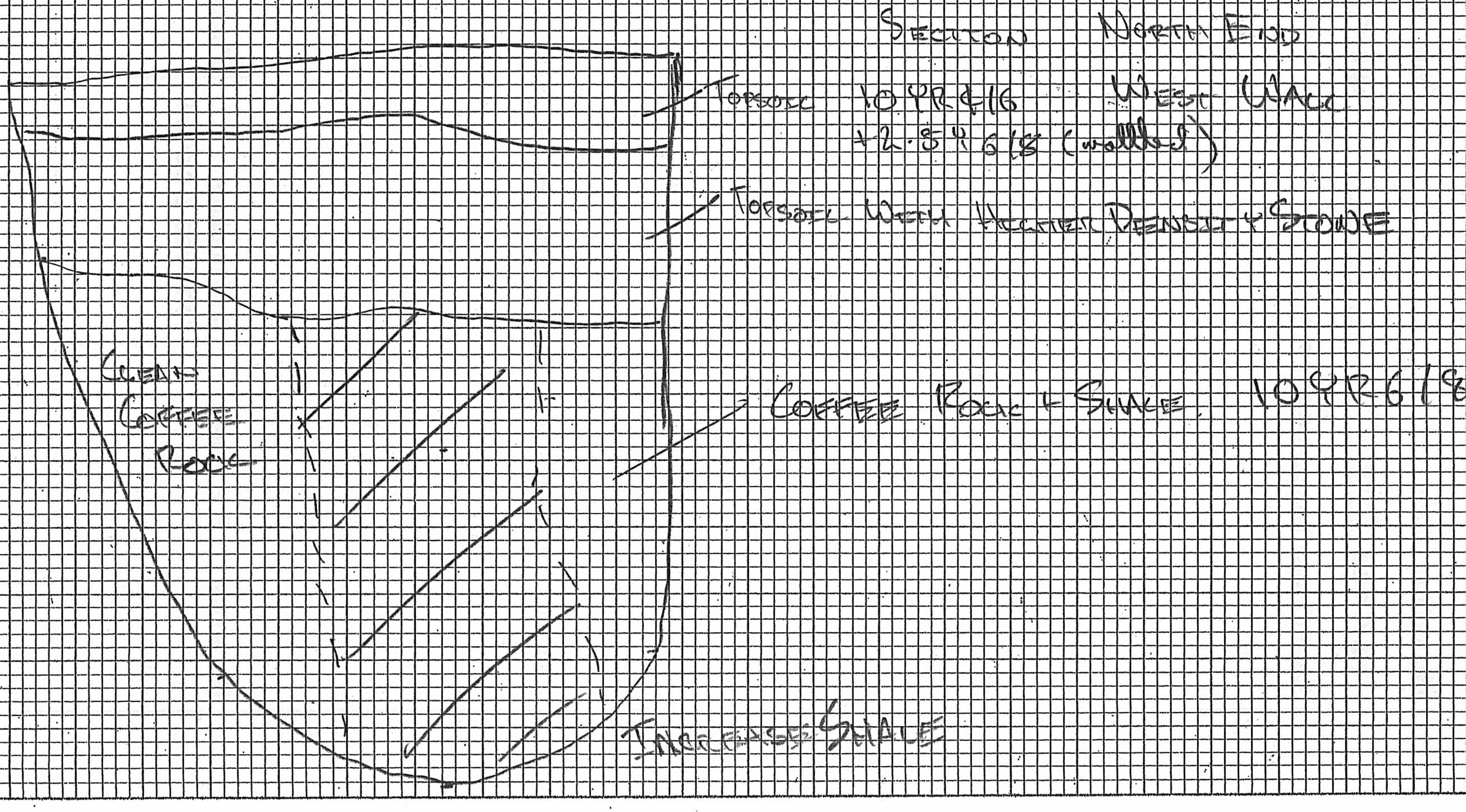
Start Orientation and GPS Points

Description of deposit	**Include** Colour Compaction Composition/particle size Inclusions Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)


SPIT TWO N →
170cm
210cm
240cm
280cm
290cm
290cm


SECTION NORTH END WEST WALL
TOPSOIL 10YR4/6 +2.5Y6/8 (mottled)
TOPSOIL WITH HIGHER DENSITY + STONE
COFFEE ROCK + SHALE 10YR6/8
CLEAN COFFEE ROCK
INCREASED SHALE

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

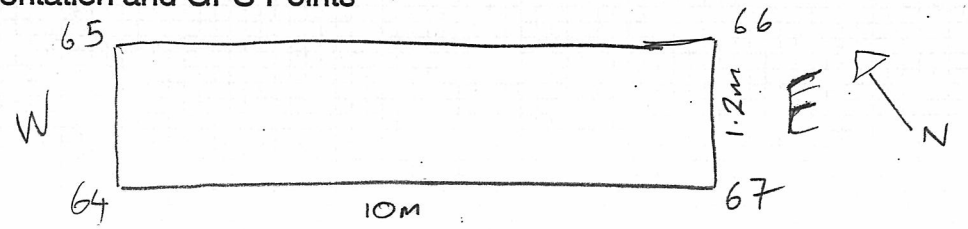
Recorder:

Date: 13.4.08

Test Area # Area B2

Spit # 1 only 1 spit

Start Orientation and GPS Points



Description of deposit

Mid- Dark brown loose clayey silty loam fine grained loose - increasing compact + clay - 1 spit only - dark brown + orange brown clay @ base

Topsoil 5YR 3/3 - 3/4 Dark reddish brown

Clay 7.5YR 3/4 - 3/3 Dark brown

Include

Colour

Compaction

Composition/particle size

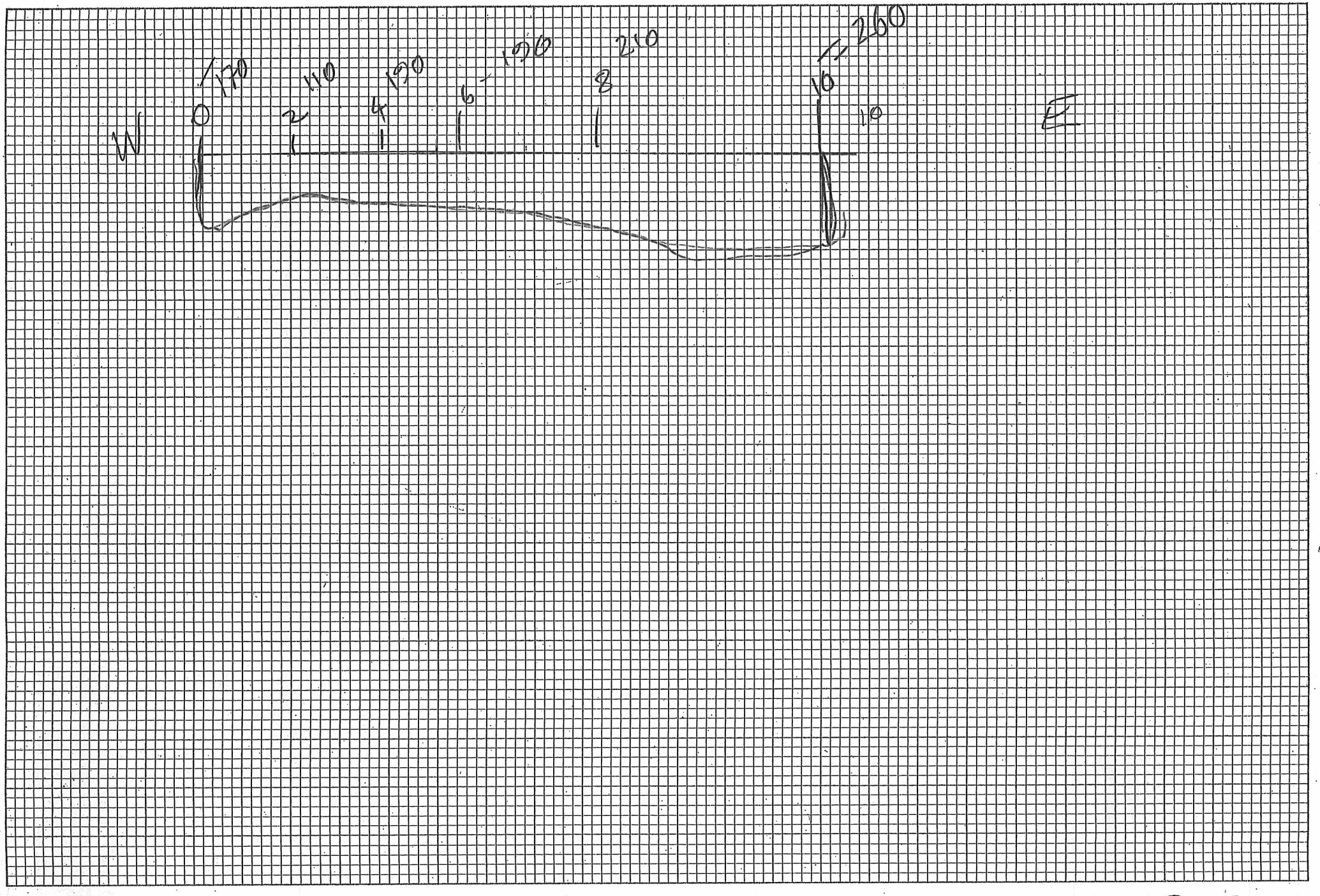
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Grass layer removal depth 10mm 20 - 70mm

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
/				


W
E
0
2
4
6
8
10
170
110
120
120
240
260
10

04092 Tillegra Dam

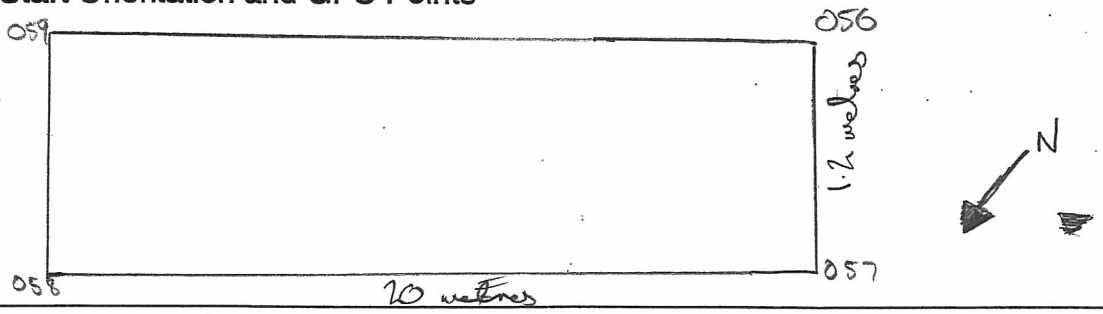
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: BEN Date: 03/04/08

Test Area # AREA B1 TRENCH ONE Spit # 1

Start Orientation and GPS Points



Description of deposit

A dark brown to very dark brown fine grained silty loam with a firm texture and inclusions of stone up to 70mm in diameter several quartzite fragments and a few river cobbles ranging in size from 50mm - 400mm in diameter

Undulating clay surface 6hsn 200-250mm

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Grass removed first to a depth of between 50 - 120mm within gross removal several fragments of European ceramics and glass were located as well as several possible aboriginal artefacts and sandstock brick fragment and bone in spit one proper.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		5 buckets sieved	Ceramics, bone Glass, brick Metal Possible flakes.	

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

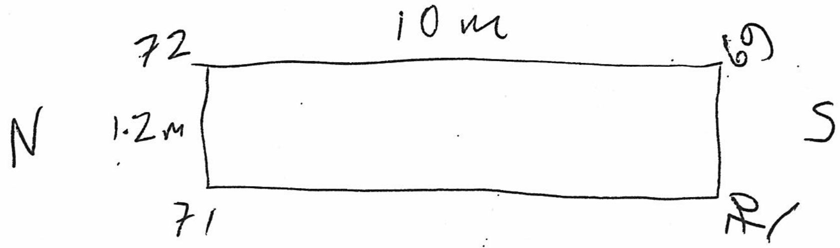
Recorder: VH

Date: 3/4/2008

Test Area # B3 Trench 1

Spit # 1

Start Orientation and GPS Points



Description of deposit

mid brown friable ~~[illegible]~~ silty loam
lots of river pebbles
clay content
mottled yellow orange clay
nr base

Include
Colour
Compaction
Composition/particle size
Inclusions
Thickness & extent

110 — 250

Methods & Conditions & Other comments (hand excavated/sieved etc.)

machine off grass — 10 — 100mm

Rocks like river rolled shale. high iron content

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓				

04092 Tillegra Dam

Machine Testing

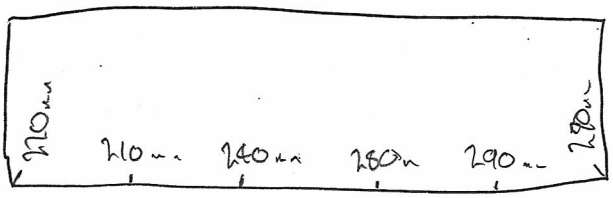
CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 3/4/2008

Test Area # Area B3 Trench 1 Spit # 2

Start Orientation and GPS Points

N



S

Description of deposit

Gravelly mid-light reddish brown yellow/orange inclusions. gravel - increase clay content clayey silt

Include

- Colour
- Compaction
- Composition/particle size
- Inclusions
- Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 2/4/2008

Test Area # Area E trench 1 Spit # 1

Start Orientation and GPS Points	

Description of deposit – Removed V. long grass Dark brown silty loam topsoil grading into light grey silt - fine grained Ironstone & Manganese inclusions Some Shale Spit = 150 – 300 mm	**Include** Colour Compaction Composition/particle size Inclusions Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)
machine + shovel clean up - then investigated via trowel.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		Sample approx 16 buckets	fractured river pebble material	

04092 Tillegra Dam

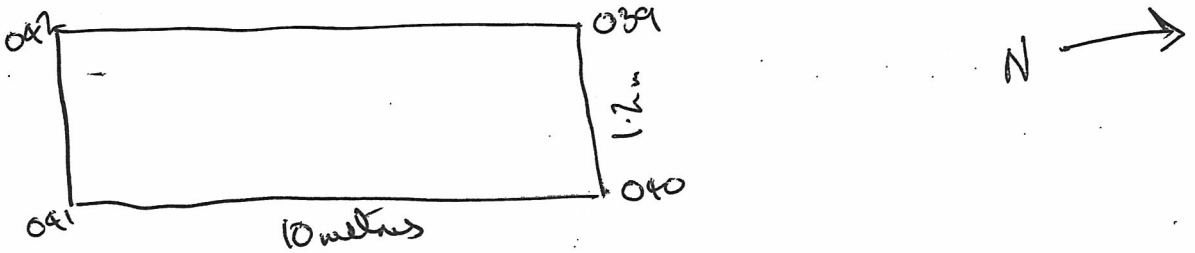
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: B.S. Date: 02/04/08

Test Area # Area E Trench 2 Spit # 1

Start Orientation and GPS Points



Description of deposit

Mid to light brown grey fine grained silt, mottled with a high level of grass roots with small amount of sandstone inclusions up to 20mm in diameter, this layer is between 80mm and 120mm onto orange brown fine grained clay

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated with mud bucket.

Grey brown silt 10YR 7/2
Brown silt 10YR 5/3 (other layer)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
	-	4 sieved		

04092 Tillegra Dam

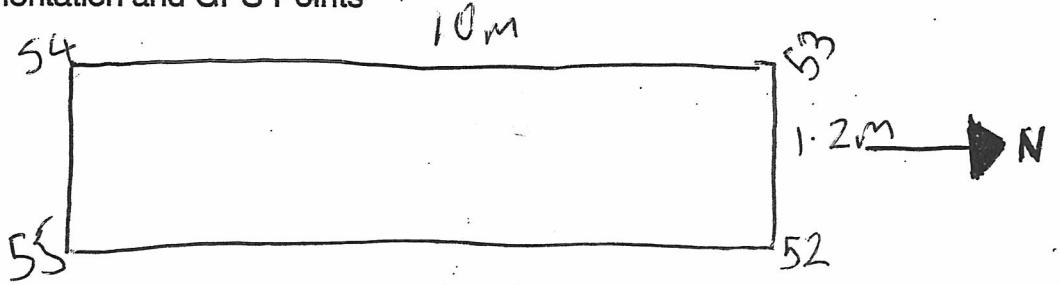
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: KM Date: 2/4/08

Test Area # E2 TRENCH 2 Spit # (1)

Start Orientation and GPS Points



Description of deposit

reddish brown topsoil - N end of trench V. large sandstone (v degraded) boulders - some river cobbles
iron inclusions
~~shale & sandstone~~

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

230mm ~~depth~~ - 330mm SPIT Depth (including grass removal)

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machined off grass - approx 50 - 100mm depth.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓				

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

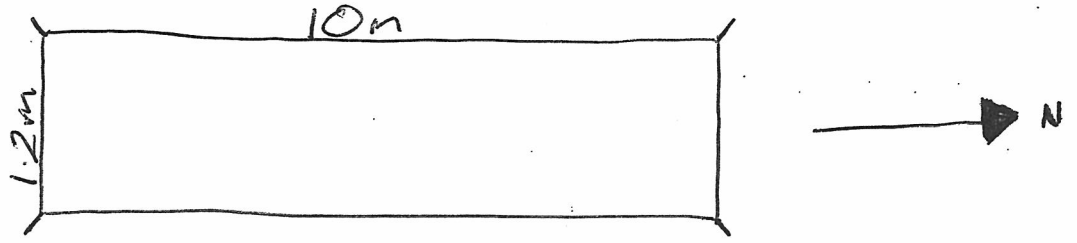
Recorder: KM

Date: 2.4.08

Test Area # E2 Trench 2

Spit # [redacted] (2)

Start Orientation and GPS Points



Description of deposit

very fine grain pale yellow brown silt, very loosely packed; some river pebbles/cobbles, reduced from DISTRIBUTION previous layer, large sandstone cobbles throughout, very degraded; some visible charcoals fragments throughout, up to 20mm Ø, less than 5%

Spit depth btwn 300-380mm

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

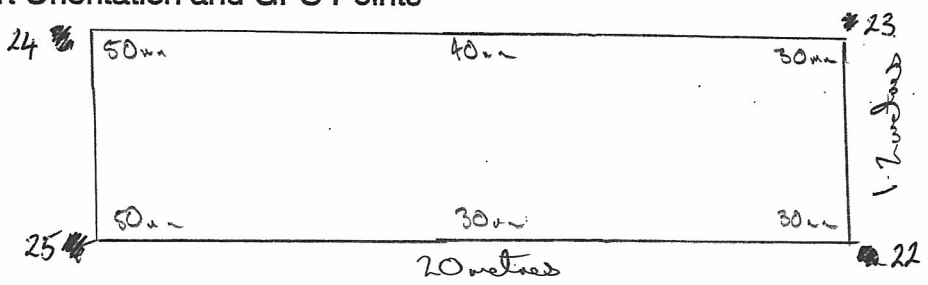
Recorder:

Date: 1/4/08

Test Area # Yinnar House "D2"

Spit # TRENCH 1 GRASS REMOVAL

Start Orientation and GPS Points



WAYPOINTS 1 = 22
2 = 23
3 = 24
4 = 25

N

Description of deposit

Mid brown alluvial deposit with substantial grass roots to a depth of 30mm. This was essentially the removal of grass. Large rounded river boulders. 30-50mm in thickness, fine grained.

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Grass removed with machine / mud bucket

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
			N/A	

04092 Tillegra Dam

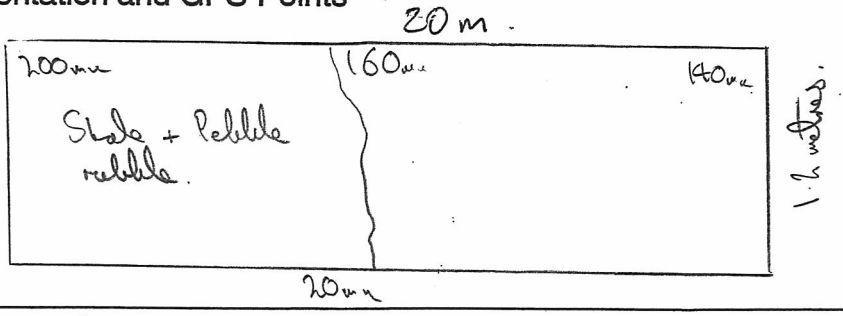
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: TRENCH ONE Date: 01/04/08

Test Area # MAINE HOUSE D2 Spit # ONE

Start Orientation and GPS Points



Description of deposit

A mid to dark brown, fine grained silt with a firm texture containing large (140mm) boulders as well as a considerable deposit of shale and smaller river stones in the eastern half of the trench. Some sandstone boulders (130mm) were also present in the eastern half of the trench.

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated with a 1200mm wide mud bucket to a depth of approx 100mm depth for the spit.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
			N/A.	

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

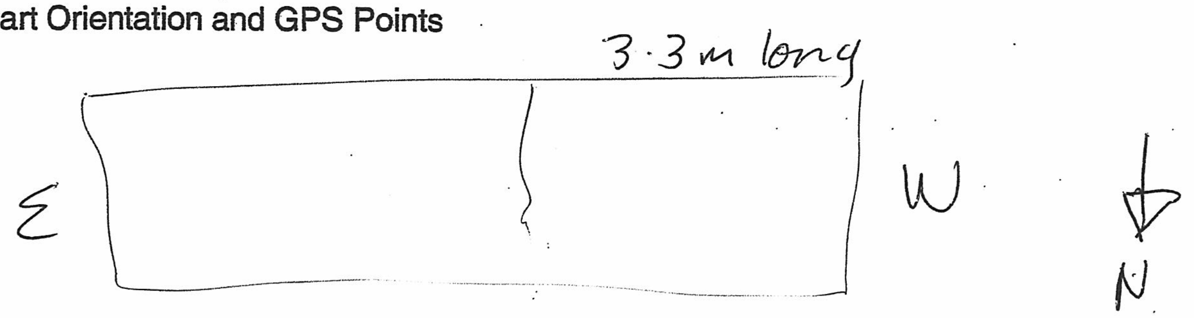
Recorder: VN

Date: 1/4/08

Test Area # ~~D~~ D2 Trench 1

Spit # 2

Start Orientation and GPS Points



Description of deposit

Only west end trench taken down
river bed deposit
dark brown silty loam ~~R Si~~ w
lots shale + river cobbles.

Include 7.5YR 3/4 munsell topsoil

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

290 270 280 mm from surface

Methods & Conditions & Other comments (hand excavated/sieved etc.)

machine excavated 100 - 150 mm from previous spit

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓	—	None	None	—

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH

Date: 1/4/08

Test Area # D2 Trench 2

Spit # not spitted

Start Orientation and GPS Points
WPt #26 (centre point) ~~120m~~ 1.2m (bucket 2.30 long Roughly N-S

Description of deposit	Include
7.5YR 3/3 – 3/4 dark brown ~~Silty~~ clayey Silt fine grained 700mm depth hit (V little until 700m occasional small river pebble) mid-compact	Colour Compaction Composition/particle size Inclusions Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)
Sieved 2 sample buckets. – dry sieve.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓	/	approx 2	None	/

04092 Tillegra Dam

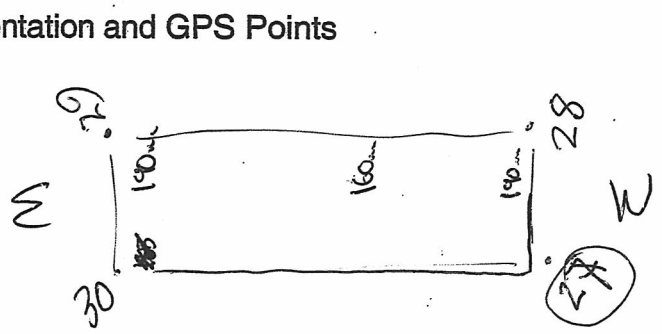
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 1/4/08

Test Area # Area D2 trench 3 Spit # (1)

Start Orientation and GPS Points



Description of deposit

Topsoil - dark brown silty clayey loam moderately loose. fine grained tiny gravel + ironstone

Coming very sandy - sandy clay tiny bits of shale

Coming on to yellow/brown clay in place.

Include

Colour mottled yellow grey

Compaction sand + clay alluvial

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

grass stripped w machine 5 - 50mm

odd bit of ironstone river pebble

Sandy alluvial mottled deposit

Euro ceramic artefacts

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		✓		

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

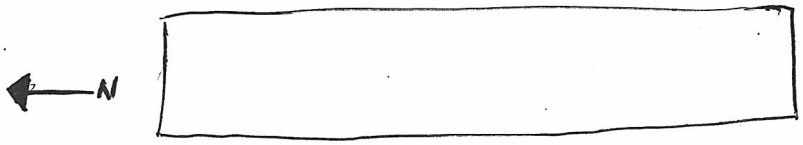
Recorder:

Date: 7.4.08

Test Area # Mann House "D2"

Spit # TRENCH 4 - SPIT (1)

Start Orientation and GPS Points



Description of deposit

dark brown loamy silt, very slightly compact extremely weak & crumbly; fine grass root systems continue to base of spit; very few gravels less than 1% large river cobble rubble at base at S end of trench; some mixed clay/loamy silt toward base of spit - undulating clay surface, mottled brown/ orange/greyish colour

Spit down approx 200mm

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machined after grass removed

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓			2x flaked river pebble	

04092 Tillegra Dam

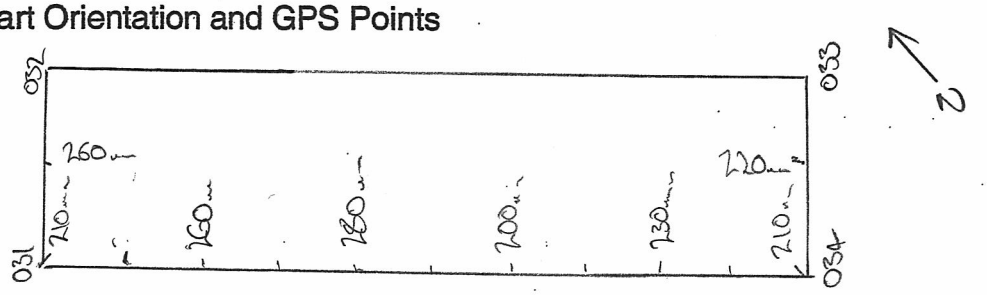
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: BEN Date: 01/02/09

Test Area # AREA D2 TRECH 4 Spit # 2

Start Orientation and GPS Points



Description of deposit

Medium grained, yellow brown clayey sand with small fragments of sandstone and shale with a firm to compact texture up to 110mm in thickness with small amounts of fine ferrous

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated with mud bucket in offset 100mm spits.

Dark brown silt 7.5 YR 4/2

Sandy Clay 10YR 5/3 + mottled 5/6

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
			2 artefacts.	

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

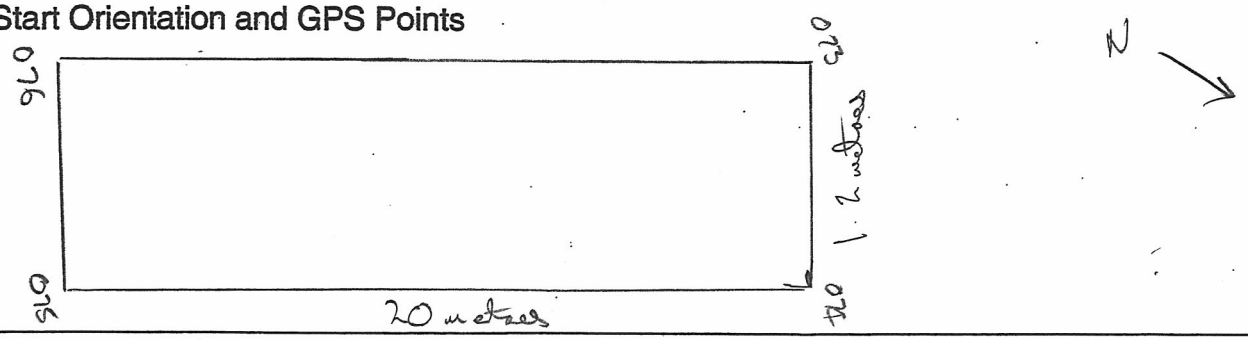
Recorder: BEN

Date: 04/04/08

Test Area # AREA F TRENCH ONE

Spit # ONE

Start Orientation and GPS Points



Description of deposit

A mid to dark brown, firm, very fine grained silty loam containing small sandstone inclusions Cross roots to a depth of 30 mm and the deposit was a depth of between 150mm and 170mm. below this is a layer of grey brown fine grained sandy silt with sandstone inclusions approx 60 - 80mm in depth

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated test trench with mud bucket, material inspected and sample sieved. Cross removed initially to a depth of 30 - 50mm

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		4 buckets sieved		

04092 Tillegra Dam

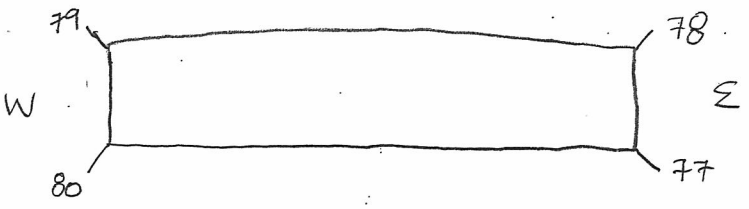
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: K. H. Date: 4.4.08

Test Area # F - Trench 2 Spit # 1

Start Orientation and GPS Points



Description of deposit

(I) Greyish brown coarse grained silt, slightly compact, very weak, gravels visible throughout spit, ~p to 20mm(L), primarily less than 5mm, degraded sandstone & some small river pebbles also visible

(II) Pale greyish/yellow brown sandy silt with mottled clayey inclusions, very coarse grained ironstone & sandstone visible; small gravels continue as above, undulating surface beginning between 120-150mm and continuing to base

Depth of spit blw 150 - 200mm

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Spit begins at top of grass removal - blw 30 - 50mm depth

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		Sample 10 buckets		

APPENDIX D: DECC SITE CARDS

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 1	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	within the site of the proposed Tillegra Dam on the Williams River northeast of Dungog.				
How to get to the site	On Salisbury Road go to 'Munni House'. when in the driveway with the house to the right, the site is within the next paddock on a flat area overlooking the river flats. Area 'D1' on attached map.				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	374385	**AMG Northing**	6426416
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

Site type(s)	Open Camp Site/artefact scatter	**Site type code (NPWS use only)**	

Description of site and contents

CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock.
DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types.
ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination.
BURIALS: number & condition of bone, position, age, sex, associated artefacts.
TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth.
QUARRIES: rock type, debris, recognisable artefacts, percentage quarried

a total of 21 artefacts uncovered from 4 of 5 test trenches

1 complete denitculate tool/possibly flake, basalt grey with water-rolled cortex 37x48mm 4 flake scars
1 proximal flake, grey basalt with 1-25% water-rolled cortex max 31.5mm
1 proximal flake, grey basalt 1-25% water-rolled cortex max dimension 27.1mm
1 distal flake, grey basalt, hinge termination with 50-100% water-rolled cortex conjoin with above flake
1 proximal flake grey hornfels, 0cortex max dimen. 36.3mm
1 multidirectional core grey hornfels, 1-25% water-rolled cortex30.6x31.6x11.8mm (length x width x thickness)
complete flake grey hornfels, feather termination, 100% water-rolled cortex 28.2x29.7x5.8mm
1 broken flake, grey hornfels 0cortex, max 32.2mm
1 bi-polar core, grey hornfels, 25-50% water-rolled cortex, 52.3x36.5x34.3
1 complete flake, feather termination, grey hornfels, 1-25% water-rolled cortex 42.8x26.4x14.2mm
1 complete burnt flake, hinge termination, grey hornfels, 0cortex, 35.7x32.3x9.9mm
1 distal flake, feather termination, grey hornfels, 1-25% water-rolled cortex, burnt max dimension 42.3mm
1 proximal flake, grey hornfels, 1-25% water-rolled cortex max dim. 54.5mm
1proximal flake grey hornfels 0cortex, max dim. 38.6mm
1 multidirectional core, grey hornfels, 1-25% water-rolled cortex, 61.8x63x42.2mm
1 proximal flake red/grey hornfels, 0cortex, max dim. 26mm
1 complete flake, grey hornfels, feather termination, 1-25% water-rolled cortex 17.1x30.9x4.6
1 proximal flake, grey hornfels 0cortex max dim. 26.8mm
1 bipolar core, grey hornfels, 0cortex, highly weathered, 41.2x36.1x21.9mm
1 complete flake, grey fgs, feather termination, 0cortex, 15x16.4x2.1mm- potlid
1 proximal flake, grey silcrete, 0cortex, max dim 24.5mm

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	elevated terrace over river	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	volcanic river cobbles			**Land use/effect**	grazing land
Distance from drinking water	100m			**Source**	Williams River
Resource zone (eg. estuarine, river, forest)	riverine			**Vegetation**	cleared
Edible plants				**Faunal resources** (include shellfish)	
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

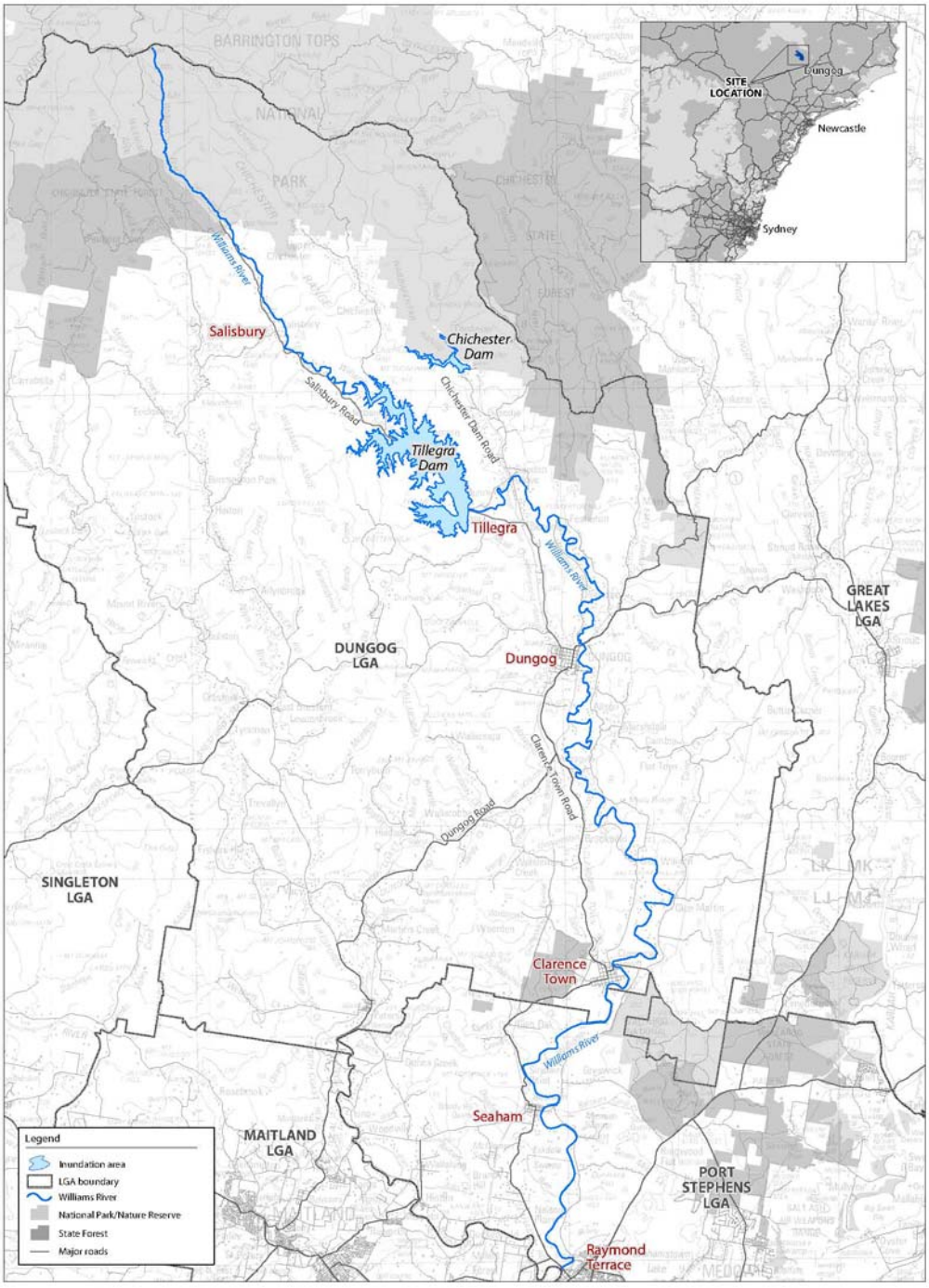
SITE MANAGEMENT

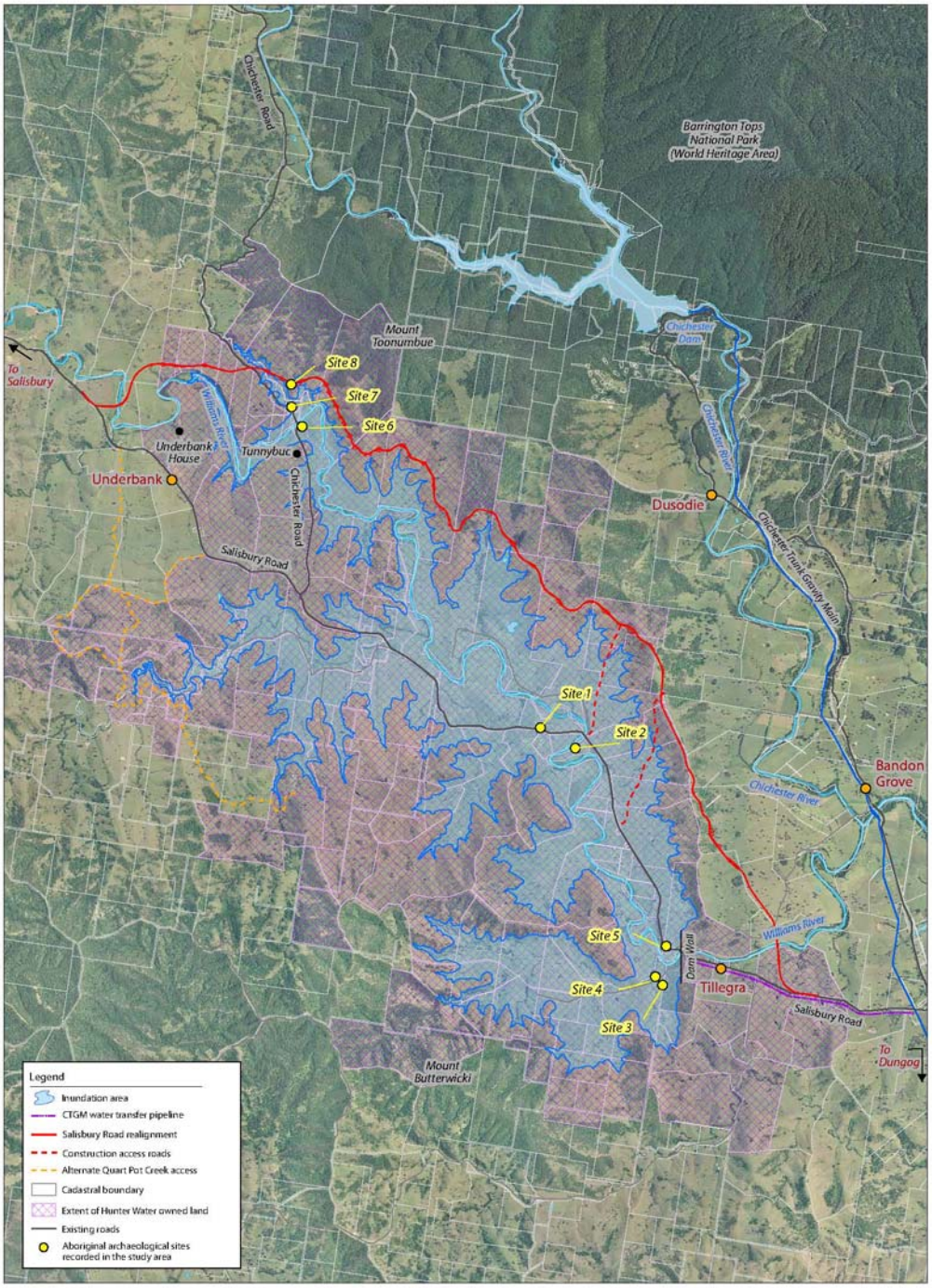
Site condition	Weathering	some disturbance from clearing and stock erosion.	
Management recommendations	further salvage and testing in the area of the proposed dam.		
Have artefacts been removed from site	Yes	**When**	31/3/2008
By whom	Vanessa Hardy	**Deposited at**	in negotiation
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Part 3A testing for EA

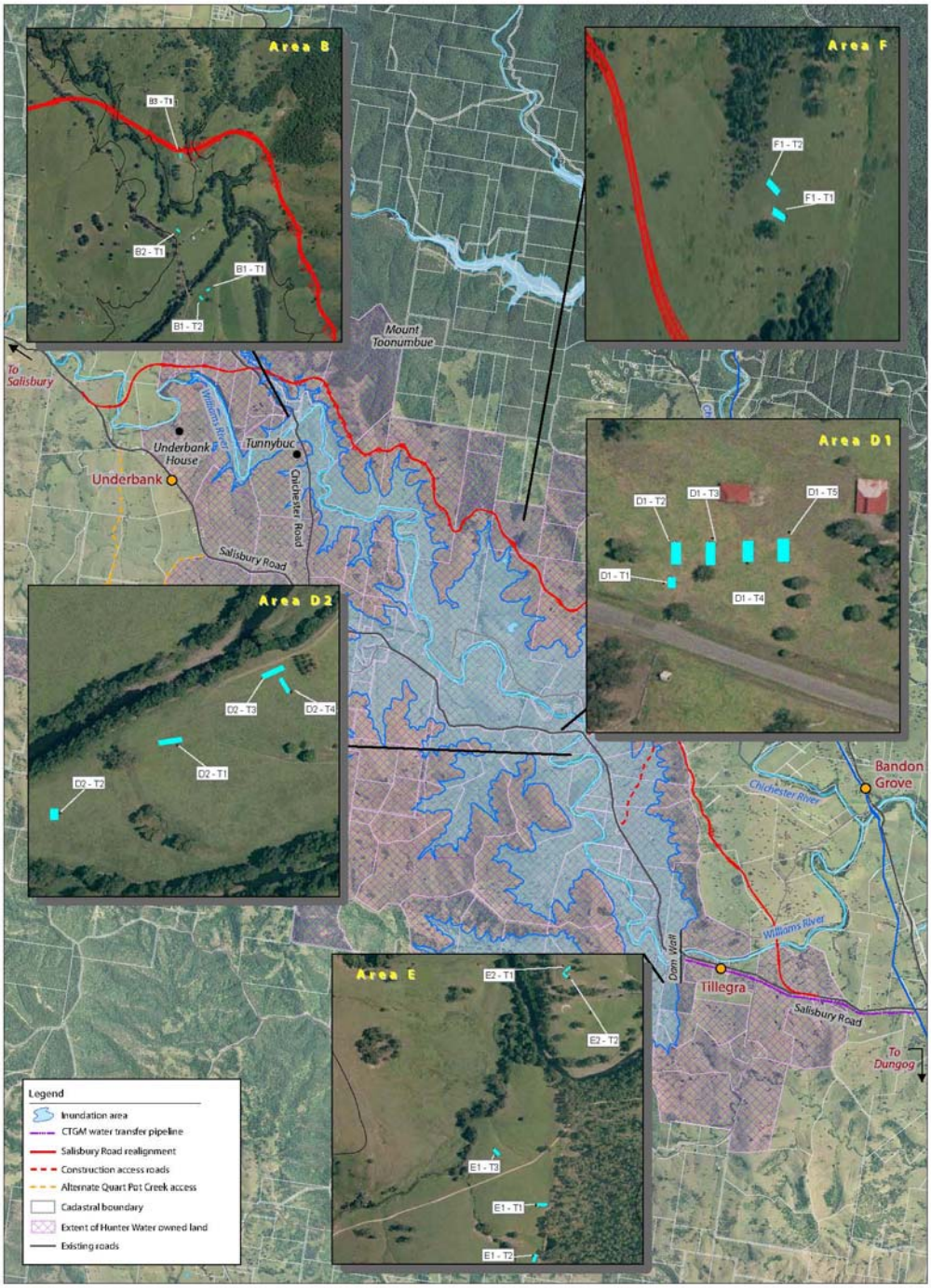
SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	31 March, 2008
Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203		

Version: June 1998	Data entered by:	Date entered:


BARRINGTON TOPS
NATIONAL
PARK
CHICHESTER
STATE
FOREST
SITE LOCATION
Dungog
Newcastle
Sydney
Williams River
Salisbury
Salisbury Road
Chichester Dam
Chichester Dam Road
Tillegra Dam
Tillegra
Williams River
GREAT LAKES LGA
DUNGOG LGA
Dungog
Clarence Town Road
Dungog Road
SINGLETON LGA
Clarence Town
Williams River
Seaham
MAITLAND LGA
PORT STEPHENS LGA
Raymond Terrace
Legend
Inundation area
LGA boundary
Williams River
National Park/Nature Reserve
State Forest
Major roads


Barrington Tops National Park (World Heritage Area)
Chichester Road
Mount Toonumbue
Chichester Dam
To Salisbury
Site 8
Site 7
Site 6
Williams River
Underbank House
Tunnybuc
Underbank
Chichester Road
Salisbury Road
Dusodie
Chichester Trunk Gravity Main
Site 1
Site 2
Bandon Grove
Chichester River
Site 5
Dam Wall
Williams River
Tillegra
Site 4
Site 3
Salisbury Road
To Dungog
Mount Butterwicki
Legend
Inundation area
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads
Aboriginal archaeological sites recorded in the study area


Area B
B3 - T1
B2 - T1
B1 - T1
B1 - T2
Area F
F1 - T2
F1 - T1
Mount Toonumbue
To Salisbury
Underbank House
Underbank
Tunnybuc
Williams River
Chichester Road
Salisbury Road
Area D1
D1 - T2
D1 - T3
D1 - T5
D1 - T1
D1 - T4
Area D2
D2 - T3
D2 - T4
D2 - T1
D2 - T2
Bandon Grove
Chichester River
Williams River
Dam Wall
Tillegra
Salisbury Road
To Dungog
Area E
E2 - T1
E2 - T2
E1 - T3
E1 - T1
E1 - T2
Legend
Inundation area
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 2	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	when travelling north along Salisbury Road, just before bridge of Williams River immediately south of Munni house there is a gate on the western side of the road, this leads to a terrace over a large bend in the Williams River (see attached maps area D2).				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	374874	**AMG Northing**	6426416
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

Site type(s)	Artefact Scatter/Open Camp SIte	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	2 artefacts retreived 1x notch tool of light grey hornfels with a break at the proximal end length 47.2 x width 46.5 x thickness 21.8mm 0% cortex 1x red/grey hornfels proximal scraper tool burnt, 1-25% water-rolled cortex max dimension 57.3mm		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	high terrace over Williams River	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	river cobbles			**Land use/effect**	grazed and cleared, partly disturbed
Distance from drinking water	<100m			**Source**	Williams River
Resource zone (eg. estuarine, river, forest)	River			**Vegetation**	cleared
Edible plants				**Faunal resources** (include shellfish)	
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

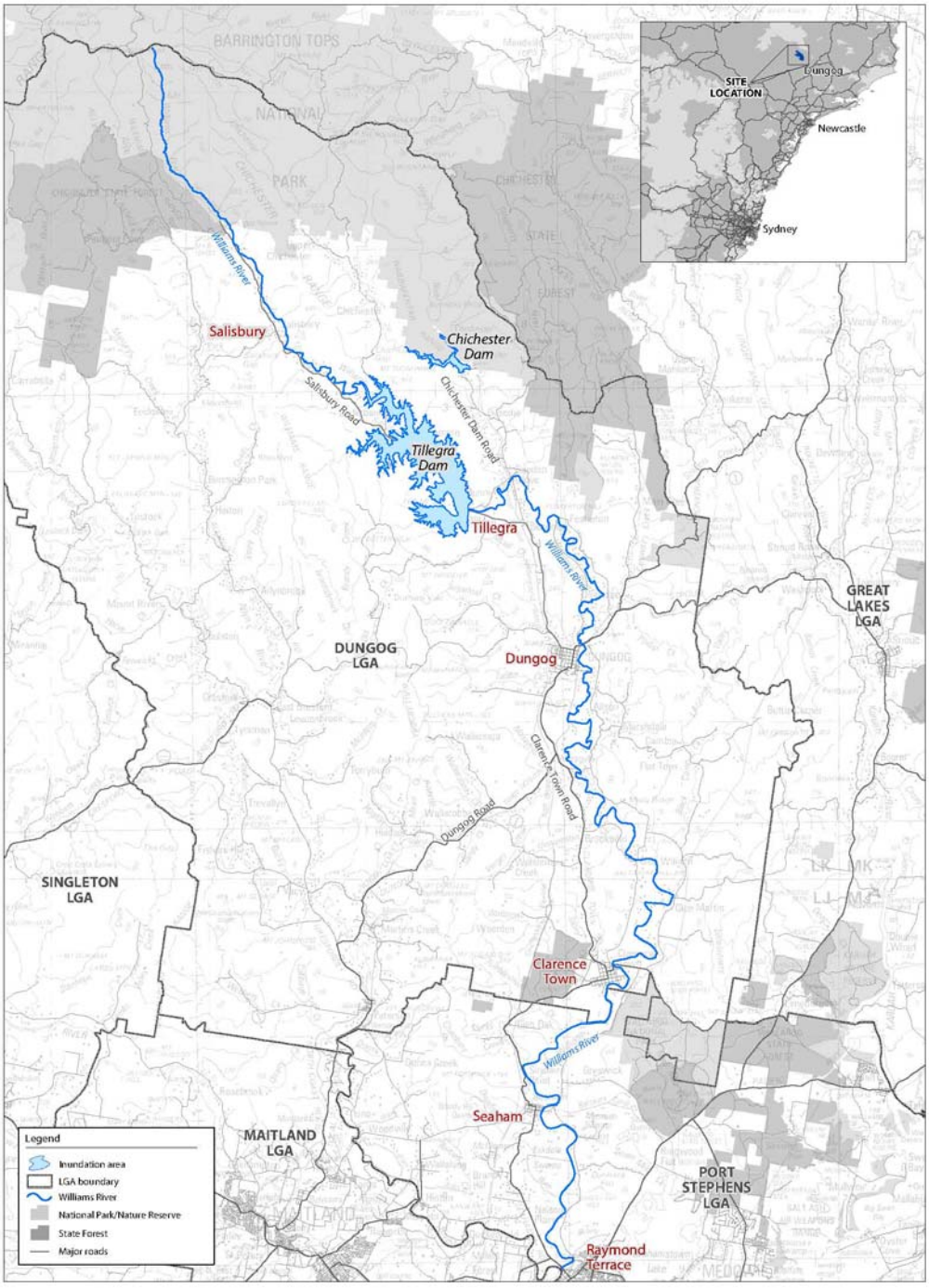
SITE MANAGEMENT

Site condition	Good	some disturbance	
Management recommendations	further testing and salvage prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	1 April, 2008
Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203		

Version: June 1998	Data entered by:	Date entered:


BARRINGTON TOPS
NATIONAL
PARK
CHICHESTER
STATE
FOREST
SITE LOCATION
Dungog
Newcastle
Sydney
Williams River
Salisbury
Salisbury Road
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Chichester Dam Road
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Dungog Road
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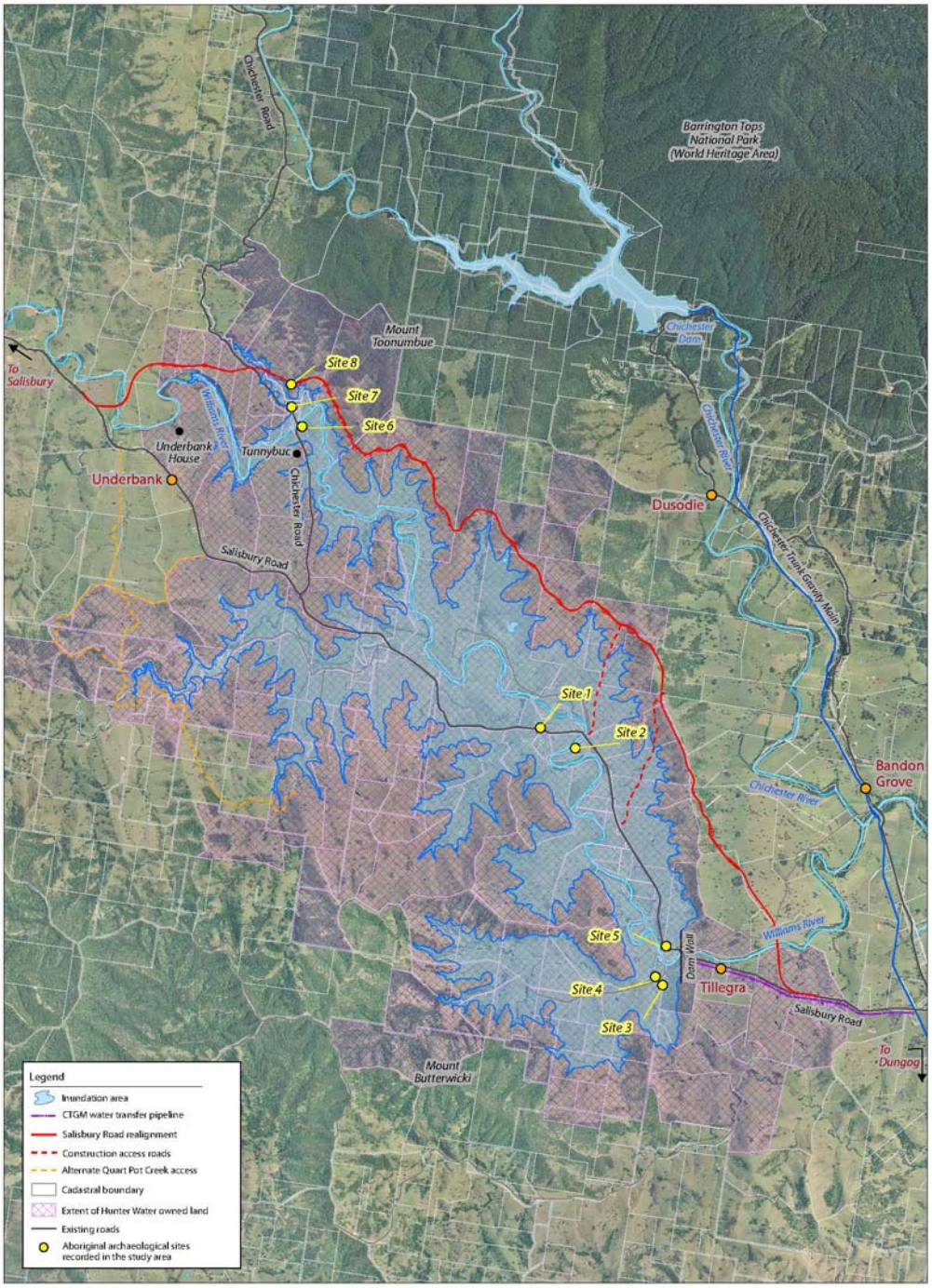
LGA boundary
Williams River
National Park/Nature Reserve
State Forest
Major roads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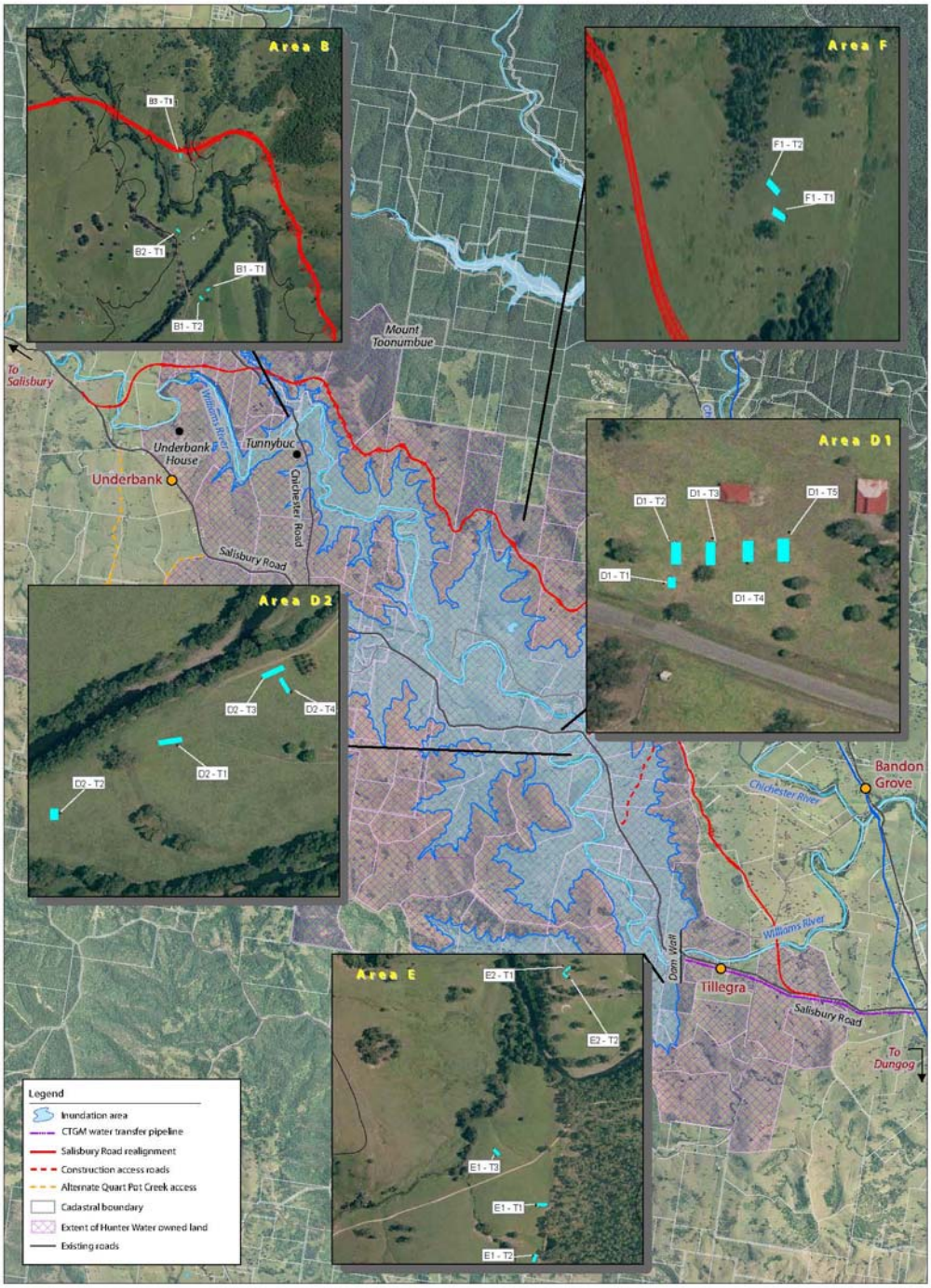
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads
Aboriginal archaeological sites recorded in the study area


Area B
B3 - T1
B2 - T1
B1 - T1
B1 - T2
Area F
F1 - T2
F1 - T1
Mount Toonumbue
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Underbank House
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Williams River
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D1 - T2
D1 - T3
D1 - T5
D1 - T1
D1 - T4
Area D2
D2 - T3
D2 - T4
D2 - T1
D2 - T2
Bandon Grove
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Williams River
Dam Wall
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Salisbury Road
To Dungog
Area E
E2 - T1
E2 - T2
E1 - T3
E1 - T1
E1 - T2
Legend
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Cadastral boundary
Extent of Hunter Water owned land
Existing roads

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 3	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Travelling norhtwest along Salisbury Road there is a track just before the Tillegra bridge (proposed dam wall site) proceed up this track and through a gate to creek flats (see attached maps - location E1- Trench 1)				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	376104	**AMG Northing**	6422784
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

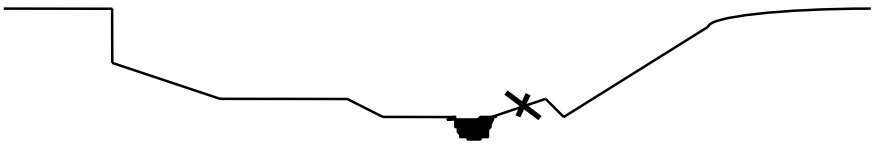
Site type(s)	Isolated Artefact	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	1 complete grey hornfels flake, l51.6x w35.7 x t7mm, 50-100% water rolled cortex, overshot termination.		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

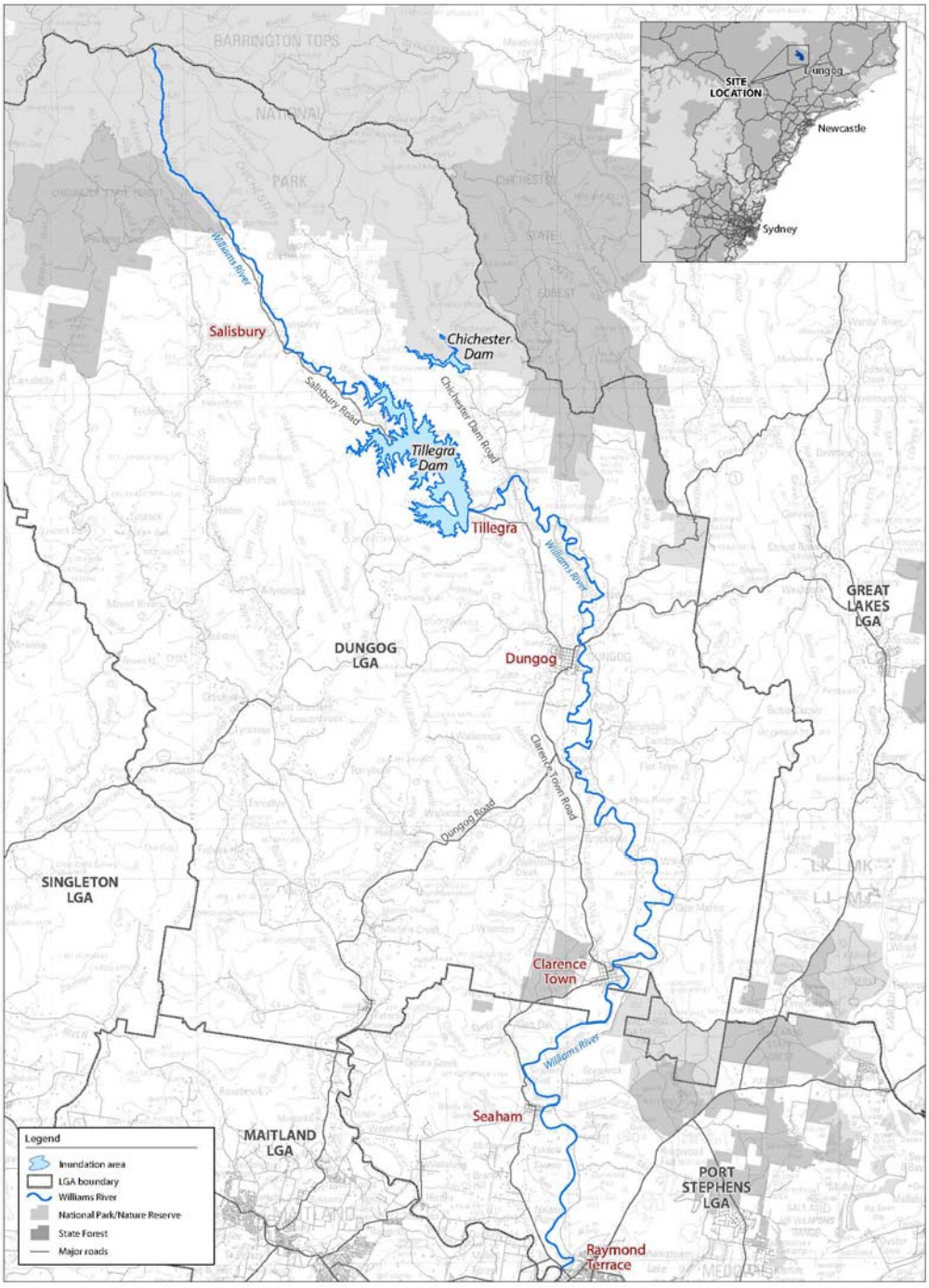
Land form	lower order creekline	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	river cobbles	**Land use/effect**	cleared grazing land		
Distance from drinking water	50m	**Source**	unnamed creekline		
Resource zone (eg. estuarine, river, forest)	river	**Vegetation**	cleared		
Edible plants		**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Weathering	some weathiering due to clearing and stock activity, area well grassed	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	
Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203		


BARRINGTON TOPS
NATIONAL
PARK
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FOREST
SITE LOCATION
Dungog
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Sydney
Williams River
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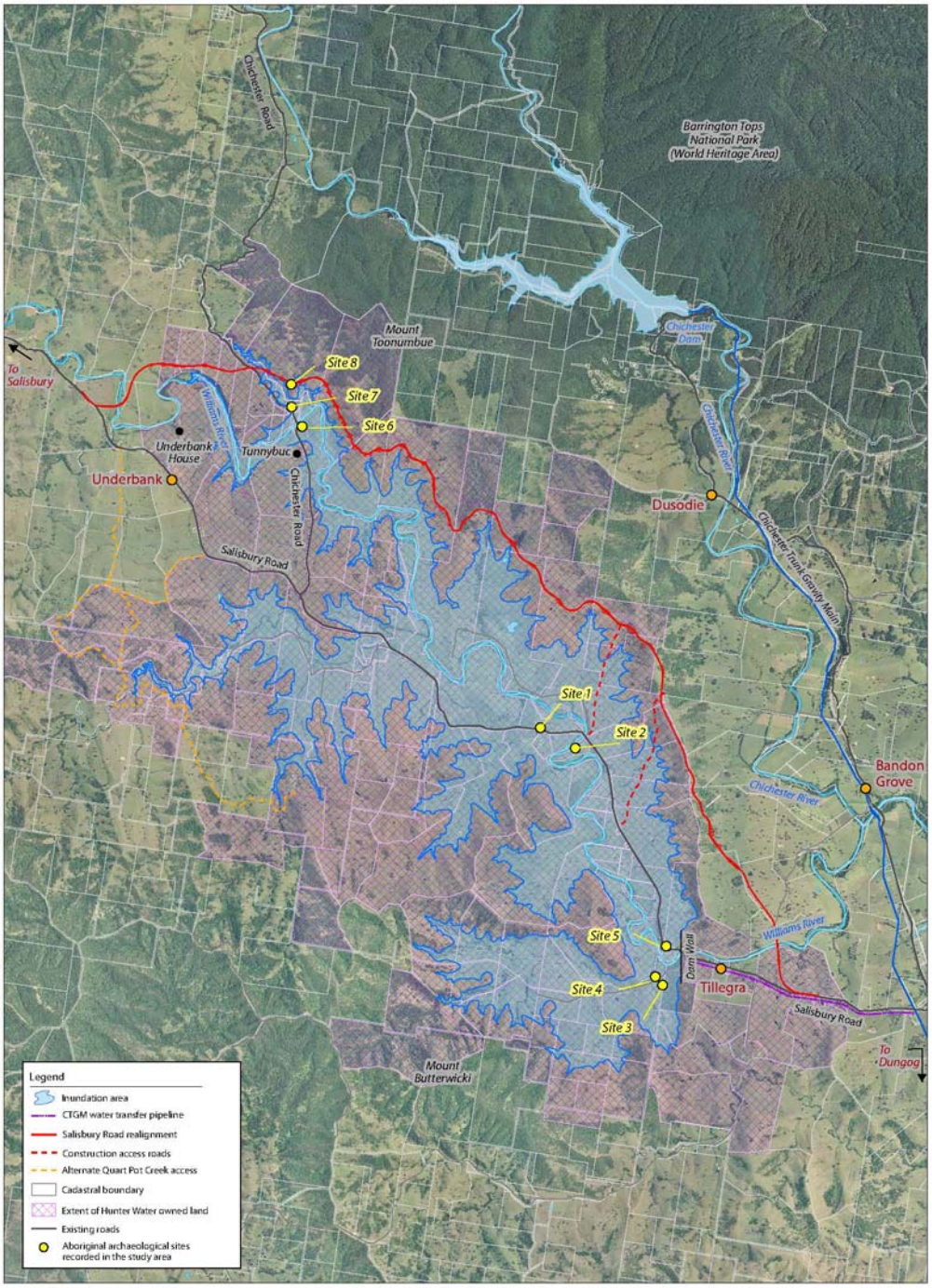
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Site 4
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Salisbury Road
To Dungog
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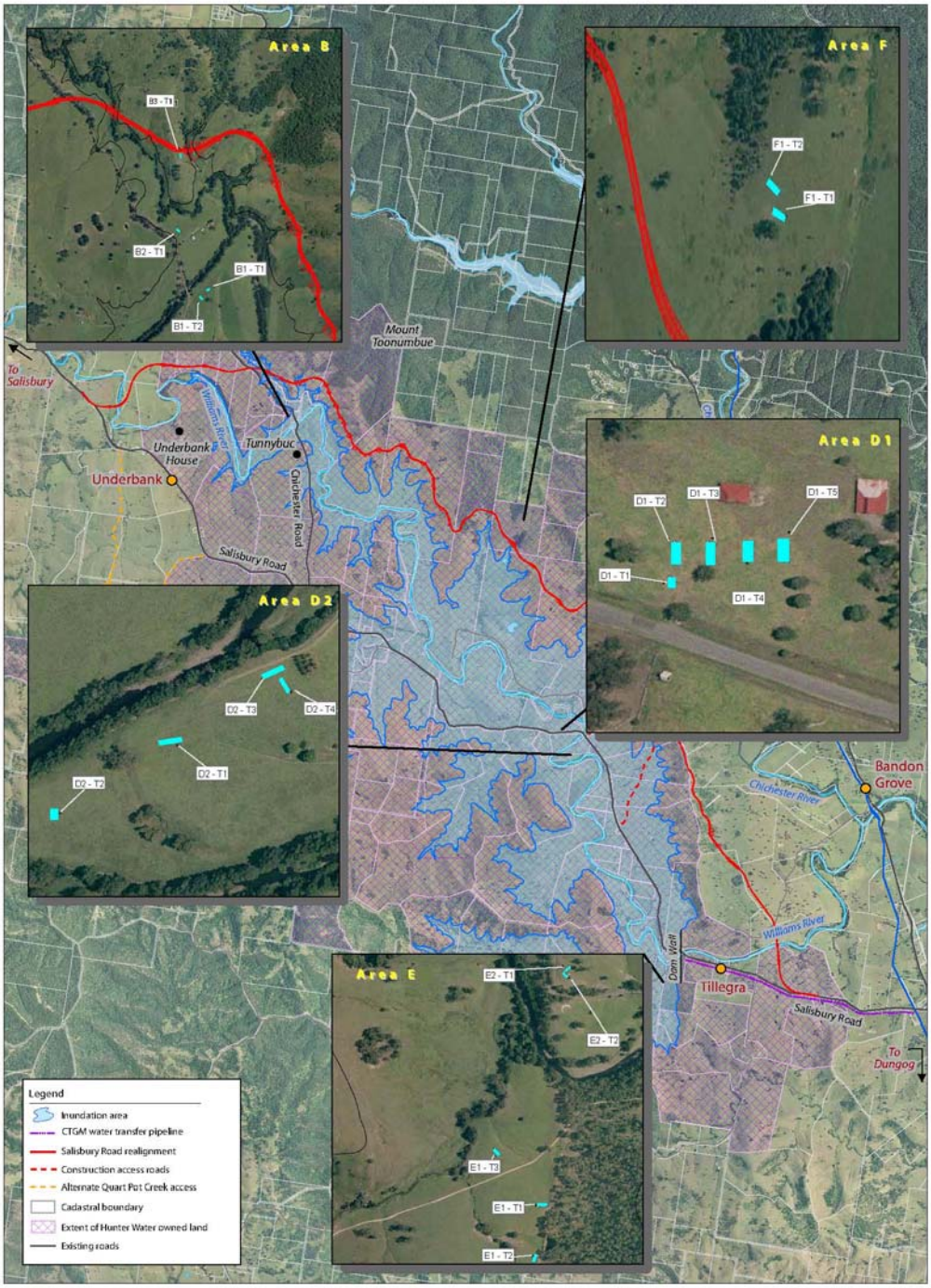
Legend
Inundation area
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads
Aboriginal archaeological sites recorded in the study area


Area B
B3 - T1
B2 - T1
B1 - T1
B1 - T2
Area F
F1 - T2
F1 - T1
Mount Toonumbue
To Salisbury
Underbank House
Underbank
Tunnybuc
Williams River
Chichester Road
Salisbury Road
Area D1
D1 - T2
D1 - T3
D1 - T5
D1 - T1
D1 - T4
Area D2
D2 - T3
D2 - T4
D2 - T1
D2 - T2
Bandon Grove
Chichester River
Williams River
Dam Wall
Tillegra
Salisbury Road
To Dungog
Area E
E2 - T1
E2 - T2
E1 - T3
E1 - T1
E1 - T2
Legend
Inundation area
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
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Cadastral boundary
Extent of Hunter Water owned land
Existing roads

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 4	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Travelling norhtwest along Salisbury Road there is a track just before the Tillegra bridge (proposed dam wall site) proceed up this track and through a gate to creek flats (see attached maps)				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	376000	**AMG Northing**	6422904
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

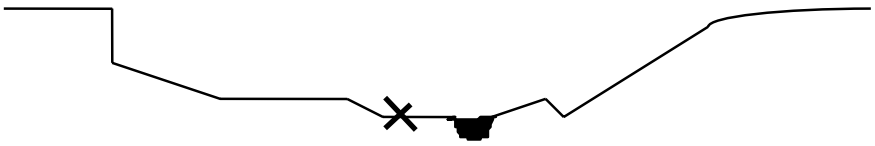
Site type(s)	Artefact Scatter	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	1 x unidirectional core, grey basalt, 1-25% water-rolled cortex, L52.6 x W41.7 x T27.4mm 1 x complete flake, grey hornfels, feather termination, 25-50% water-rolledcortex, 30.1x49x15.6mm 1 x multidirectional core, grey hornfels, 0cortex - 43.8x34.1x14.5mm 1 x distal flake, grey hornfels, feather termination, 1-25% cortex -water-rolled max dimension 29.1mm 1 x complete bifacial flake, grey hornfels, feather termination, 100% water-rolled cortex 66x42.1x12.9mm retreived from trench 3 (see attached plans) uppermost spit		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	Creek flat	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type		**Land use/effect**			
Distance from drinking water	<50m	**Source**	Native Dog Creek		
Resource zone (eg. estuarine, river, forest)	river	**Vegetation**	cleared, grassed		
Edible plants		**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Good	some weathering from clearing and stock movement possible but well grassed	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	2 April, 2008

Version: June 1998	Data entered by:	Date entered:

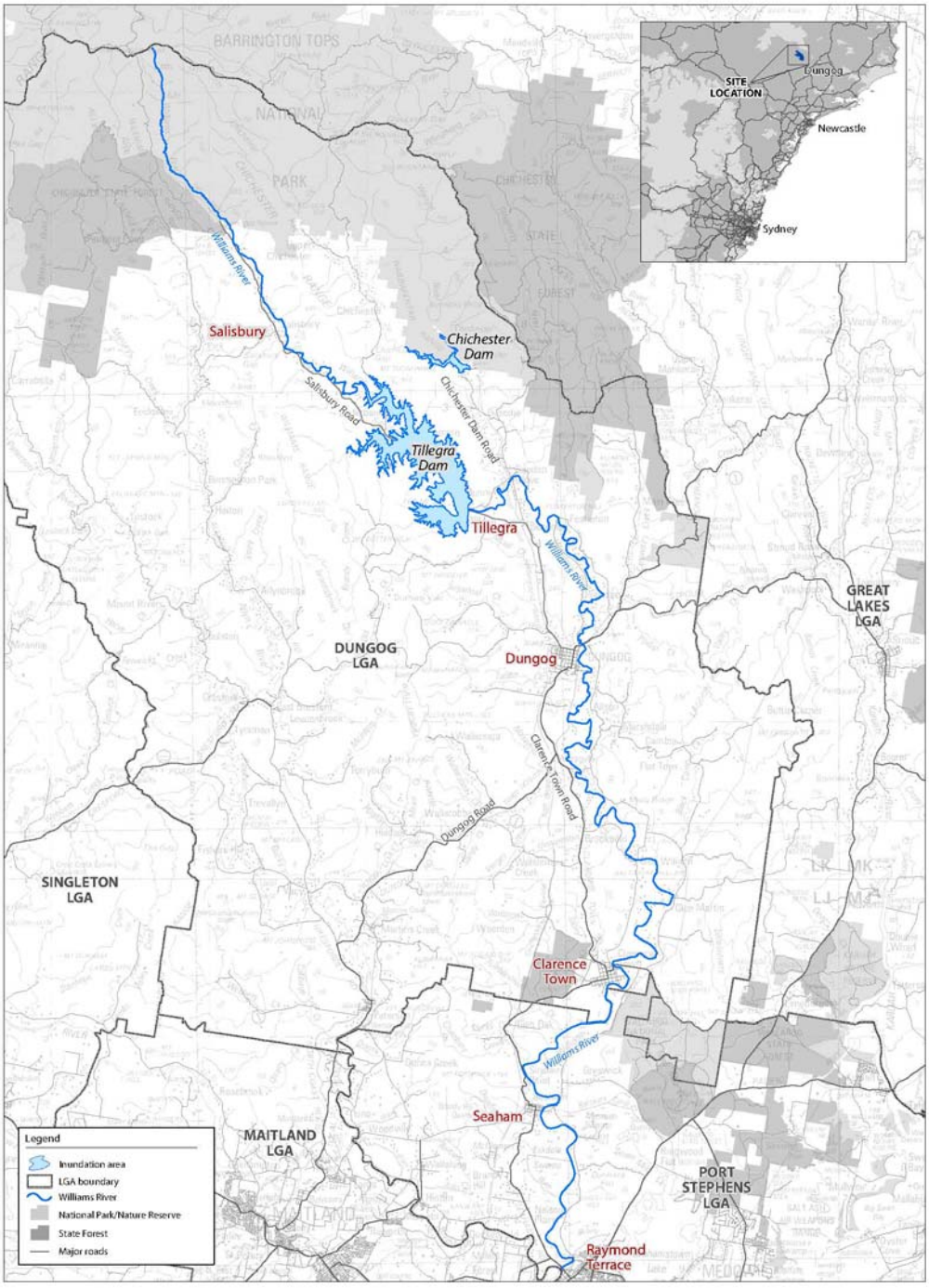
Aboriginal Sites Register of NSW

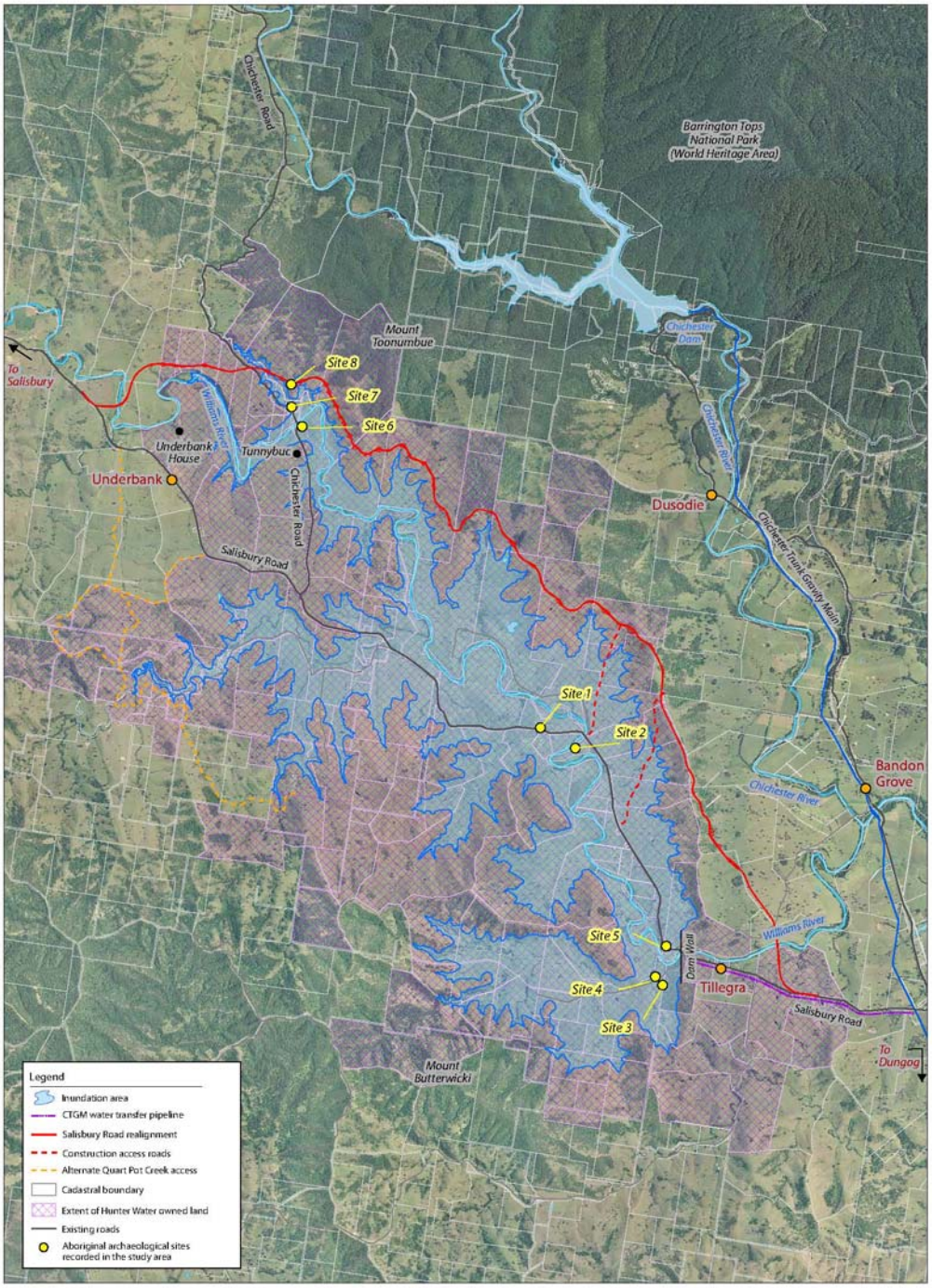
NPWS, PO Box 1967, Hurstville NSW 2220

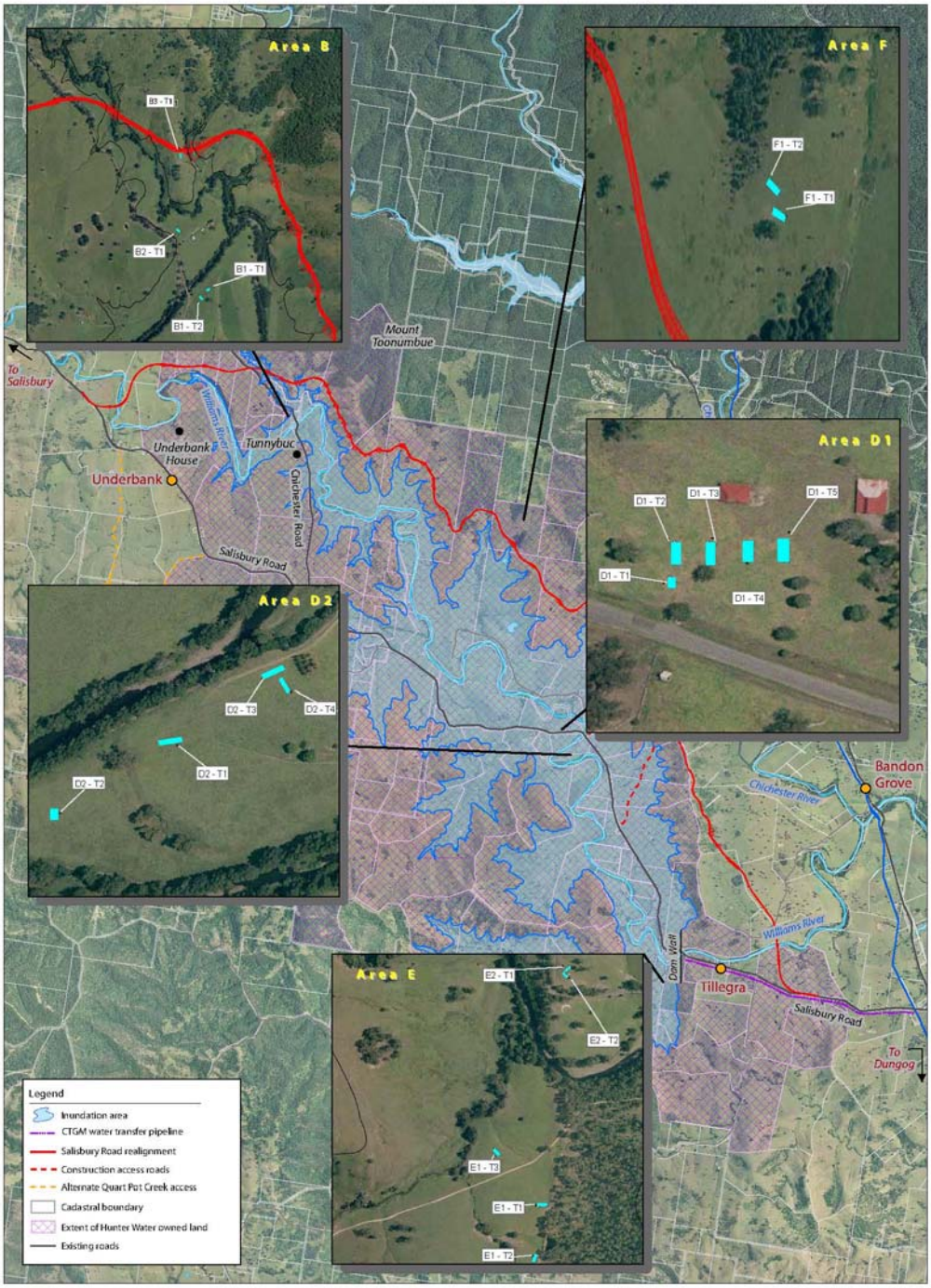
Standard Site Recording Form

Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203

Version: June 1998	Data entered by:	Date entered:


BARRINGTON TOPS
NATIONAL
PARK
CHICHESTER
STATE
FOREST
SITE LOCATION
Dungog
Newcastle
Sydney
Williams River
Salisbury
Salisbury Road
Chichester Dam
Chichester Dam Road
Tillegra Dam
Tillegra
Williams River
GREAT LAKES LGA
DUNGOG LGA
Dungog
Clarence Town Road
Dungog Road
SINGLETON LGA
Clarence Town
Williams River
Seaham
MAITLAND LGA
PORT STEPHENS LGA
Raymond Terrace
Legend
Inundation area
LGA boundary
Williams River
National Park/Nature Reserve
State Forest
Major roads


Barrington Tops National Park (World Heritage Area)
Chichester Road
Mount Toonumbue
Chichester Dam
To Salisbury
Site 8
Site 7
Site 6
Williams River
Underbank House
Tunnybuc
Underbank
Chichester Road
Salisbury Road
Dusodie
Chichester Trunk Gravity Main
Site 1
Site 2
Bandon Grove
Chichester River
Site 5
Dam Wall
Williams River
Tillegra
Site 4
Site 3
Salisbury Road
To Dungog
Mount Butterwicki
Legend
Inundation area
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads
Aboriginal archaeological sites recorded in the study area


Area B
B3 - T1
B2 - T1
B1 - T1
B1 - T2
Area F
F1 - T2
F1 - T1
Mount Toonumbue
To Salisbury
Underbank House
Underbank
Tunnybuc
Williams River
Chichester Road
Salisbury Road
Area D1
D1 - T2
D1 - T3
D1 - T5
D1 - T1
D1 - T4
Area D2
D2 - T3
D2 - T4
D2 - T1
D2 - T2
Bandon Grove
Chichester River
Williams River
Dam Wall
Tillegra
Salisbury Road
To Dungog
Area E
E2 - T1
E2 - T2
E1 - T3
E1 - T1
E1 - T2
Legend
Inundation area
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 5	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Travelling norhtwest along Salisbury Road there is a driveway on the right just after the Tillegra bridge (proposed dam wall site) as the driveway turns to the left there is a track on the right, proceed up this track to the bench protruding back toward Salisbury Rd (see attached maps - Area E2 - Trench 1)				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	376154	**AMG Northing**	6423338
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

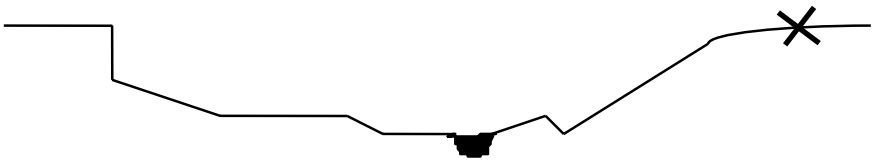
Site type(s)	Isolated Artefact	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	1x complete grey hornfels flake,) cortex, platform termination L47.7xW24.3xT18.4mm		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	bench above river terrace	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	river cobbles, basalt, hornfels. Outcropping sandstone	**Land use/effect**	cleared grazing land		
Distance from drinking water	200m	**Source**	Williams River		
Resource zone (eg. estuarine, river, forest)	river	**Vegetation**	cleared		
Edible plants		**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Good	some weathering due to clearing and grazing, well grassed	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	2 April, 2008

Version: June 1998	Data entered by:	Date entered:

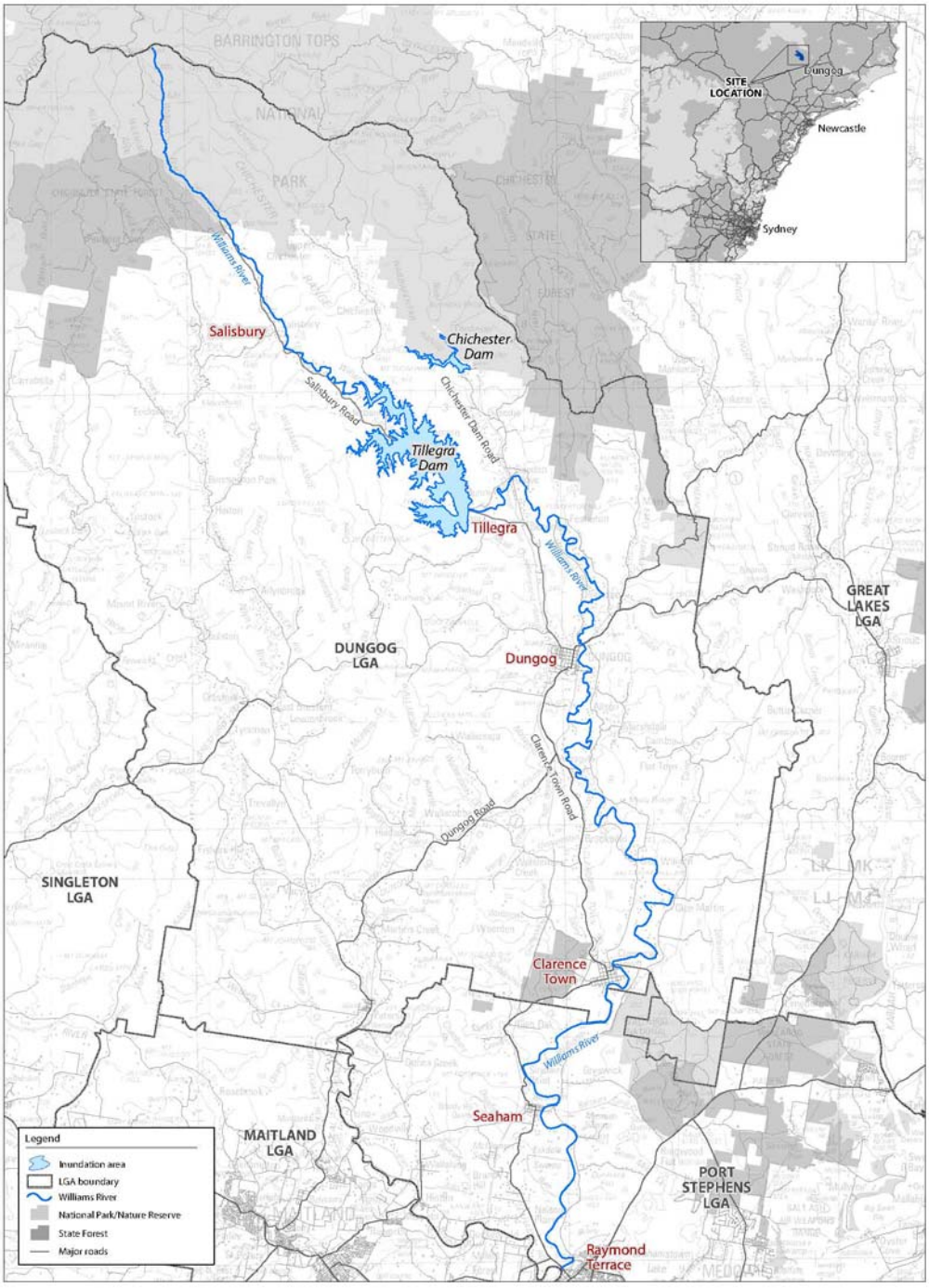
Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203

Version: June 1998	Data entered by:	Date entered:


BARRINGTON TOPS
NATIONAL
PARK
CHICHESTER
STATE
FOREST
SITE LOCATION
Dungog
Newcastle
Sydney
Williams River
Salisbury
Salisbury Road
Chichester Dam
Chichester Dam Road
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Tillegra
Williams River
GREAT LAKES LGA
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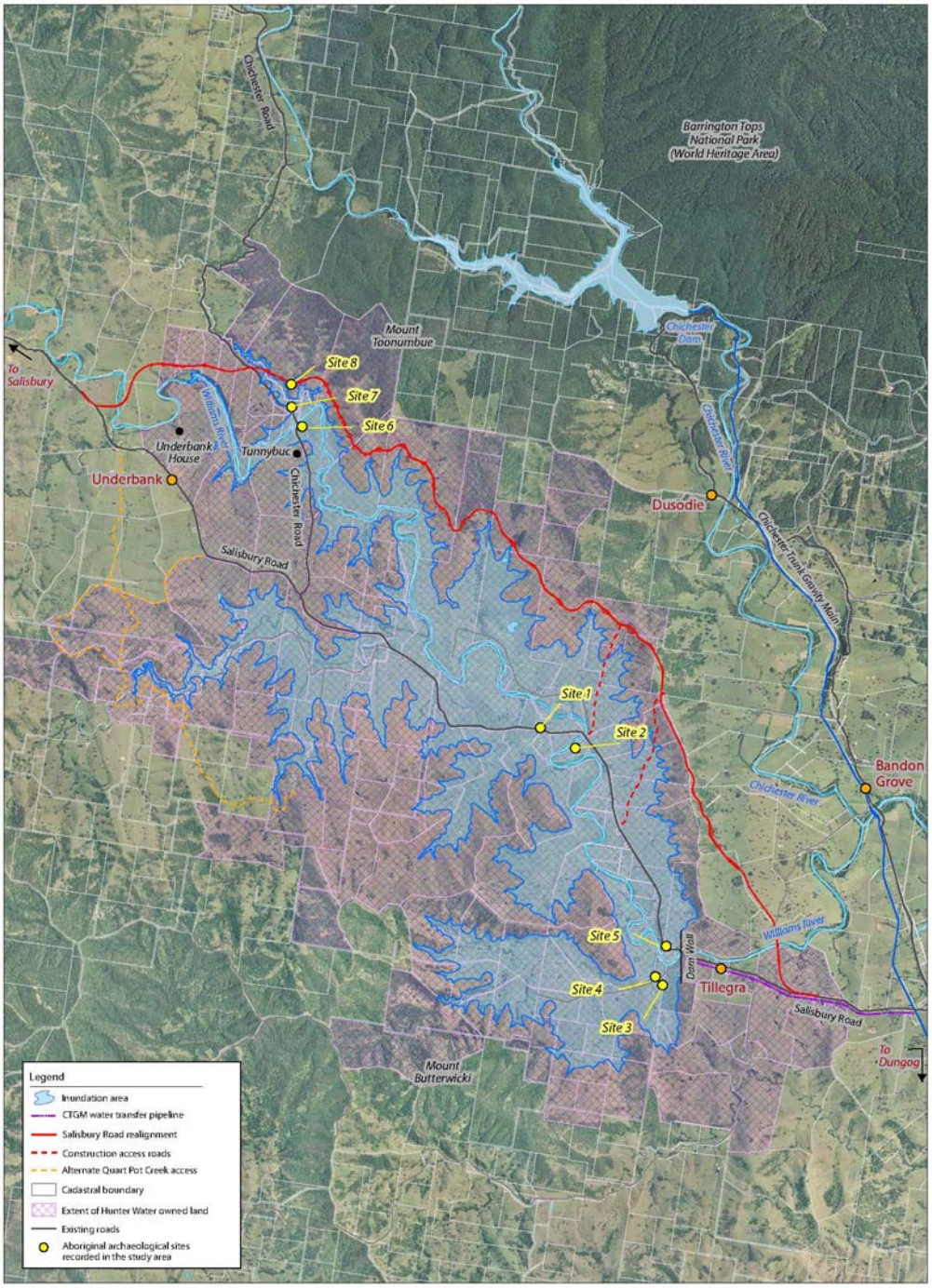
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Site 4
Site 3
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To Dungog
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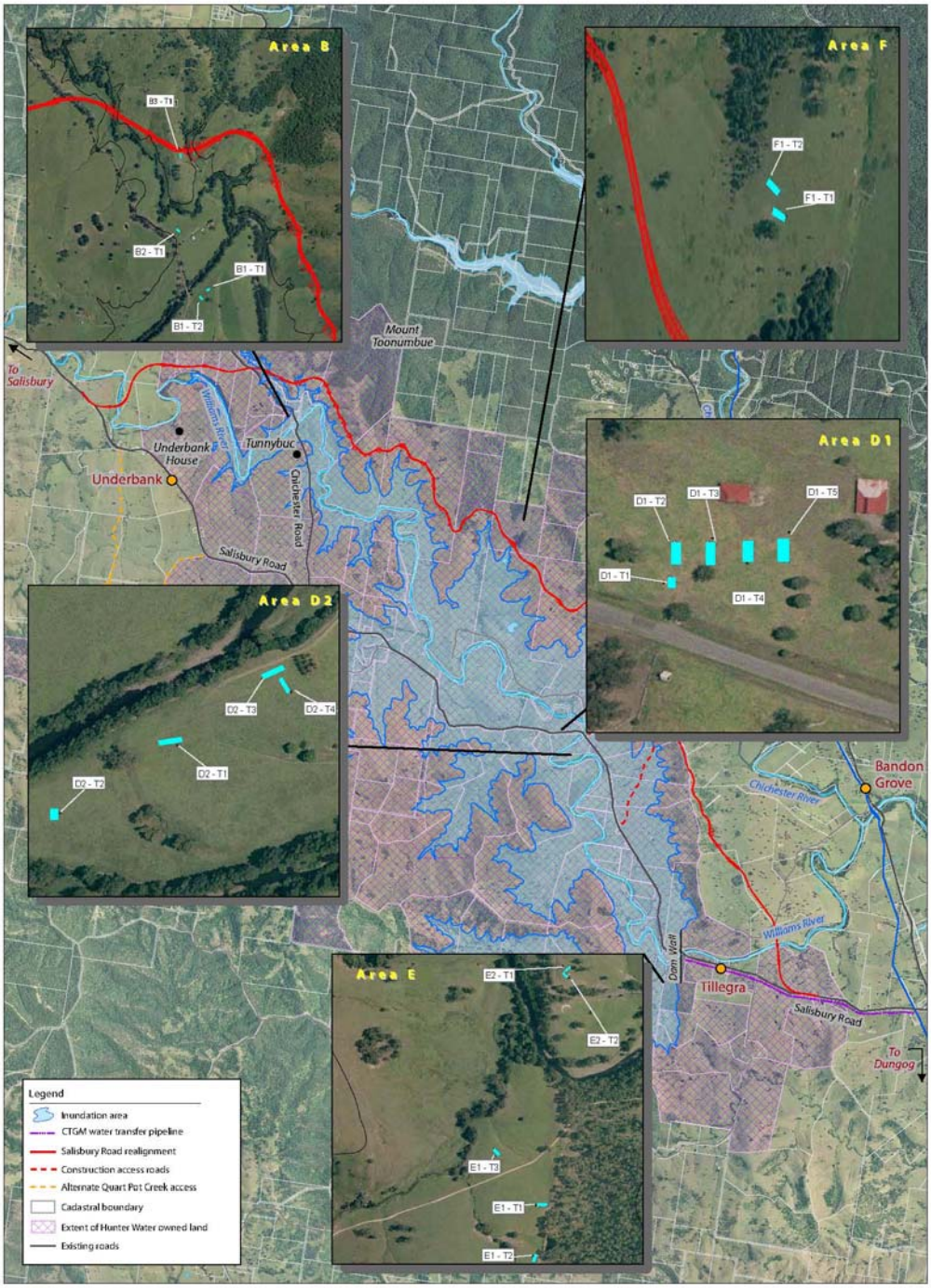
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads
Aboriginal archaeological sites recorded in the study area


Area B
B3 - T1
B2 - T1
B1 - T1
B1 - T2
Area F
F1 - T2
F1 - T1
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D1 - T3
D1 - T5
D1 - T1
D1 - T4
Area D2
D2 - T3
D2 - T4
D2 - T1
D2 - T2
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E2 - T2
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E1 - T2
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Cadastral boundary
Extent of Hunter Water owned land
Existing roads

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 6	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Take Chichester Road off Salisbury Rd and follow to just before the first bridge over the Williams River, site is in area to the east of the road in elevated second terrace				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	371029	**AMG Northing**	6430655
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

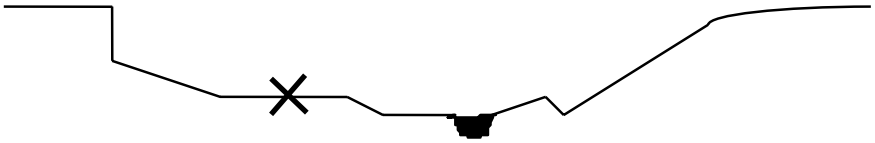
Site type(s)	Artefact scatter/open camp site	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	artefacts retreived from area B1- Trench 1 (see attached maps) 1x complete grey hornfels retouched tool, 50-100% water rolled cortex, L34.1xW55.3xT27.8mm 1x complete grey hornfels flake, hinge termination, 33.5x26x11.7mm		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

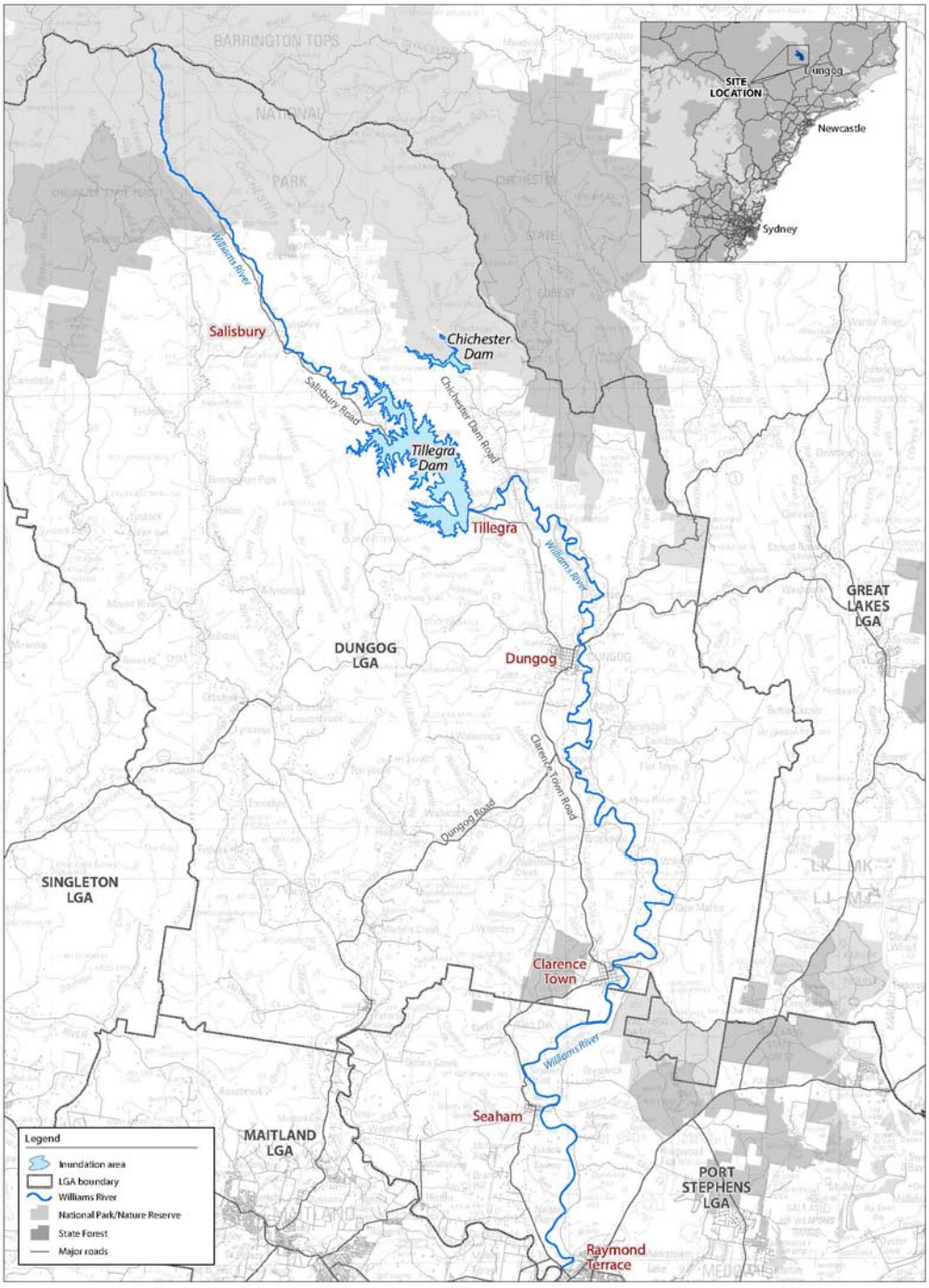
Land form	elevated river terrace	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	river cobbles		**Land use/effect**	cleared grazing land	
Distance from drinking water	<100m		**Source**	Williams River	
Resource zone (eg. estuarine, river, forest)	river		**Vegetation**	cleared	
Edible plants			**Faunal resources** (include shellfish)		
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Good	some weathering from clearing and grazing, area well grassed	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	3 April, 2008
Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203		


BARRINGTON TOPS
NATIONAL
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SITE LOCATION
Dungog
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National Park/Nature Reserve
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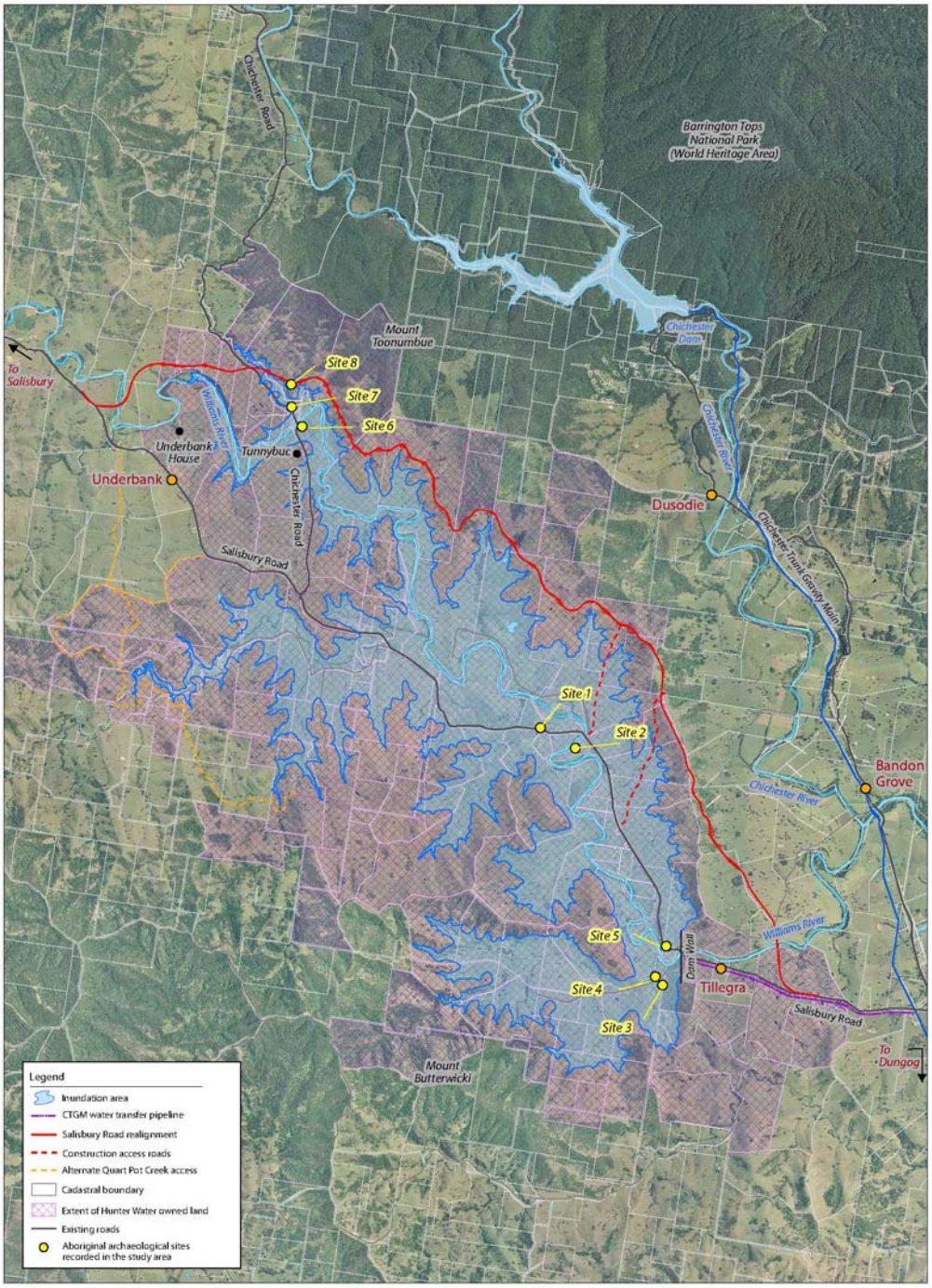
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Salisbury Road realignment
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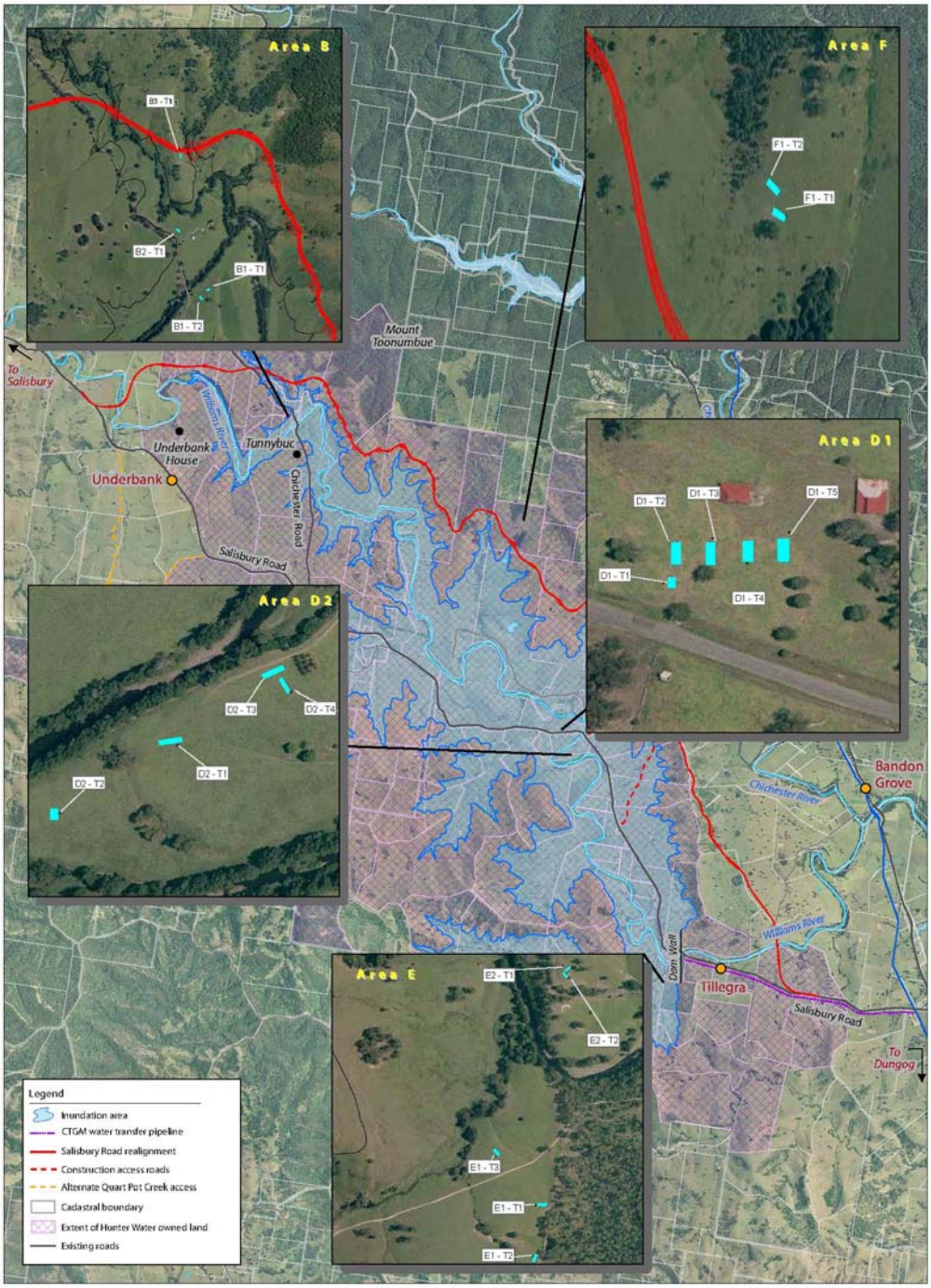
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads
Aboriginal archaeological sites recorded in the study area


Area B
B3 - T1
B2 - T1
B1 - T1
B1 - T2
Area F
F1 - T2
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Mount Toonumbue
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Existing roads

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 7	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Take Chichester Road off Salisbury Rd and follow to just after the Tunnybuc Bridge over the Williams River, site is in area to the east of the road on terrace of Tillegra Creek (see maps Area B2-Trench 1)				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	370883	**AMG Northing**	6430929
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

Site type(s)	Isolated artefact	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	1 x burnt pink silcrete proximal flake, 0cortex **Attach photographs and sketches, eg. plan & section of shelter.**		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

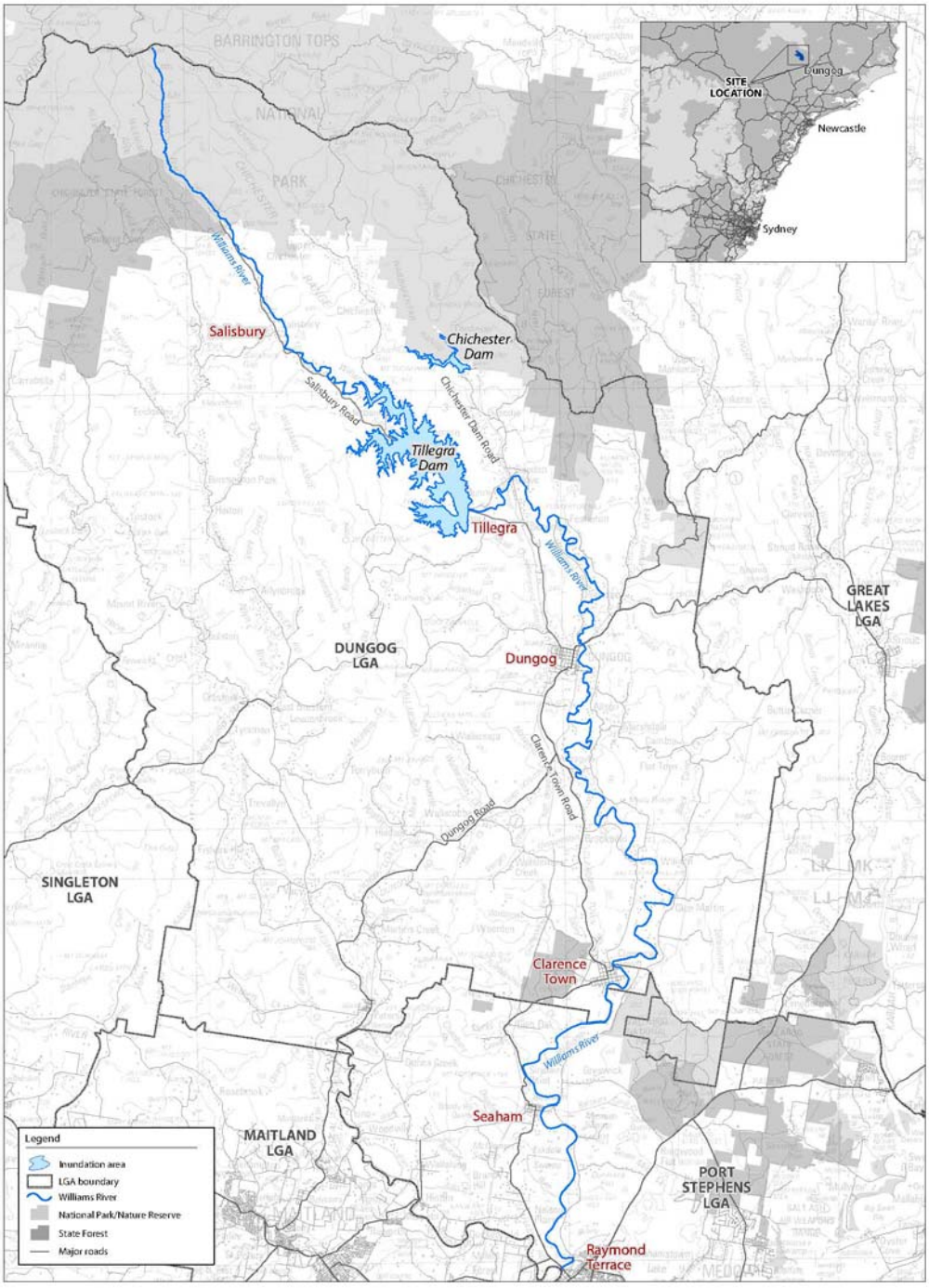
Land form	Creek terrace	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	river cobbles basalt, hornfels	**Land use/effect**	cleared grazing land		
Distance from drinking water	<100m	**Source**	Tillegra Creek		
Resource zone (eg. estuarine, river, forest)	river	**Vegetation**			
Edible plants		**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Weathering	some disturbance from clearing and grazing	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	3 April, 2008
Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203		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SITE LOCATION
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Williams River
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Salisbury Road
Chichester Dam
Chichester Dam Road
Tillegra Dam
Tillegra
Williams River
GREAT LAKES LGA
DUNGOG LGA
Dungog
Clarence Town Road
Dungog Road
SINGLETON LGA
Clarence Town
Williams River
Seaham
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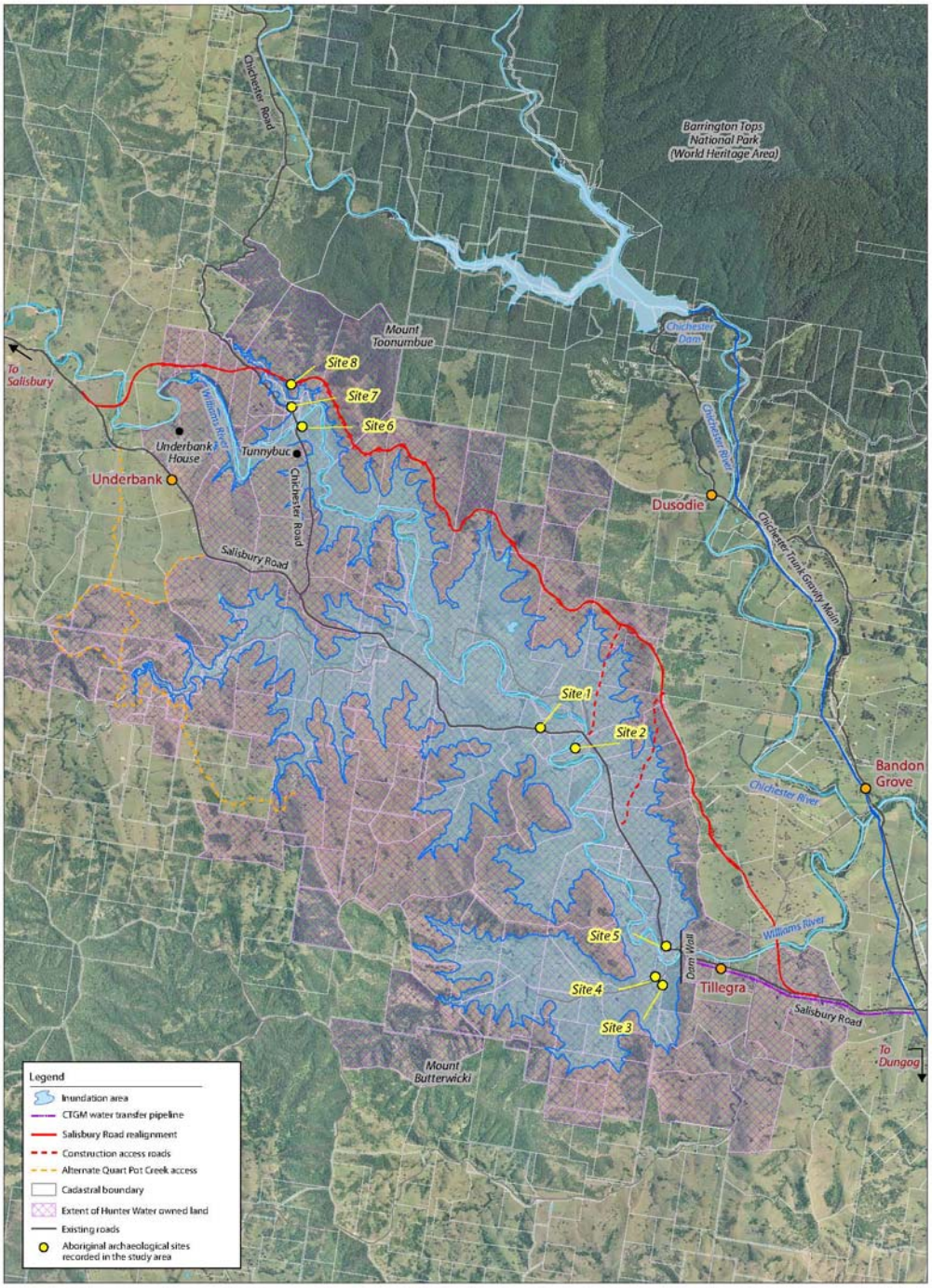
PORT STEPHENS LGA
Raymond Terrace
Legend
Inundation area
LGA boundary
Williams River
National Park/Nature Reserve
State Forest
Major roads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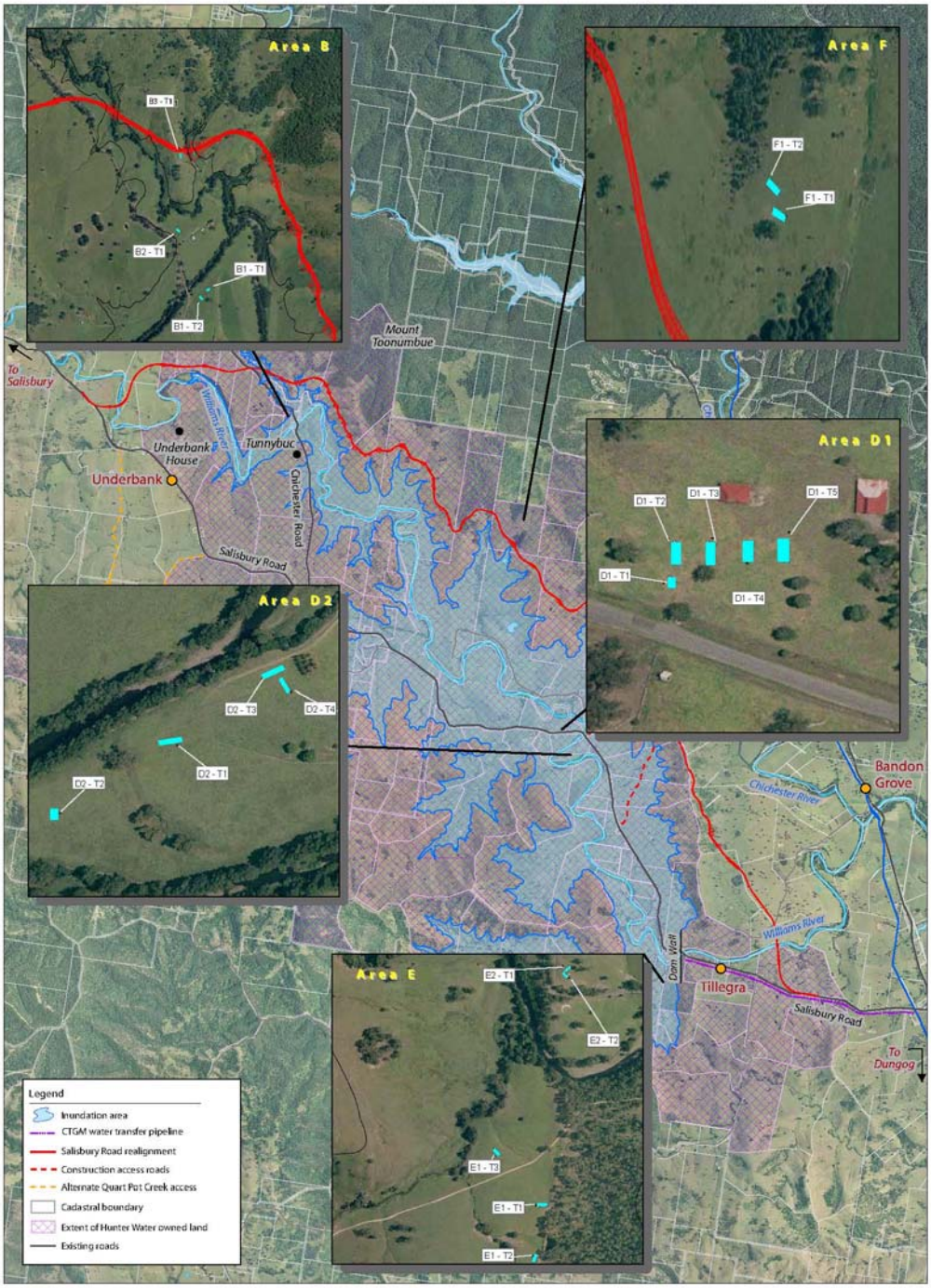
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Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION			
Site name	Tillegra 8	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION					
Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Take Chichester Road off Salisbury Rd and follow to just after the Tunnybuc Bridge over the Williams River, site is in area to the east of the road on elevated ridge flat on the northeastern side of Tillegra Creek (see maps Area B3 -Trench 1)				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**		**AMG Northing**	
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

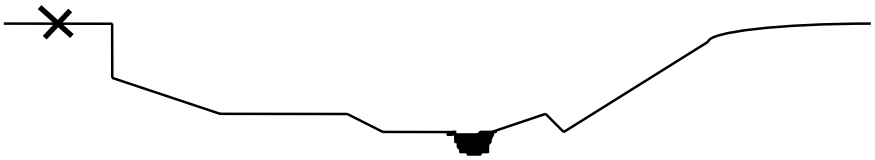
SITE DESCRIPTION			
Site type(s)	Isolated artefact	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	1x fine grained siliceous stone, light grey distal step tool, 1-25% water-rolled cortex, max dimension 22.6mm, possible core		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	flat ridge over creek	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	sandstone outcropping and shale	**Land use/effect**	cleared grazed		
Distance from drinking water	200m+	**Source**	Tillegra Creek		
Resource zone (eg. estuarine, river, forest)	river	**Vegetation**	cleared		
Edible plants		**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Weathering	some weathering due to clearing and grazing likely	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	

Version: June 1998	Data entered by:	Date entered:

Aboriginal Sites Register of NSW

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Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203

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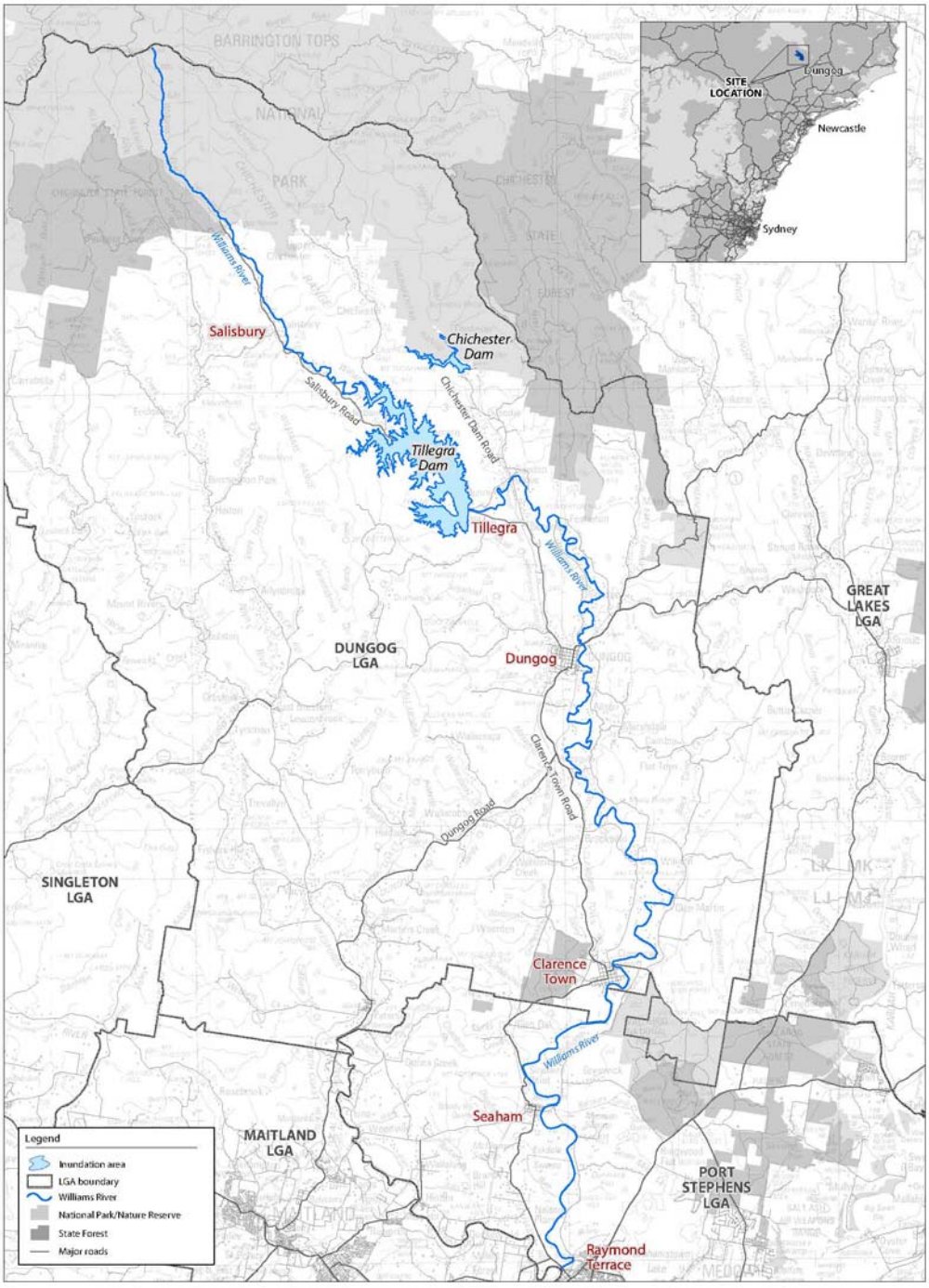
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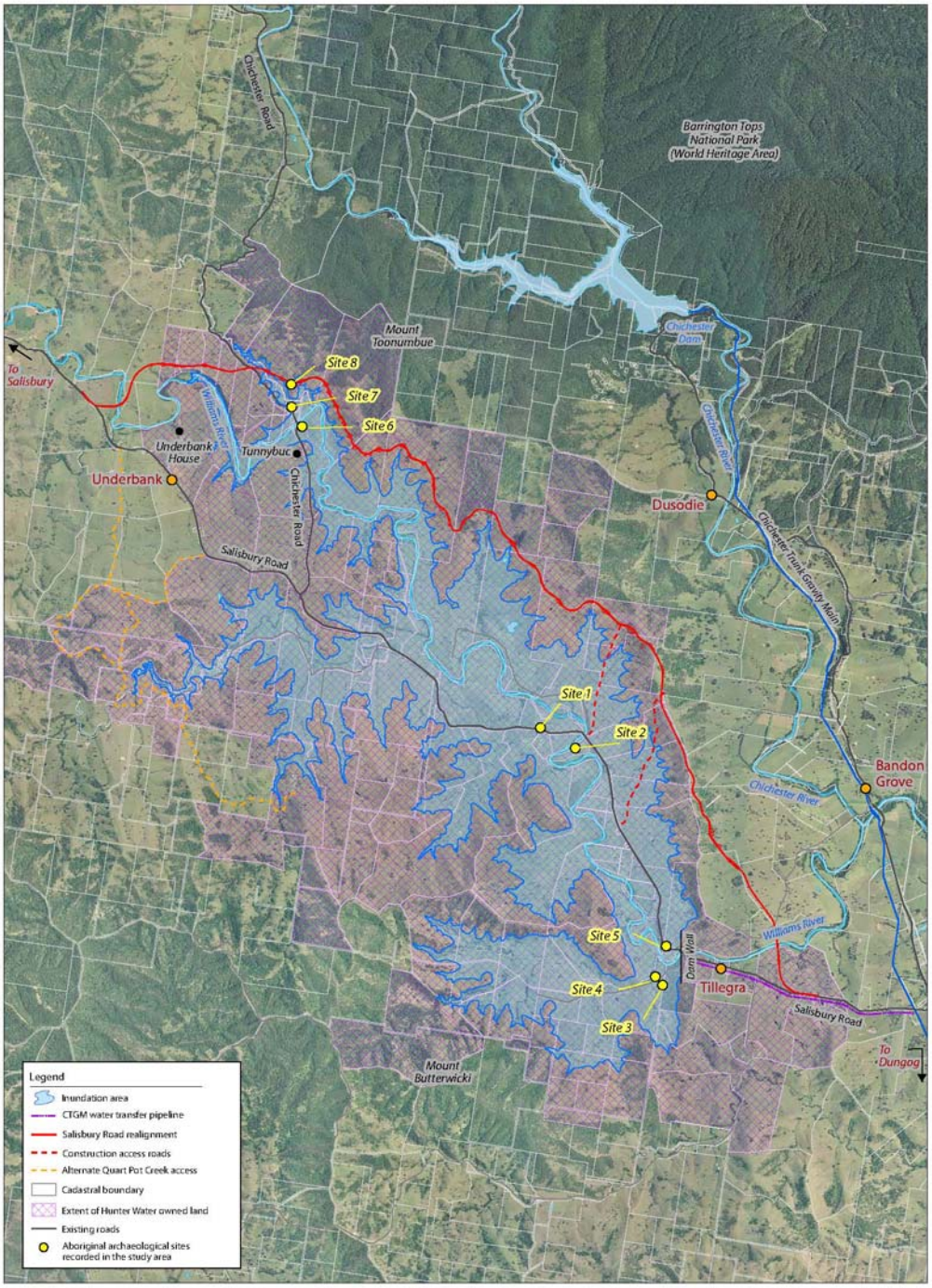
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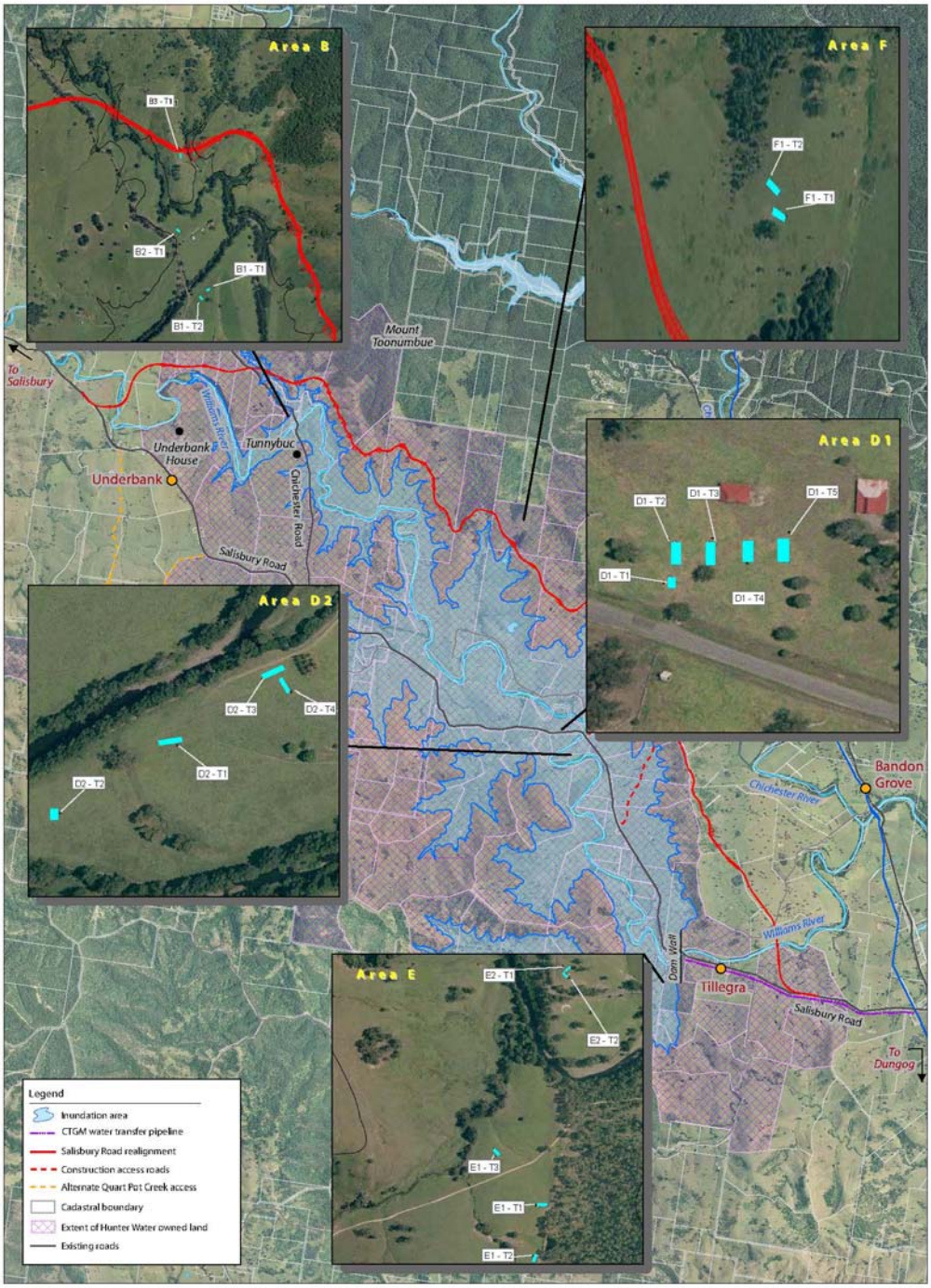
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Groundtruth Consulting
ABN: 66 179 449 249

Dr P.B. Mitchell.
P.O. Box 515,
GLADESVILLE 1675
Phone: + 61 (0)2 9817 4859
groundtruth@optusnet.com.au

6 March 2008

Identification of archaeologically sensitive landscape elements based on geomorphic criteria in the inundation area of the proposed Tillegra Dam

Groundtruth Consulting was commissioned by Cultural Heritage Connections Pty Ltd to provide guidance on the geomorphology of the inundation area of the proposed Tillegra Dam on the upper Williams River 12km northwest of Dungog, NSW. The purpose of the review was to assist in the location of Aboriginal sites that are expected to occur within the area but which have not been found by a conventional site survey as reported by Hardy (2007). This report is based on a review of the available literature, examination of an air photo of the area, and a brief field survey conducted on March 3, 2008, that was limited to landscapes visible from areas of public access.

Background.
Hunter Water Corporation is proposing the construction of a new dam and reservoir on the Upper Williams River to supplement Hunter Valley water supplies and provide a small amount of hydro-electricity.

The landscape that will be inundated has been mapped as part of the Wallaroo Land System by Story *et al*., (1963). This is described as hilly country with 750-1000mm of rainfall, steep slopes with skeletal and brown podzolic (texture contrast) soils, that was originally covered by tall mixed woodland and eucalypt forest with elements of gallery rainforest along the streams. Most of the landscape has been cleared and used for intensive cattle grazing. Some of consequences of land use in this environment have been a considerable amount of sheet and gully erosion on the steep slopes, a large increase in peak discharge in the main streams, and extensive modification of the stream channels and floodplains by soil erosion, sediment deposition and engineering works that modified the stream channels.

At the time of inspection the growth of pasture grasses across the entire landscape, including even road cuttings, was so dense that the ground surface was almost invisible. The discovery of Aboriginal sites by field walking in these conditions is an almost impossible task and it is no surprise that Hardy (2007) reports that she was unable to locate any Aboriginal sites during her survey in late 2007 under similar ground cover conditions.

However it is inevitable that Aboriginal sites will be present and this view is confirmed by the limited ethnographic references applicable to the area that are discussed by Hardy (2007). The problem then is how can sites be located if they cannot be seen?

Experience elsewhere in the Hunter Valley and on the Cumberland Plain west of Sydney has shown that the distribution of Aboriginal sites is closely matched to stream order patterns (*sensu* Strahler 1957), and more general models relating sites to distance from known water sources have also been developed. These relationships are not precise enough to pinpoint site locations but if interpreted with experience it should be possible to identify particular landscape features (geomorphic elements) that can be considered to have a high sensitivity for the presence of Aboriginal archaeological sites. After identifying such features particular locations can then be targeted for a more specific examination by subsurface testing.

Geology

The area to be inundated is underlain by Carboniferous lithic sandstones, siltstones and some thin limestone units. Where observed in road cuttings and exposed in stream beds these sedimentary rocks have moderate to steep dips (40 to 60^0) and have been faulted. None of the observed rock types are likely to have been used by Aboriginal people as raw material for artefact manufacture. No rock shelters were seen, and it is unlikely that any of the coarser grained sedimentary rocks were particularly suitable for use as axe grinding sites. Geology therefore does not provide a useful guide to Aboriginal site location.

Geomorphology of the main channels

The fluvial geomorphology of the entire Williams River channel has been described by Gippel and Anderson (2007) and for the reaches above the dam site they draw on work by Brooks *et al*., (2004, 2006) and Erskine (2001).

Above the site of the proposed dam the Williams River has a moderately steep gradient, and carries a coarse bedload of pebbles and cobbles. Active depositional features such as bars are common and it is clear from the location of flood debris and recorded changes in the valley that the modern flood regime has changed significantly as a consequence of European land management especially the extensive clearing of the hillslopes. Brooks *et al*., (2004) described the river channel near Munni as being a discontinuous floodplain style with alternating reaches of bedrock confinement and small floodplain patches. Brooks *et al*., (2006) believe that the transport capacity of the river is greater than can be sustained by the long-term sediment yield from the catchment. This has probably always been the case and suggests that all of the valley floor geomorphology is young and active. Given the hydraulic regime operating in this stream today it is unlikely that any Pleistocene land surfaces were ever preserved within the floodplain patches.

Erskine (2001) noted that the channel along the entire upper catchment has been subject to river training scheme works between 1966 and 1991. Most of this work involved reshaping the river-bed and the effects were often to exacerbate bank erosion. Past flood have substantially modified the bed and banks and it is unlikely that any Aboriginal sites originally present near water level will have survived.

Stream order and topography

Whilst the stream order model applied by Mitchell and others on the Cumberland Plain and the central lowlands of the Hunter Valley has been a useful indicator of the likely presence of Aboriginal sites, it appears unlikely to be helpful in this

environment as the only stream segments that have any development of floodplain patches are the highest order segments along the main channel. Therefore further work should concentrate on the main streams.

All streams up to fourth order have steep gradients, direct hill slope links and bedrock channels. None contain ground suitable for camp sites and the channel gradient in smaller tributaries is as steep or steeper than the adjacent ridges so it is reasonable to suggest that they would not normally have been used as access routes.

The main tributary streams of Tunnybuc Creek and Quart Pot Creek also have steep gradients, and narrow incised channels with only patches of intact flood plain deposits along their length.

First second and third order streams flowing into these creeks and all similar streams flowing directly into the main channel are even steeper (up to 18^0) and the side slopes in these small catchments connect directly to the stream channels. In other words all of the upper catchment above Tunnybuc and Quart Pot Cemetery, and all of the steep side slopes are sources of sediments and contains few (if any) landscape elements where Aboriginal people may have camped. These areas undoubtedly had food and fibre resources valued by Aboriginal people and it is reasonable to expect that they would have been visited but this landscape was probably best traversed along ridge lines and the larger stream lines. Open Aboriginal sites would be expected to be small and scattered. Their survival is also in doubt as these slopes have been stripped of much surface sediment and the stream lines are eroded to long sections of exposed bedrock.

Even along the Williams River true terraces (abandoned floodplains) do not appear to be present above Tillegra, although two or three low benches are noted on the floodplain at the river crossing east of Munni House. It is suggested that each of these benches should be tested for archaeological sites and this work should include backhoe pits into the benches to reveal their stratigraphy. Note however that post-European sediments and flood debris may be present even on the highest bench.

Areas identified on geomorphic grounds as being archaeologically sensitive.
Figure 1 locates five areas that are considered to be archaeologically sensitive on the basis that they have lower angle slopes, are in close proximity to water, but are above average flood levels. It is suggested that further archaeological investigation should be conducted at these locations.

Note that parts of Areas A, D and E are all expected to contain a texture contrast soil and that any archaeological deposit found in these will be shallow (less than 30 to 40cm). The limitations of interpreting open sites in such soils as described by Dean-Jones and Mitchell (1993) will apply.

Area A.
The left bank slip-off slope of the meander appears to have a lower slope angle than usual and may have provided reasonable ground for a campsite and/or have been used as a short-cut across the river bend. Grader scrape testing or equivalent is recommended.

Area B.

The junction of Tillegra Creek and the Williams River is likely to have been the site of a large waterhole during Aboriginal times and may have low gradient benches suitable for camp sites. The original survey partly covered this area as Site SN2 and although no artefacts were found, sub-surface testing on any higher benches on the right bank of both the river and Tillegra Creek is suggested.

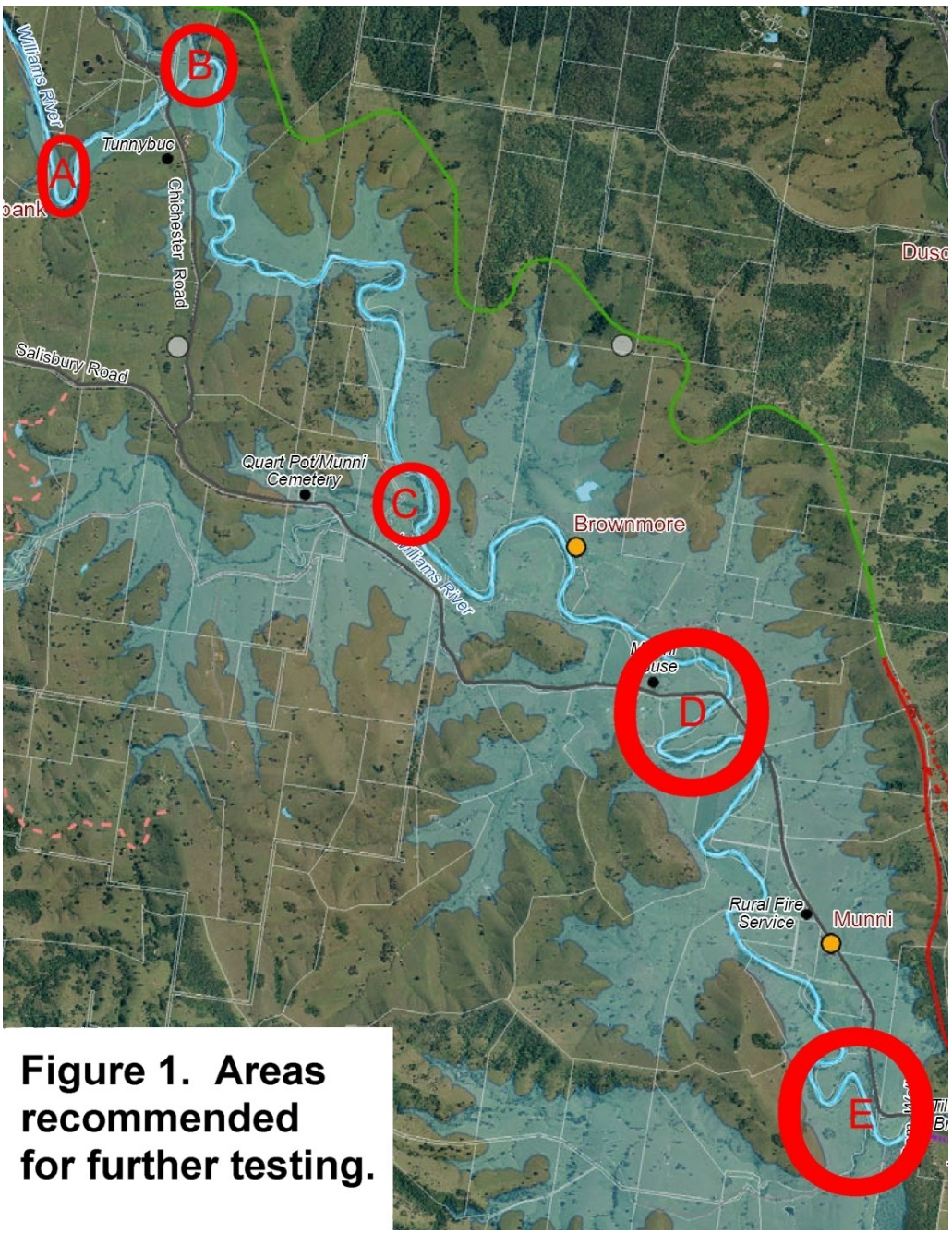

Figure 1. Areas recommended for further testing.

Figure 1. Areas A to E identified on geomorphic grounds as being archaeologically sensitive and recommended for further testing. See text for details.

Area C.

Although this site was not examined on the ground the junction of Quart Pot Creek and the Williams River is likely to have originally had a large waterhole and to retain higher benches on the floodplain. The lower parts of the floodplain are not worth testing but any higher benches present should be tested and this work could include a deeper backhoe pit to check for the presence/absence of any buried land surfaces.

Area D.

Three low benches do occur on the floodplain North of Salisbury Road. These features do not appear to be true terraces and it is possible that each of them have been disturbed by 20th Century floods. However surface testing and a deep backhoe pit to check the stratigraphy of the alluvial sequence is recommended.

South of Salisbury Road the river meander defines a long ridge (spur) with a gentle gradient. Surface testing should be conducted along the length of this ridge. This work should include observations on any low saddle that exists on the ridge where Aboriginal people may have taken a 'short-cut' across the meander.

Area E.

There are three targets within area E.

- The dam site itself will require closer examination as it will be totally modified by construction work. Although the steep slopes and rock outcrops in this area are not likely to contain any Aboriginal sites.
- Two low benches occur on the floodplain of the un-named right bank tributary just upstream of the dam site and these should be tested as for Area D.
- The saddle across the meander loop north of the tributary junction should be tested for the same reasons as the saddle in Area D.

Recommendations.

- Subsurface testing should be undertaken on those parts of the project where extreme ground disturbance is proposed. These include the dam site itself (part Area D) and sample sections of the diverted roads. No particular locations for testing in these areas have been identified and site selection should be made by the archaeologist.

- Subsurface testing and some deeper excavation for stratigraphic purposes as described above should be undertaken in those areas (A to E) identified as archaeologically sensitive on Figure 1. Specific site selection may be made by the archaeologist. The services of a geomorphologist may be required to assist in the interpretation of the stratigraphic pits.

- No further survey for Aboriginal sites is recommended within the 1:100 flood level at any locality.

- Cultural Heritage Connections Pty Ltd should provide copies of this report to their client, the Department of Environment and Climate Change and to all participating Aboriginal groups.

Dr P.B. Mitchell

References.

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Analysis of Artefacts Recovered from Sub-surface Testing of the Tillegra Dam Inundation Area

Dr Trudy Doelman
Department of Archaeology
University of Sydney

Contents

1. Introduction

This report provides an analysis of the stone artefact assemblage recovered from sub-surface testing in three locations along the Williams River. Artefacts were cleaned, individually analysed and entered into the software program *Entrer* loaded with a configuration file written for this specific purpose. This program prompts the user to address all relevant criteria through a series of menus based on the artefact type. In this way a comprehensive typological, technological and metrical analysis of the assemblage was undertaken. The resulting data was than be imported into a relational database, Microsoft Access, for further analysis (Appendix A). A definition of the terms used for the artefact types and their attributes can be found in Appendix B of this report.

2. Distribution of the Assemblage

A total of 34 artefacts were identified from the three sampling locations (Area B, D and E). The highest concentration of artefacts occurs in Area D (n=23, 67.6%) with Trenches 2 and 4 having the highest number of artefacts (n=8, 23.5%). Two of the artefacts in this trench were broken, possibly during manufacture, and could be refitting (D4IS-22, proximal flake and D4IS-19, distal flake, Figure 1, Appendix D) reducing the minimum number of artefacts to seven. Recent breaks that would be refitted were counted as complete flakes.

Areas	Trench	m^2	Count	%
B1	1	24	2	5.9
B2	1	12	1	2.9
B3	2	12	1	2.9
Sub-total			4	11.8
D1	3	19.5	1	2.9
D1	2	18.4	8	23.5
D1	4	21.3	8	23.5
D1	5	22.3	4	11.8
D2	4	12	2	5.9
Sub-total			23	67.6
E1	1	12	1	2.9
E1	3	24	5	14.7
E2	1	12	1	2.9
Sub-total			7	20.6
Total			34	

Table 1. Distribution of the Artefacts in the Sampling Areas

3. Raw Material Procurement

The cortex (or weathered surface of stones or the parent rock, Appendix B) can provide information about the type of stone sources used (i.e. a primary or secondary source). Artefacts with a rough cortex were acquired from a primary source (or an *in situ* outcrop). Artefacts with a smooth or water worn cortex originated from a secondary source (such as a river cobble) from a waterway. Similarly, the amount of cortex present on an artefact is often attributed to the distance artefacts were transported from the source (Hiscock and Mitchell 1993:12-17). A high percentage of cortex on an artefact indicates that the source of stone was nearby while artefacts with less cortex or no cortex were transported further from the source. Equally, as cores are transported away from the source they are typically reduced further and the resulting flakes are smaller as the core also reduces in size.

Most of the artefacts were made from hornfels (n=25, 73.5%), had cortex, representing an early stage of core reduction (n=21, 61.8%), and were made from local cobbles obtained from nearby waterways, shown by the presence of water-rolled cortex (n=21, 100%) and their large size (Tables 2 and 3). Five were identified as basalt (e.g. Figure 1, Appendix D). Only four non-local artefacts were identified; two proximal flakes of silcrete, a distal flake of FGS (fine-grained siliceous) with retouch and a complete flake also made from FGS (Table 2, e.g. Figure 2, Appendix D). A description of the raw material types is provided in Appendix C.

% of cortex	Count	%
0	13	38.2
1-25	12	35.3
25-50	2	5.9
50-99	5	14.7
100	2	5.9
Material Type		
Basalt	5	14.7
Hornfels	25	73.5
FGS	2	5.9
Silcrete	2	5.9
Total	34	

Table 2. Characteristics of the artefacts that indicate the source

	Maximum Dimension (mm)	
Material	**Mean**	**STD**
Basalt	37.6	12.6
Hornfels	45.6	13.5
FGS	19.2	4.8
Silcrete	28.9	6.2

Table 3. Maximum dimension of the artefacts in the assemblage

4. Composition of the Assemblage

Table 4 shows the types of artefacts found in the assemblage. Artefacts were classified as cores or flakes, broken or complete and retouched or non-retouched (Table 4, refer Appendix B for definitions). Retouched flakes were presumably used as tools (Table 4). The assemblage shows that broken flakes dominate (n=13) closely followed by complete flakes (n=10) and cores (n=6). A surprisingly high number of proximal flakes occur which may reflect the physical properties of the raw material – hornfels is more likely to break during manufacture due to its fracture toughness. A high frequency of tools also occurs in the assemblage (n=5). Most of the tools, broken flakes and cores were recovered from Area D (Table 5).

	Class	**Count**	**%**
	Core	6	17.6
Non-retouched	Complete flake	10	29.4
	Distal flake	3	8.8
	Broken flake	1	2.9
	Proximal flake	9	26.5
		23	67.6
Retouched	Complete tool	3	8.8
	Proximal tool	1	2.9
	Distal tool	1	2.9
		5	14.6

Table 4. Composition of the assemblage

Class	**D**	**B**	**E**
Core	4		2
Complete flake	2	1	4
Distal flake	2		1
Broken flake	1		
Proximal flake	8	1	
Complete tool	2	1	
Proximal tool	1		
Distal tool		1	

Table 5. Distribution of the different artefact classes

5. Retouched Implements

Five artefacts were retouched to form tools; this represents 14.6% of the assemblage (Table 4). Three of the tools were made from hornfels, one from FGS and another from basalt. A variety of scrapers were recovered with different types of retouch. Those with step and notch retouch presumably indicate a 'heavy-duty' use (Figure 4, Appendix D). No evidence of backing, generally attributed to the mid-Holocene, was present in the assemblage, although this may be a product of the raw material types; e.g. FGS raw materials are more often found with backing retouch.

Area	Trench	Tool type	Count
B	1	Scraper (step retouch)	1
B3	2	Scraper (step retouch)	1
D	4	Denticulate (notch retouch)	1
D2	4	Notch	1
D2	4	Scraper (scalar retouch)	1

Table 6. Retouched implements

6. Reduction Strategies

Six cores were found in the assemblage. Although this number is small it represents a high frequency in the total number of artefacts (Table 4). Only one core was made from basalt and the remaining were hornfels. Three cores still retain a water-rolled cortex and were therefore obtained from a watercourse. Most of the cores were multi-directional indicating that they were rotated to form new platforms for the removal of flakes. Relatively high numbers of flakes were removed from each core, shown by the number of flake scars. The absence of large numbers of flakes in the different areas associated with the cores indicates that the resulting flakes were removed for use elsewhere.

ID	Core Type	Material Type	Core body	Scar form	Platform Number	No of core scars	Length (mm)
D21-33	Bipolar	hornfels		Mixed	2	3	41.2
D21-34	Multi-directional	hornfels	cobble	expanding	4	7	61.8
D35	Multi-directional	hornfels		Mixed	4	7	30.6
D52	Bipolar	hornfels	cobble	expanding	2 - 1 crushed	5	52.3
E31-13	Multi-directional	hornfels		Mixed	4	8	43.8
E31-15	Uni-directional	basalt	cobble	elongated	1	3	52.6

Table 7. Characteristics of the cores

The form of the discarded broken and complete flakes shows that most of the flakes were indeterminate or expanding indicating an unsystematic core reduction (Table 8). Three of the flakes have evidence of platform rejuvenation – this technique shows that the core was rotated to extend its use-life. No evidence of blade manufacture was present in the assemblage. The aim of flake manufacture was to produce a large flake with a suitable working edge.

Form	Count	%
Block	4	14.3
Block/platform rejuvenation	1	3.6
Elongated	4	14.3
Expanding	8	28.6
Expand/platform rejuvenation	1	3.6
Indeterminate	9	32.1
Platform rejuvenation	1	3.6

Table 8. The form of the flakes

7. Summary

- The number of artefacts per square is very low in all the sampling areas. The densest locations were in Area D, Trenches 2 (1 artefact per 2.3 per m^2) and 4 (1 artefact per 2.6 per m^2). Only 34 artefacts were recovered from the total excavated area of 263.4 m^2.

- It is unusual to see an assemblage dominated by hornfels although this probably reflects the use of locally available material from nearby rivers and the absence of other suitable material. That hornfels was obtained locally, probably from the Chichester River, is reflected in the amount of cortex on the artefacts, the type of cortex (i.e. water-rolled) and the large size of the artefacts. Only a limited number of non-local material (FGS and silcrete) were present in the assemblage.

- Identifying raw material types, such as a fine-grained basalt and hornfels, in hand specimen is difficult especially if the artefacts are highly weathered. The only way to positively identify the raw material types is through a petrological analysis. For this report hornfels was identified as having bedding and/or fossils, the colour and texture.

- A high number of cores are present in the assemblage. These cores are typically multi-directional with relatively large numbers of flakes removed. These two characteristics indicate that the cores were rotated to remove more flakes and extend their use-life – typically a feature of raw material scarcity and/or the distance from source. Although the source of the hornfels is considered local the distance from the Chichester River to the sampling lcoations was enough to influence how the cores were reduced.

- Five artefacts were found with retouch. Most of these tools had a 'heavy-duty' retouch but it is not possible to finely retouch this material type (due to its hardness and texture).

- It is impossible to assess the age of the artefacts are no chronological markers are present in the assemblage (e.g. backed artefacts are generally attributed to the mid-Holocene).

APPENDIX A Database

ID	Area	Trench	Spit	Class	Material	Colour	Distal end	% of cortex	Type of cortex	Form	Platform Type	Flake Scars	Scar direction	Tool type	Edge No	Edge 1	Edge 2	Edge 3	Edge 4
D4IS-16	D	4	initial scarpe	complete tool	basalt	grey	feather	50-100	water-rollec	expanding	Unifacial	0-retouched		denticulate	2			notch	notch
E31-15	E	3	1	core	basalt	grey		1-25	water-rollec										
D21-32	D	2	1	proximal flake	basalt	grey		1-25	water-rollec	indeterminate	Cortical								
D4IS-22	D	4	initial scarpe	proximal flake	basalt	grey		1-25	water-rollec	expanding	Unifacial								
D4IS-19	D	4	initial scarpe	distal flake	basalt	grey	hinge	50-100	water-rollec	expanding									
D21-9	D2	4	1(spoil)	complete tool	hornfels	lightgrey	platform	0		platform rejuventatior	Missing	3	radial	notch	1	notch			
E31-14	E	3	1	complete flake	hornfels	grey	feather	25-50	water-rollec	block	Unifacial/rough	2	0						
E31-13	E	3	1	core	hornfels	grey		0											
E31-12	E	3	1	distal flake	hornfels	grey	feather	1-25	water-rollec	expanding/platform rejuventatior									
D51	D	5		proximal flake	hornfels	grey		0		indeterminate	Bifacial								
D21-10	D2	4	1(spoil)	proximal tool	hornfels	red/grey		1-25	water-rollec	indeterminate	Bifacial			scraper					
E21-8	E2	1	1	complete flake	hornfels	grey	platform	0		elongatec	Bifacial	8	180						
E21-7	E	1	1	complete flake	hornfels	grey	overshot	50-100	water-rollec	elongatec	Unifacial	1	0						
D35	D	3	2	core	hornfels	grey		1-25	water-rollec										
D54	D	5		complete flake	hornfels	grey	feather	100	water-rollec	expanding	Missing	0	NA						
D53	D	5		broken flake	hornfels	grey		0		indeterminate									
D52	D	5		core	hornfels	grey		25-50	water-rollec										
E31-11	E	3	1	complete flake	hornfels	grey	feather	100	water-rollec	elongatec	Bifacial	0	N/A						
D21-29	D	2	1	complete flake	hornfels	grey	feather	1-25	water-rollec	indeterminate	Unifacial	2	1						
D4IS-20	D	4	initial scarpe	complete flake	hornfels	grey	hinge	0		indeterminate	Unifacial	3	0						
D4IS-21	D	4	initial scarpe	distal flake	hornfels	grey	feather	1-25	water-rollec	elongatec									
D4IS-23	D	4	initial scarpe	proximal flake	hornfels	grey		1-25	water-rollec	expanding	Cortical								
B11-24	B	1	1	complete tool	hornfels	grey	na	50-100	water-rollec	block	Unifacial	0-retouched	N/A	step	1			step	
B11-25	B	1	1	complete flake	hornfels	grey	hinge	50-100	water-rollec	indeterminate	Bifacial	1	0						
D4IS-18	D	4	initial scarpe	proximal flake	hornfels	grey		0		indeterminate	unifacial/rough								
D21-34	D	2	1	core	hornfels	grey		1-25	water-rollec										
D4IS-17	D	4	initial scarpe	proximal flake	hornfels	red/grey		0		expanding	Unifacial								
D21-30	D	2	1	complete flake	hornfels	grey	feather	1-25	water-rollec	expanding	Unifacial	2	1						
D21-31	D	2	1	proximal flake	hornfels	grey		0		indeterminate	Unifacial								
D21-33	D	2	1	core	hornfels	grey		0											
D21-35	D	2	1	complete flake	fgs	grey	feather	0		expanding	Unifacial	2	90						
B321-27	B3	2	1	distal tool	fgs	lightgrey	cort	1-25	water-rollec	block/platform rejuventatior				step					
D21-36	D	2	1	proximal flake	silcrete	grey		0		block	Unifacial								
B211-26	B2	1	1	proximal flake	silcrete	pink		0		block	Unifacial/rough								

ID	Core Type	Core body	Scar form	Platform No	Maximum Dimensio	Length	Width	Thickness	Platform Width	Platform thickness	no of core scars	Scar length	Scar width	comments
D4IS-16					49.8	37	48	16.7	37.5	13.1				large retouch flakes -core?, unidirectional, 4 scar
E31-15	unidirectional	cobble	elongatec	1	52.6	52.6	41.7	27.4			3	23.5	17.8	
D21-32					31.5				18.5	6.1				
D4IS-22					27.1				10.7	1.4				conjoin with d4is-19
D4IS-19					27.1									burnt, conjoin with d4is-22=-old break
D21-9					56.8	47.2	46.5	21.8						break at proximal enc
E31-14					49	30.1	49	15.6	25.7	12.7				possible scalar retouch q?
E31-13	multidirectional		mixed	4	44.4	43.8	34.1	14.5	33.3	14.5				
E31-12					29.1									
D51					36.3				23.7	8.4				conjoined-recent breal
D21-10					57.3				25.3	8.7				burnt
E21-8					52.8	47.7	24.3	18.4	10	7.5				fossil - weatherec
E21-7					53.7	51.6	35.7	7	9.2	2.2				weathered
D35	multidirectional		mixed	4	36.5	30.6	31.6	11.8			7			retouch?
D54					32.4	28.2	29.7	5.8						
D53					32.2									
D52	bipolar	cobble	expanding	2 - 1 crush	61.4	52.3	36.5	34.3			5	14.3	24.2	overhang
E31-11					76.1	66	42.1	12.9	22.9	12.4				conjoined-recent breal
D21-29					45.9	42.8	26.4	14.2	7.5	6.3				
D4IS-20					40.9	35.7	32.3	9.9	24.5	9.6				burnt
D4IS-21					42.3									burnt
D4IS-23					54.5				54.0	10.9				recent damage
B11-24					63.6	34.1	55.3	27.8	54	23.7				
B11-25					36.5	33.5	26	11.7	10.2	6.5				
D4IS-18					38.6				16.4	8.4				
D21-34	multidirectional	cobble	expanding	4	70.4	61.8	63	42.2			7	14.8	27.2	
D4IS-17					26				18.5	5.1				burnt
D21-30					35.8	17.1	30.9	4.6	6.1	2.2				weathered
D21-31					26.8				10.5	5.2				recent break
D21-33	bipolar		mixed	2	41.6	41.2	36.1	21.9			3	21.1	18	highly weatherec
D21-35					15.8	15	16.4	2.1	8.8	2				potlid
B321-27					22.6									possibly a core
D21-36					24.5	11.7	14.1							burnt
B211-26					33.2				26.4	8.7				burnt

Appendix B Definitions

Attribute	*Value*	*Definition*
Technological type		
	Complete flake	Has a platform and termination
	Proximal flake	Has a platform and no termination
	Distal flake	A termination but no platform
	Broken flake	No platform or termination
	Complete, broken, distal and proximal tool	As above but with retouch
	Core	Negative scars from the removal of flakes
	Core fragment	A broken core showing evidence of flake removal
	Core tool, core fragment tool	As above but with retouch
	Block	No flake characteristics, cubed shape
	Hammer stone	Cobble shaped with evidence of pecking/ crushing
	Broken hammer stone	Broken hammer cobble, shows pecking/crushing
Cortex percentage	0%, 1-25%, 26-50%, 51-99%, 100%	Percentage of cortex on the dorsal surface of flakes
		Percentage of cortex on the total surface of cores
Cortex type	Water-rolled	Smooth surface from secondary source
	Rough	Weathered, angular surface from primary source
Termination	Feather	Tapering termination
	Abrupt	Non-tapering termination
	Plunge	Curves towards the ventral surface
	Hinge	Curves towards the dorsal surface
	Step	Steps at termination
	Cortical	Termination ends in cortex
	Platform	Evidence of old platform at termination
Form	Expanding	Proximal end narrower then distal end
	Block	Cubed form
	Elongated	Twice as long as wide
	Indeterminate	All other flake forms
	Platform rejuvenation	Evidence of an old platform on dorsal surface
Platform type	Unifacial	Struck from a unifacially flaked platform
	Bifacial	Struck from a bifacially flaked platform
	Cortical	Struck from a cortical platform
	Missing	Crushed or missing platform
Flake scars		flakes scars on dorsal surface of complete flake
Flake scar direction	0 degrees	Flakes struck from the platform
	90 degrees	Flakes show a 90 degree core rotation
	180 degress	Flakes show a 180 degree core rotation
	Radial	Flakes from multiple core rotations
Tool type	Scalar	Continuous macroscopic scalar retouch
	Backed	Geometric microlith
	End-scraper	Scalar retouch in Quadrant 3 (Figure 1)
	Notch	Retouch forming a cuspate notch
	Denticulate	Retouch form more than one cuspate notch
	Stepped scraper	Steep, overlapping retouch with step terminations

Core type	Uni-directional	Flaking from one direction
	Bidirectional	Flaking from two directions
	Multi-directional	Flaking from more than two directions
	Microblade	Small parallel flakes scars
	Tranchet	Blade flakes removed from a flake axis
	Prismatic	Blade production rotating from a single platform
	Cobble	One or two minor flakes removed, remaining is cortex
	Bipolar	Flakes removed in opposite directions from two platforms, anvil rested
Flake dimensions	Maximum dimension	Figure 2
	Maximum length	
	Maximum width	
	Maximum thickness	
	Platform width	
	Platform thickness	
Core body	Cobble	Water-rolled cortex present
	Unknown	
	Flake	Evidence of a flake attribute
Flake scars	Elongated	Twice as long as wide
	Mixed	Both expanding and elongated flakes
	Expanding	Wider than long
Core dimensions	Maximum length	Figure 3
(block)	Maximum width	
	Maximum thickness	
	Scar length	Axial length of last complete flake removed
	Scar width	Maximum width of last complete flake removed

Appendix C - Description of Raw Materials

Hornfels is a grey/black, fine-grained metamorphic rock formed by thermal metamorphism in a contact zone surrounding an igneous intrusion (Lapidus 1990:277). Under a hand lens the grains are equal in size and show no preferred orientation. Bedding is sometimes present. The parent rock is a shale and may some times have remanet fossils present in the fabric. It is likely that hornfels is found as a secondary source in the Chichester River which drains from the closest outcrop (Figure 3, Pain 1983:190).

Basalt is a dark-coloured basic, extrusive volcanic rock (Lapidus 1990:53). It is commonly found in the Barrington Tops some of which are fine-grained and suitable for knapping (Graham pers. comm., Pain 1983). It is likely that basalt can be found in both the Chichester River and Williams River due to its large distribution across the Barrington Tops (Figure 3, Pain 1983:190).

Fine Grained Siliceous (FGS) is defineds “rock which may be very fine-grained quartzite, chert or quartz, but could not be correctly classified without petroscopic analysis (Attenbrow 1987, vol 11, Appendix 4:2 as cited in Corkill 1999: Glossary and Abbreviations, p5)

Silcrete is defined as a brittle, intensely indurated rock composed of quartz clasts (ranging from sand to boulders), cemented by a matrix which may be well-crystallised quartz, cryptocrystalline quartz or amorphous silica (Langford-Smith 1978:3). The actual texture of the silcrete reflects the parent rock which may be a claystone, sandstone or siltstone (Watts 1978:41). The parent rock (the size of the quartz grains and the degree of size-sorting) influences the flaking quality of the silcrete (Doelman *et al.* 2001).

Appendix D - Photographs

Figure 1. Refitting artefacts, D4IS-19 Distal fragment (bottom), DAIS-22 proximal fragment (top)

Figure 2. E31-15, basalt unidirectional core

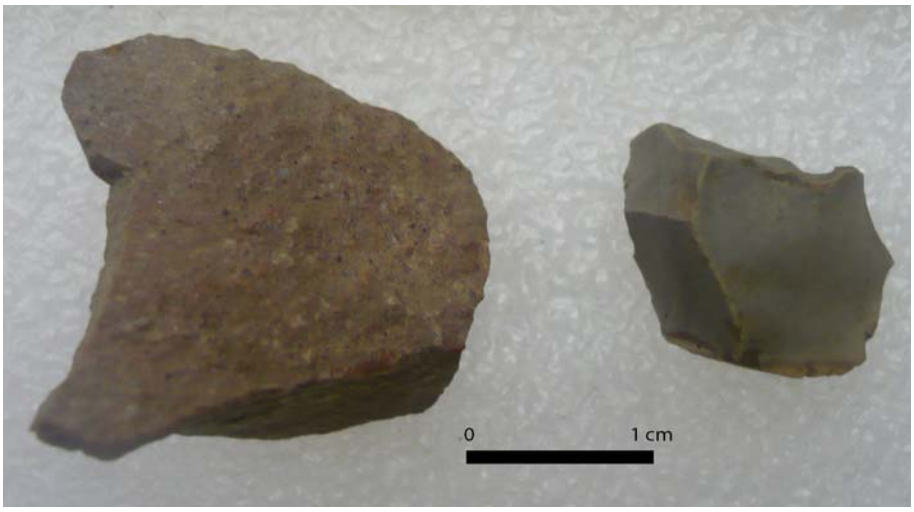

Figure 3. B211-26, Proximal silcrete flake (left), B32-1, distal tool of FGS (right)

Figure 4. B1-24. Ventral view of a complete flake with stepped retouch (left), dorsal view of a complete flake with stepped retouch in Quadrant 3.

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04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

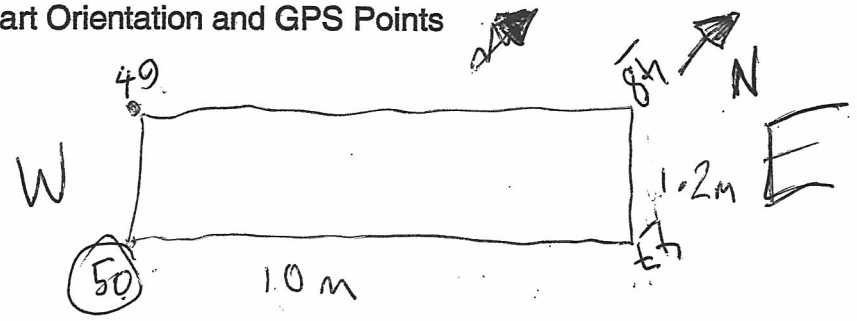
Recorder: VH

Date: 2/4/08

Test Area # E2 Trench 1

Spit # Only 1 Spit

Start Orientation and GPS Points



Description of deposit

Mid brown grading to light grey/brown loamy silt. Some large cobbles fire cracked moderate wood charcoal inclusions visible throughout up to 0mm Ø, less than 1%, deposit continues to base

110 – 160 spit

Include

Colour 7.5YR 3/3

Compaction

Composition/particle size

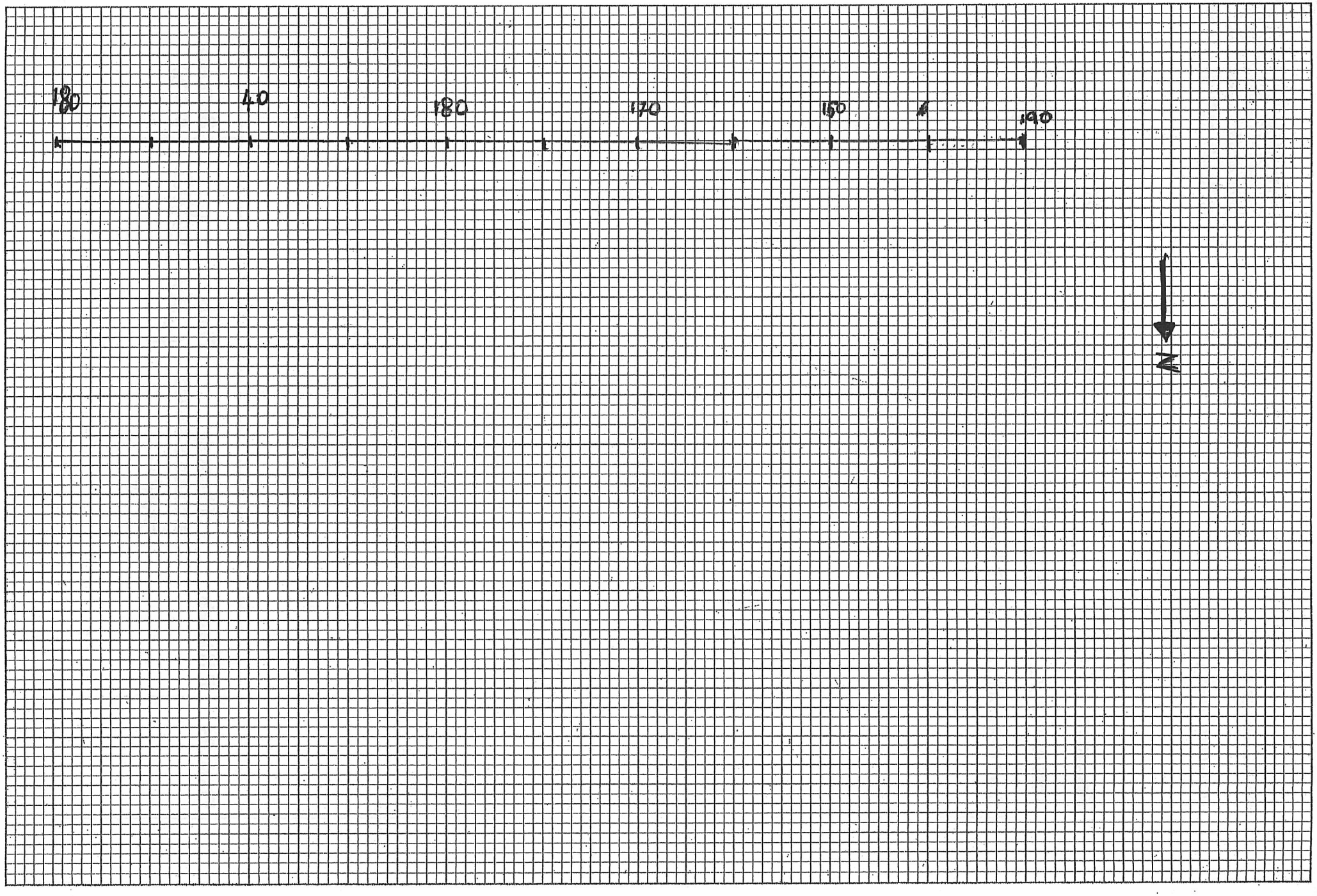
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

grass stripped first – to mid-brown topsoil

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		Sample	flaked cobble.	


180
40
180
170
150
190
N

04092 Tillegra Dam

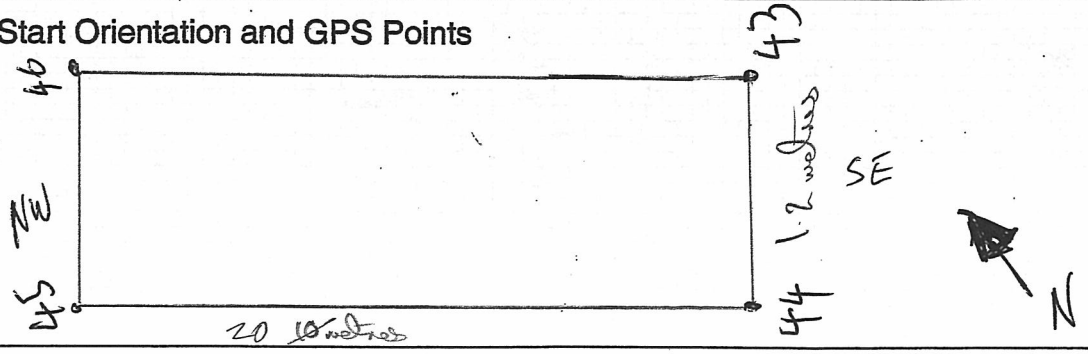
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: BEN Date: 02/09/08

Test Area # AREA E. TRENCH 3 Spit # 1

Start Orientation and GPS Points



Description of deposit

light grey-brown silt very little darker topsoil - well mixed alluvial deposit coming down to mottled brown yellow orange clay -
River cobble + corse sandstone ish cobble
w - Iron Staining

Include

Colour — Very dry @ clay

Compaction

Composition/particle size

Inclusions

Thickness & extent

? Sandstone geology

Methods & Conditions & Other comments (hand excavated/sieved etc.)

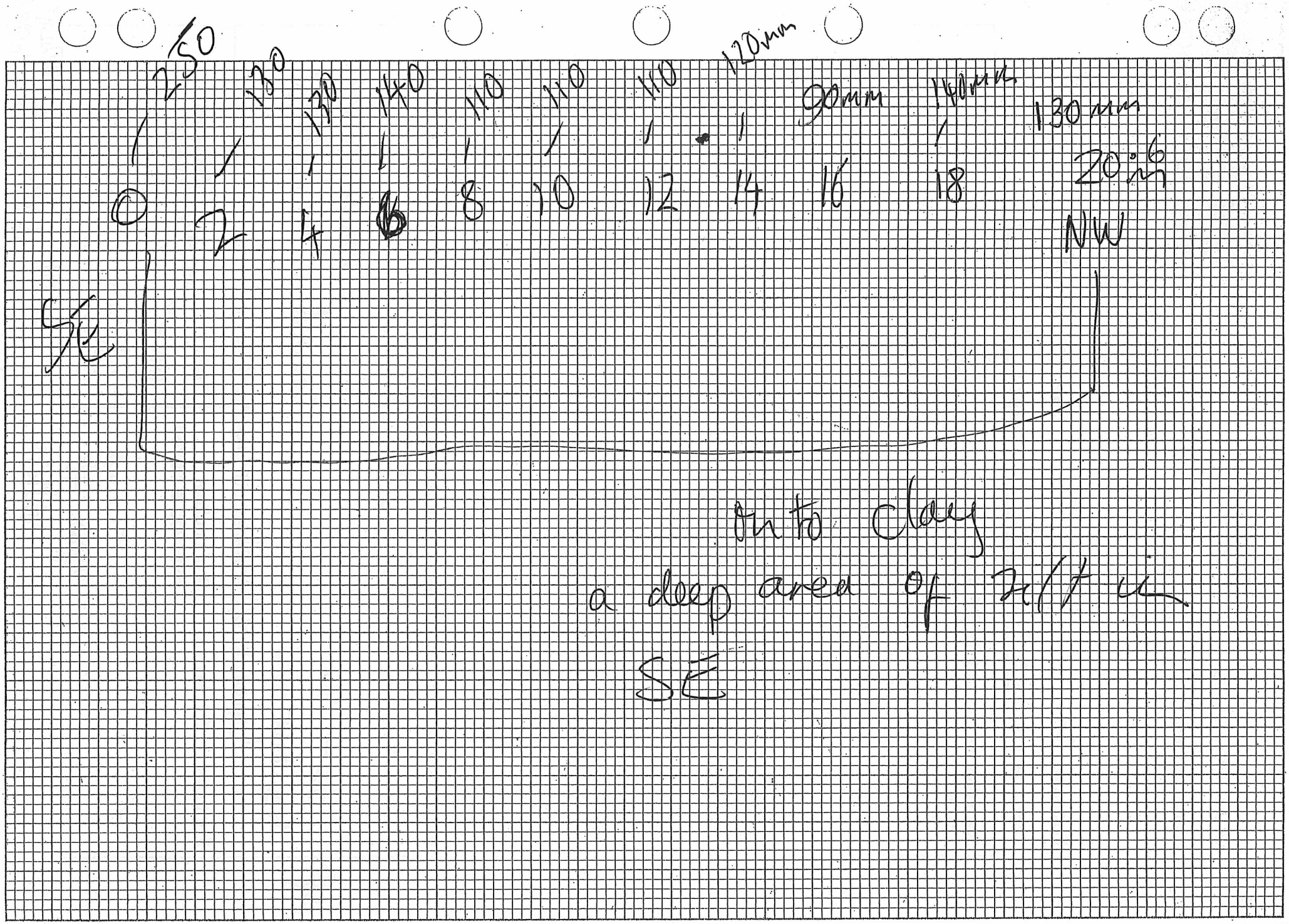
Machine excavated using mud bucket hand sorted when cobbles appearing - sieved a # buckets

depth = 300 - 180 from surface (grass previously removed

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		4 sieved approx 40 buckets	boiler river cobbles	

- silt 10YR 5/2 pale grey brown

Munsell = 10YR 4/3 - clay w mottlings 7.5YR 5/8


250
130
120
140
110
110
110
120mm
90mm
140mm
130 mm
20%
NW
SE
2
4
6
8
10
12
14
16
18
On to clay
a deep area of
SE

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

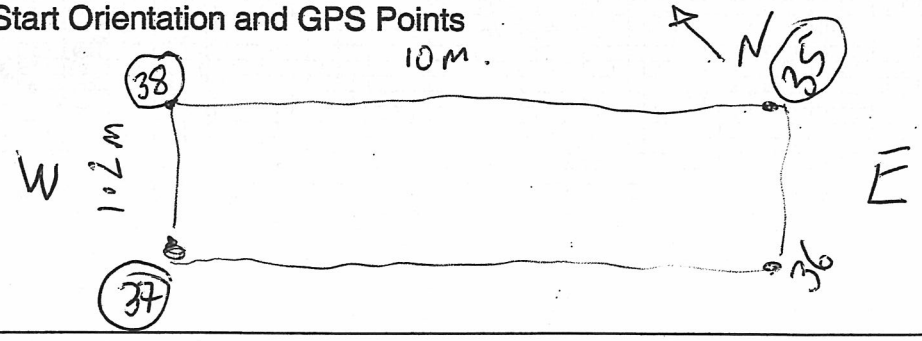
Recorder: VH

Date: 2/4/2008

Test Area # E - Trench 1

Spit # 2

Start Orientation and GPS Points



Description of deposit

light grey silt w ironstone + light brown clay w orange/yellow mottle - some large cobbles.

Include

Colour

Compaction

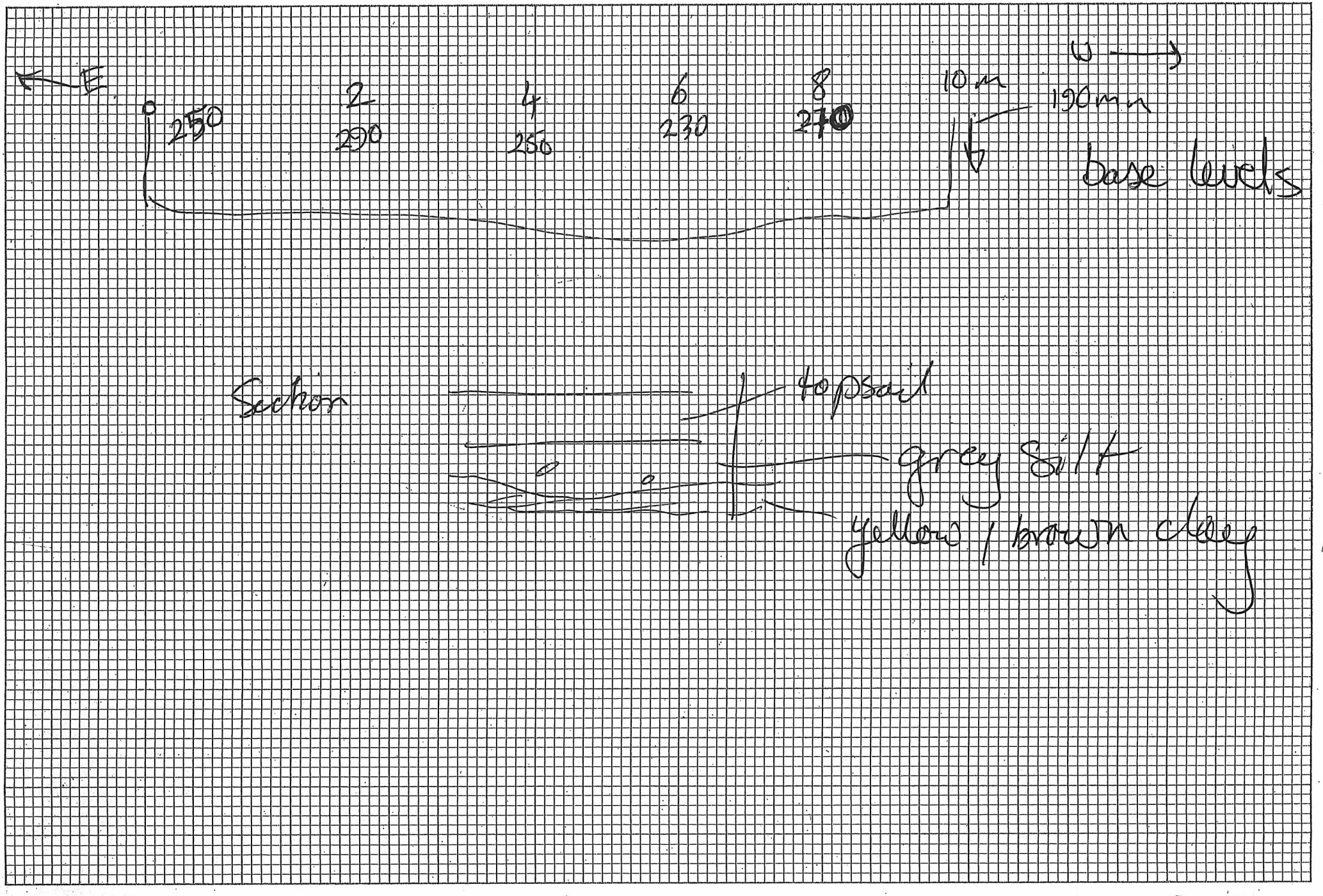
Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		Sample 6-10 buckets		


E
250
2
200
4
250
6
230
8
270
10 m
W
190 m m
base levels
Section
topsoil
grey silt
yellow / brown clay

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

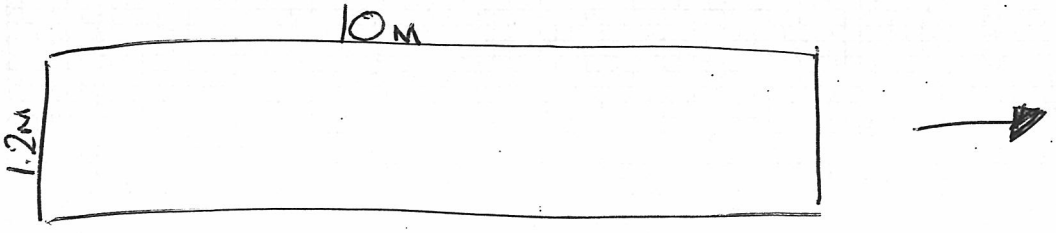
Recorder: KM

Date: 2.4.08

Test Area # E2 TRENCH 2

Spit # (3)

Start Orientation and GPS Points



Description of deposit

continued pale yellow/brown silt; loosely packed, very weakly degraded sandstone cobbles & minor distribution of river cobbles- soft & uneven boty towards Base: mottled orange/yellow clay & silty clay, varying from loose to slightly compact; sandstone & river cobbles continuing from previous layer

Include

Colour

Compaction

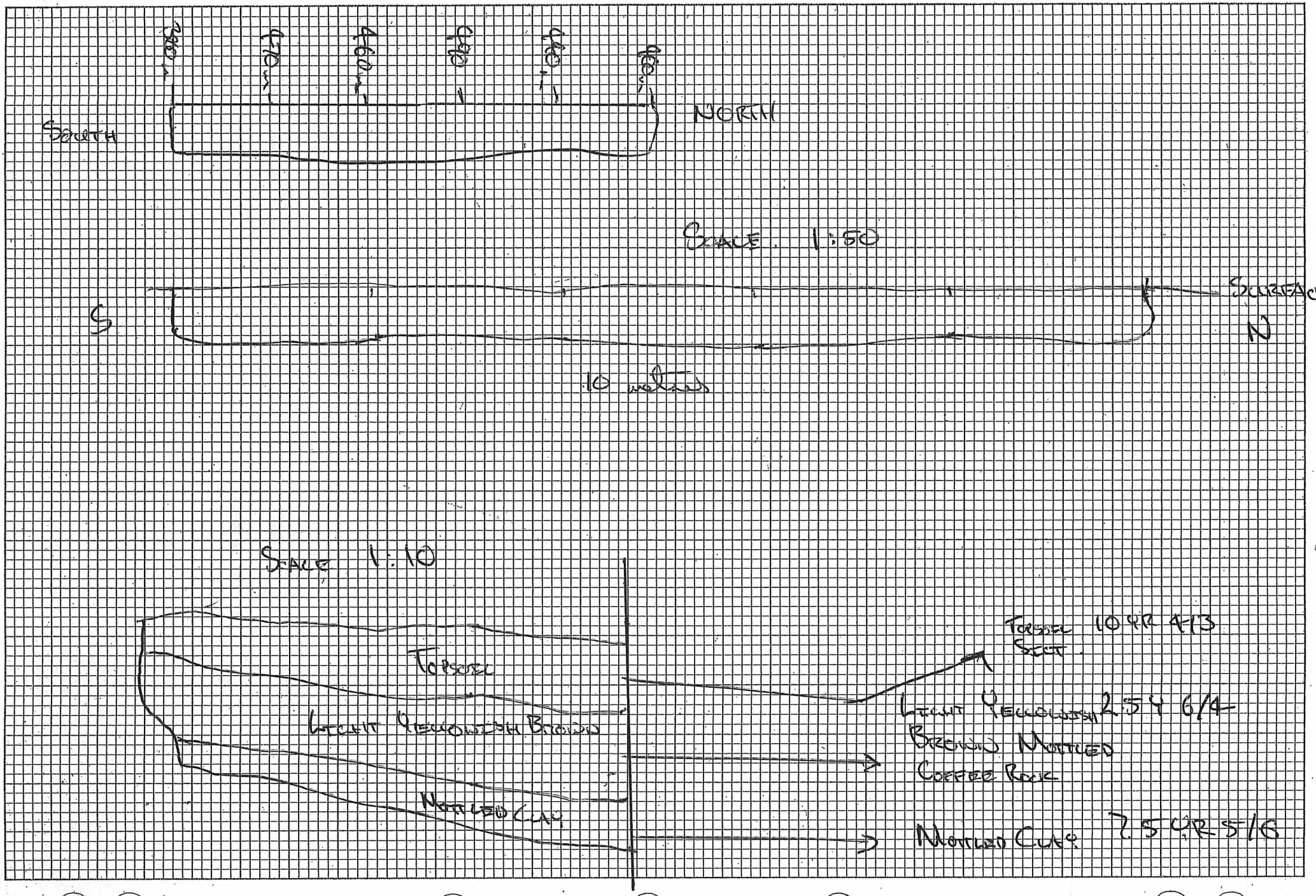
Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓				


SOUTH
NORTH
SCALE 1:50
S
SURFACE
N
10 metres
SCALE 1:10
TOPSOIL
LIGHT YELLOWISH BROWN
MOTTLED CLAY
TOPSOIL 10 YR 4/3
SILT
LIGHT YELLOWISH BROWN MOTTLED COFFEE ROCK 2.5 Y 6/4
MOTTLED CLAY 7.5 YR 5/6

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

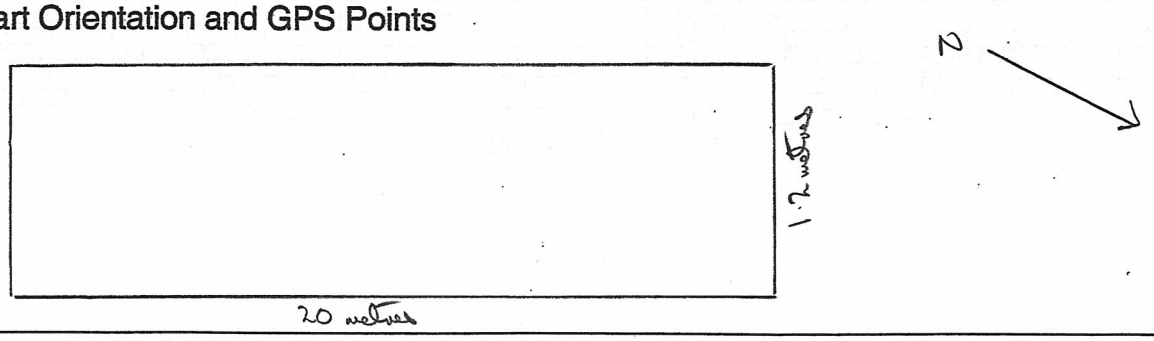
Recorder: BEN

Date: 04/04/09

Test Area # AREA F TRENCH ONE

Spit # TWO

Start Orientation and GPS Points



Description of deposit

This spit consists primarily of a grey brown sandy silt with small ironstone inclusions with a compact texture and a depth of 60-80 cm. Below this is an orange brown sandy clay that is very compact and contains tree roots and some decomposing sandstone.

Include

Colour

Compaction

Composition/particle size

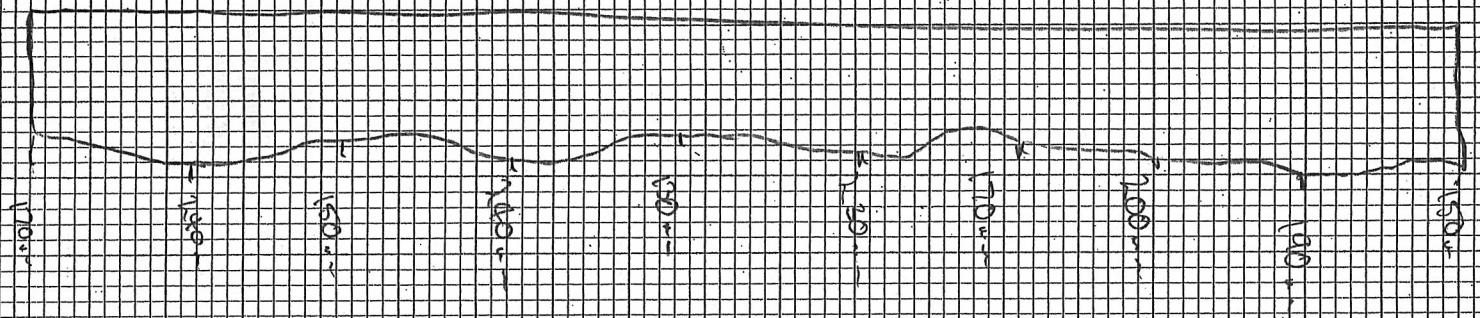
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated using the mud bucket.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		Sample 10 buckets		



MUNSELL HUE

SILTY LOAM: 10YR 4/2

SANDY SILT: 10YR 5/2

10 YR 5/3 - 5/4

CLAY:

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: [illegible] Date: 4.4.08

Test Area # E - Trench 2 Spit # 2

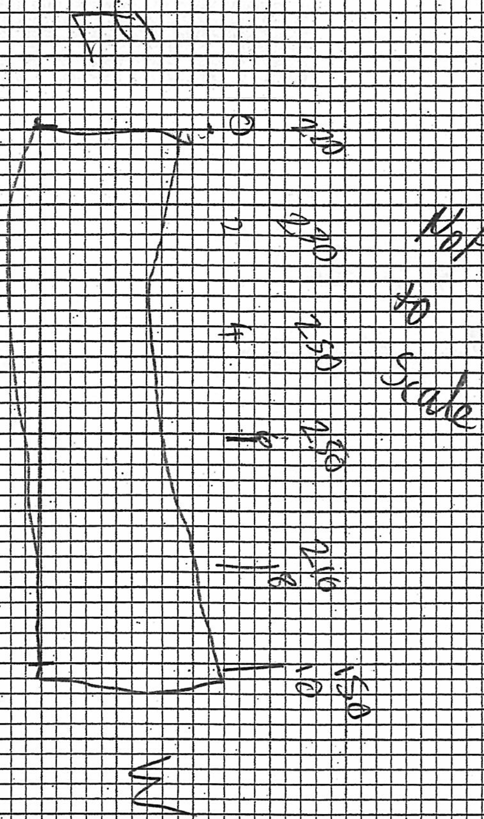
Start Orientation and GPS Points	

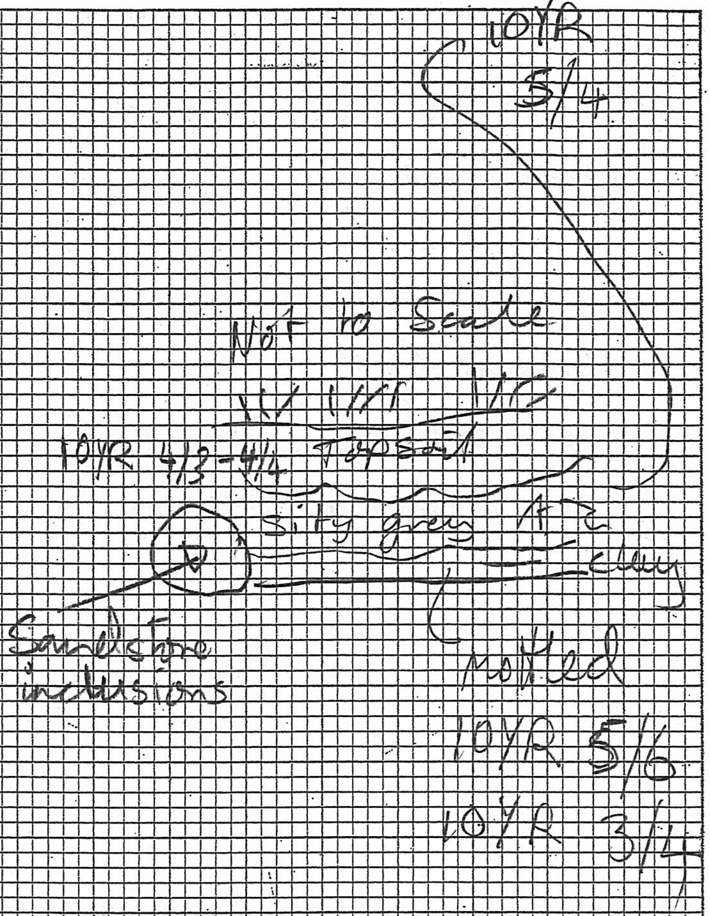
Description of deposit	**Include**
light grey/sL brown ~~silty~~ sandy clayey silt mottled coming down onto light yellow/brown clay – varied inclusions – gravel Sandstone + Shale patches – some heavy iron content rocks fine grained ~~more~~ silt – loose clay compact w cracking	Colour Compaction Composition/particle size Inclusions Thickness & extent

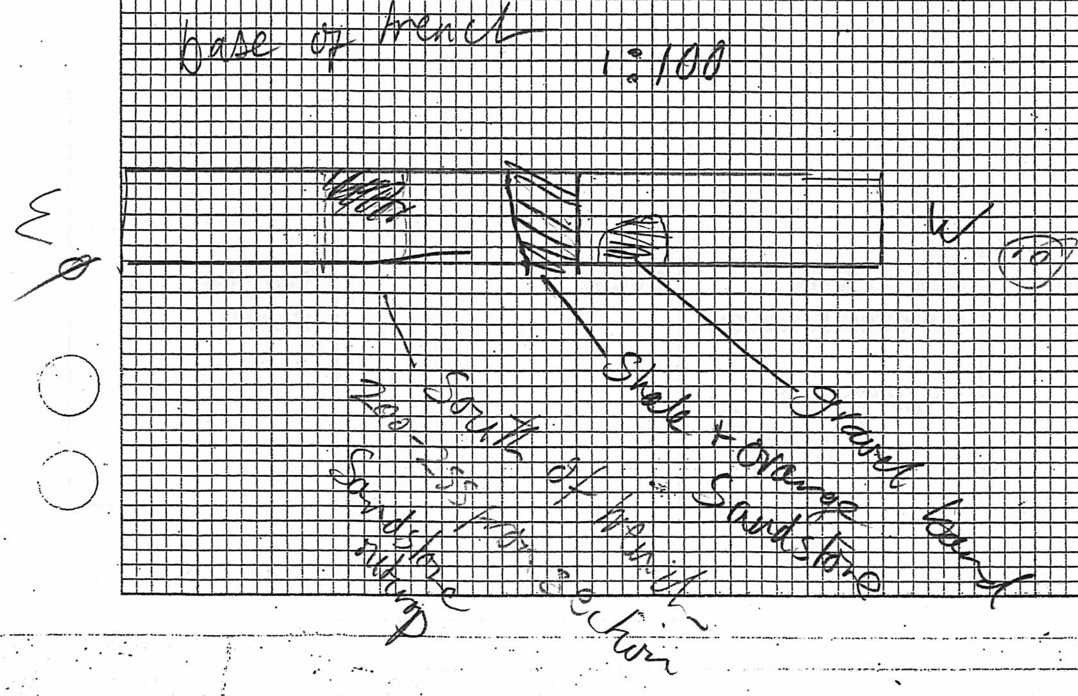
Methods & Conditions & Other comments (hand excavated/sieved etc.)

machine

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		Sample 10 buckets		


N
Not to Scale
E


10YR 5/4
Not to Scale
10YR 4/3-4/4 Topsoil
silty grey
clay
Sandstone inclusions
mottled
10YR 5/6
10YR 3/4


base of trench
1:100
E
W
Shale + orange sandstone
Gravel band

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

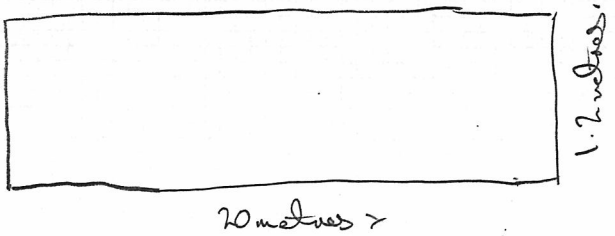
Recorder: BS

Date: 01/03/08

Test Area # AREA D2 TRENCH 3

Spit # 2

Start Orientation and GPS Points



See spit one for waypoints.

Description of deposit

Medium yellow brown sandy clay with small fragments of iron stone and shale firm to comfact in texture with a thickness of between 90mm 110mm.

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

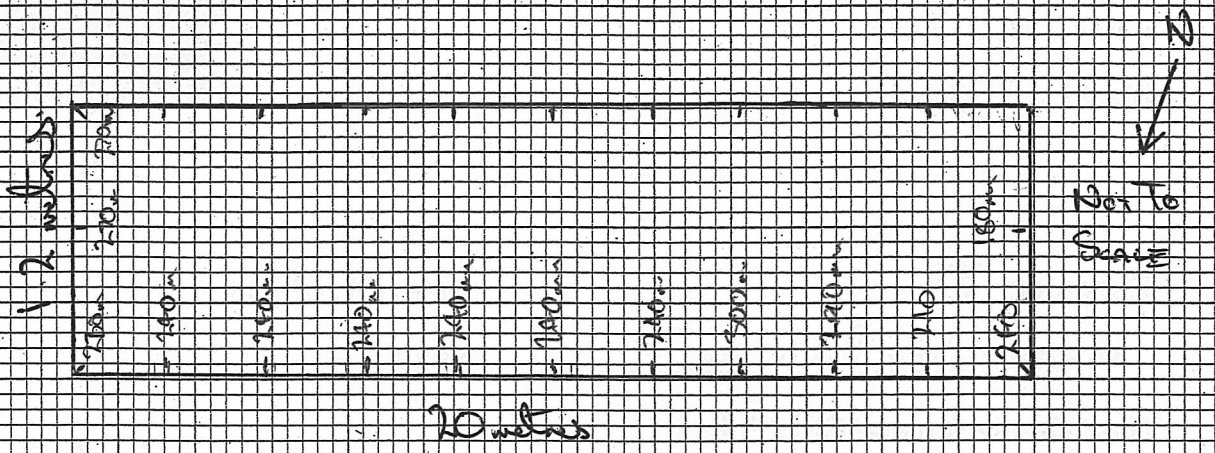
Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated with the mud bucket in approx 100mm spits

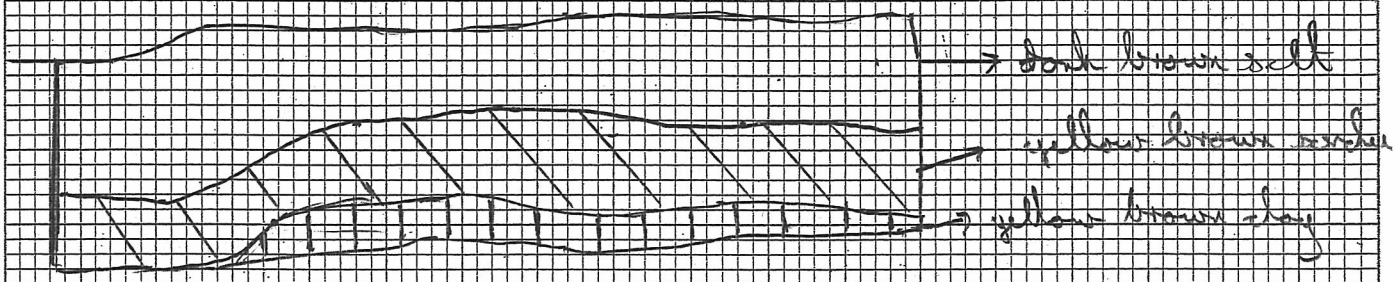
Brown silt 7.5YR 4/2

Clay/Sand 10YR 5/3 mottled 5/6

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
	-	2 buckets sieved	N/A	



TRENCH 3 SOIL PROFILE NORTHERN WALL (PART)



SCALE 1:10

Western End of Trench

04092 Tillegra Dam

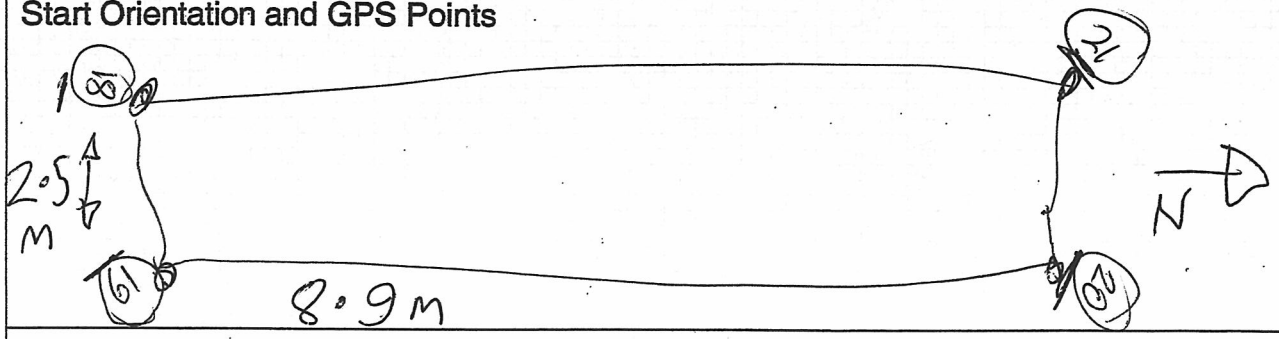
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 31/3/08

Test Area # Munni Horse 'D1' ~~Spit #~~ Trench 5

Start Orientation and GPS Points



Description of deposit

dark brown loamy topsoil

mottled layer

- yellow brown clay - v hard

clay depth approx 140mm start

110 - 160mm

clay breaks apart dried out brick inclusions river pebble et

Include

Colour

Compaction

Composition/particle size

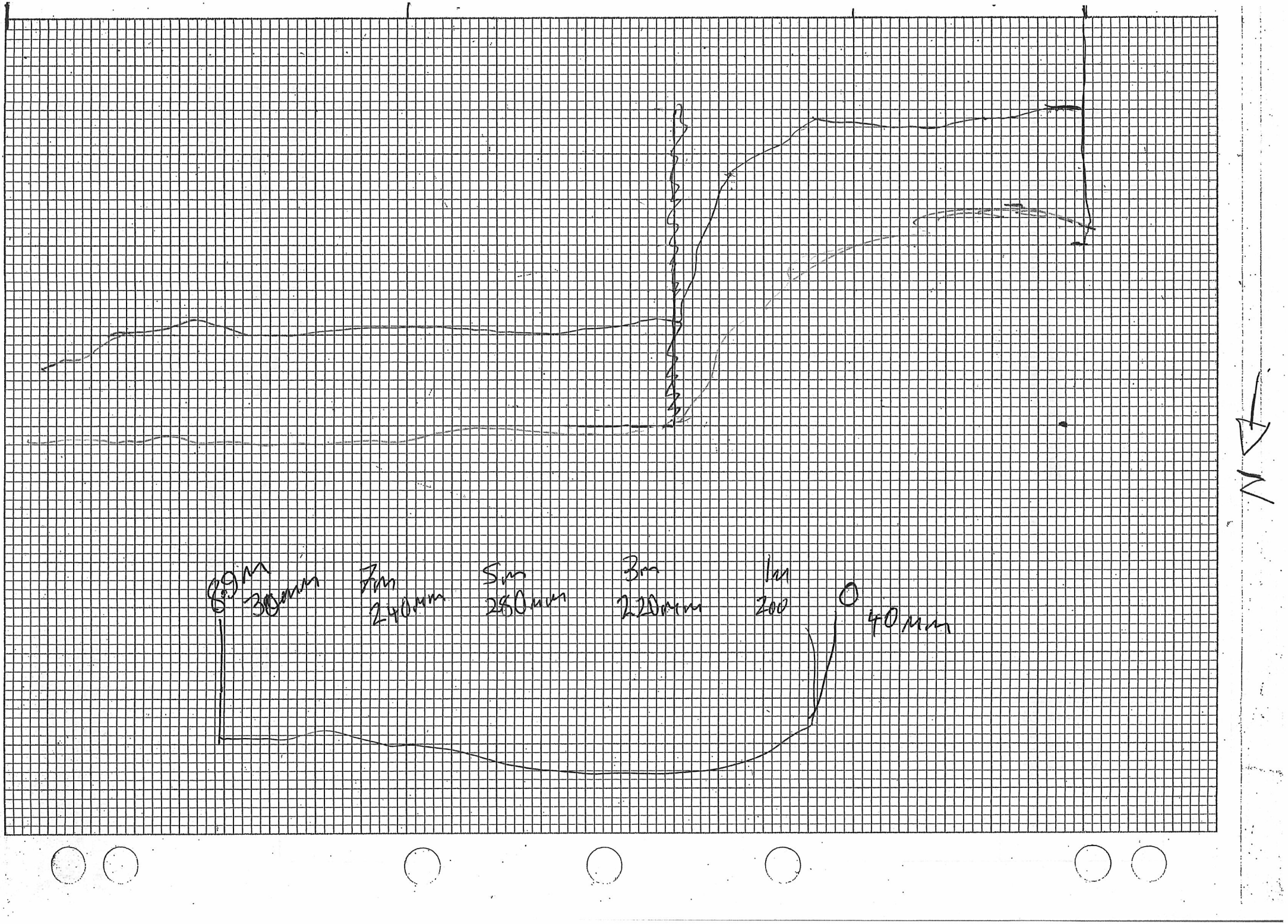
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

2 Scrapes trowled in between

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		✓	yes	-


9m
300mm
7m
240mm
5m
280mm
3m
220mm
1m
200
0
40mm

04092 Tillegra Dam

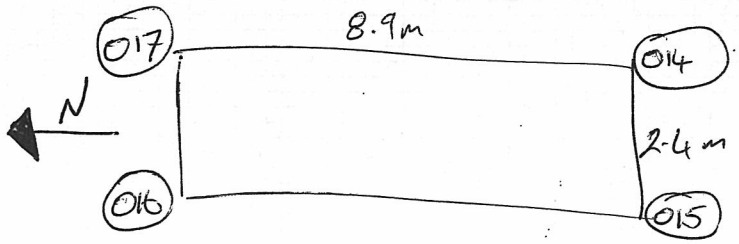
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 31/3/08

Test Area # Mummi House Area Dump Spit # Trench 4

Start Orientation and GPS Points



Description of deposit

(I) Dark brown sandy loam; very loosely packed; small to medium grass roots throughout, rounded river pebbles up to 30mm Ø and broken cobbles throughout deposit; charcoal fragments throughout brick fragments throughout, see below

(II) Mottled dark brown/light brown/orange clay; slightly compact, hard & crumbly; grass roots continue to base; charcoal smears & burnt clay visible throughout; brick fragments still visible in clay.

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

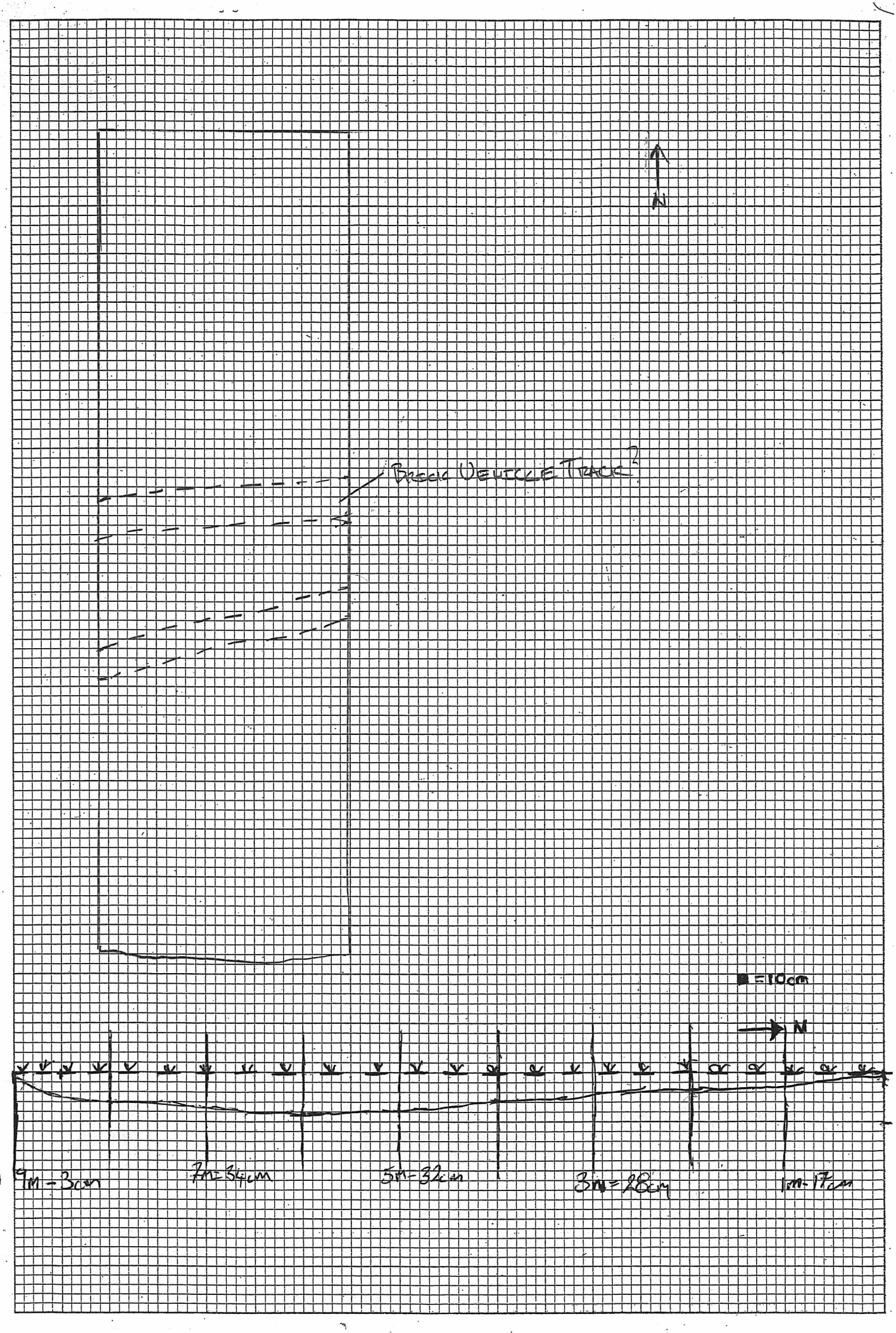
(I) 0 - 16cm

(II) 16 - base (varying, see over)

Methods & Conditions & Other comments (hand excavated/sieved etc.)

A feature was present (as shown over) and was two parallel lines of sandstone brick rubble and some gravel.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)


N
BRECIA VEHICLE TRACK?
■ = 10cm
N
9M - 3cm
7M - 34cm
5M - 32cm
3M = 28cm
1M - 17cm

04092 Tillegra Dam

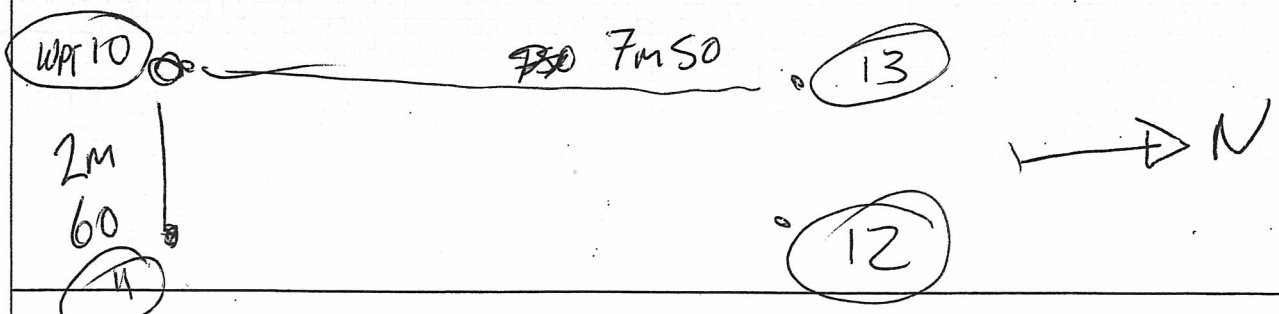
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 31/3/08

Test Area # Munni/Howe D1 Trench 3 Spit # ~~50~~ Not spitted

Start Orientation and GPS Points



Description of deposit

Dark brown loamy topsoil texture contrast soils comes on to mottled clay light brown/yellow V hard

Include

Colour

Compaction

Composition/particle size

Inclusions

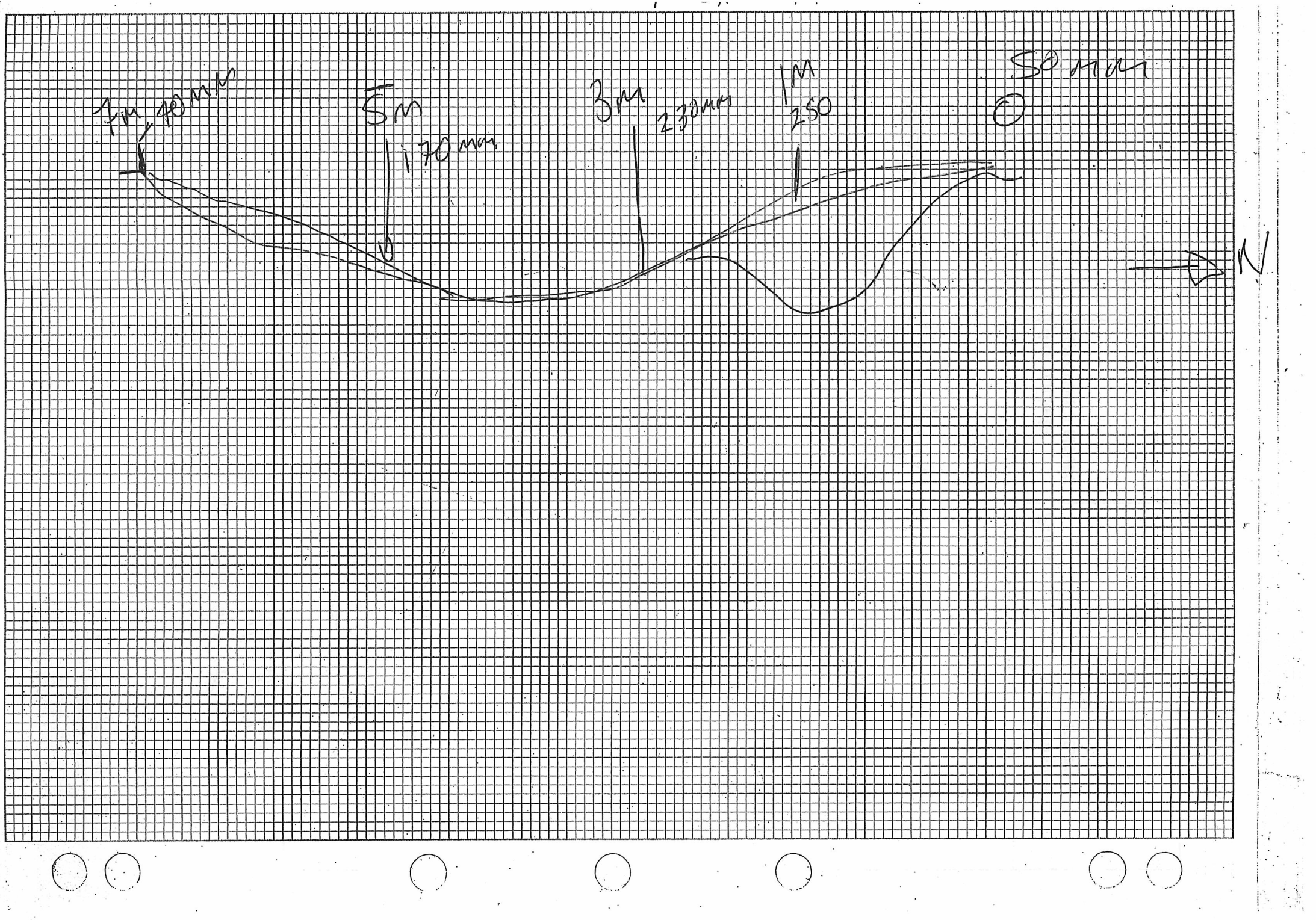
Thickness & extent

No artefacts

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Scraped off grass + then excavated w machine trowelled through spoil

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)


7m
40mm
5m
170mm
3m
230mm
1m
250
0
50mm
N

04092 Tillegra Dam

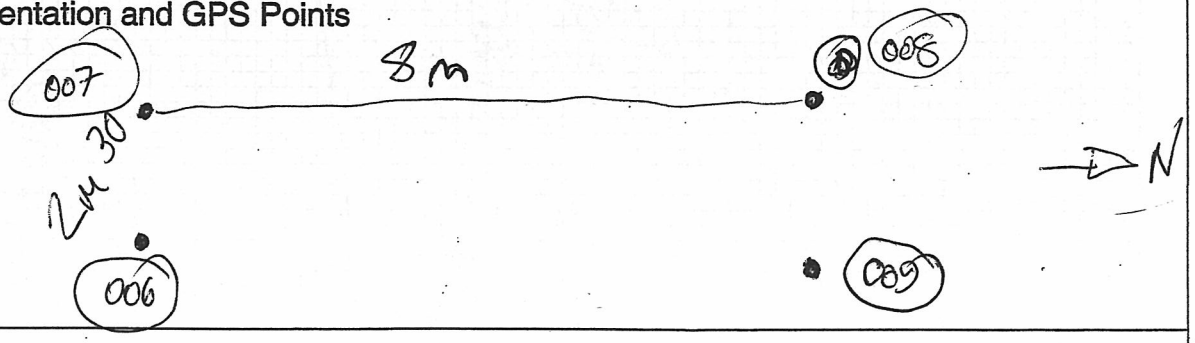
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 31/3/08

Test Area # Munni D1 Trench 2 Spit # Tr1 Not spitted

Start Orientation and GPS Points



Description of deposit

Dark brown loamy topsoil large peds
Some gravel — coming onto clay.
large area of burnt - ?tree stump including burnt clay.
mottled clay grades to yellowy clay

Include

Colour

Compaction

Composition/particle size

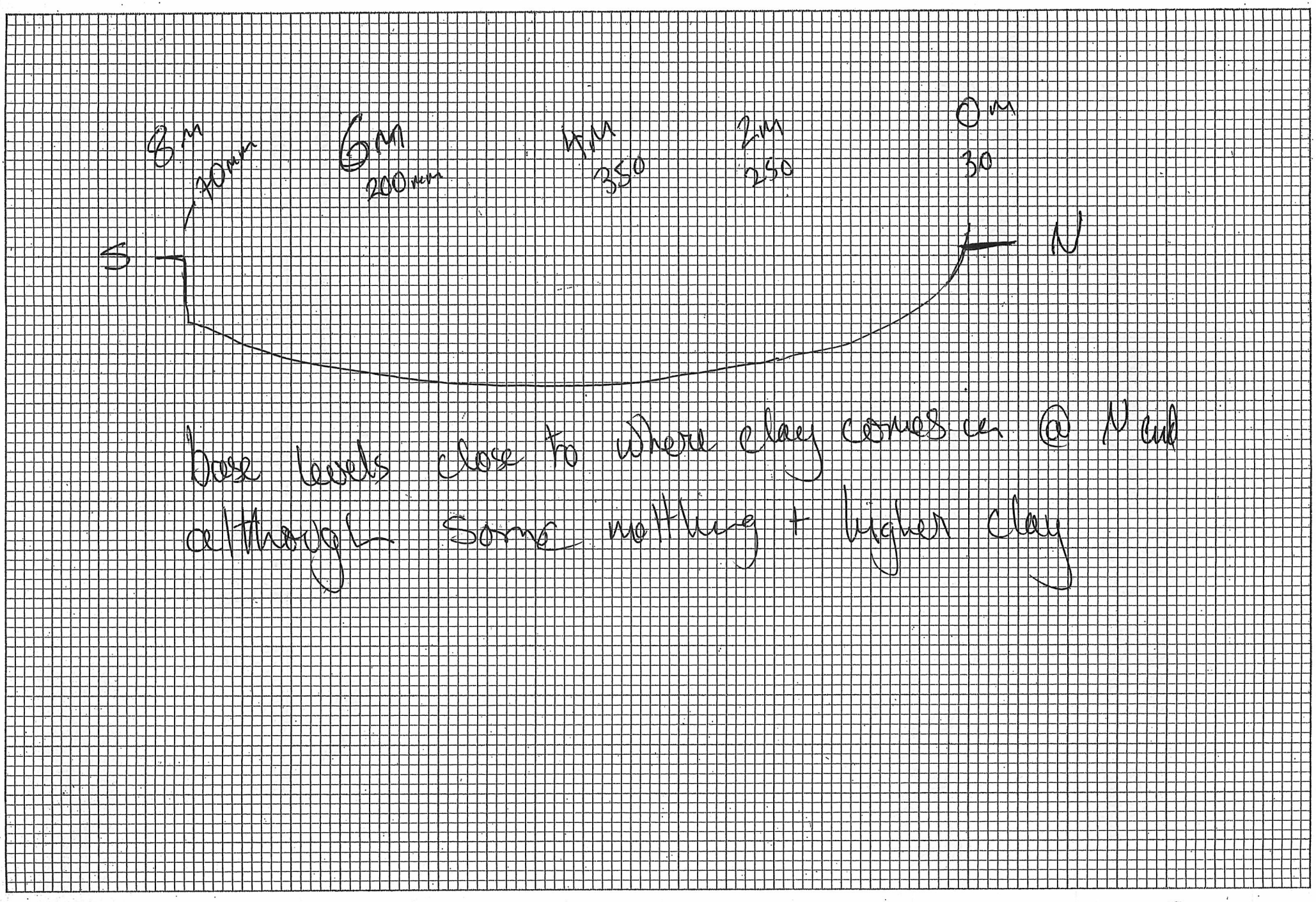
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Scraped grass off w claw bucket - then trowelled/Loe back by hand - followed by scrape w front mud bucket

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
1 ✓		Nil	bagged ?volcanic + FGS = wpt 005	



base levels close to where clay comes in @ N end although some melting + higher clay

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

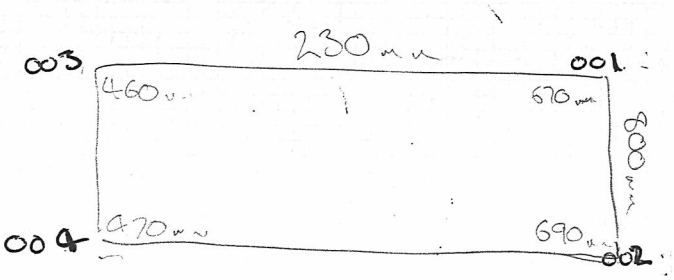
Recorder: VH

Test Area # Munni House D1

Date: 31/3/08

~~Spit #~~ trench 1

Start Orientation and GPS Points



WAYPOINTS as shown

Description of deposit

Light brown to grey silt with a ferric tinge, fine grained with no visible inclusions. Depth between 300 - 340mm. Thick grass cover with roots to a depth of 200mm.

Include

Colour

Compaction

Composition/particle size

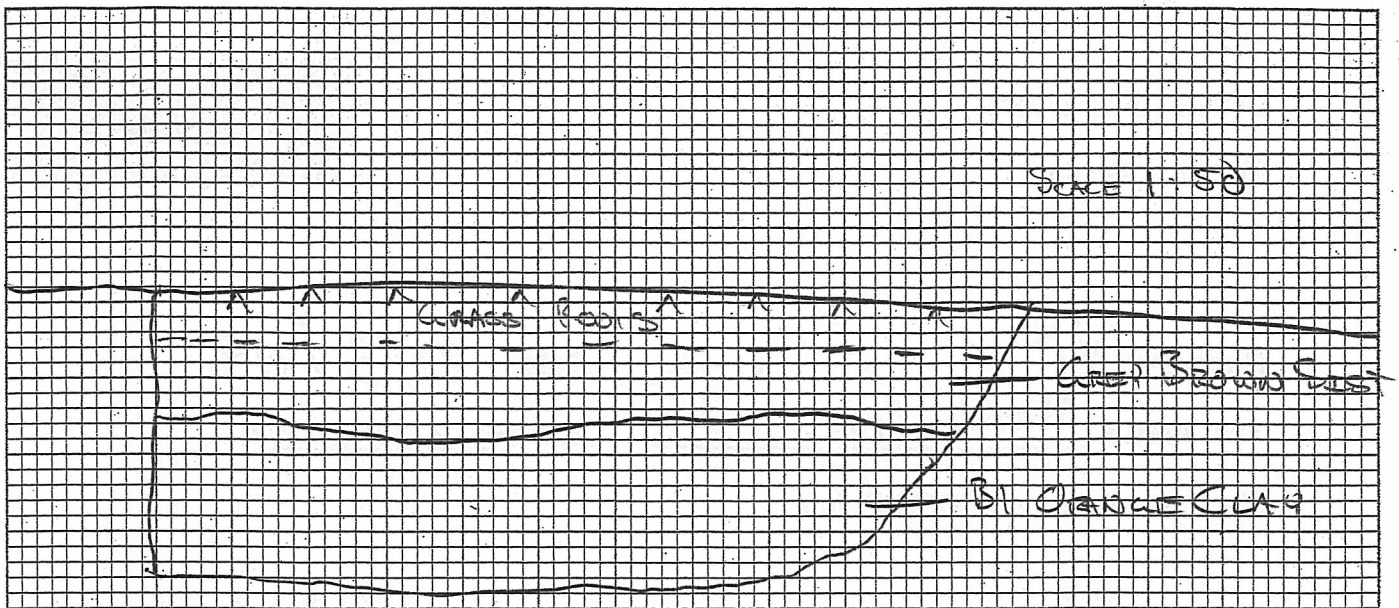
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Test trench to grope soil horizon depth sorted and examined by hand.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		–	None.	



ORANGE BROWN CLAY
VERY FINE GRAINED
NO VISIBLE INCLUSIONS
QUITE SANDY

04092 Tillegra Dam

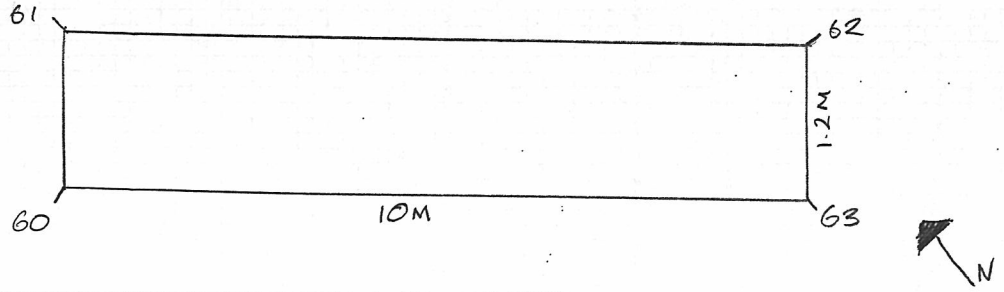
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: Date: 3.4.08

Test Area # AREA B1 TRENCH 2 Spit # 1

Start Orientation and GPS Points



Description of deposit

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

(I) Grey brown fine grained clayey silt (clamp) slightly compact. Very weak; river cobbles up to 25mm(L), varying btwn flat & spherical; pitted iron rich cobbles scattered throughout, degraded sandstone & shale gravels; grass roots throughout layer, no visible evidence of burning. Base of layer btwn 100-150mm

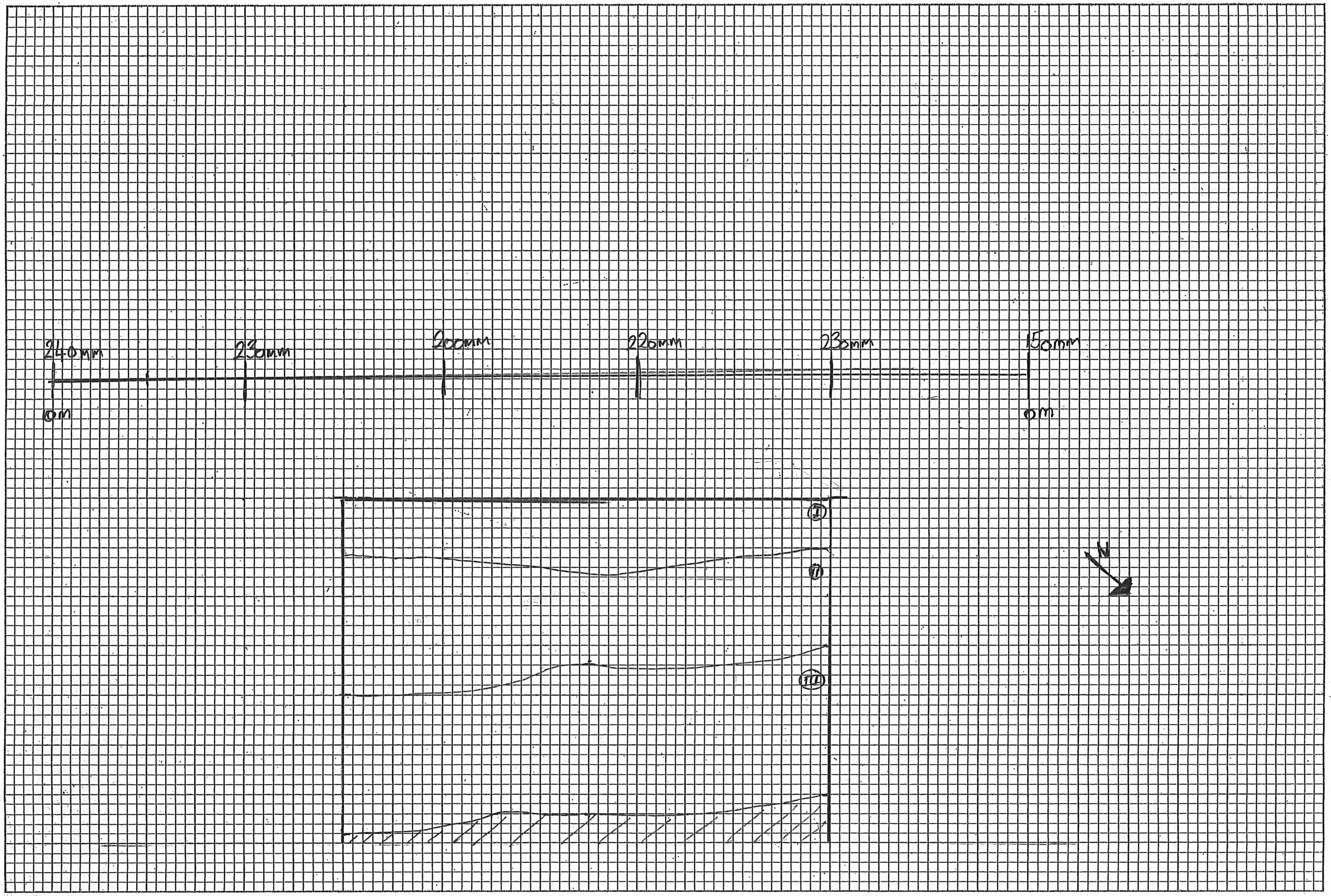
(II) Mottled grey/orangey brown clay; gravels/cobbles continuing from above; grass roots continuing to base.

(III) Yellow/Orange clay with grey brown mottling; large river cobbles & degraded shales, pitted dense ironstone, 2.5YR4/4 as above in (II)

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Grass first removed to a maximum depth of 150mm

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)


240mm
0m
230mm
200mm
220mm
230mm
150mm
0m
I
II
III
N

04092 Tillegra Dam

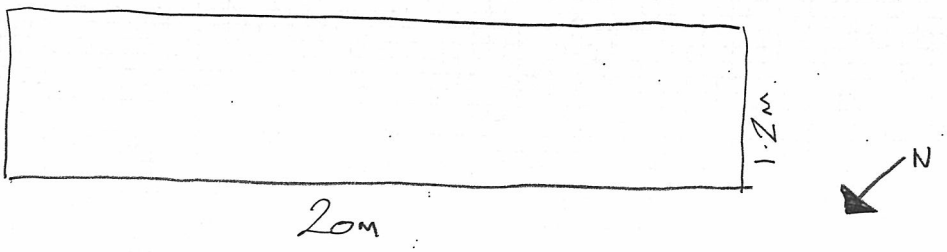
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: K.M. Date: 3.4.08

Test Area # Area B1 TRENCH 1 Spit # 2

Start Orientation and GPS Points



Description of deposit

Pale brownish grey clay & silty clay (clamp) slightly compact; some degraded sandstone inclusions throughout; degraded shale, river cobbles & pebbles, up to 10% maximum diameter 200mm

Munsell: Topsoil – Grey Brown ~~10YR~~ 10YR 4/2

Clay – Grey/brown 10YR 3/2 with mottling of orange brown 10YR 5/6.

Include

Colour

Compaction

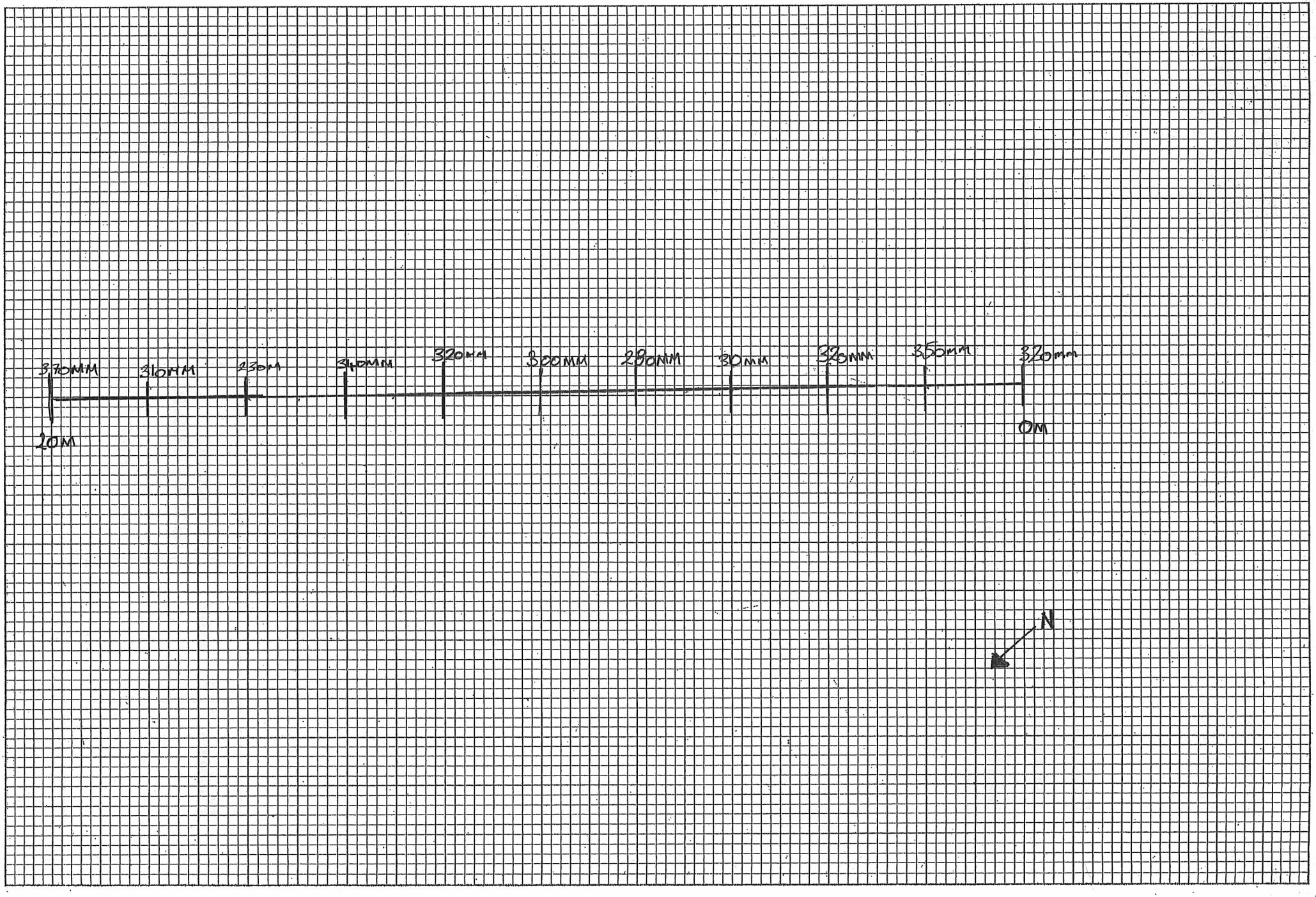
Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		2 sieved		


370MM
310MM
230M
340MM
320MM
300MM
280MM
30MM
320MM
350MM
370MM
20M
0M
N

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: Ben

Date: 03/04/08

Test Area # Area B3

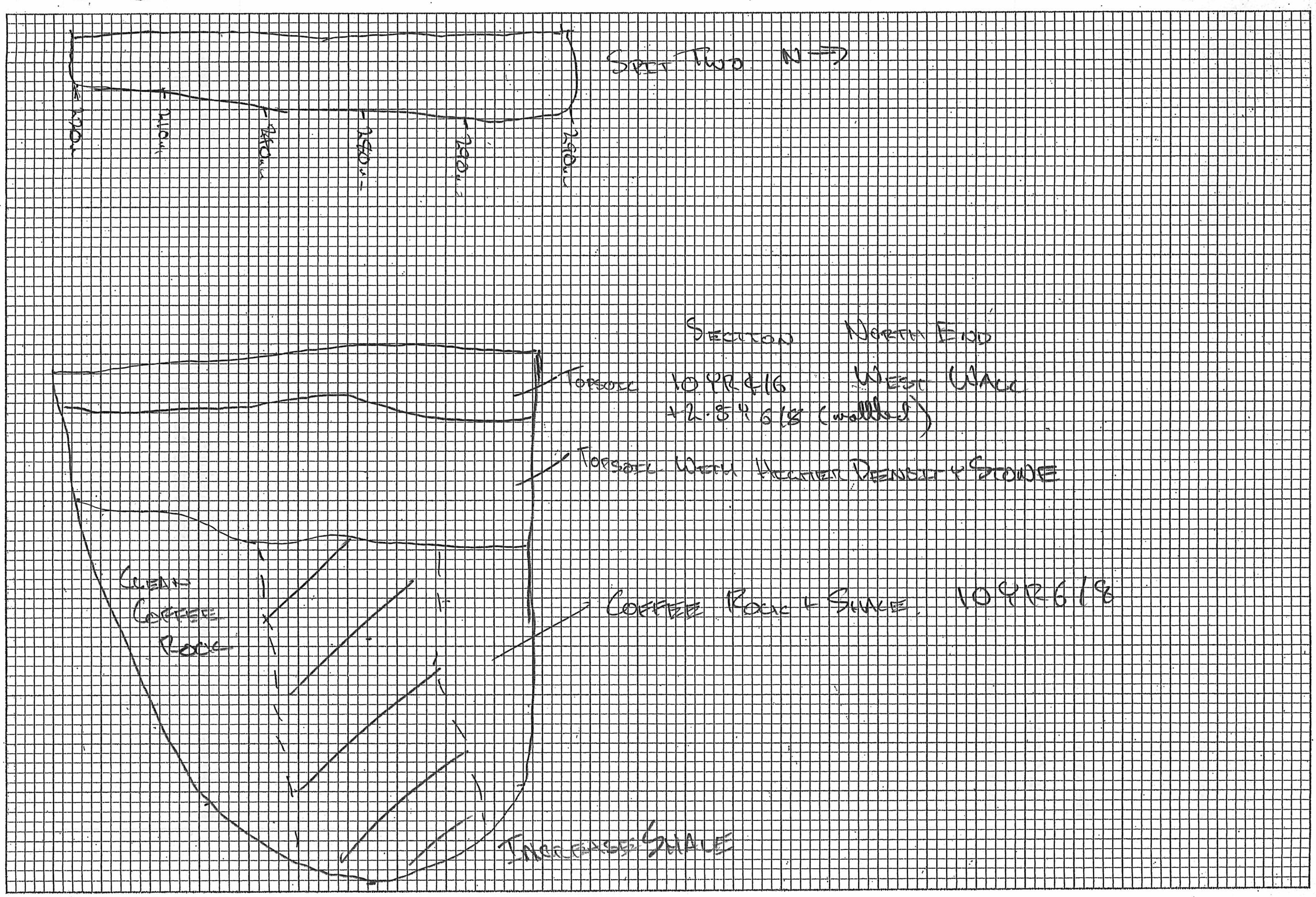
~~Spit #~~ Deep Pit

Start Orientation and GPS Points

Description of deposit	**Include** Colour Compaction Composition/particle size Inclusions Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)


Spit Two N→
170cm
210cm
240cm
240cm
290cm
290cm
Section North End West Wall
Topsoil 10YR 4/6
+2.5Y 6/8 (mottled)
Topsoil With Higher Density + Stone
Coffee Rock + Shale 10YR 6/8
Clean Coffee Rock
Increased Shale

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

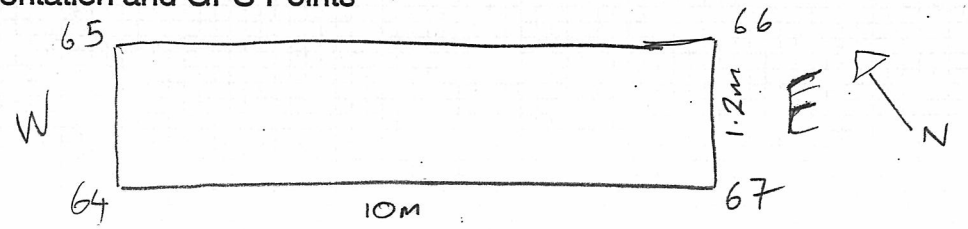
Recorder:

Date: 13.4.08

Test Area # Area B2

Spit # 1 only 1 spit

Start Orientation and GPS Points



Description of deposit

Mid- Dark brown loose clayey silty loam fine grained loose - increasing compact + clay - 1 spit only - dark brown + orange brown clay @ base

Topsoil 5YR 3/3 - 3/4 Dark reddish brown

Clay 7.5YR 3/4 - 3/3 Dark brown

Include

Colour

Compaction

Composition/particle size

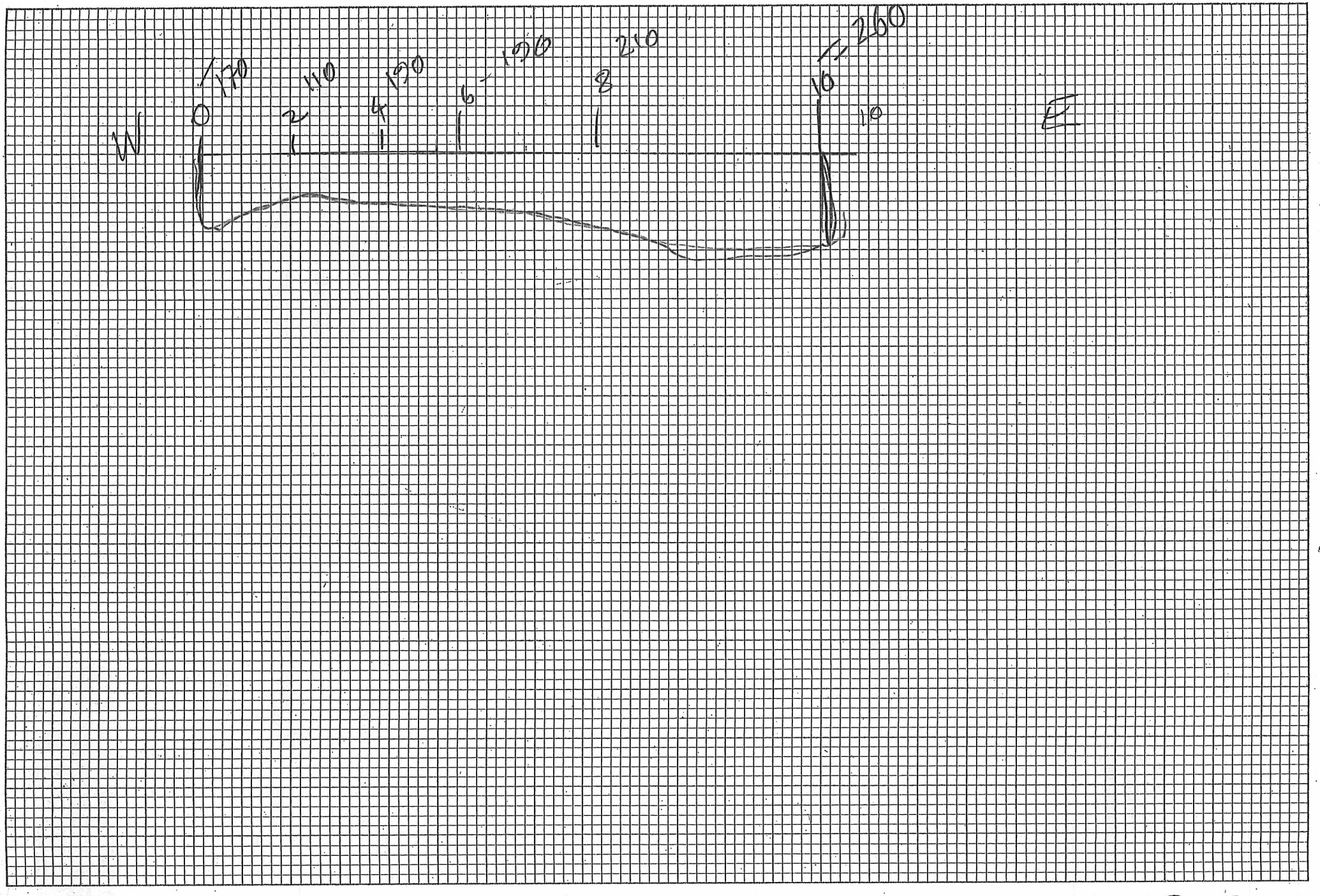
Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Grass layer removal depth 10mm 20 - 70mm

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
/				


W
E
0
2
4
6
8
10
170
110
120
120
240
260
10

04092 Tillegra Dam

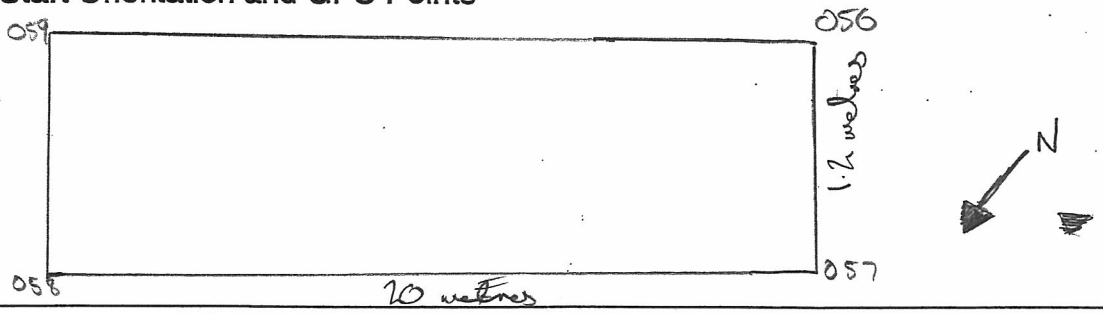
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: BEN Date: 03/04/08

Test Area # AREA B1 TRENCH ONE Spit # 1

Start Orientation and GPS Points



Description of deposit

A dark brown to very dark brown fine grained silty loam with a firm texture and inclusions of stone up to 70mm in diameter several quartzite fragments and a few river cobbles ranging in size from 50mm - 400mm in diameter

Undulating clay surface 6hsn 200-250mm

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Grass removed first to a depth of between 50 - 120mm within gross removal several fragments of European ceramics and glass were located as well as several possible aboriginal artefacts and sandstock brick fragment and bone in spit one proper.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		5 buckets sieved	Ceramics, bone Glass, brick Metal Possible flakes.	

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

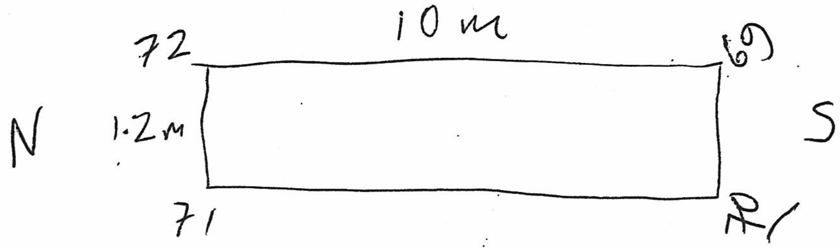
Recorder: VH

Date: 3/4/2008

Test Area # B3 Trench 1

Spit # 1

Start Orientation and GPS Points



Description of deposit

mid brown friable ~~[illegible]~~ silty loam
lots of river pebbles
clay content
mottled yellow orange clay
nr base

Include
Colour
Compaction
Composition/particle size
Inclusions
Thickness & extent

110 — 250

Methods & Conditions & Other comments (hand excavated/sieved etc.)

machine off grass — 10 — 100mm

Rocks like river rolled shale. high iron content

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓				

04092 Tillegra Dam

Machine Testing

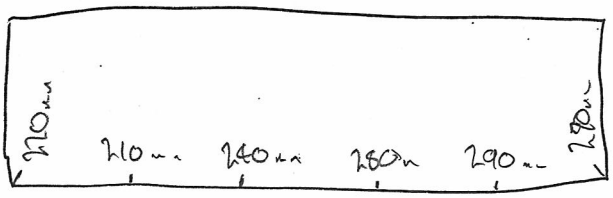
CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 3/4/2008

Test Area # Area B3 Trench 1 Spit # 2

Start Orientation and GPS Points

N



S

Description of deposit

Gravelly mid-light reddish brown yellow/orange inclusions. gravel - increase clay content clayey silt

Include

- Colour
- Compaction
- Composition/particle size
- Inclusions
- Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 2/4/2008

Test Area # Area E trench 1 Spit # 1

Start Orientation and GPS Points	

Description of deposit – Removed V. long grass Dark brown silty loam topsoil grading into light grey silt - fine grained Ironstone & Manganese inclusions Some Shale Spit = 150 – 300 mm	**Include** Colour Compaction Composition/particle size Inclusions Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)
machine + shovel clean up - then investigated via trowel.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓		Sample approx 16 buckets	fractured river pebble material	

04092 Tillegra Dam

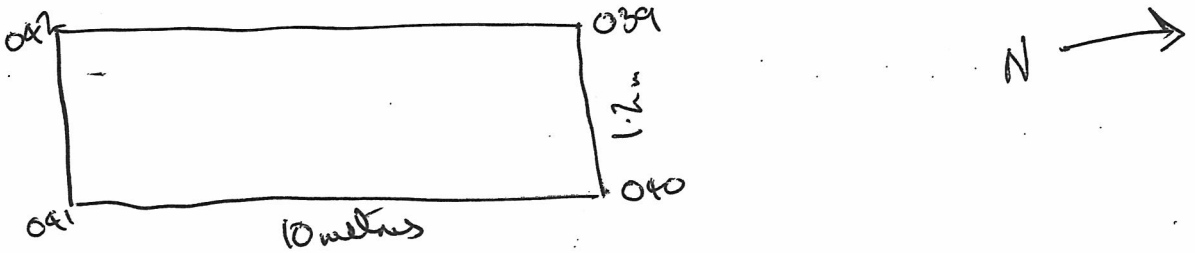
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: B.S. Date: 02/04/08

Test Area # Area E Trench 2 Spit # 1

Start Orientation and GPS Points



Description of deposit

Mid to light brown grey fine grained silt, mottled with a high level of grass roots with small amount of sandstone inclusions up to 20mm in diameter, this layer is between 80mm and 120mm onto orange brown fine grained clay

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated with mud bucket.

Grey brown silt 10YR 7/2
Brown silt 10YR 5/3 (other layer)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
	-	4 sieved		

04092 Tillegra Dam

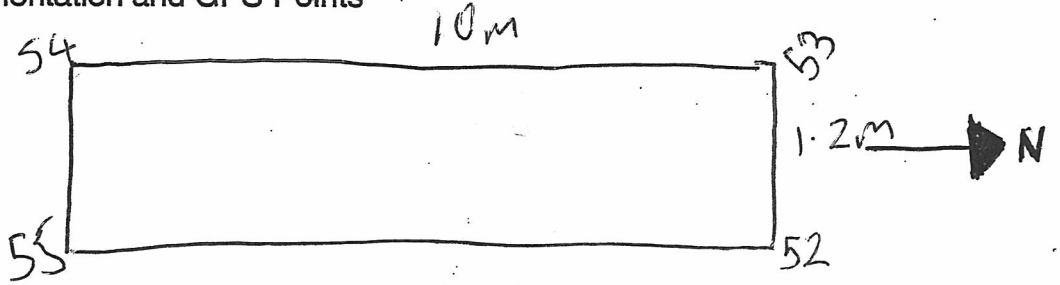
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: KM Date: 2/4/08

Test Area # E2 TRENCH 2 Spit # (1)

Start Orientation and GPS Points



Description of deposit

reddish brown topsoil - N end of trench V. large sandstone (v degraded) boulders - some river cobbles
iron inclusions
~~shale & sandstone~~

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

230mm ~~depth~~ - 330mm SPIT Depth (including grass removal)

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machined off grass - approx 50 - 100mm depth.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓				

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

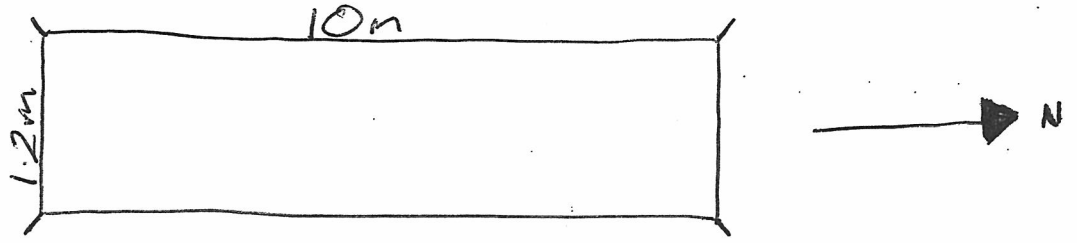
Recorder: KM

Date: 2.4.08

Test Area # E2 Trench 2

Spit # [redacted] (2)

Start Orientation and GPS Points



Description of deposit

very fine grain pale yellow brown silt, very loosely packed; some river pebbles/cobbles, reduced from DISTRIBUTION previous layer, large sandstone cobbles throughout, very degraded; some visible charcoals fragments throughout, up to 20mm Ø, less than 5%

Spit depth btwn 300-380mm

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

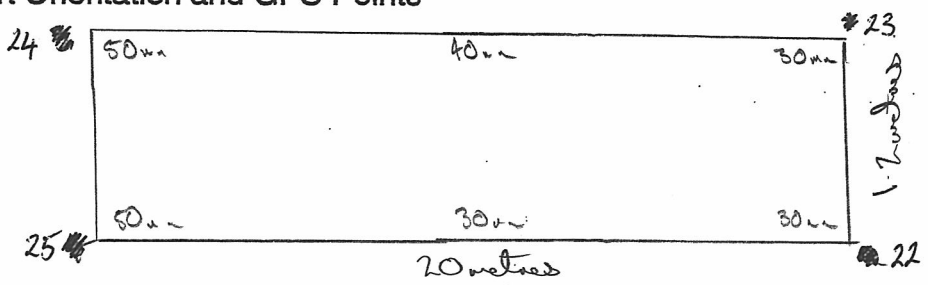
Recorder:

Date: 1/4/08

Test Area # Yinnar House "D2"

Spit # TRENCH 1 GRASS REMOVAL

Start Orientation and GPS Points



WAYPOINTS 1 = 22
2 = 23
3 = 24
4 = 25

N

Description of deposit

Mid brown alluvial deposit with substantial grass roots to a depth of 30mm. This was essentially the removal of grass. Large rounded river boulders. 30-50mm in thickness, fine grained.

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Grass removed with machine / mud bucket

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
			N/A	

04092 Tillegra Dam

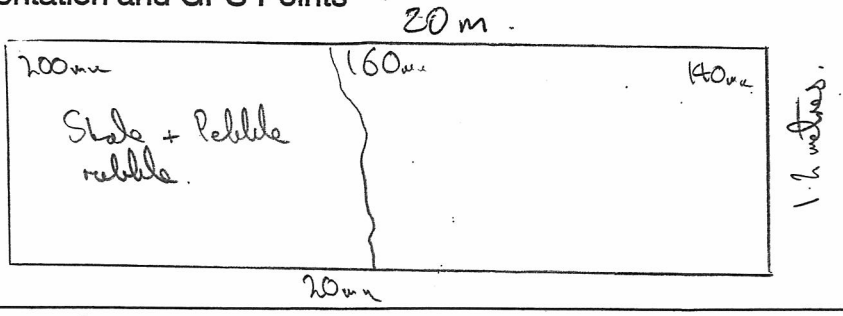
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: TRENCH ONE Date: 01/04/08

Test Area # MAINE HOUSE D2 Spit # ONE

Start Orientation and GPS Points



Description of deposit

A mid to dark brown, fine grained silt with a firm texture containing large (140mm) boulders as well as a considerable deposit of shale and smaller river stones in the eastern half of the trench. Some sandstone boulders (130mm) were also present in the eastern half of the trench.

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated with a 1200mm wide mud bucket to a depth of approx 100mm depth for the spit.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
			N/A.	

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

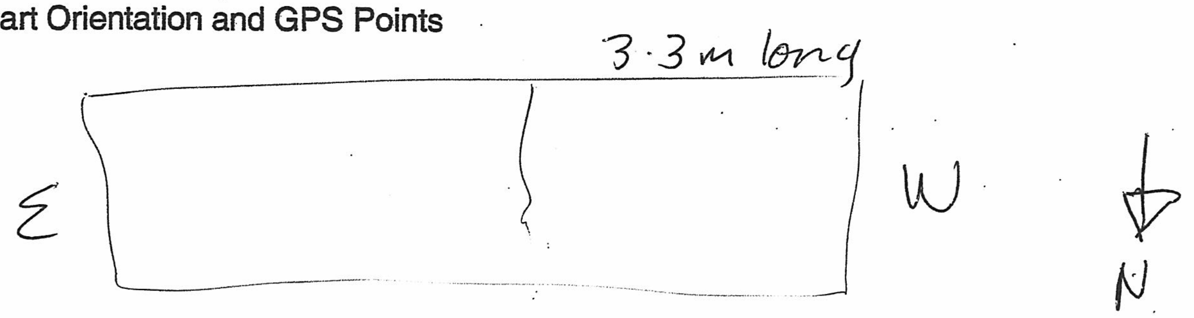
Recorder: VH

Date: 1/4/08

Test Area # ~~Ta.~~ D2 Trench 1

Spit # 2

Start Orientation and GPS Points



Description of deposit

Only west end trench taken down
river bed deposit
dark brown silty loam ~~R si~~ w
lots shale + river cobbles.

Include

Colour — munsell 7.5YR 3/4 topsoil

Compaction

Composition/particle size

Inclusions

Thickness & extent

290 270 280 mm from surface

Methods & Conditions & Other comments (hand excavated/sieved etc.)

machine excavated 100 - 150 mm from previous Spit

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓	—	None	None	—

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH

Date: 1/4/08

Test Area # D2 Trench 2

Spit # not spitted.

Start Orientation and GPS Points
WPt #26 (centre point) ~~120m~~ 1.2m (bucket 2.30 long Roughly N-S

Description of deposit	Include
7.5YR 3/3 - 3/4 dark brown ~~Silty~~ clayey Silt fine grained 700mm depth hit. V little until 700m occasional small river pebble) mid-compact	Colour Compaction Composition/particle size Inclusions Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)
Sieved 2 sample buckets. - dry sieve.

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓	/	approx 2	None	/

04092 Tillegra Dam

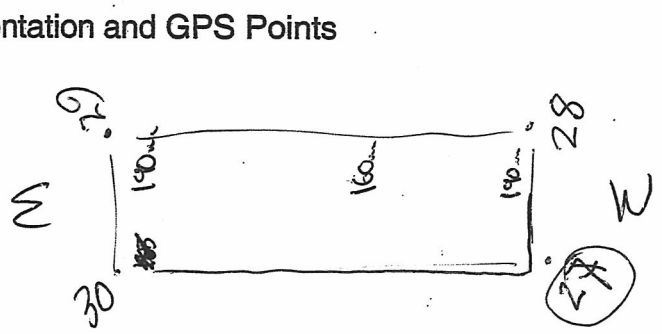
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: VH Date: 1/4/08

Test Area # Area D2 trench 3 Spit # (1)

Start Orientation and GPS Points



Description of deposit

Topsoil - dark brown silty clayey loam moderately loose. fine grained tiny gravel + ironstone

Coming very sandy - sandy clay tiny bits of shale

Coming on to yellow/brown clay in place.

Include

Colour mottled yellow grey

Compaction sand + clay alluvial

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

grass stripped w machine 5 - 50mm

odd bit of ironstone river pebble

Sandy alluvial mottled deposit

Euro ceramic artefacts

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		✓		

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

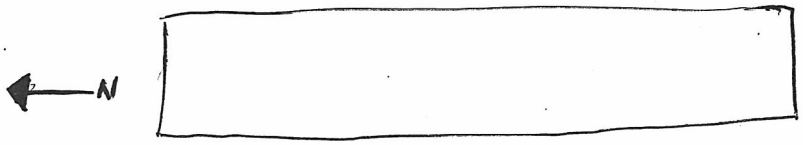
Recorder:

Date: 7.4.08

Test Area # Mann House "D2"

Spit # TRENCH 4 - SPIT (1)

Start Orientation and GPS Points



Description of deposit

dark brown loamy silt, very slightly compact extremely weak & crumbly; fine grass root systems continue to base of spit; very few gravels less than 1% large river cobble rubble at base at S end of trench; some mixed clay/loamy silt toward base of spit - undulating clay surface, mottled brown/ orange/greyish colour

Spit down approx 200mm

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machined after grass removed

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
✓			2x flaked river pebble	

04092 Tillegra Dam

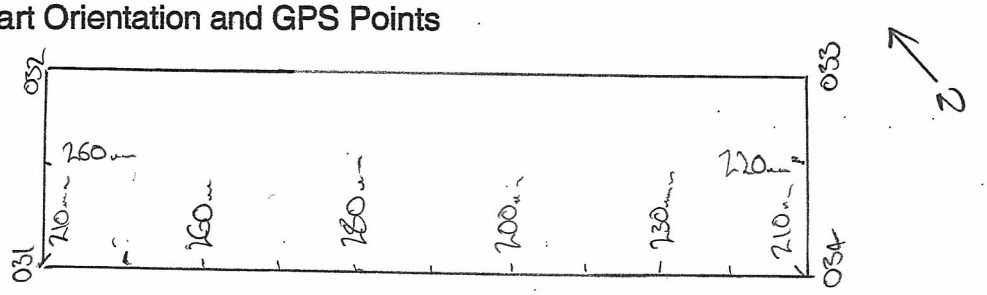
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: BEN Date: 01/02/09

Test Area # AREA D2 TRECH 4 Spit # 2

Start Orientation and GPS Points



Description of deposit

Medium grained, yellow brown clayey sand with small fragments of sandstone and shale with a firm to compact texture up to 110mm in thickness with small amounts of fine ferrous

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated with mud bucket in offset 100mm spits.

Dark brown silt 7.5 YR 4/2

Sandy Clay 10YR 5/3 + mottled 5/6

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
			2 artefacts.	

04092 Tillegra Dam

Machine Testing

CULTURAL HERITAGE CONNECTIONS

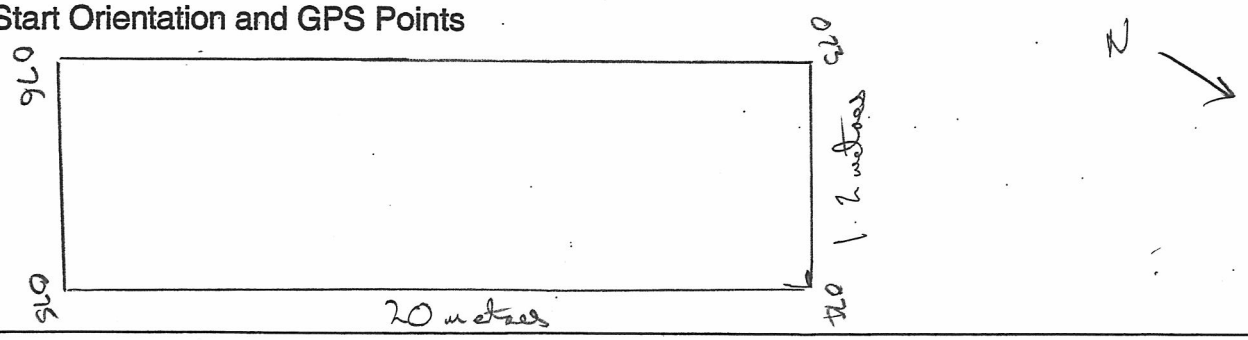
Recorder: BEN

Date: 04/04/08

Test Area # AREA F TRENCH ONE

Spit # ONE

Start Orientation and GPS Points



Description of deposit

A mid to dark brown, firm, very fine grained silty loam containing small sandstone inclusions Cross roots to a depth of 30 mm and the deposit was a depth of between 150mm and 170mm. below this is a layer of grey brown fine grained sandy silt with sandstone inclusions approx 60 - 80mm in depth

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Machine excavated test trench with mud bucket, material inspected and sample sieved. Cross removed initially to a depth of 30 - 50mm

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		4 buckets sieved		

04092 Tillegra Dam

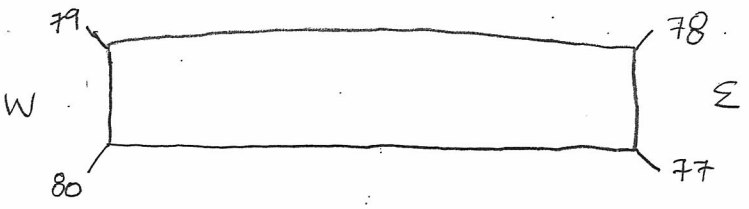
Machine Testing

CULTURAL HERITAGE CONNECTIONS

Recorder: K. H. Date: 4.4.08

Test Area # F - Trench 2 Spit # 1

Start Orientation and GPS Points



Description of deposit

(I) Greyish brown coarse grained silt, slightly compact, very weak, gravels visible throughout spit, ~p to 20mm(L), primarily less than 5mm, degraded sandstone & some small river pebbles also visible

(II) Pale greyish/yellow brown sandy silt with mottled clayey inclusions, very coarse grained ironstone & sandstone visible; small gravels continue as above, undulating surface beginning between 120-150mm and continuing to base

Depth of spit blw 150 - 200mm

Include

Colour

Compaction

Composition/particle size

Inclusions

Thickness & extent

Methods & Conditions & Other comments (hand excavated/sieved etc.)

Spit begins at top of grass removal - blw 30 - 50mm depth

Photo #s	P H levels	# of buckets removed & sieved	Finds	Samples (if any)
		Sample 10 buckets		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 1	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	within the site of the proposed Tillegra Dam on the Williams River northeast of Dungog.				
How to get to the site	On Salisbury Road go to 'Munni House'. when in the driveway with the house to the right, the site is within the next paddock on a flat area overlooking the river flats. Area 'D1' on attached map.				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	374385	**AMG Northing**	6426416
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

Site type(s)	Open Camp Site/artefact scatter	**Site type code (NPWS use only)**	

Description of site and contents

CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock.
DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types.
ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination.
BURIALS: number & condition of bone, position, age, sex, associated artefacts.
TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth.
QUARRIES: rock type, debris, recognisable artefacts, percentage quarried

a total of 21 artefacts uncovered from 4 of 5 test trenches

1 complete denitculate tool/possibly flake, basalt grey with water-rolled cortex 37x48mm 4 flake scars
1 proximal flake, grey basalt with 1-25% water-rolled cortex max 31.5mm
1 proximal flake, grey basalt 1-25% water-rolled cortex max dimension 27.1mm
1 distal flake, grey basalt, hinge termination with 50-100% water-rolled cortex conjoin with above flake
1 proximal flake grey hornfels, 0cortex max dimen. 36.3mm
1 multidirectional core grey hornfels, 1-25% water-rolled cortex30.6x31.6x11.8mm (length x width x thickness)
complete flake grey hornfels, feather termination, 100% water-rolled cortex 28.2x29.7x5.8mm
1 broken flake, grey hornfels 0cortex, max 32.2mm
1 bi-polar core, grey hornfels, 25-50% water-rolled cortex, 52.3x36.5x34.3
1 complete flake, feather termination, grey hornfels, 1-25% water-rolled cortex 42.8x26.4x14.2mm
1 complete burnt flake, hinge termination, grey hornfels, 0cortex, 35.7x32.3x9.9mm
1 distal flake, feather termination, grey hornfels, 1-25% water-rolled cortex, burnt max dimension 42.3mm
1 proximal flake, grey hornfels, 1-25% water-rolled cortex max dim. 54.5mm
1proximal flake grey hornfels 0cortex, max dim. 38.6mm
1 multidirectional core, grey hornfels, 1-25% water-rolled cortex, 61.8x63x42.2mm
1 proximal flake red/grey hornfels, 0cortex, max dim. 26mm
1 complete flake, grey hornfels, feather termination, 1-25% water-rolled cortex 17.1x30.9x4.6
1 proximal flake, grey hornfels 0cortex max dim. 26.8mm
1 bipolar core, grey hornfels, 0cortex, highly weathered, 41.2x36.1x21.9mm
1 complete flake, grey fgs, feather termination, 0cortex, 15x16.4x2.1mm- potlid
1 proximal flake, grey silcrete, 0cortex, max dim 24.5mm

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

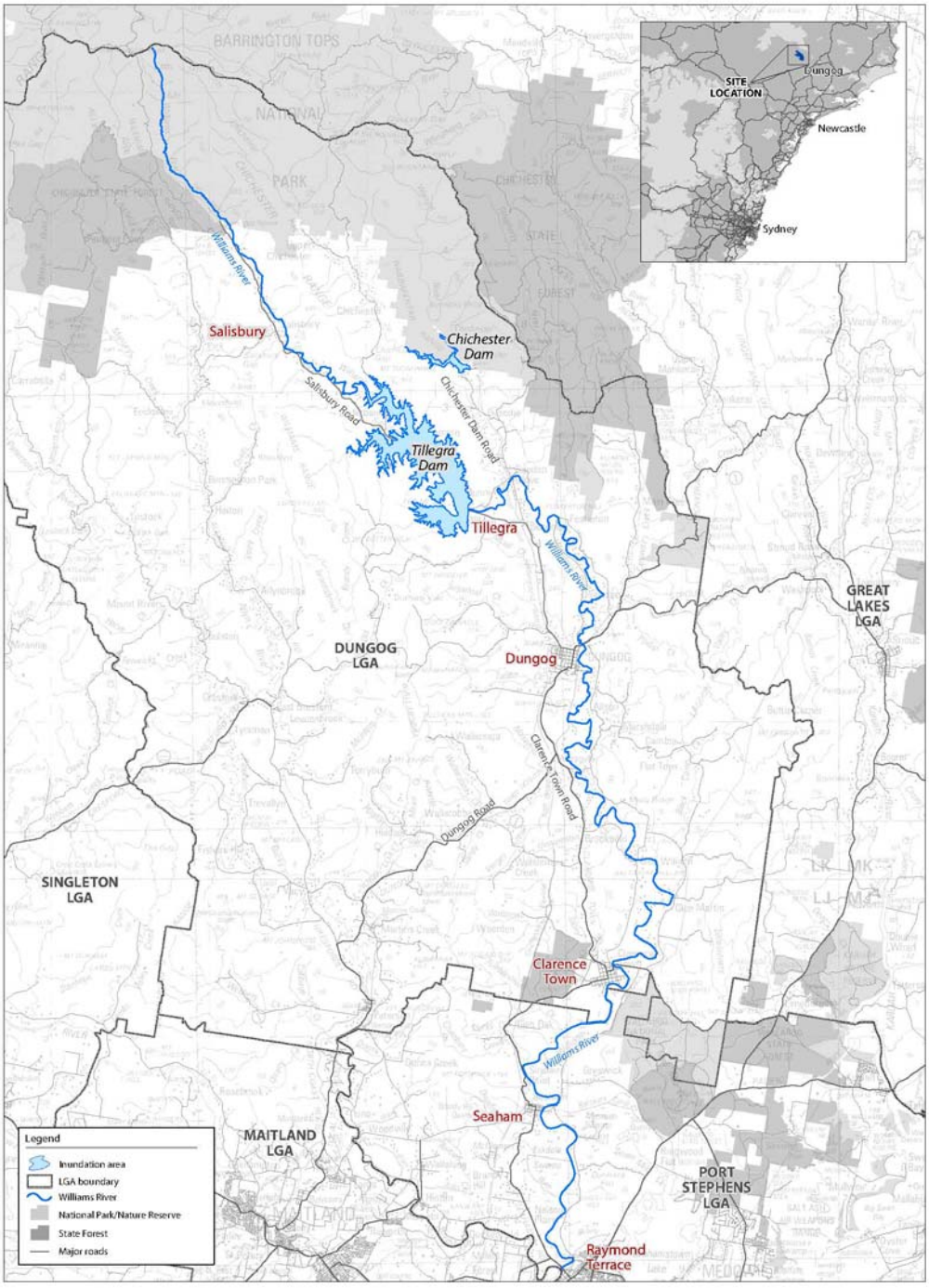
Land form	elevated terrace over river	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	volcanic river cobbles		**Land use/effect**	grazing land	
Distance from drinking water	100m		**Source**	Williams River	
Resource zone (eg. estuarine, river, forest)	riverine		**Vegetation**	cleared	
Edible plants			**Faunal resources** (include shellfish)		
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

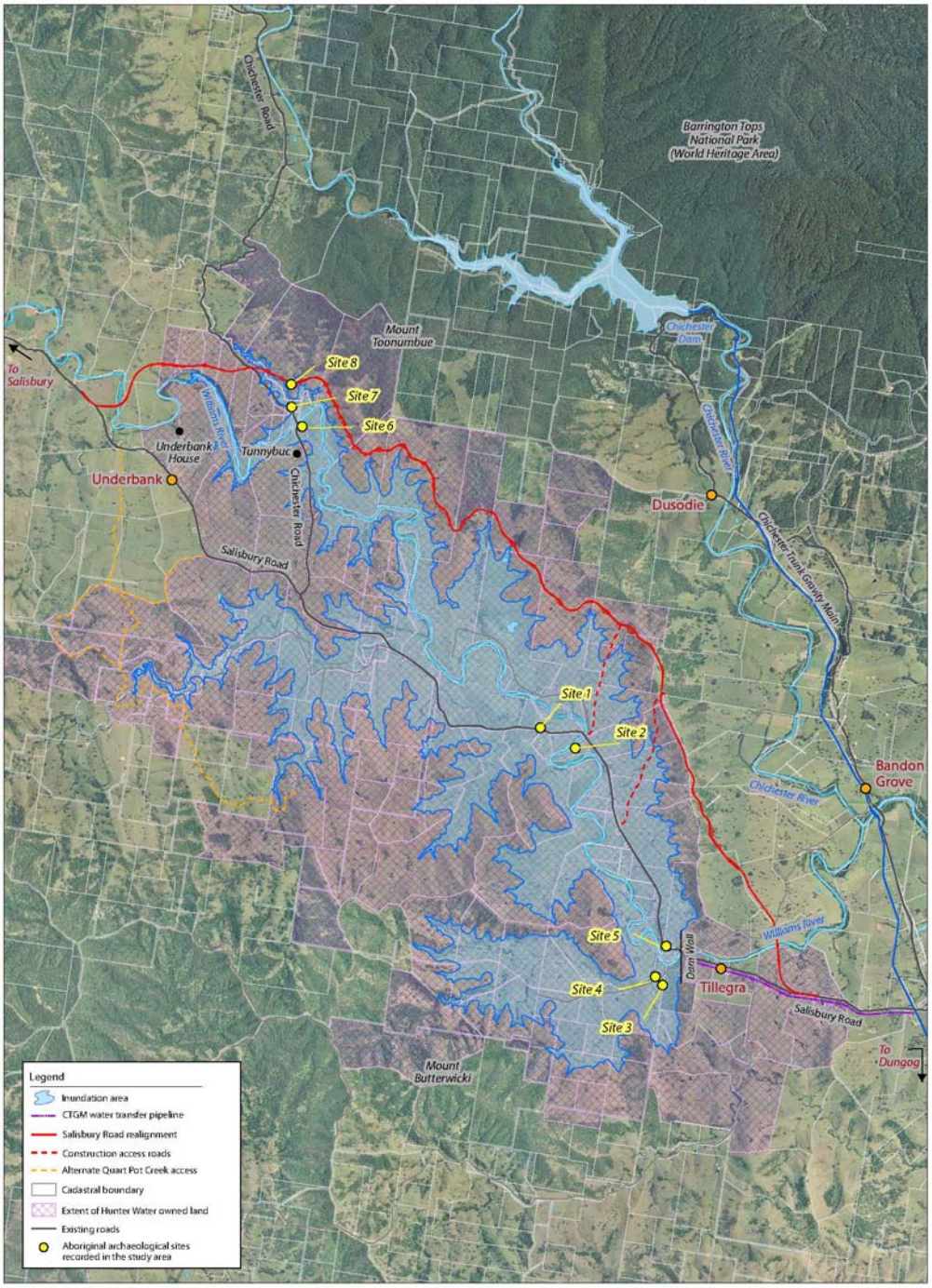
SITE MANAGEMENT

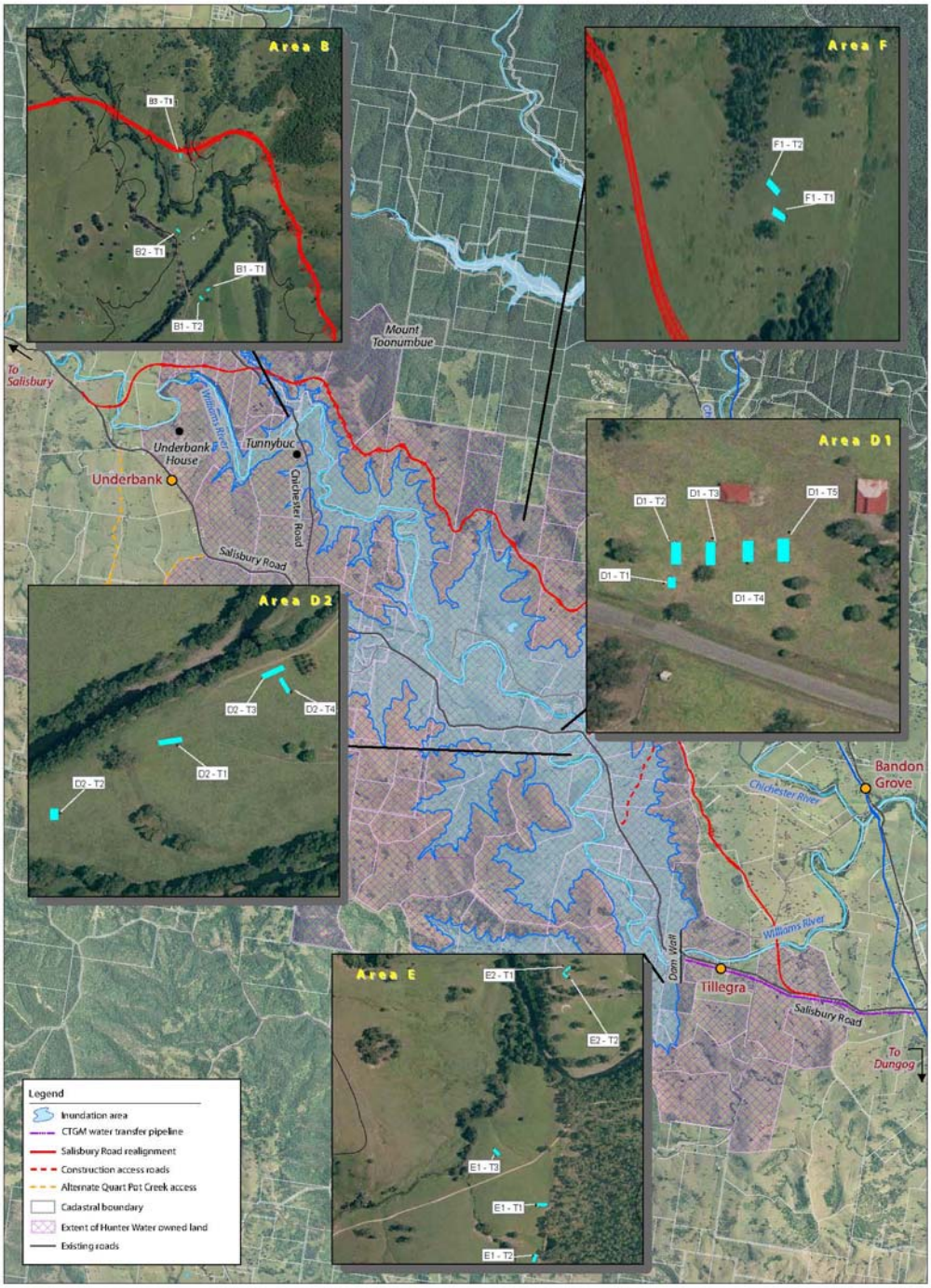
Site condition	Weathering	some disturbance from clearing and stock erosion.	
Management recommendations	further salvage and testing in the area of the proposed dam.		
Have artefacts been removed from site	Yes	**When**	31/3/2008
By whom	Vanessa Hardy	**Deposited at**	in negotiation
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Part 3A testing for EA

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	31 March, 2008
Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203		


BARRINGTON TOPS
NATIONAL
PARK
CHICHESTER
STATE
FOREST
SITE LOCATION
Dungog
Newcastle
Sydney
Williams River
Salisbury
Salisbury Road
Chichester Dam
Chichester Dam Road
Tillegra Dam
Tillegra
Williams River
GREAT LAKES LGA
DUNGOG LGA
Dungog
Clarence Town Road
Dungog Road
SINGLETON LGA
Clarence Town
Williams River
Seaham
MAITLAND LGA
PORT STEPHENS LGA
Raymond Terrace
Legend
Inundation area
LGA boundary
Williams River
National Park/Nature Reserve
State Forest
Major roads


Barrington Tops National Park (World Heritage Area)
Chichester Road
Mount Toonumbue
Chichester Dam
To Salisbury
Site 8
Site 7
Site 6
Williams River
Underbank House
Tunnybuc
Underbank
Chichester Road
Salisbury Road
Dusodie
Chichester Trunk Gravity Main
Site 1
Site 2
Bandon Grove
Chichester River
Site 5
Dam Wall
Williams River
Tillegra
Site 4
Site 3
Salisbury Road
To Dungog
Mount Butterwicki
Legend
Inundation area
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads
Aboriginal archaeological sites recorded in the study area


Area B
B3 - T1
B2 - T1
B1 - T1
B1 - T2
Area F
F1 - T2
F1 - T1
Mount Toonumbue
To Salisbury
Underbank House
Underbank
Tunnybuc
Williams River
Chichester Road
Salisbury Road
Area D1
D1 - T2
D1 - T3
D1 - T5
D1 - T1
D1 - T4
Area D2
D2 - T3
D2 - T4
D2 - T1
D2 - T2
Bandon Grove
Chichester River
Williams River
Dam Wall
Tillegra
Salisbury Road
To Dungog
Area E
E2 - T1
E2 - T2
E1 - T3
E1 - T1
E1 - T2
Legend
Inundation area
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 2	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	when travelling north along Salisbury Road, just before bridge of Williams River immediately south of Munni house there is a gate on the western side of the road, this leads to a terrace over a large bend in the Williams River (see attached maps area D2).				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	374874	**AMG Northing**	6426416
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

Site type(s)	Artefact Scatter/Open Camp SIte	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	2 artefacts retreived 1x notch tool of light grey hornfels with a break at the proximal end length 47.2 x width 46.5 x thickness 21.8mm 0% cortex 1x red/grey hornfels proximal scraper tool burnt, 1-25% water-rolled cortex max dimension 57.3mm		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	high terrace over Williams River	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	river cobbles			**Land use/effect**	grazed and cleared, partly disturbed
Distance from drinking water	<100m			**Source**	Williams River
Resource zone (eg. estuarine, river, forest)	River			**Vegetation**	cleared
Edible plants				**Faunal resources** (include shellfish)	
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

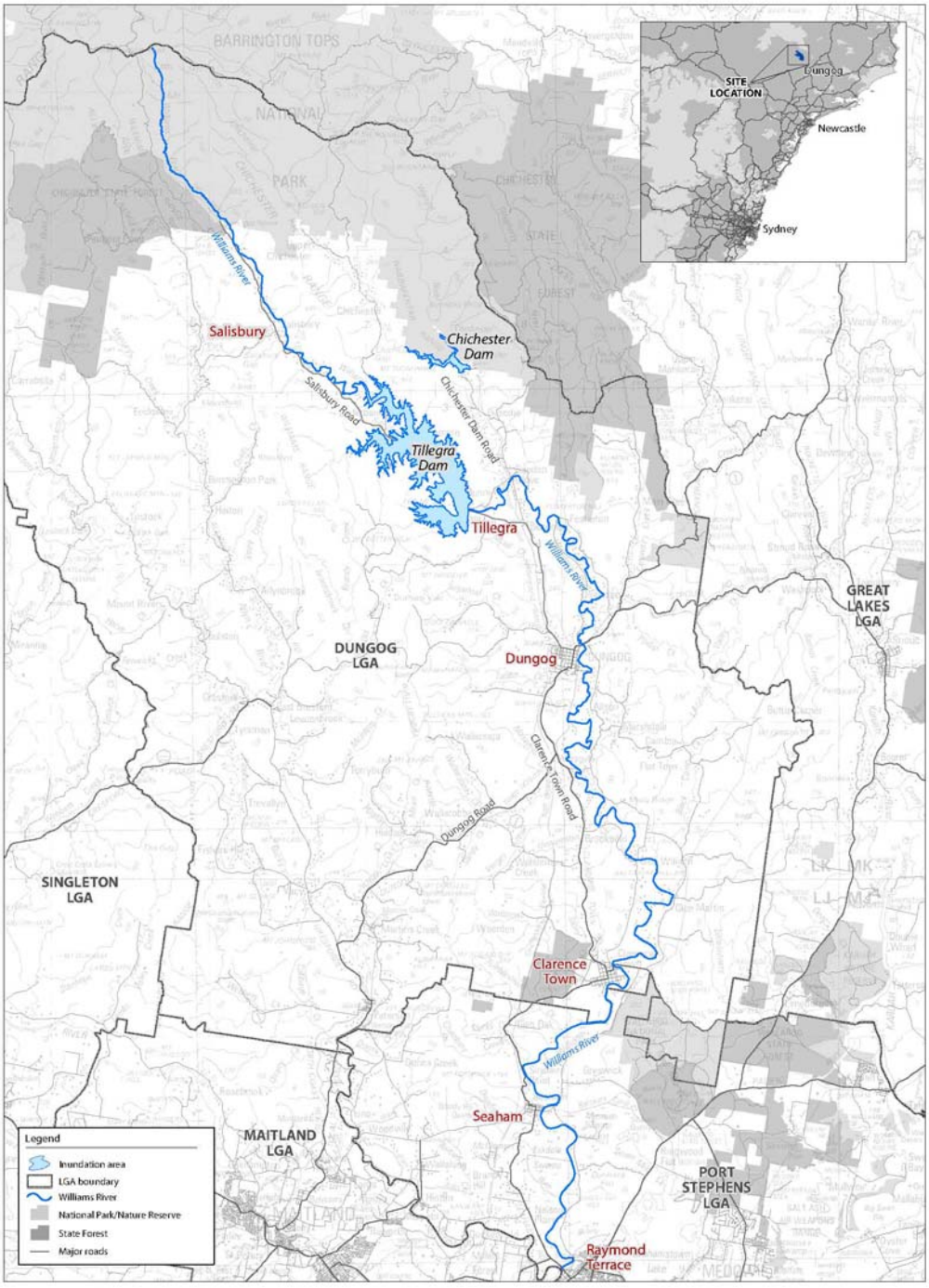
SITE MANAGEMENT

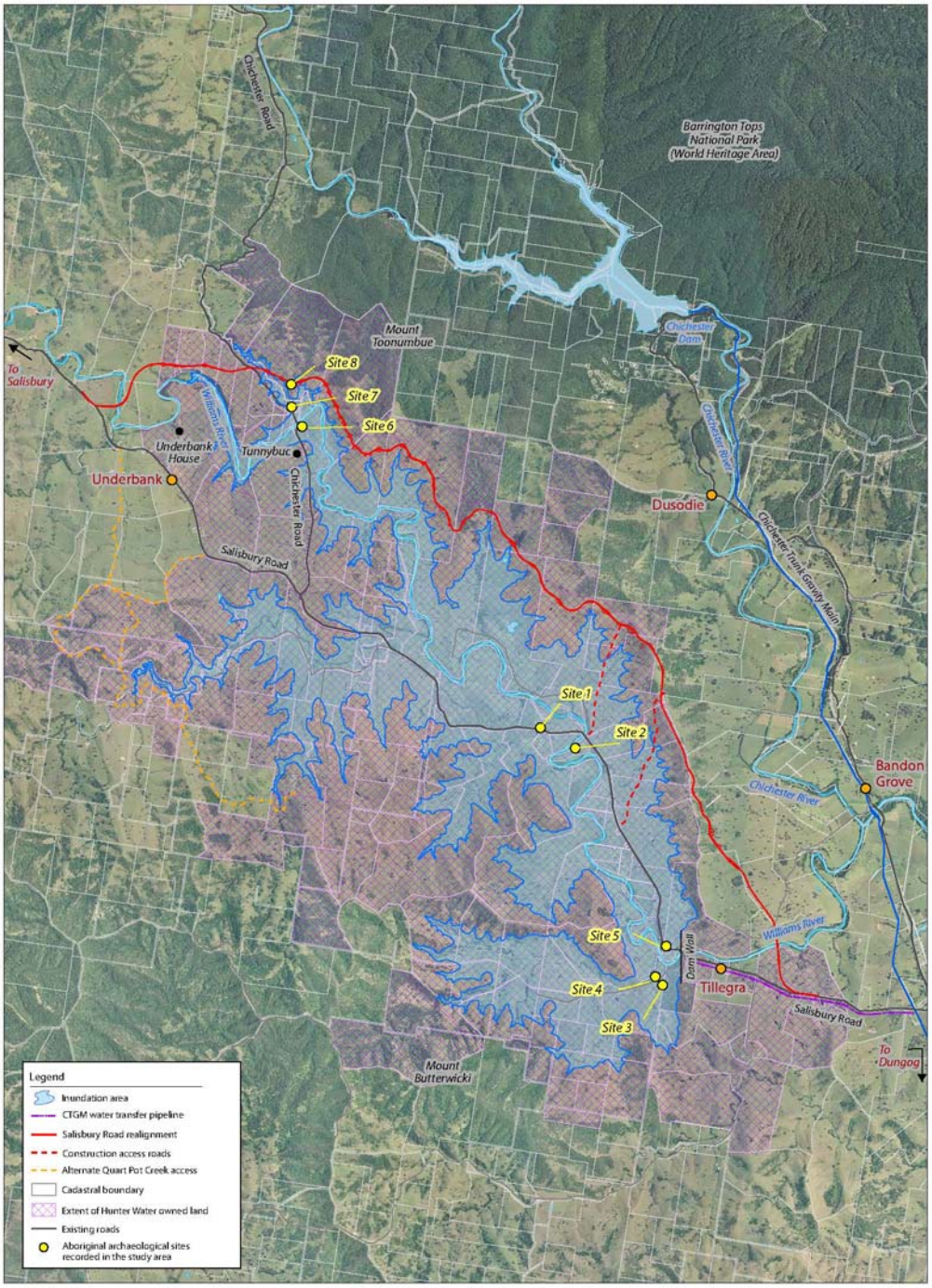
Site condition	Good	some disturbance	
Management recommendations	further testing and salvage prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	1 April, 2008
Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203		

Version: June 1998	Data entered by:	Date entered:


BARRINGTON TOPS
NATIONAL
PARK
CHICHESTER
STATE
FOREST
SITE LOCATION
Dungog
Newcastle
Sydney
Williams River
Salisbury
Salisbury Road
Chichester Dam
Chichester Dam Road
Tillegra Dam
Tillegra
Williams River
GREAT LAKES LGA
DUNGOG LGA
Dungog
Clarence Town Road
Dungog Road
SINGLETON LGA
Clarence Town
Williams River
Seaham
MAITLAND LGA
PORT STEPHENS LGA
Raymond Terrace
Legend
Inundation area
LGA boundary
Williams River
National Park/Nature Reserve
State Forest
Major roads


Barrington Tops National Park (World Heritage Area)
Chichester Road
Mount Toonumbue
Chichester Dam
To Salisbury
Site 8
Site 7
Site 6
Williams River
Underbank House
Tunnybuc
Underbank
Chichester Road
Salisbury Road
Dusodie
Chichester Trunk Gravity Main
Site 1
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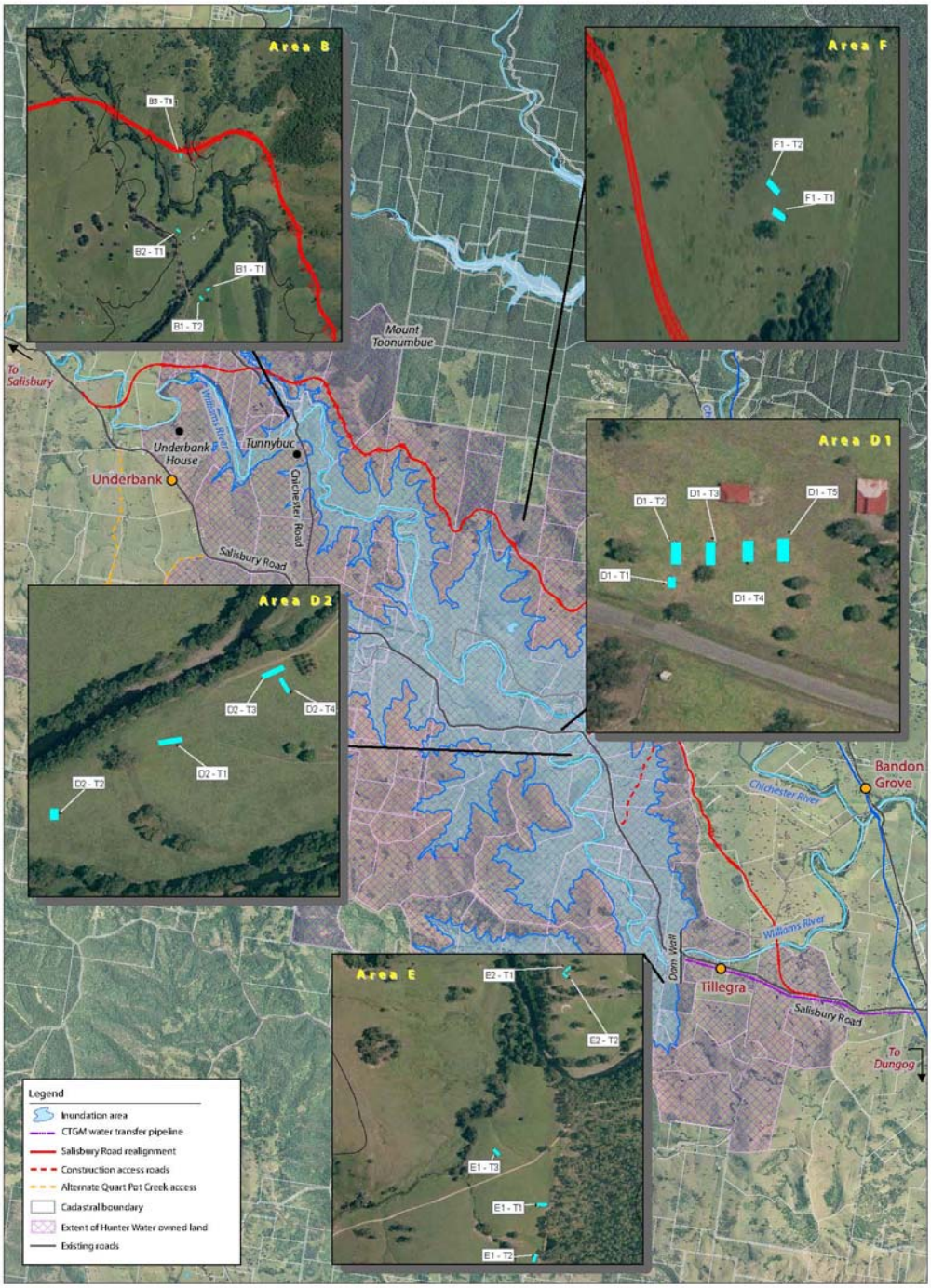
Bandon Grove
Chichester River
Site 5
Dam Wall
Williams River
Tillegra
Site 4
Site 3
Salisbury Road
To Dungog
Mount Butterwicki
Legend
Inundation area
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads
Aboriginal archaeological sites recorded in the study area


Area B
B3 - T1
B2 - T1
B1 - T1
B1 - T2
Area F
F1 - T2
F1 - T1
Mount Toonumbue
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Area D2
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Existing roads

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 3	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Travelling norhtwest along Salisbury Road there is a track just before the Tillegra bridge (proposed dam wall site) proceed up this track and through a gate to creek flats (see attached maps - location E1- Trench 1)				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	376104	**AMG Northing**	6422784
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

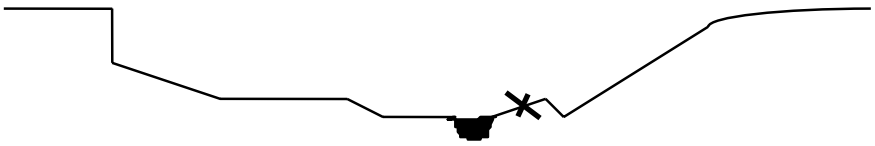
Site type(s)	Isolated Artefact	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	1 complete grey hornfels flake, l51.6x w35.7 x t7mm, 50-100% water rolled cortex, overshot termination.		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

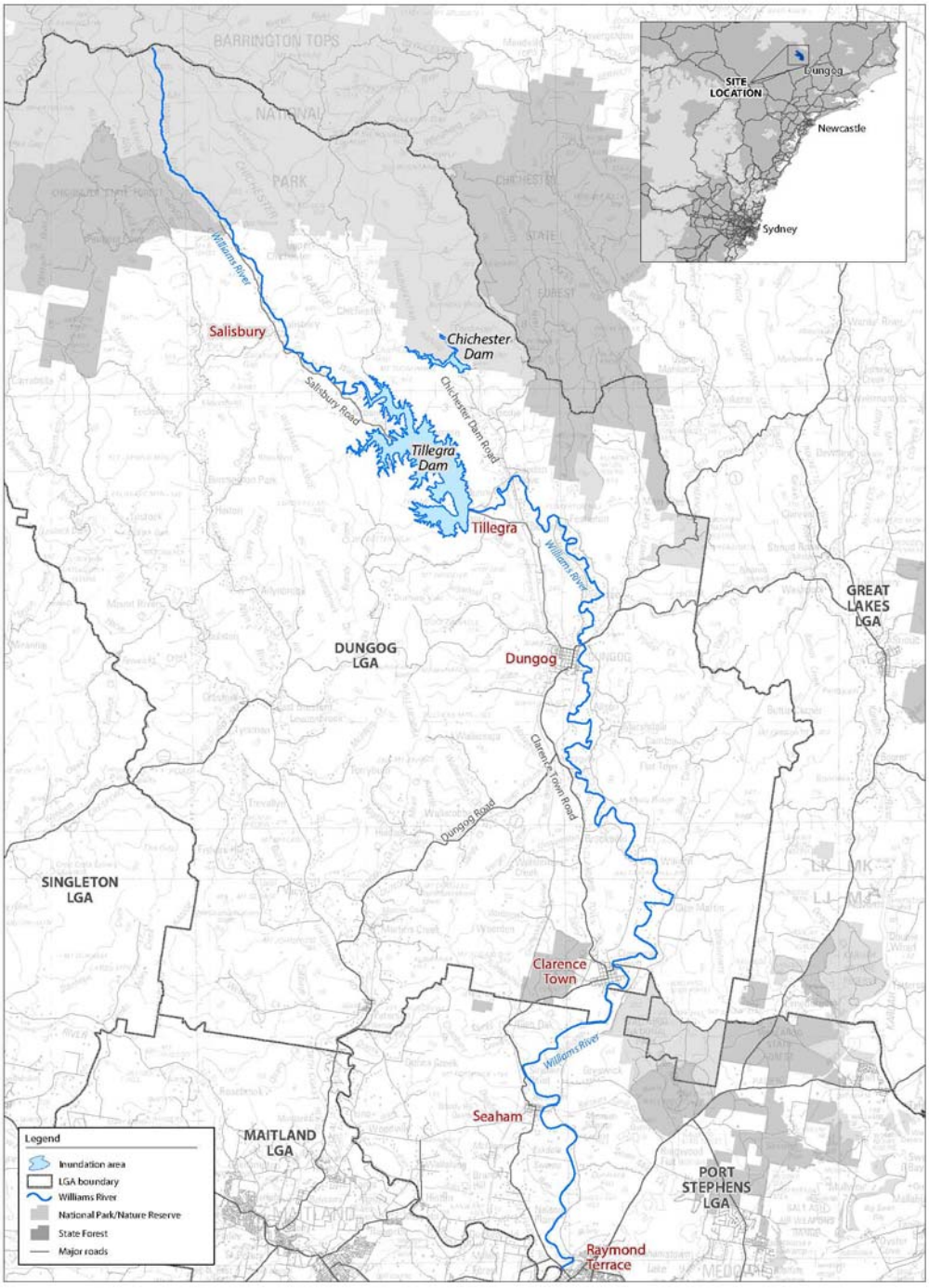
Land form	lower order creekline	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	river cobbles	**Land use/effect**	cleared grazing land		
Distance from drinking water	50m	**Source**	unnamed creekline		
Resource zone (eg. estuarine, river, forest)	river	**Vegetation**	cleared		
Edible plants		**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Weathering	some weathiering due to clearing and stock activity, area well grassed	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	
Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203		


BARRINGTON TOPS
NATIONAL
PARK
CHICHESTER
STATE
FOREST
SITE LOCATION
Dungog
Newcastle
Sydney
Williams River
Salisbury
Salisbury Road
Chichester Dam
Chichester Dam Road
Tillegra Dam
Tillegra
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GREAT LAKES LGA
DUNGOG LGA
Dungog
Clarence Town Road
Dungog Road
SINGLETON LGA
Clarence Town
Williams River
Seaham
MAITLAND LGA
PORT STEPHENS LGA
Raymond Terrace
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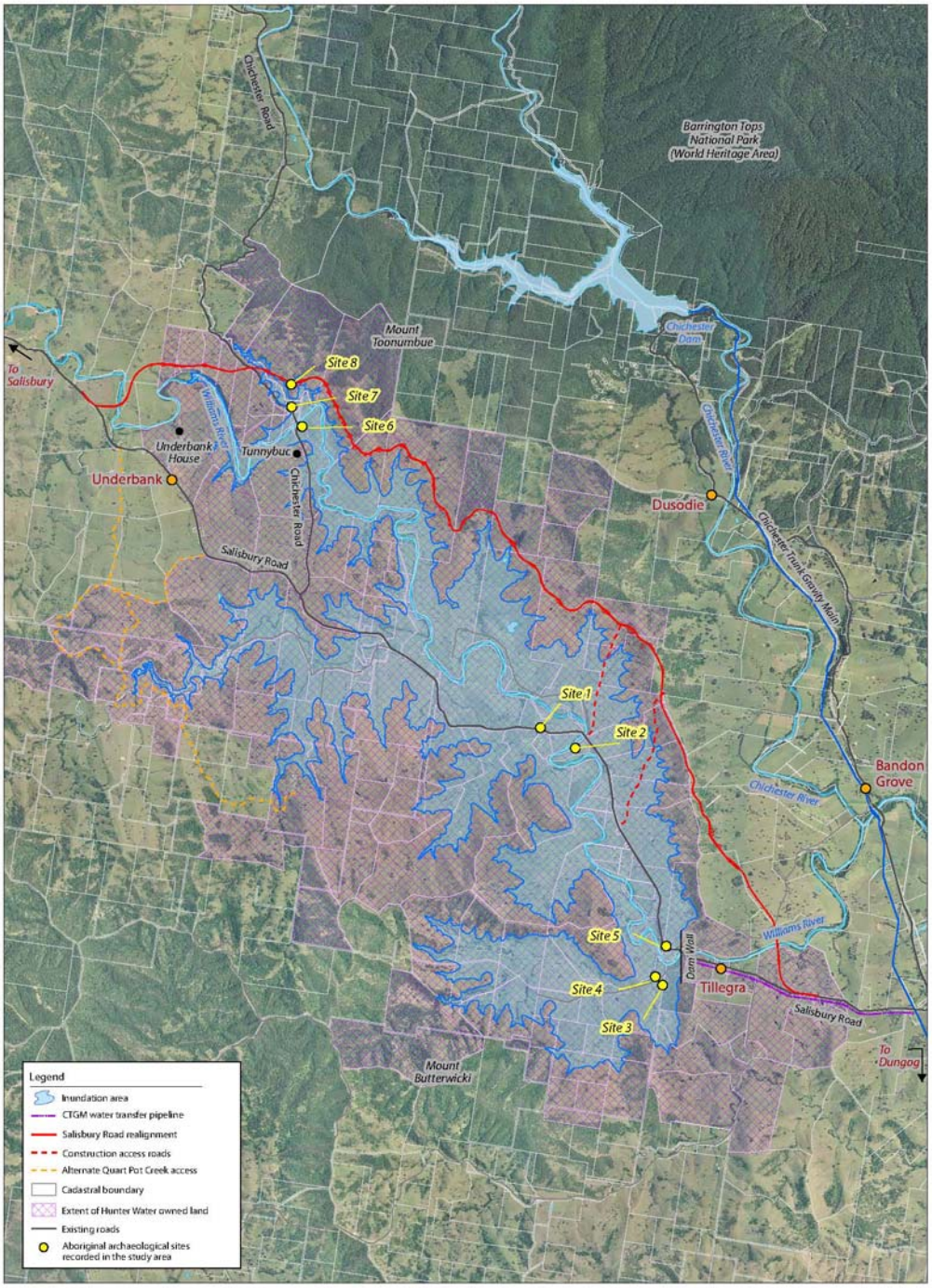
Inundation area
LGA boundary
Williams River
National Park/Nature Reserve
State Forest
Major roads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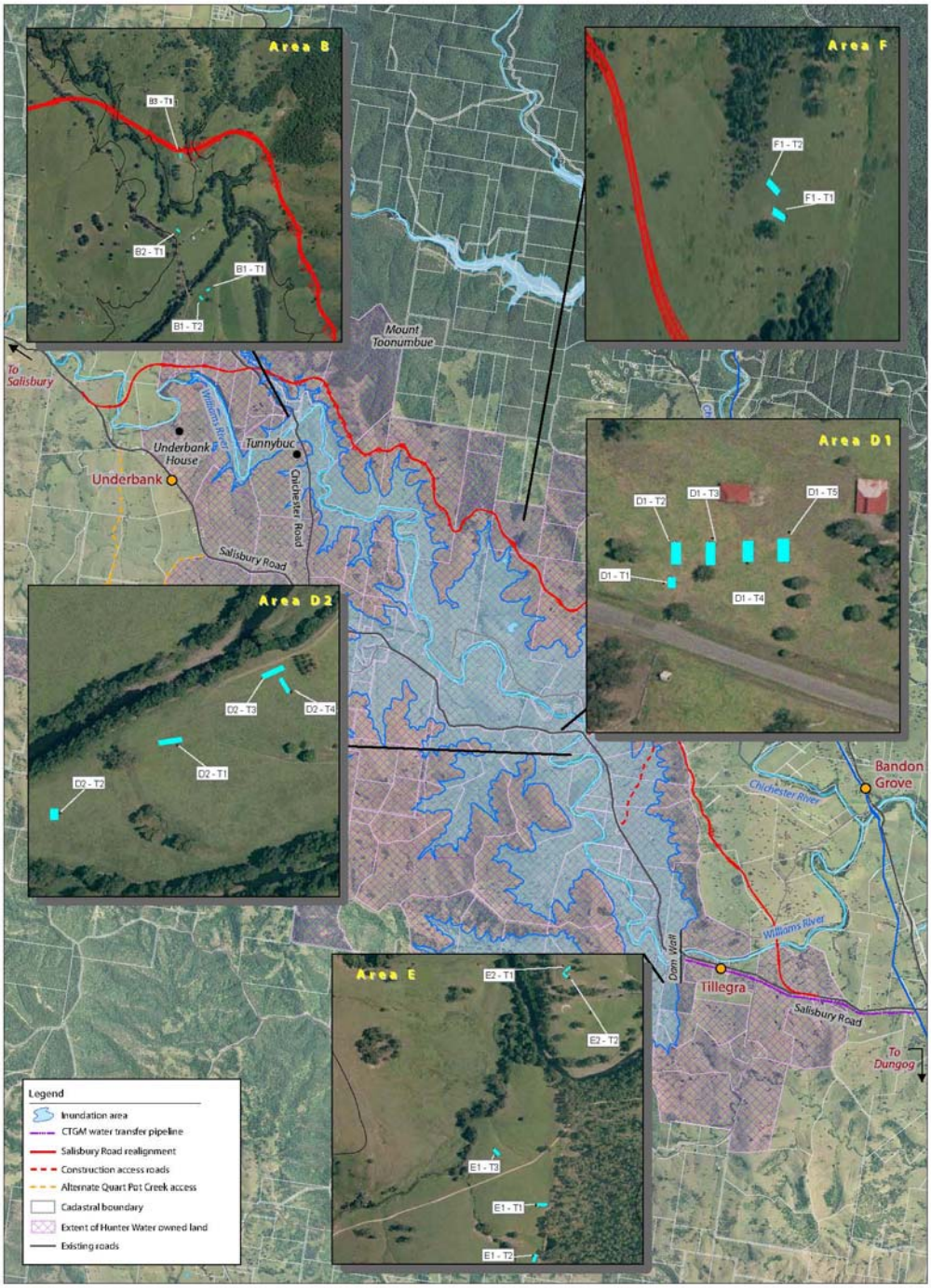
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Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 4	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Travelling norhtwest along Salisbury Road there is a track just before the Tillegra bridge (proposed dam wall site) proceed up this track and through a gate to creek flats (see attached maps)				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	376000	**AMG Northing**	6422904
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

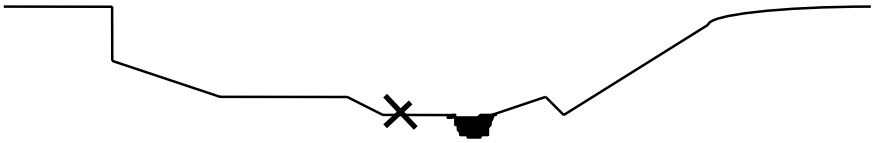
Site type(s)	Artefact Scatter	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	1 x unidirectional core, grey basalt, 1-25% water-rolled cortex, L52.6 x W41.7 x T27.4mm 1 x complete flake, grey hornfels, feather termination, 25-50% water-rolledcortex, 30.1x49x15.6mm 1 x multidirectional core, grey hornfels, 0cortex - 43.8x34.1x14.5mm 1 x distal flake, grey hornfels, feather termination, 1-25% cortex -water-rolled max dimension 29.1mm 1 x complete bifacial flake, grey hornfels, feather termination, 100% water-rolled cortex 66x42.1x12.9mm retreived from trench 3 (see attached plans) uppermost spit		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	Creek flat	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type		**Land use/effect**			
Distance from drinking water	<50m	**Source**	Native Dog Creek		
Resource zone (eg. estuarine, river, forest)	river	**Vegetation**	cleared, grassed		
Edible plants		**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Good	some weathering from clearing and stock movement possible but well grassed	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	2 April, 2008

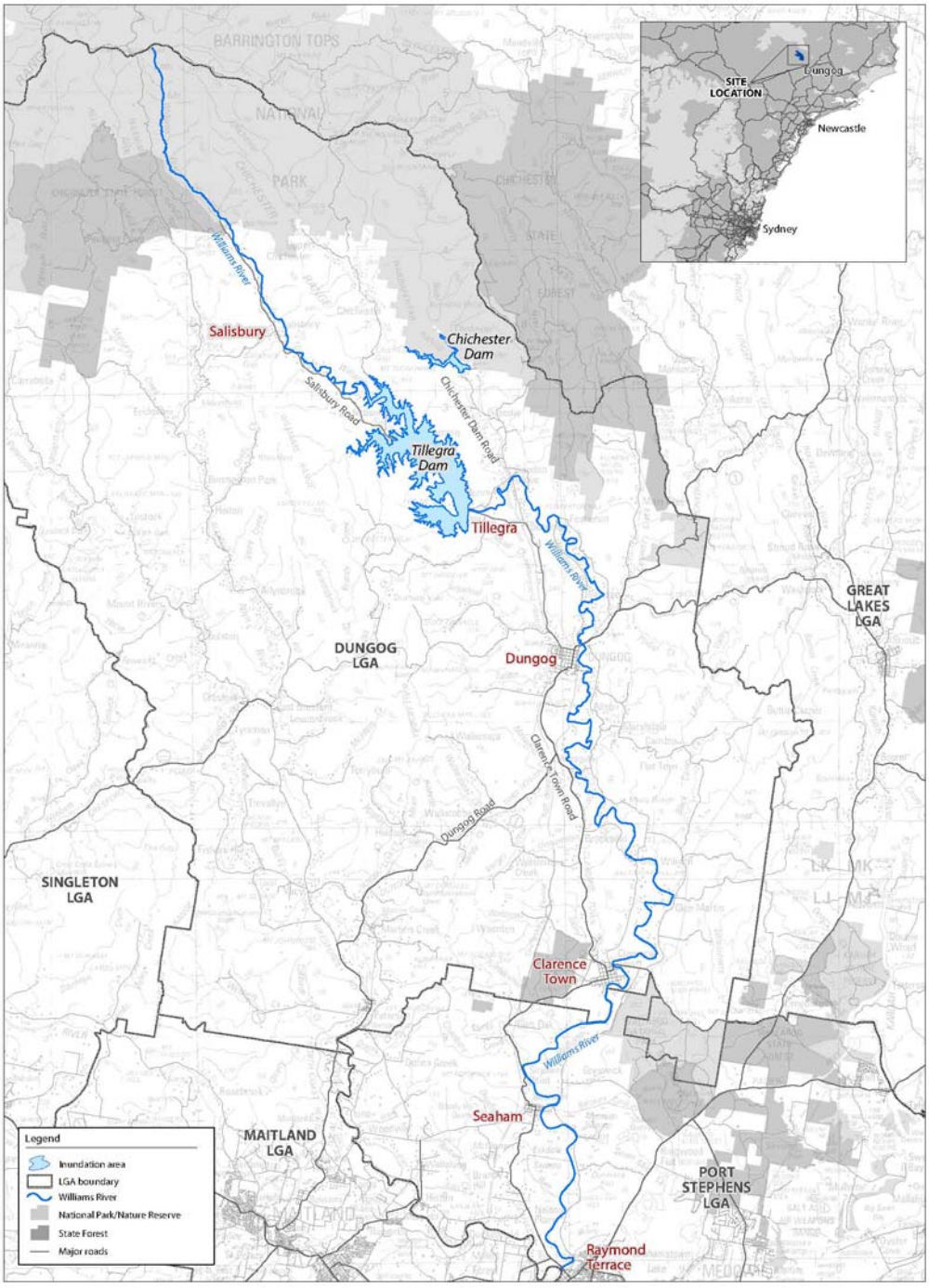
Version: June 1998	Data entered by:	Date entered:

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203


BARRINGTON TOPS
NATIONAL
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SITE LOCATION
Dungog
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Dungog Road
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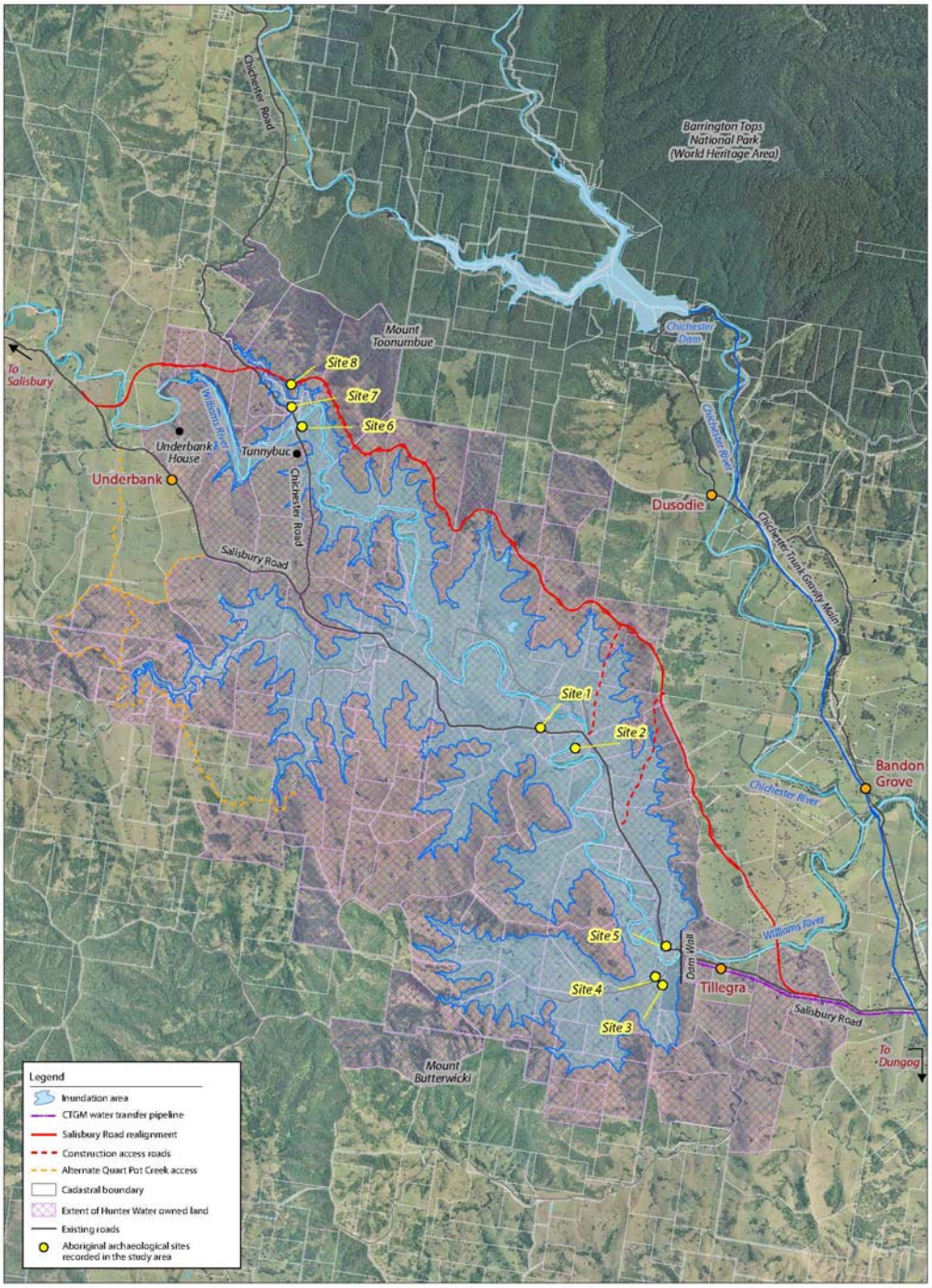
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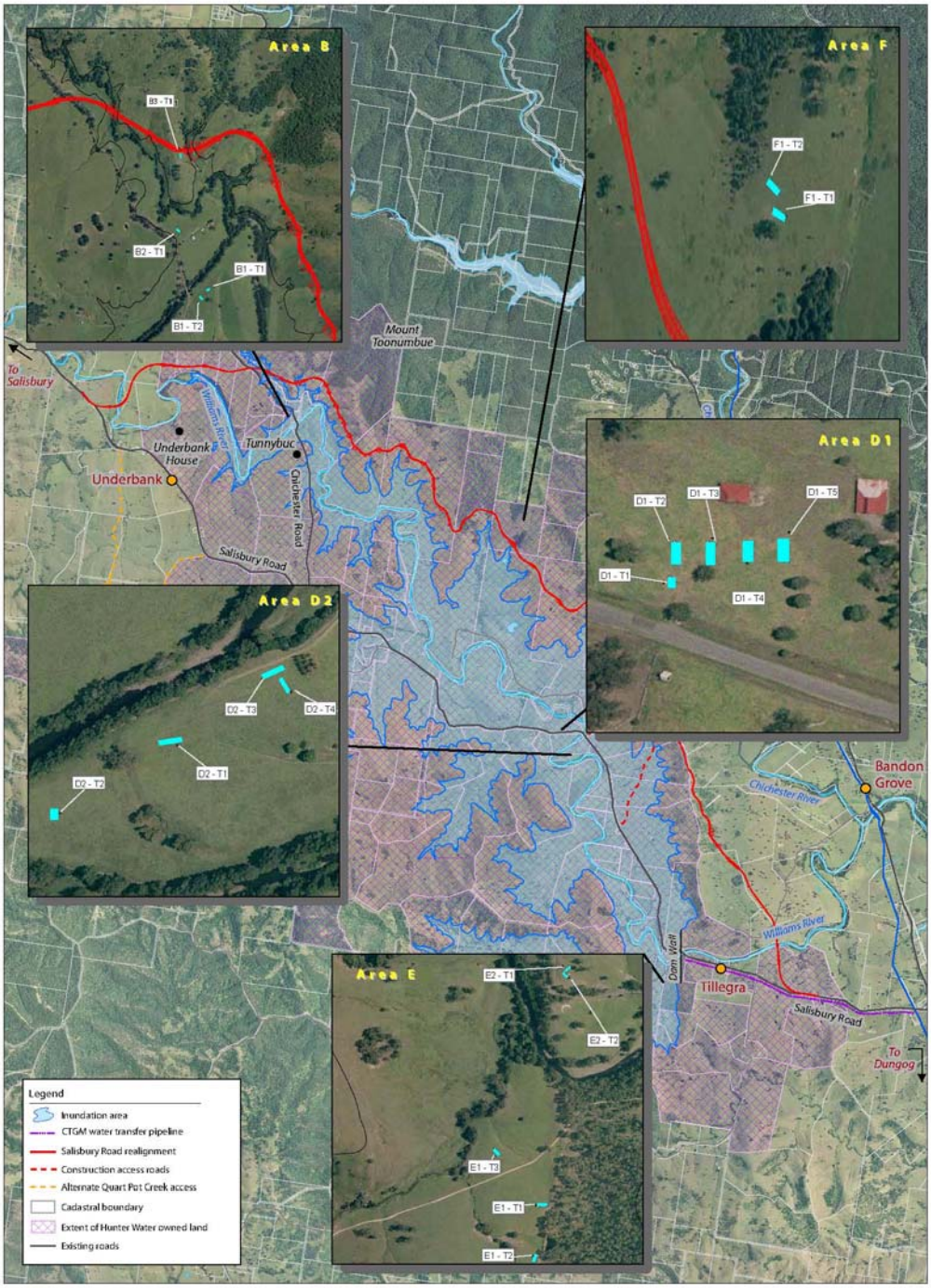
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Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 5	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Travelling norhtwest along Salisbury Road there is a driveway on the right just after the Tillegra bridge (proposed dam wall site) as the driveway turns to the left there is a track on the right, proceed up this track to the bench protruding back toward Salisbury Rd (see attached maps - Area E2 - Trench 1)				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	376154	**AMG Northing**	6423338
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

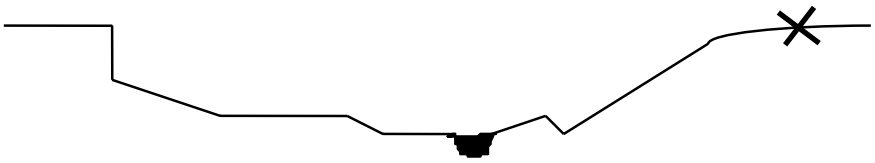
Site type(s)	Isolated Artefact	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	1x complete grey hornfels flake,) cortex, platform termination L47.7xW24.3xT18.4mm		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	bench above river terrace	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	river cobbles, basalt, hornfels. Outcropping sandstone	**Land use/effect**	cleared grazing land		
Distance from drinking water	200m	**Source**	Williams River		
Resource zone (eg. estuarine, river, forest)	river	**Vegetation**	cleared		
Edible plants		**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Good	some weathering due to clearing and grazing, well grassed	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	2 April, 2008

Version: June 1998	Data entered by:	Date entered:

Aboriginal Sites Register of NSW

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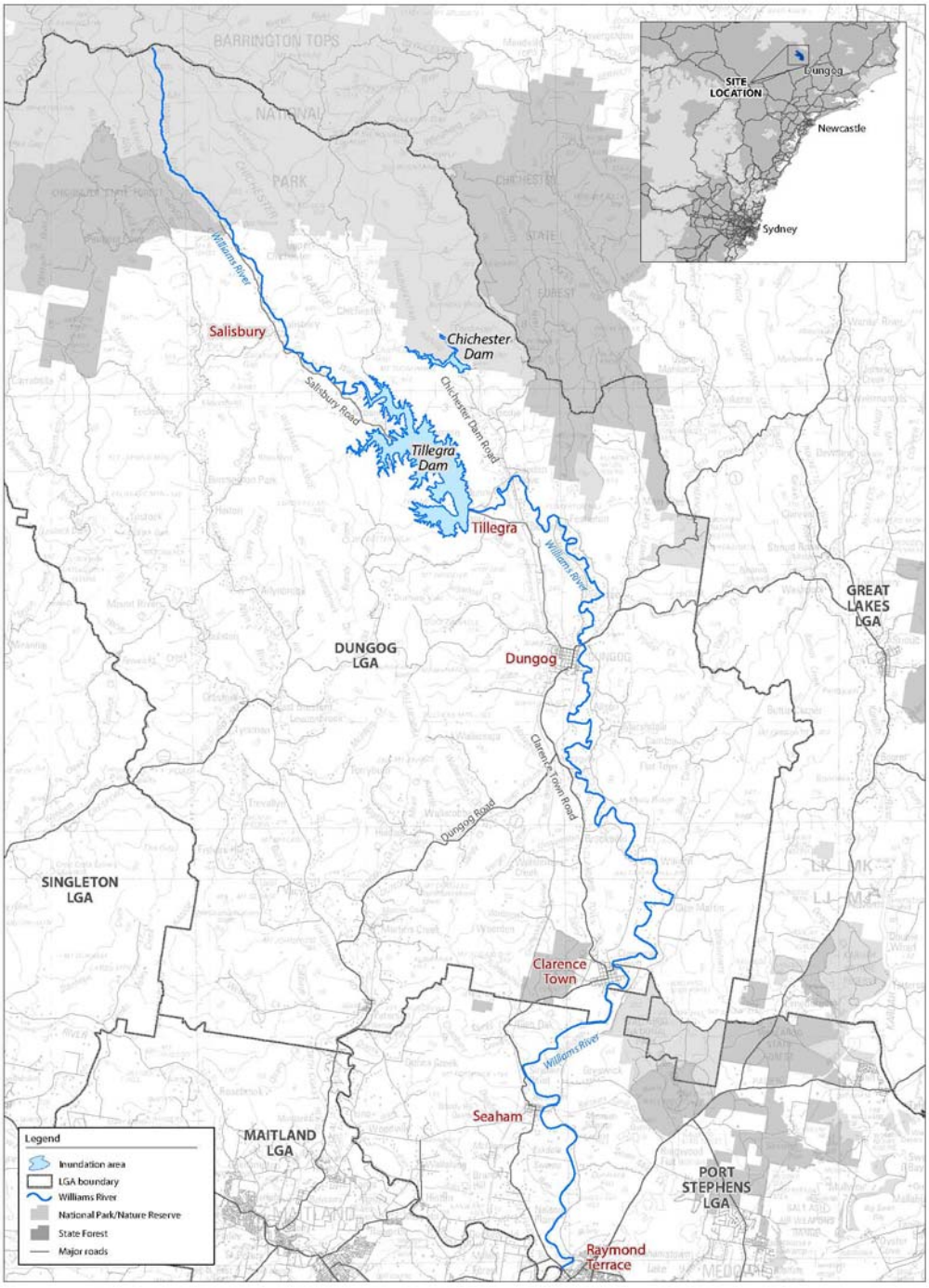
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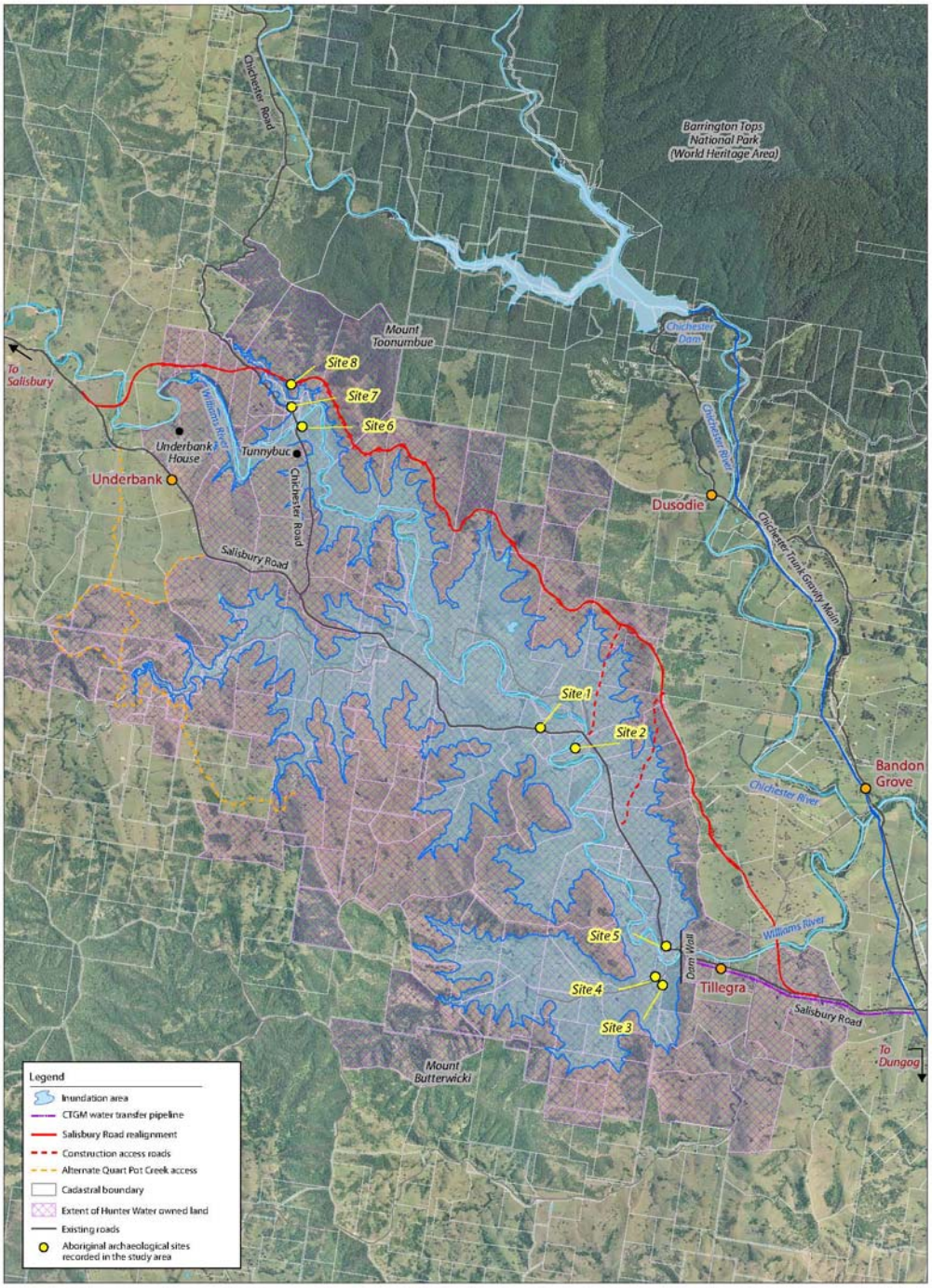
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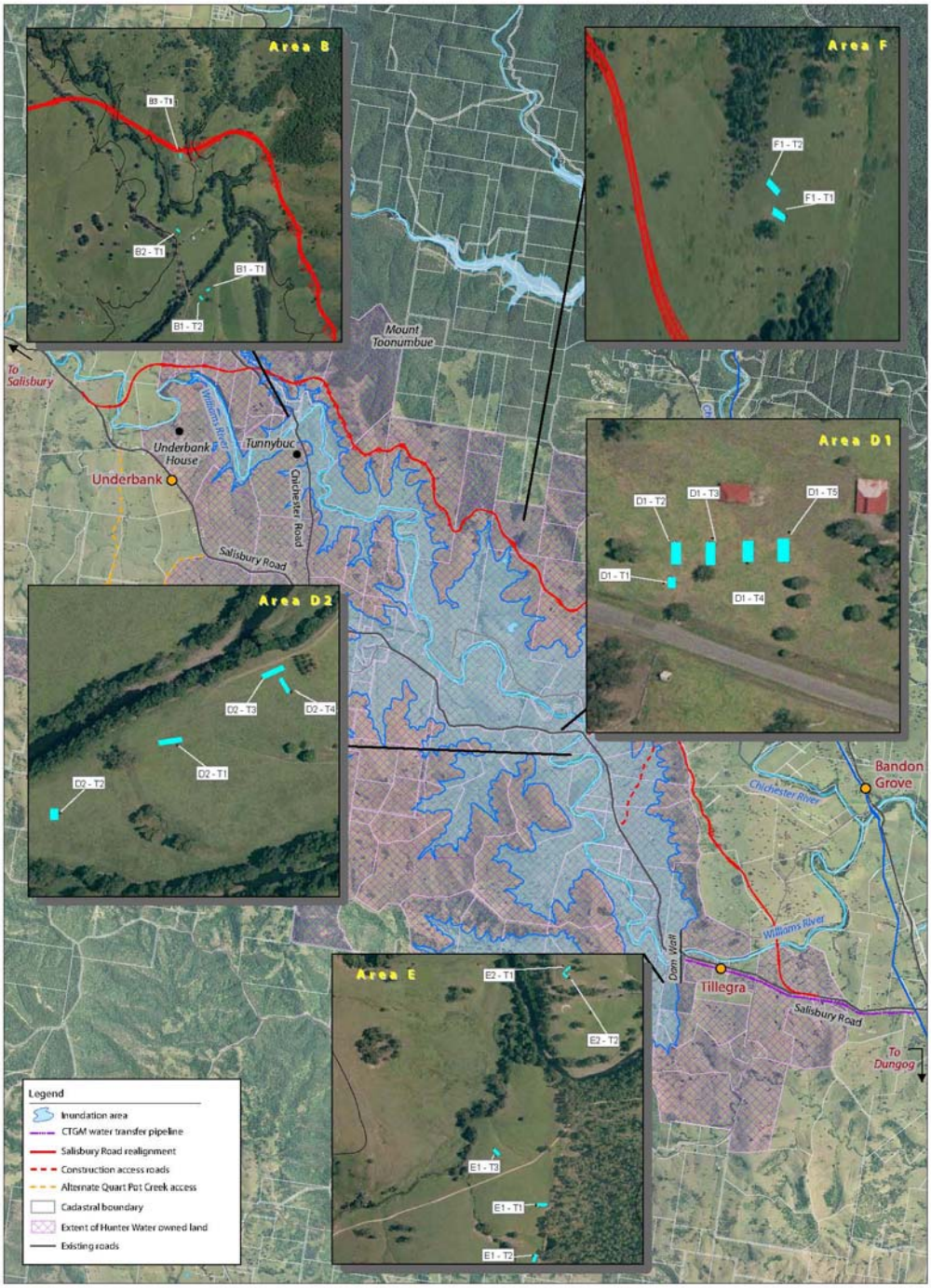
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Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 6	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Take Chichester Road off Salisbury Rd and follow to just before the first bridge over the Williams River, site is in area to the east of the road in elevated second terrace				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	371029	**AMG Northing**	6430655
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

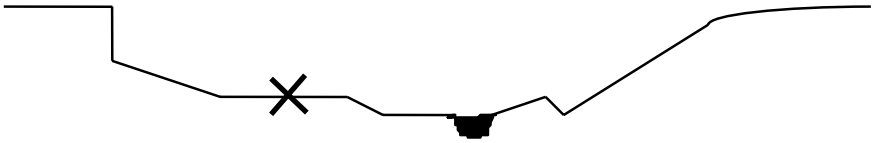
Site type(s)	Artefact scatter/open camp site	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	artefacts retreived from area B1- Trench 1 (see attached maps) 1x complete grey hornfels retouched tool, 50-100% water rolled cortex, L34.1xW55.3xT27.8mm 1x complete grey hornfels flake, hinge termination, 33.5x26x11.7mm		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

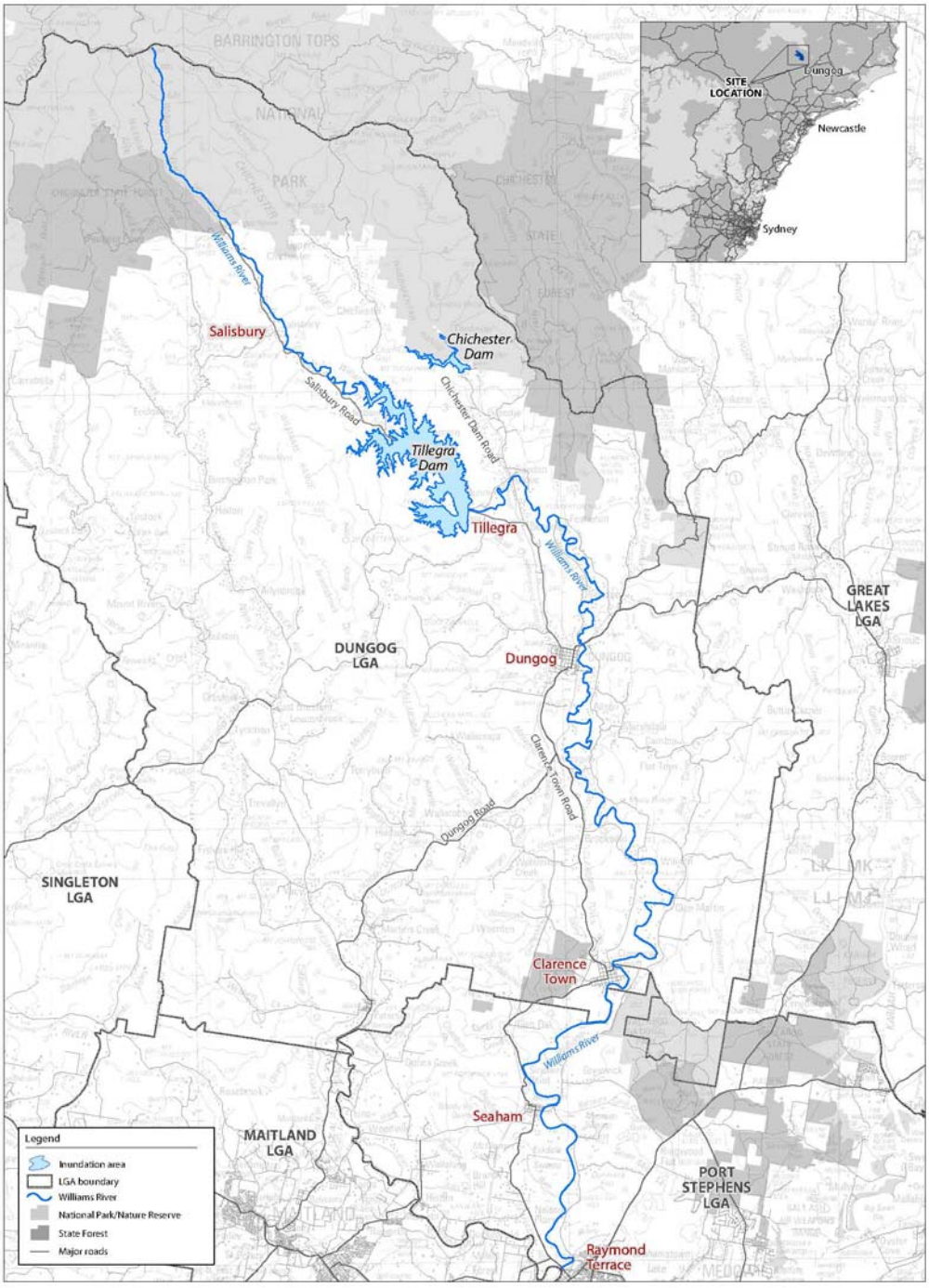
Land form	elevated river terrace	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	river cobbles		**Land use/effect**	cleared grazing land	
Distance from drinking water	<100m		**Source**	Williams River	
Resource zone (eg. estuarine, river, forest)	river		**Vegetation**	cleared	
Edible plants			**Faunal resources** (include shellfish)		
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

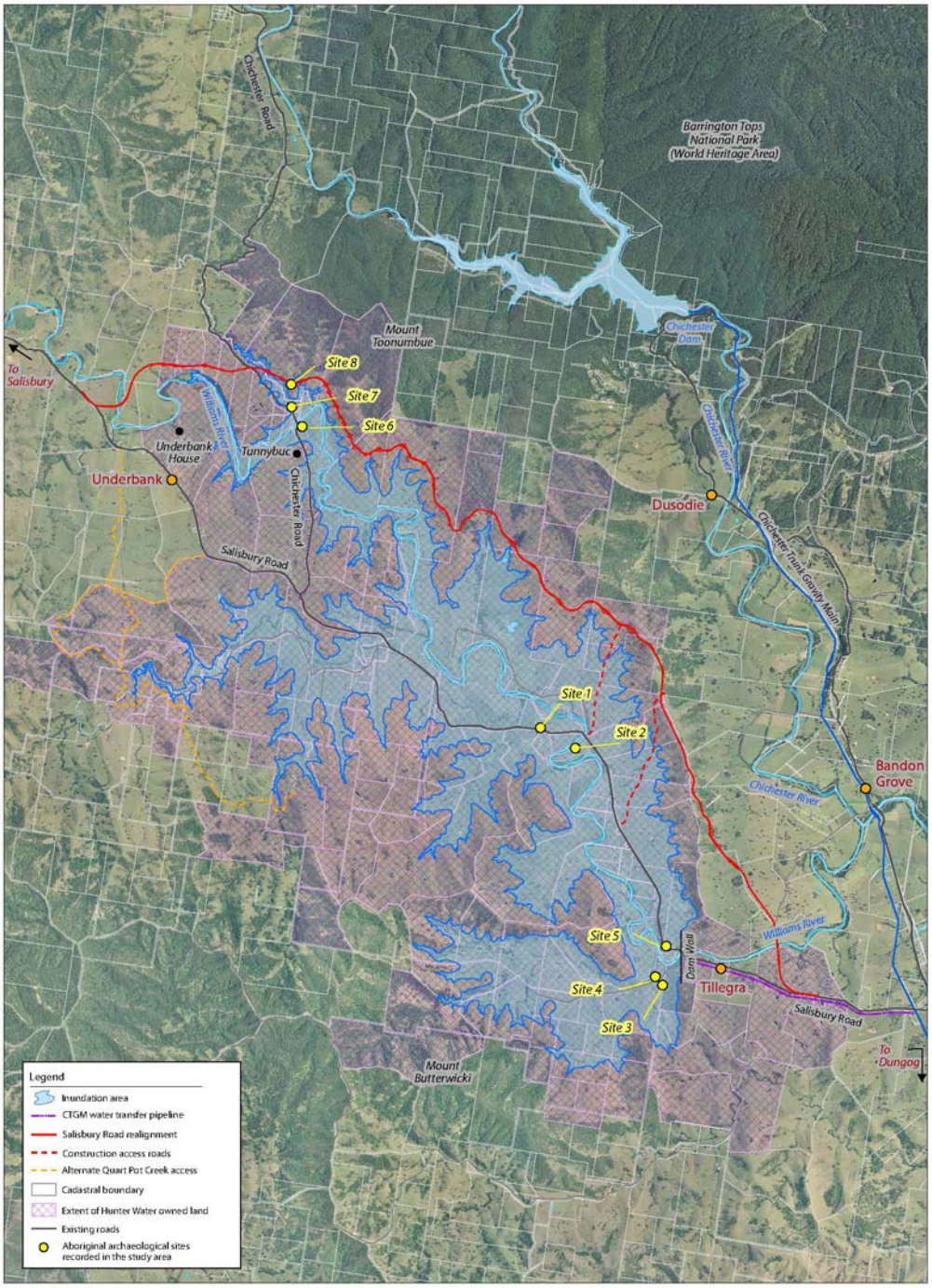
SITE MANAGEMENT

Site condition	Good	some weathering from clearing and grazing, area well grassed	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	3 April, 2008
Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203		


BARRINGTON TOPS
NATIONAL
PARK
CHICHESTER
STATE
FOREST
SITE LOCATION
Dungog
Newcastle
Sydney
Williams River
Salisbury
Salisbury Road
Chichester Dam
Chichester Dam Road
Tillegra Dam
Tillegra
Williams River
GREAT LAKES LGA
DUNGOG LGA
Dungog
Clarence Town Road
Dungog Road
SINGLETON LGA
Clarence Town
Williams River
Seaham
MAITLAND LGA
PORT STEPHENS LGA
Raymond Terrace
Legend
Inundation area
LGA boundary
Williams River
National Park/Nature Reserve
State Forest
Major roads


Barrington Tops National Park (World Heritage Area)
Chichester Road
Mount Toonumbue
Chichester Dam
To Salisbury
Site 8
Site 7
Site 6
Williams River
Underbank House
Tunnybuc
Underbank
Chichester Road
Salisbury Road
Dusodie
Chichester Trunk Gravity Main
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Salisbury Road
To Dungog
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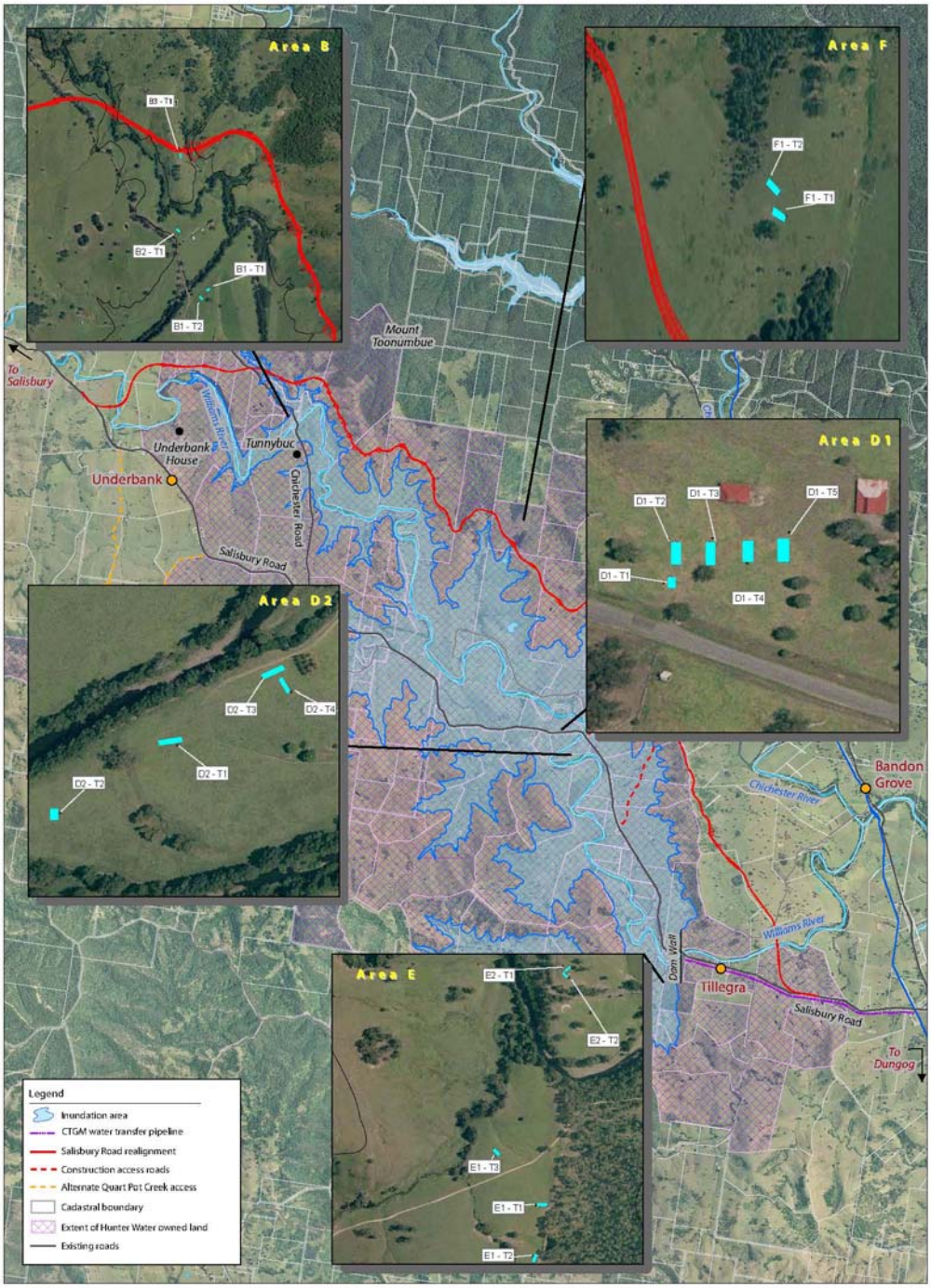
Inundation area
CTGM water transfer pipeline
Salisbury Road realignment
Construction access roads
Alternate Quart Pot Creek access
Cadastral boundary
Extent of Hunter Water owned land
Existing roads
Aboriginal archaeological sites recorded in the study area


Area B
B3 - T1
B2 - T1
B1 - T1
B1 - T2
Area F
F1 - T2
F1 - T1
Mount Toonumbue
To Salisbury
Underbank House
Underbank
Tunnybuc
Williams River
Chichester Road
Salisbury Road
Area D1
D1 - T2
D1 - T3
D1 - T5
D1 - T1
D1 - T4
Area D2
D2 - T3
D2 - T4
D2 - T1
D2 - T2
Bandon Grove
Chichester River
Williams River
Dam Wall
Tillegra
Salisbury Road
To Dungog
Area E
E2 - T1
E2 - T2
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E1 - T1
E1 - T2
Legend
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Extent of Hunter Water owned land
Existing roads

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 7	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Take Chichester Road off Salisbury Rd and follow to just after the Tunnybuc Bridge over the Williams River, site is in area to the east of the road on terrace of Tillegra Creek (see maps Area B2-Trench 1)				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**	370883	**AMG Northing**	6430929
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

Site type(s)	Isolated artefact	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	1 x burnt pink silcrete proximal flake, 0cortex **Attach photographs and sketches, eg. plan & section of shelter.**		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

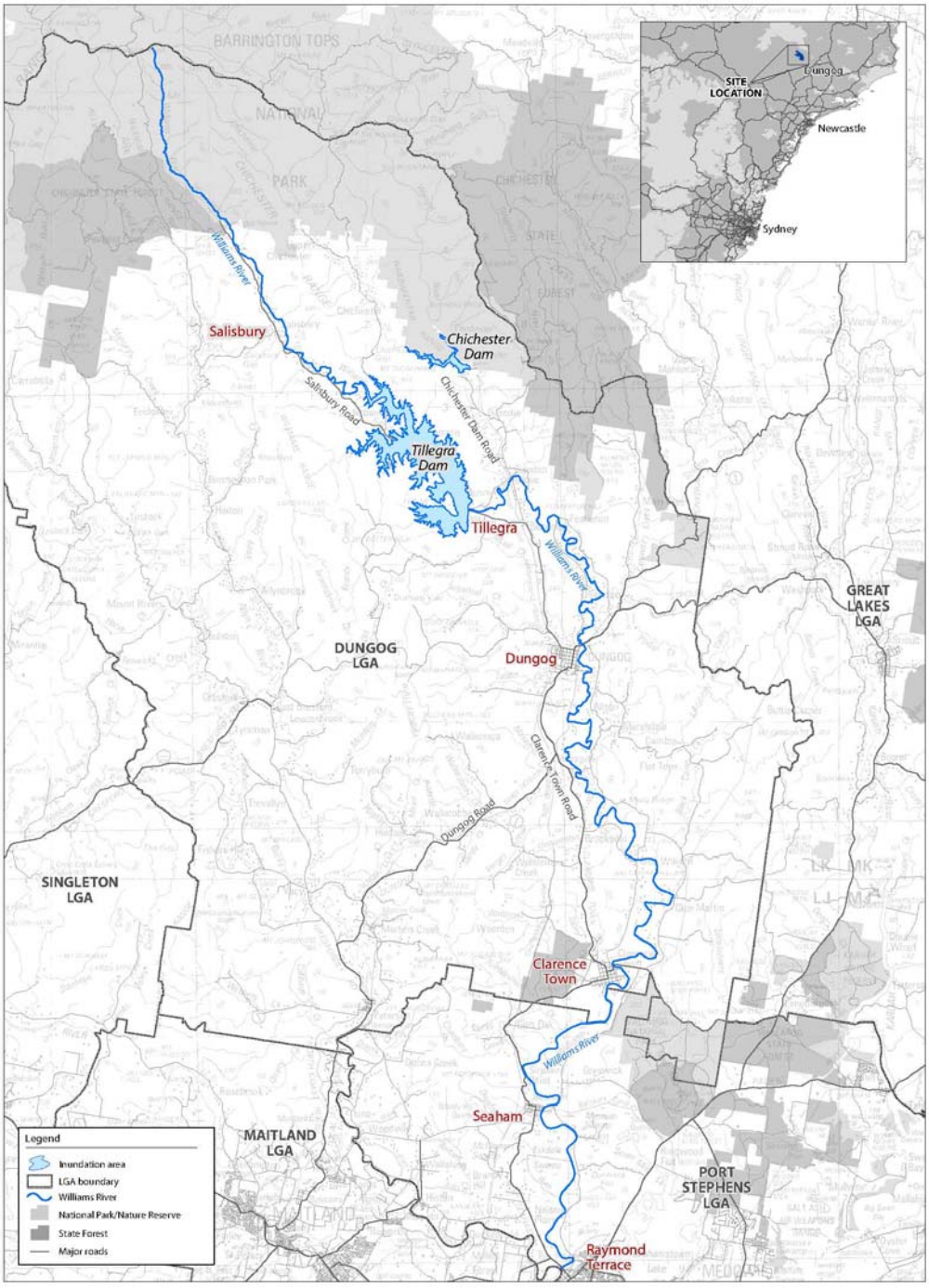
Land form	Creek terrace	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	river cobbles basalt, hornfels	**Land use/effect**	cleared grazing land		
Distance from drinking water	<100m	**Source**	Tillegra Creek		
Resource zone (eg. estuarine, river, forest)	river	**Vegetation**			
Edible plants		**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Weathering	some disturbance from clearing and grazing	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	3 April, 2008
Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203		


BARRINGTON TOPS
NATIONAL
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FOREST
SITE LOCATION
Dungog
Newcastle
Sydney
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Tillegra
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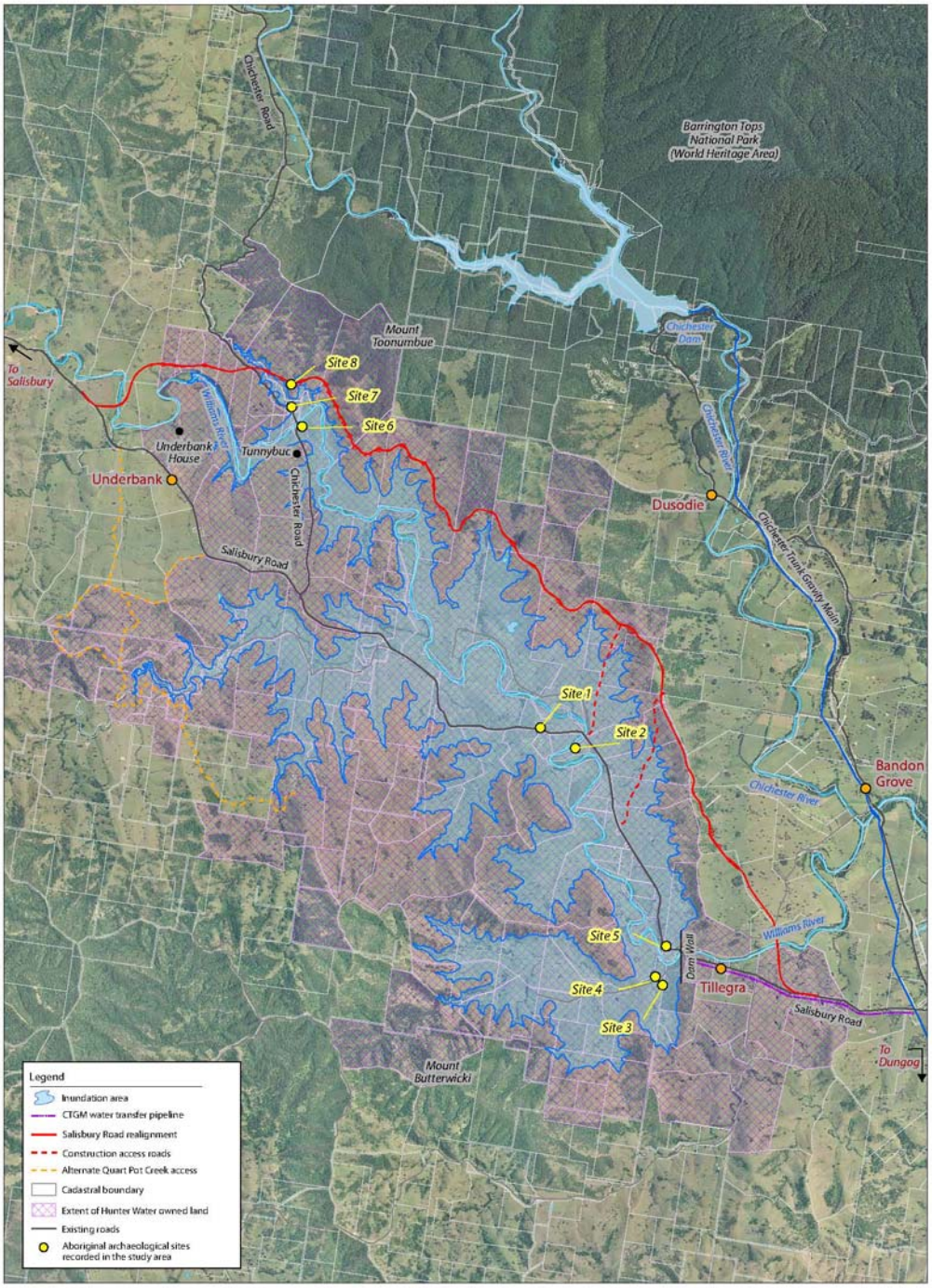
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Cadastral boundary
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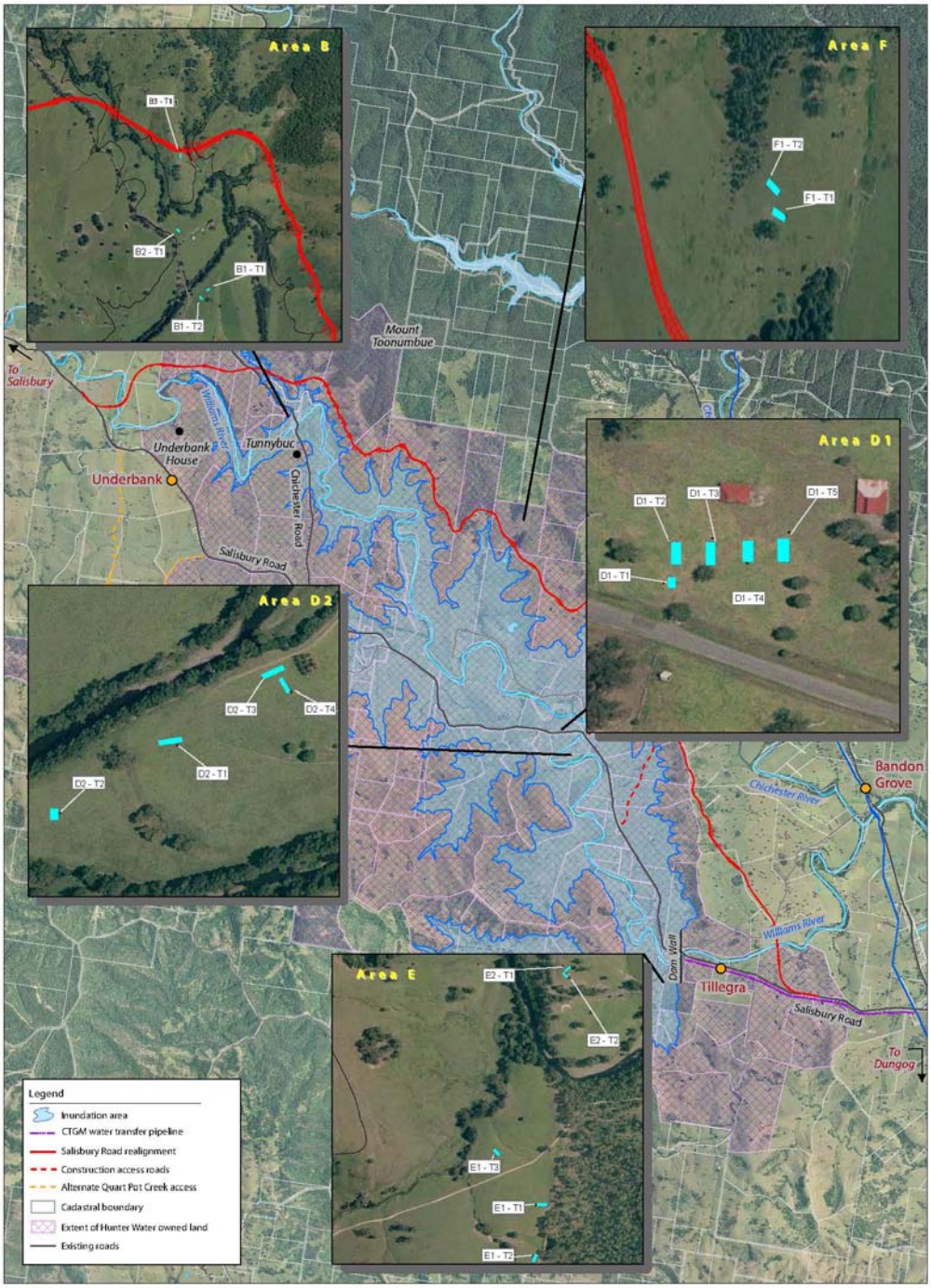
Area B
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B1 - T1
B1 - T2
Area F
F1 - T2
F1 - T1
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To Salisbury
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D1 - T1
D1 - T4
Area D2
D2 - T3
D2 - T4
D2 - T1
D2 - T2
Bandon Grove
Chichester River
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Existing roads

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION

Site name	Tillegra 8	**NPWS Site Number**	
Owner/manager	Hunter Water Corporation		
Owner Address	PO Box 5171 HRMC NSW 2310		

LOCATION

Location	Within the area of the propsed Tillegra Dam northeast of Dungog				
How to get to the site	Take Chichester Road off Salisbury Rd and follow to just after the Tunnybuc Bridge over the Williams River, site is in area to the east of the road on elevated ridge flat on the northeastern side of Tillegra Creek (see maps Area B3 -Trench 1)				
1:250,000 map name	Newcastle			**NPWS map code**	
AMG Zone	56	**AMG Easting**		**AMG Northing**	
Method for grid reference	Hand-held GPS	**Map scale (if method = map)**		**Map name**	
NPWS District Name (see map)				**NPWS Zone (see map)**	
Portion no.				**Parish**	

SITE DESCRIPTION

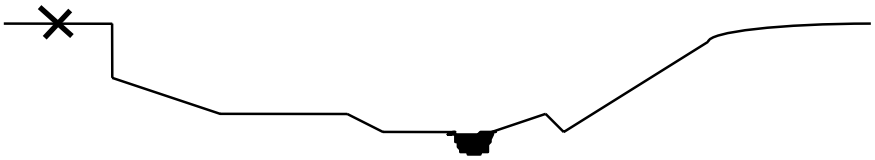
Site type(s)	Isolated artefact	**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	1x fine grained siliceous stone, light grey distal step tool, 1-25% water-rolled cortex, max dimension 22.6mm, possible core		

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	flat ridge over creek	**Aspect**		**Slope**	<5%
Mark position of the site					
Local rock type	sandstone outcropping and shale	**Land use/effect**	cleared grazed		
Distance from drinking water	200m+	**Source**	Tillegra Creek		
Resource zone (eg. estuarine, river, forest)	river	**Vegetation**	cleared		
Edible plants		**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Artefact scatters

SITE MANAGEMENT

Site condition	Weathering	some weathering due to clearing and grazing likely	
Management recommendations	further testing and salvage in project area prior to dam construction		
Have artefacts been removed from site	Yes	**When**	April 2008
By whom	Vanessa Hardy	**Deposited at**	In negotiation with community
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	Testing under Part 3A

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental assessment for proposed Tillegra Dam on the Williams River		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Lower Wonnarua Council Shop 2/145 Lang Street Kurri Kurri NSW 2327 & Arthur Fletcher Wonn 1 Sites Officer 619 Main Rd Glendale NSW 2285
Is the site important to local Aborigines	yes		
Verbal/written reference sources	Hardy 2008 - Tillegra Dam Aboriginal Archaeology Environmental Assessment Report	**ASR report number(s) (or title)**	C- C-
Photographs taken	Yes	**No. of Photos attached**	
Site recorded by	Vanessa Hardy, Ben Streat & Kylie McDonald	**Date of recording**	

Version: June 1998	Data entered by:	Date entered:

Aboriginal Sites Register of NSW

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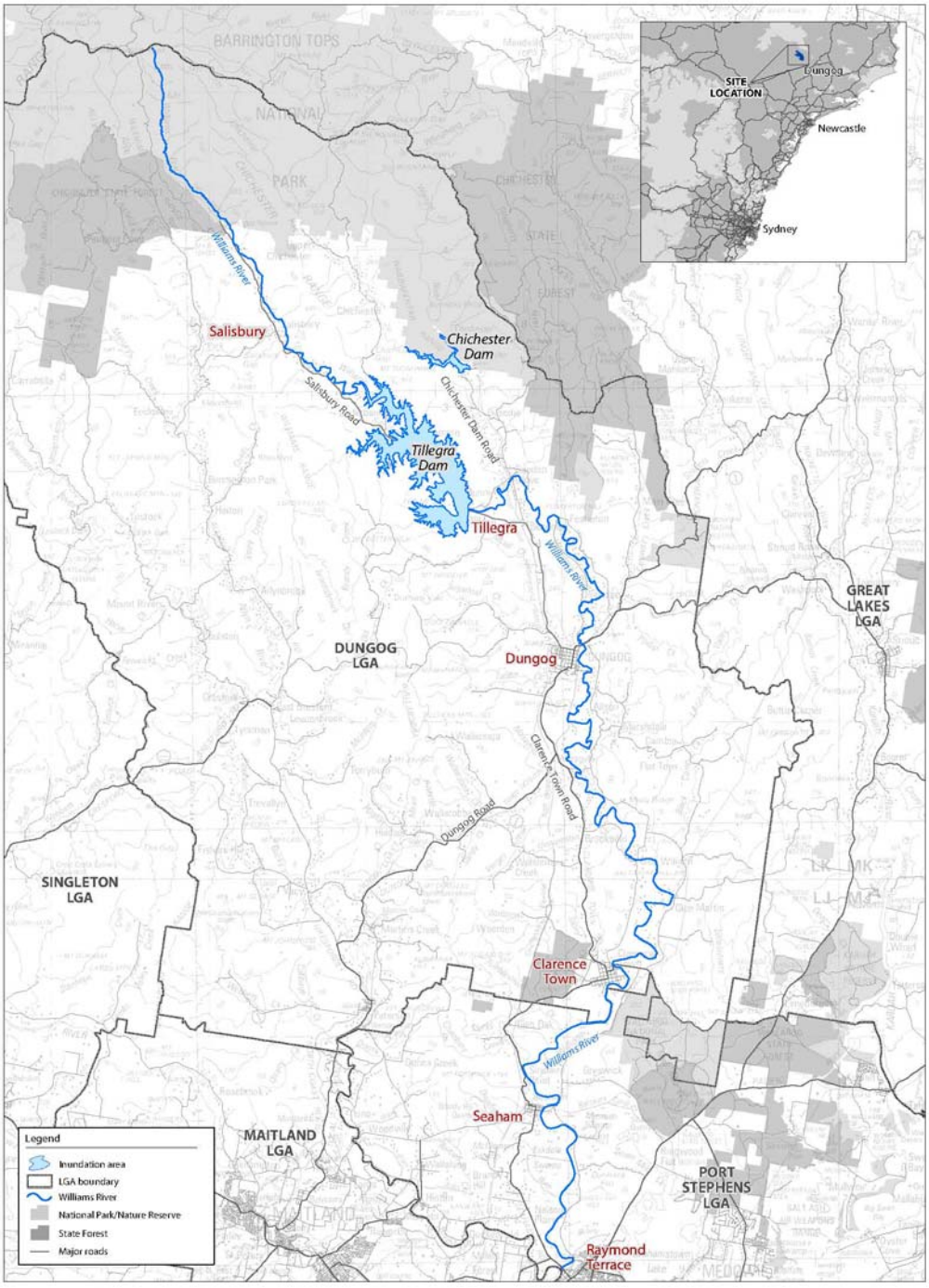
Standard Site Recording Form

Address/institution	Cultural Heritage Connections PO Box 490 Dulwich Hill NSW 2203


BARRINGTON TOPS
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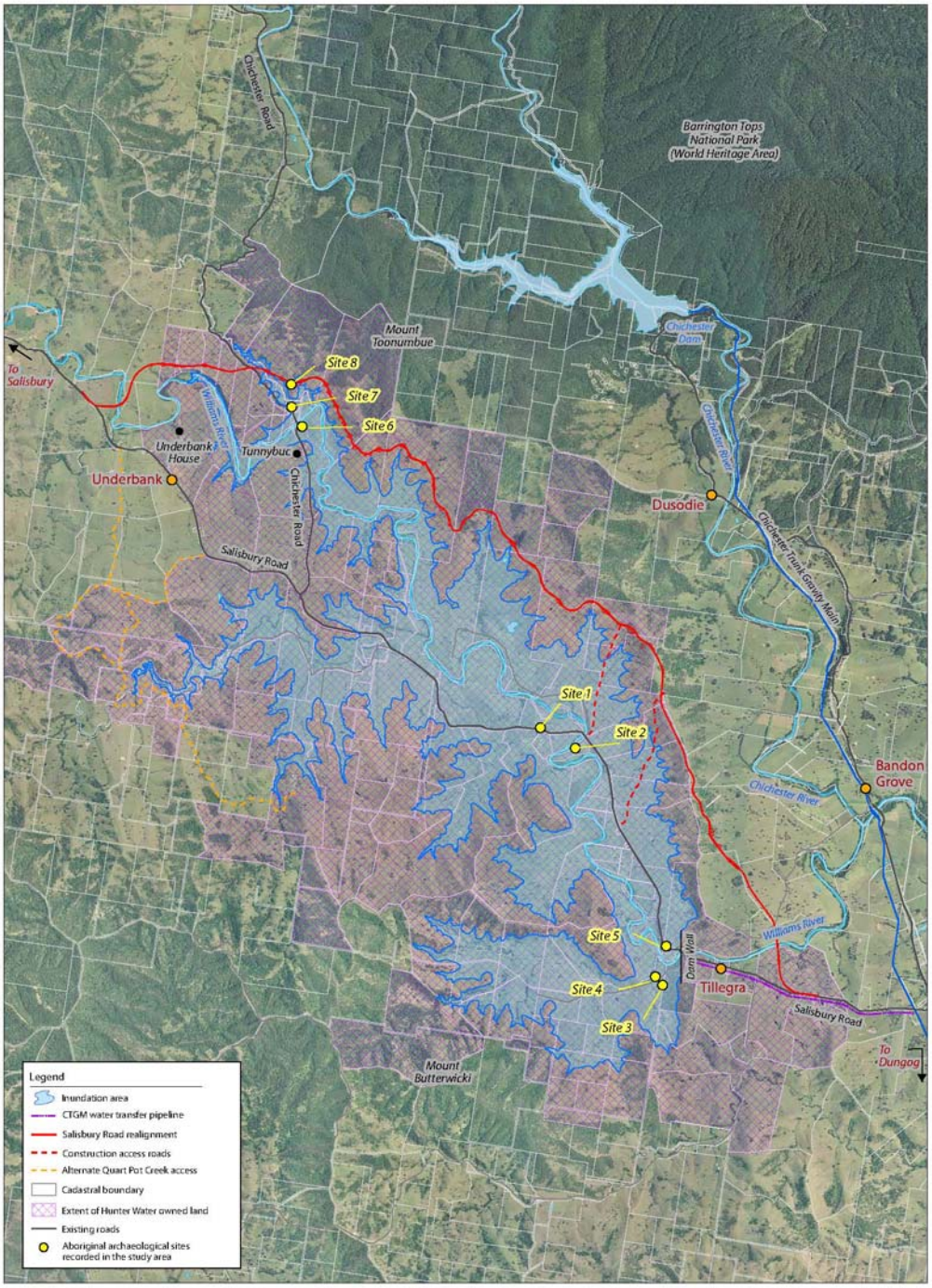
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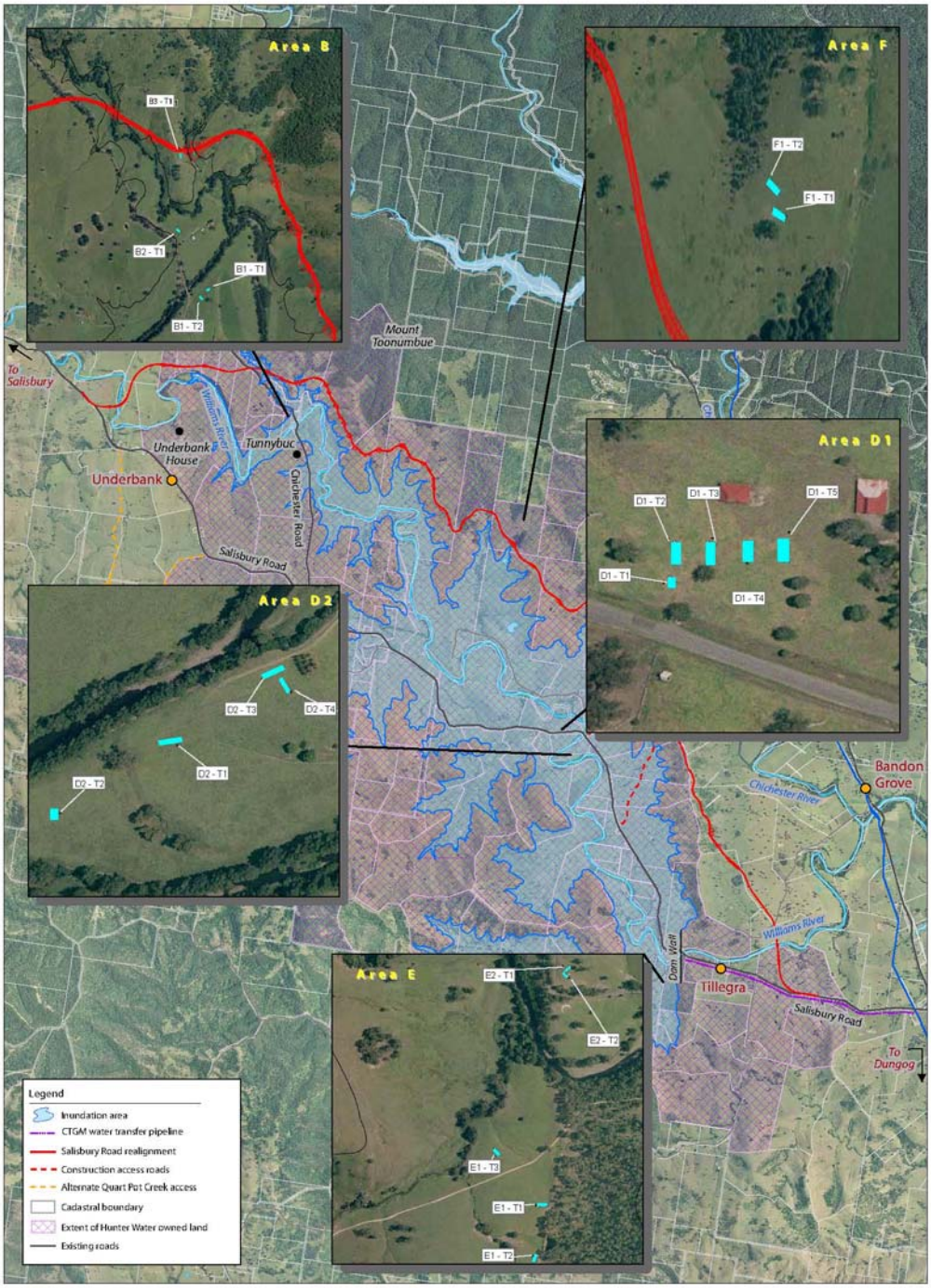
Area B
B3 - T1
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