APPENDIX K

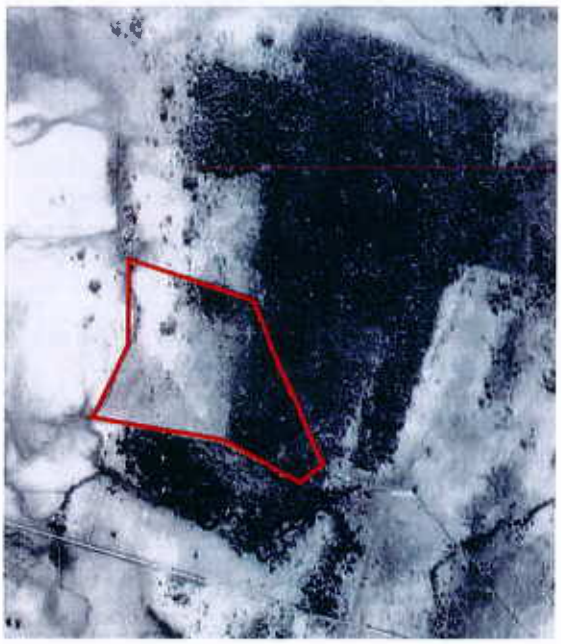
Cultural Heritage Assessment

EVERICK
Heritage Consultants Pty Ltd

ABN 78102206682

March 2013

CULTURAL HERITAGE ASSESSMENT



PROPOSED SAND QUARRY LENNOX HEAD, NSW

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Report Reference:

Piper, A., Robins. T. and J. Lavers 2013 *Sand Quarry, Lennox Head, NSW: Cultural Heritage Assessment (March 2013)*. Everick Heritage Consultants Pty Ltd unpublished report prepared for Ballina Sands Pty Ltd, Ballina.

Acknowledgements:

Everick would like to acknowledge the following people for their assistance in the production of this report:

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Document Status:

Rev No.	Version	Author(s)	Amended Sections	Date	Authorised
0	Draft	A. Piper, T. Robins, J. Lavers	All	14.09.11	T. Robins
1	Final	T. Robins	ES, 3, 9 & Ap. A	02.11.11	T. Robins
2	Final	T. Robins	1.1, 3, Fig3, Fig 5	27.03.12	T. Robins

EXECUTIVE SUMMARY

The following is a cultural heritage assessment of Aboriginal and non-Indigenous (historic) cultural heritage for the proposed development of Sand Quarry at Lennox Head, northern NSW. The land subject to assessment is identified as Lot 32 on DP 1151612 ('Project Area') situated approximately 10 km north of Ballina.

This assessment has been commissioned by Ballina Sands Pty Ltd in support of a development application to the New South Wales Department of Planning and Infrastructure (DGR 520). It involved a literature review, heritage register searches, consultation with the Aboriginal community and a field inspection. The methods used in this assessment conform with the Office of Environment and Heritage ('OEH') *Code of Practice for Archaeological Conduct in New South Wales* (2010) ('Code of Practice'), a checklist for which is included as Appendix B.

As part of a desktop study, Everick undertook searches of the relevant Aboriginal and historic heritage registers. A search of applicable historic heritage registers did not identify any items of cultural heritage significance within close proximity to the proposed Project Area. A search was conducted on 12 April 2011 of the OEH Aboriginal Heritage Information Management System ('AHIMS'), which identified 53 recorded sites for the broader search area. Five Indigenous archaeological sites are registered within 1.25 km of the Project Area. None were recorded within the Project Area. There are no Indigenous places within the Project Area listed in other heritage registers.

The Project Area is within the area administered for Aboriginal cultural heritage purposes by the Jali Local Aboriginal Land Council ('Jali LALC'). A survey for historic and Aboriginal cultural heritage was carried out by Everick Senior Archaeologist Adrian Piper and Mr Marcus Ferguson, Sites Officer for the Jali LALC, on 24 August 2011.

The Jali LALC have provided written support for the content and recommendations in this report Appendix A).

Results

- No Aboriginal Objects or Places were identified within the Project Area.
- The is a (low) potential that the Project Area may contain Aboriginal Objects due to its proximity to registered sites and other observed cultural heritage materials.
- Consultation with the Jali LALC established that they had a similar view on the archaeological potential of the Project Area and identified no places of cultural (spiritual) significance.
- No items of historic heritage significance were identified within the Project Area.

Recommendations: Indigenous Cultural Heritage

The following recommendations are based upon the desktop review, the results of the field assessment and consultation with the Jali LALC.

As the Project Area is unlikely to contain scientifically significant Aboriginal Objects, or high concentrations of Aboriginal Objects, archaeological test or salvage excavations are not recommended. No Aboriginal Objects have been identified that would require an Aboriginal Heritage Impact Permit prior to the Project proceeding.

Recommendation 1: Additional Jali LALC Site Inspection

It is recommended that the Jali LALC are invited to inspect the initial clearing of vegetation and stripping of topsoil within the Project Area, prior to the Project commencing. The Jali LALC Sites Officer should be present as the clearing takes place, and should have input into which parts of the Project Area are cleared for inspection. Jali LALC Sites Officers are extremely knowledgeable on the heritage of the region, and will be able to identify those areas that require monitoring, being the areas closest to the eastern boundary of the Project Area. No less than 25% of the Project Area should be inspected in this manner.

Protocols for communication between the plant operator and the Jali LALC Sites Officer should be agreed prior to commencing the clearing. In the event that Aboriginal Objects are identified, the operator should cease all clearing activities immediately. The Find Procedure (Recommendation 3) should then be followed.

Recommendation 2: Aboriginal Human Remains

It is recommended that if human remains are located at any stage during earthworks within the Project Area, all works must halt in the immediate area to prevent any further impacts to the remains. The Site should be cordoned off and the remains themselves should be left untouched. The nearest police station, the Jali Local Aboriginal Land Council and the OEH Regional Office, Coffs Harbour are to be notified as soon as possible. If the remains are found to be of Aboriginal origin and the police do not wish to investigate the Site for criminal activities, the Aboriginal community and the OEH should be consulted as to how the remains should be dealt with. Work may only resume after agreement is reached between all notified parties, provided it is in accordance with all parties' statutory obligations.

It is also recommended that in all dealings with Aboriginal human remains, the Proponent should use respectful language, bearing in mind that they are the remains of Aboriginal people rather than scientific specimens.

Recommendation 3: Aboriginal Objects Find Procedure

It is recommended that if it is suspected that Aboriginal material has been uncovered as a result of development activities within the Project Area:

(a) work in the surrounding area is to stop immediately;
(b) a temporary fence is to be erected around the site, with a buffer zone of at least 10 metres around the known edge of the site;
(c) an appropriately qualified archaeological consultant is to be engaged to identify the material; and

(d) if the material is found to be of Aboriginal origin, the Aboriginal community is to be consulted in a manner as outlined in the OEH guidelines: *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010).

Recommendation 4: Notifying the OEH

It is recommended that if Aboriginal cultural materials are uncovered as a result of development activities within the Project Area, they are to be registered as Sites in the Aboriginal Heritage Information Management System (AHIMS) managed by the OEH. Any management outcomes for the site will be included in the information provided to the AHIMS.

Recommendation 5: Conservation Principles

It is recommended that all effort must be taken to avoid any impacts on Aboriginal Cultural Heritage values at all stages during the development works. If impacts are unavoidable, mitigation measures should be negotiated between the Proponent, OEH and the Aboriginal community.

Recommendations: Historic Cultural Heritage

There are no further actions or recommendations warranted.

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DEFINITIONS

The following definitions apply to the terms used in this report:

Aboriginal Object means 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 Place means any place declared to be an Aboriginal place (under s.84 of the NPW Act) by the Minister administering the NPW Act, by order published in the NSW Government Gazette, because the Minister is of the opinion that the place is or was of special significance with respect to Aboriginal culture. It may or may not contain Aboriginal Objects.

ACHCR Guidelines means the OEH *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010).

Archaeological Code of Practice means the OEH *Code of Practice for Archaeological Conduct in New South Wales* (2010).

Burra Charter means the International Council of Monuments and Sites ('ICOMOS') Burra Charter (1999).

Due Diligence Code means the OEH *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (2010).

EP&A Act means the *Environmental Planning and Assessment Act 1979* (NSW).

Jali LALC means the Jali Local Aboriginal Land Council.

NCREP 1988 means the *North Coast Regional Environmental Plan 1988.*

NPW Act means the *National Parks and Wildlife Act 1974* (NSW).

NPW Regulations means the *National Parks and Wildlife Regulations 2009* (NSW).

OEH means the New South Wales Office of Environment and Heritage.

Project Area means the land subject to this assessment identified as Lot 32 on DP 1151612.

Proposed Works means all activities associated with extraction, construction and rehabilitation within the Project Area (Figures 2 and 3), including activities undertaken by subsequent landholders.

Proponent means Ballina Sands Pty Ltd and all employees and contractors of the Proponent.

The Project means the proposed development of Lot 32 on DP 1151612, Newrybar Swamp Road, Lennox Head.

The Consultant means qualified archaeological staff and/or contractors of Everick Heritage Consultants Pty Ltd.

1. INTRODUCTION

1.1 Purpose of the Archaeological Investigation

The following report is an assessment of Indigenous and non-Indigenous cultural heritage relating to the proposed development of a property at Newrybar Swamp Road, Lennox Head (the Project). The land subject to assessment is situated approximately 10 km north of Ballina. The intent of the investigation was to identify any archaeological or cultural heritage constraints to the eventual use of the Project Area for sand extraction purposes.

1.2 Proponent & Project Brief

Everick Heritage Consultants (The Consultant) was commissioned by Ballina Sands Pty Ltd to undertake this assessment. It is understood that Ballina Sands will be making an application to the Ballina Shire Council on behalf of the owners of the Project Area.

The brief for this project was to undertake a heritage assessment of suitable standard to be submitted as a stand alone report in support of a Development Application to the Department of Planning and Infrastructure. In accordance with the relevant administrative and legislative standards for New South Wales (see Section 2 below), the methods employed in this assessment included:

(a) consultation with the Jali LALC;

(b) searches of applicable heritage registers;

(c) a review of ethnographic and historic resources relevant to the region;

(d) a review of previous archaeological assessments from the region;

(e) a review of historic aerial photography;

(f) archaeological survey of the Project Area;

(g) assessments of archaeological significance and impact; and

(h) report on findings and recommended management strategies.

1.3 Defining the Project Area

The Project Area is situated within the Ballina Shire Council local government area, approximately 5 km west of the township of Lennox Head (Figure 1). The area subject to this assessment includes all of Lot 32 on DP 1151612 (Figure 2). The land is accessed from Newrybar Swamp Road. The Project Area is approximately 15 ha in area.

Figure 1: Project Area General Locality

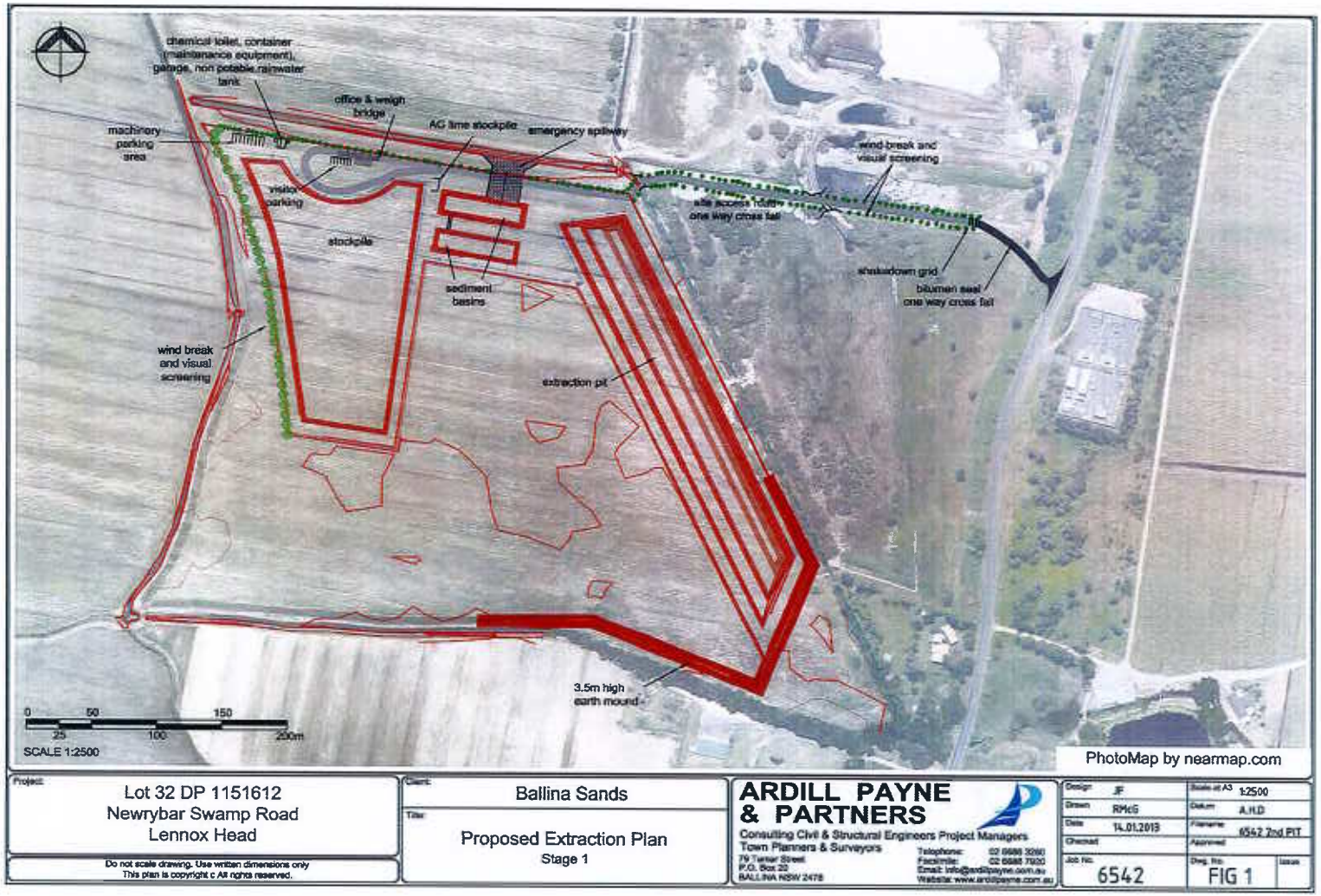

Figure 2: Aerial View of the Project Area (Google Earth 2007)

1.4 Report Authorship

The site survey was undertaken by qualified archaeologist Adrian Piper, assisted by Mr Marcus Ferguson, Sites Officer of the Jali Local Aboriginal Land Council (Jali LALC). The desktop study was undertaken by Adrian Piper, Tim Robins and Jane Lavers. This report was written by Adrian Piper, assisted by Tim Robins and Jane Lavers.

2. LEGISLATIVE AND PLANNING CONTEXT

The following legislation provides the context for cultural heritage in NSW: the *National Parks and Wildlife Act 1974* (NSW), the *Environmental Planning and Assessment Act 1979* (NSW) and the *Heritage Act 1977* (NSW). The Commonwealth also has a role in the protection of nationally significant cultural heritage through the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth), *The Protection of Movable Cultural Heritage Act 1986* (Cth) and the *Historic Shipwrecks Act 1976* (Cth).

For the purposes of this assessment it is the State and local legislation that is relevant. The consent authorities will be the Department of Planning and Infrastructure, with the Office of Environment and Heritage as a referral agency. Approval from the OEH will also be required should the Project impact on identified Aboriginal Objects. The information below lists the legislative and policy framework within which this assessment is set.

As of 1 October 2010, a range of legislative amendments came into operation in New South Wales affecting Aboriginal heritage. The methods used in this assessment have been informed by these legislative amendments, which are discussed in further detail below.

2.1 The *National Parks and Wildlife Act 1974* (NSW) and the *National Parks and Wildlife Regulations 2009* (NSW)

The *National Parks and Wildlife Act 1974* (NSW) (NPW Act) is the primary legislation concerning the identification and protection of Aboriginal cultural heritage. It provides for the management of both Aboriginal Objects and Aboriginal Places. Under the NPW Act, an Aboriginal Object is any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area, regardless of whether the evidence of habitation occurred before or after non-Aboriginal settlement of the land. This means that every Aboriginal Object – regardless of its size or seeming isolation from other Objects – is protected under the Act.

An Aboriginal Place is an area of particular significance to Aboriginal people which has been *declared* an Aboriginal Place by the Minister. The drafting of this legislation reflects the traditional focus on Objects, rather than on areas of significance such as story places and ceremonial grounds. However, a gradual shift in cultural heritage management practices is occurring towards recognising the value of identifying the significance of areas to Indigenous peoples beyond their physical attributes. With the introduction of the *National Parks and Wildlife Amendment Act 2010* (NSW) the former offence provisions under Section 86 of 'disturbing', 'moving', 'removing' or 'taking possession' of Aboriginal Objects or Places have been replaced by the new offence of 'harming or desecrating'. The definition of 'harm' is 'destroying, defacing or damaging an Object'. Importantly in the context of the management recommendations in this assessment, harm to an Object that is 'trivial or negligible' will not constitute an offence.

The subsequent amendments also significantly strengthen the penalty provisions. The issue of intent to harm Aboriginal cultural heritage has been formally addressed by separating it from inadvertent harm. The penalty for individuals who inadvertently harm Aboriginal Objects has been set at up to $55,000, while for corporations it is $220,000. Also introduced is the concept of '*circumstances of aggravation*' which allows for harsher penalties (up to $110,000) for individuals who inadvertently harm Aboriginal heritage in the course of undertaking a commercial activity or have a record for committing similar offences. For those who knowingly harm Aboriginal cultural heritage, the penalty will rise substantially. The maximum penalty will be set at $275,000 or one year imprisonment for individuals, while for corporations it will rise to $1,100,000.

Where a land user has or is likely to undertake activities that will harm Aboriginal Objects, the Director General (OEH) has a range of enforcement powers, including stop work orders, interim protection orders and remediation orders. The amended regulations also allow for a number of penalties in support of these provisions. The NPWA also now includes a range of defence provisions for unintentionally harming Aboriginal Objects:

(a) Undertaking activities that are prescribed as '*Low Impact*'.

(b) Acting in accordance with the new *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (2010) ('Due Diligence Code');

(c) Using a consulting archaeologist who correctly applies the OEH *Code of Practice for Archaeological Conduct in New South Wales* (2010) ("Archaeological Code of Practice') (see Appendix B); and

(d) Acting in accordance with an Aboriginal Heritage Impact Permit (AHIP).

2.1.1 'Low Impact Activities'

The new regulations allow for a range of low impact activities to be undertaken without the need to consult the OEH or a consulting archaeologist. Generally, those who undertake activities of this nature will not be committing an offence, even if they inadvertently harm Aboriginal Objects. These activities include:

(a) Maintenance – For example on existing roads and tracks, or on existing utilities such as underground power cables and sewage lines.

(b) Farming and Land Management – for land previously disturbed, activities such as cropping, grazing, bores, fencing, erosions control etc.*

(c) Removal of dead or dying vegetation - only if there is minimal ground disturbance.

(d) Environmental rehabilitation – weed removal, bush regeneration.

(e) Development in accordance with a Development Certificate issued under the EPA Act 1979 (provided the land is previously disturbed).*

(f) Downhole logging, sampling and coring using hand held equipment.

(g) Geochemical surveying, seismic surveying, costeaning or drilling.*

* This defence is only available where the land has been disturbed by previous activity. Disturbance is defined as a clear and observable change to the land's surface, including but not limited to land disturbed by the following: soil ploughing; urban development; rural infrastructure (such as dams and fences); roads, trails and walking tracks; pipelines, transmission lines; and stormwater drainage and other similar infrastructure.

2.1.2 Due Diligence Code of Practice for the Protection of Aboriginal Objects

The Due Diligence Code has been applied in Section 7.2 of this assessment. It operates by posing a series of questions for land users before they commence development. These questions are based around assessing previous ground disturbance. An activity will generally be unlikely to harm Aboriginal Objects where it:

(a) will cause no additional ground disturbance; or

(b) is in a developed area; or

(c) is in a significantly disturbed area.

Where these criteria are not fulfilled, further assessment for Aboriginal cultural heritage will typically be required prior to commencing the activity.

2.2. The ACHCR (2010)

The OEH has published the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010) (ACHCR). These requirements replaced the former *Interim Community Consultation Requirements for Applicants* (2004) (ICCR) as of 12 April 2010. The ACHCR provide an acceptable framework for conducting Aboriginal community consultation in preparation for Aboriginal Heritage Impact Permits. Proponents are also required to follow the ACHCR where undertaking a Part 3A Major Project, a Project that is likely to impact on cultural heritage and where required by Council.

2.3 The Heritage Act 1977 (NSW)

The Heritage Act 1977 (NSW) ('Heritage Act') is aimed at identifying and protecting significant items of historic (as opposed to Aboriginal) cultural heritage. The focus of the legislation is on identifying places of either local or state heritage significance, and protecting them by registration on heritage registers. Significant historic heritage items are afforded little protection (other than at the discretion of councils) where they are not on a heritage register.

Of note are the provisions allowing for interim heritage orders (Part 3), which grants the Minister or the Minister's delegates, (which importantly may include a local government agent) the power to enter a property

and provide emergency protection for places that have not yet been put on a heritage register but that may be of local or State significance.

The Heritage Act 1977 (NSW) also makes allowances for the protection of archaeological deposits and relics (Part 6). An archaeological "relic" means any deposit, object or material evidence which relates to the settlement of the area, not being Aboriginal settlement. Importantly, a former requirement for an archaeological relic to be 50 years or older has recently been repealed. The focus is now on the item's potential heritage significance, not its age. As will be discussed below, it is highly unlikely that archaeological relics of significant historic sites are located within the Project Area.

2.4 The *Ballina Local Environmental Plan 2012* and *Development Control Plan 2012*

The Ballina LEP 2012 provides statutory protection for items already listed as being of heritage significance. It ensures that essential best practice components of the heritage decision-making process are followed. A listed environmental heritage item is an item that is either:

(a) designated as an item of environmental heritage in Schedule 5 of the BLEP 2012; or

(b) designated as an item of environmental heritage by the DCP 2012.

For listed heritage items, a person must have the consent of the Council for:

(a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):

(i) a heritage item,

(ii) an Aboriginal object,

(iii) a building, work, relic or tree within a heritage conservation area,

(b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,

(c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,

(d) disturbing or excavating an Aboriginal place of heritage significance,

(e) erecting a building on land:

(i) on which a heritage item is located or that is within a heritage conservation area, or

(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance; and

(f) subdividing land:

(i) on which a heritage item is located or that is within a heritage conservation area, or

(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.

Consent can only be given once the Council considers the effect of the proposed development on the heritage significance of the area. The Council may also require a heritage management document to be prepared. This document must assess the extent to which the carrying out of the proposed development would affect the heritage significance of the area concerned. After this the Council may also require a heritage conservation management plan for the heritage that was assessed.

If the proposed development will require the demolition of a nominated State Heritage item then the Council must notify the Heritage Council of the application and consider any responses received within 28 days. Similarly, if the development is on an archaeological site, the Council must notify the Heritage Council of intentions to grant consent and consider any responses received within 28 days.

Should the development be on an Aboriginal place of heritage significance, the Council must notify the local Aboriginal communities about the application and consider any responses received within 28 days. Additionally, the Council must consider the effect that the development would have on the heritage significance of the Aboriginal place and any Aboriginal objects that are known or likely to be within the development. This must be done by means of an adequate investigation and assessment.

The Council may also grant consent for a development on a heritage item, land, or Aboriginal place that would not otherwise be allowed in this Plan, if the Council is satisfied that:

(a) the conservation of the heritage item or Aboriginal place of heritage significance is facilitated by the granting of consent, and

(b) the proposed development is in accordance with a heritage management document that has been approved by the consent authority, and

(c) the consent to the proposed development would require that all necessary conservation work identified in the heritage management document is carried out, and

(d) the proposed development would not adversely affect the heritage significance of the heritage item, including its setting, or the heritage significance of the Aboriginal place of heritage significance, and

(e) the proposed development would not have any significant adverse effect on the amenity of the surrounding area.

Under its present zoning, the Project Area lies within Zone RU1 (Primary Production) under the Ballina Local Environment Plan 2012 (BLEP 2012). The Ballina Shire Council has also adopted the *Ballina Development Control Plan 2012* ('DCP 2012'). It supports the BLEP 2012, and requires any person or organisation who intends to impact a heritage item to produce either a Statement of Significance (in the event of minor alterations to a heritage item) or a Statement of Heritage Impact (in the event of major alterations). Where the proposed development is in the vicinity of a listed Aboriginal item, the application is to be accompanied by an assessment from a qualified archaeologist in consultation with the Jali LALC. Under the Section 3.12 of chapter 2 of the DCP 2012, applications are to be accompanied by an archaeological assessment undertaken in consultation with the Jali LALC and the Office of Environment and Heritage ('OEH').

2.5 The North Coast Regional Environmental Plan 1988

The North Coast Regional Environmental Plan 1988 ('NCREP 1988') recognises the importance of regionally significant heritage items and places to the State of NSW. It provides statutory protection for a select number of state and regionally significant heritage items and places in northern NSW. A "heritage item" means a building, work, relic, tree or place of heritage significance to the North Coast Region specified or described in Schedule 2 or 3 of the NCREP 1988. For these items, the Ballina Shire Council remains the consent authority. Under the NCREP 1988 Council must consider:

- the views of the Heritage Council;
- the heritage significance of the item to the State or region;
- the extent to which the carrying out of the development would affect the heritage significance of the item and its site;

- whether the setting of the item, and in particular, whether any stylistic, horticultural or archaeological features of the setting should be retained;
- measures taken to conserve and preserve the heritage item, including where appropriate, any conservation plan; and
- whether the item constitutes a danger to the users or occupiers.

The main difference between the NCREP 1988 and other Council planning controls is that it focuses on regional significance rather than local significance. It also involves referral to the NSW Heritage Council, regardless of whether the item is on the NSW Heritage Register.

2.6 The NSW Heritage Manual

The NSW Heritage Manual lists an 8-step process that is generally considered a best practice guide to assessing significant items. The process steps are:

1. Summarise what is known about the item.
2. Describe the previous and current uses of the item and the associations it may have to individuals or groups and its meaning for those people.
3. Assess the significance using the NSW heritage criteria.
4. Check if a sound analysis of the item's heritage significance can be made.
5. Determine the item's level of significance.
6. Prepare a succinct statement of heritage significance.
7. Get feedback.
8. Write up the information.

Contrary to common belief, a significant heritage item need not be particularly 'old' (the exception to the rule being the definition of an Archaeological Relic discussed above). Rather, the focus is on identifying what aspects of a particular item may be significant.

The NSW Heritage Manual contains a set of 7 assessment criteria that act as a guide to assessing significance. They are:

- **Criterion (a):** An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area);
- **Criterion (b):** An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area);
- **Criterion (c):** An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area);
- **Criterion (d):** An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons;
- **Criterion (e):** An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);
- **Criterion (f):** An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area); and
- **Criterion (g):** An item is important in demonstrating the principal characteristics of a class of NSW's
    - cultural or natural places; or
    - cultural or natural environments.

3. DESCRIPTION OF DEVELOPMENT PROPOSAL

The Proponent is seeking a Development Consent from the DPI to mine an extractable resource within the Project Area. The operation will be similar in size and nature to the existing extractive operations on adjoining properties. Operations will involve stripping of topsoil, use of excavators to extract 610,000 cubic metres (in situ) of sand, stockpiling and loading into haulage trucks. For the purposes of this assessment, it has been assumed that all of the Project Area may be the subject of significant surface and subsurface ground disturbance.

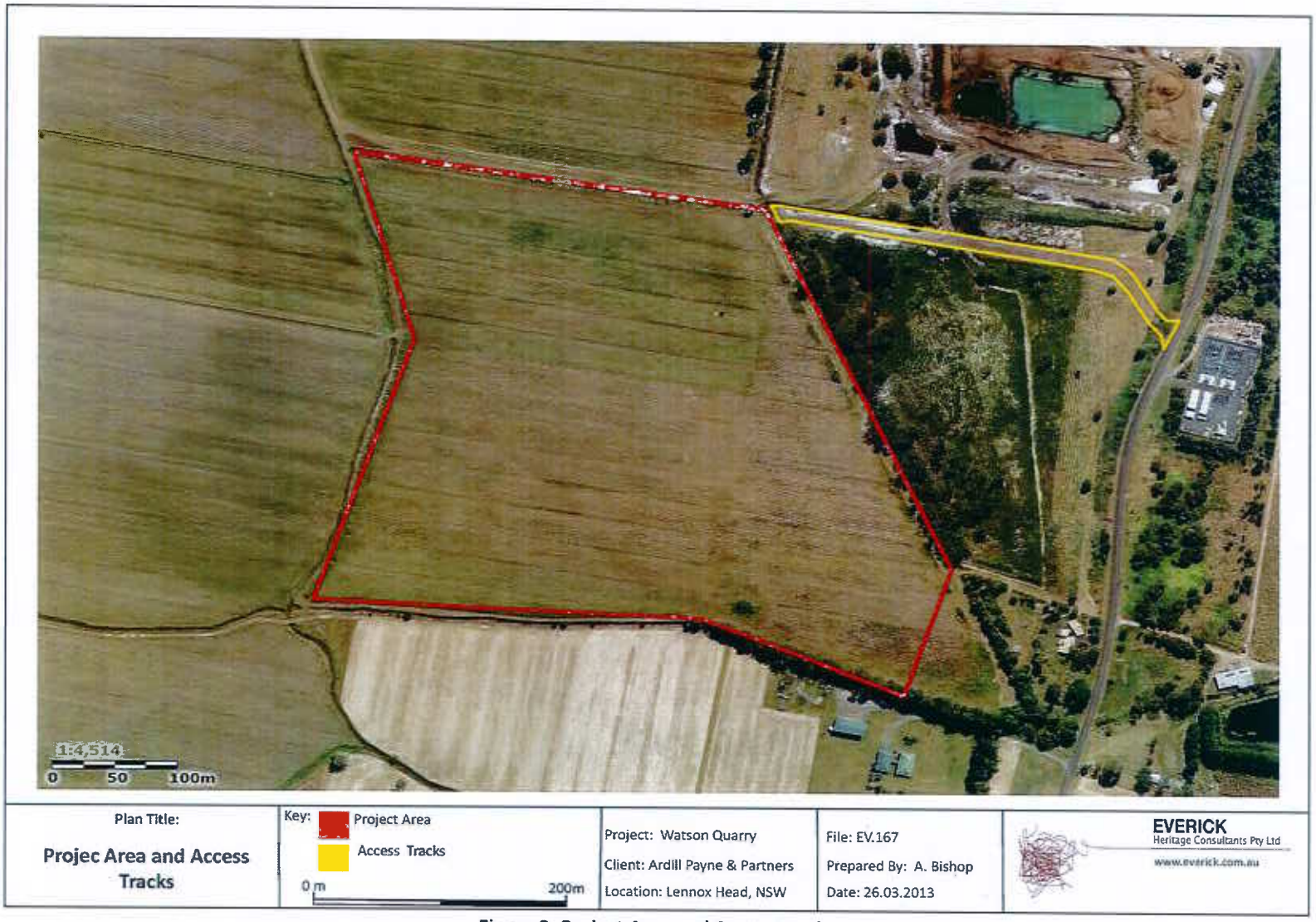

Figure 3: Project Area and Access Tracks

4. HERITAGE REGISTERS: ABORIGINAL AND HISTORIC HERITAGE

4.1 The OEH Aboriginal Heritage Information Management System

Care should be taken when using the AHIMS database to reach conclusions about site prevalence or distribution. For example, a lack of sites in a given area should not be seen as evidence that the area was not occupied by Aboriginal people. It may simply be an indication that it has not been surveyed, or that the survey was undertaken in areas of poor surface visibility. Further, care needs to be taken when looking at the classification of sites. For example, the decision to classify a site an Open Campsites containing shell rather than a Midden can be a highly subjective exercise, the threshold for which may vary between archaeologists. There are also errors with the data.

A search was conducted on 12 April 2011 of the OEH Aboriginal Heritage Information Management System (AHIMS service number 32722) over 25 km^2 centered on the Project Area. The search identified 53 registered Aboriginal sites within the general locality search area (Figure 4). The majority of the registered sites are Open Campsites containing artefact scatters or single artefacts (20). Seventeen Open Sites were listed as PAD's (Potential Archaeological Deposits). It not known whether theses PAD's would contain shell, artefacts, burials or other types of evidence of human occupation.

One bora ring is listed at Lennox Heads, near Gibbons Street. The search identified 11 middens within the search area. As is consistent with the archaeological record for other parts of the region, the middens are typically located close to the shellfish resource.

Indigenous archaeological sites within close proximity (up to 1.25 km) to the Project area include one midden/artefact scatter (#04-5-070) and four artefact scatters (#04-5-0068, #04-5-0069, #04-5-0164, #04-5-0166) (Figure 4). Sites #04-5-0068, #04-5-0069, #04-5-0070 were subject to Section 90 Provisions of the *NPWA* 1974: *Consent To Destroy*. While these sites no longer technically exist, it is the practice of the OEH to retain their original registration on the AHIMS.

A follow up search was lodged on 8 March 2013. No new sites were found within the survey area. However, a modern projection of the data showed sites in a different location than was originally reported. The current and most accurate projection of site locations is shown below in Figure 5. New mapping showed one site (04-5-0069) 30m from the current access tracks, directly across the road from the access tracks entrance. This is not predicted to be a problem however because the site technically no longer exists, as mentioned above, and the site is on a different property so no works or disturbance will take place at that location. As long as the Proponent remains within the advised Project Area no sites should be impacted.

Figure 4: AHIMS search results (indicative locations only)

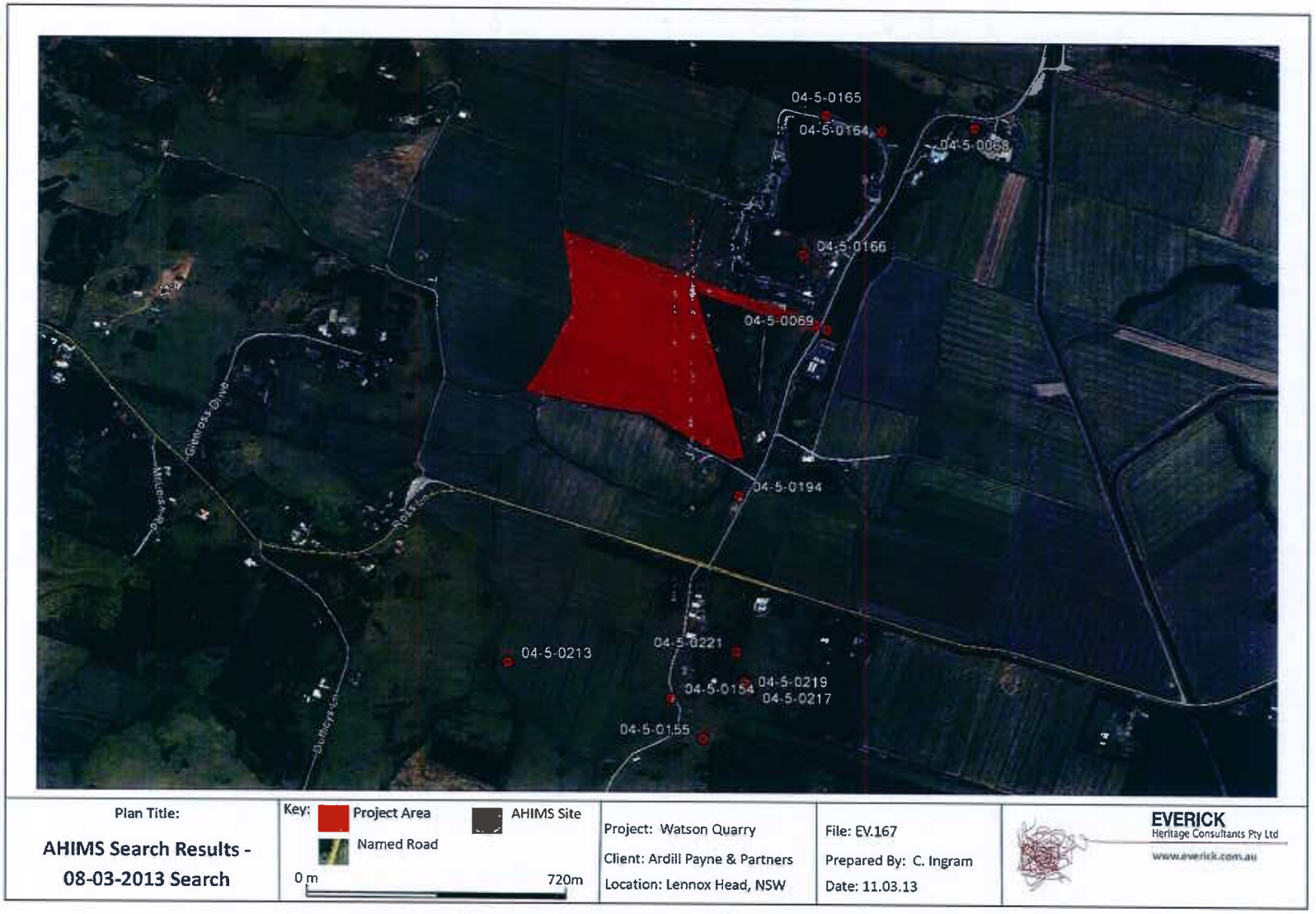

Figure 5: AHIMS search results close to Project Area (indicative locations only)

According to Tindale the Project Area is within the territory of the Arakwal with the Minjungbal from a short distance north of Byron Bay and the Badjalang to the south of the Richmond River (Tindale 1974). Crowley (1978) refers to Banjalang dialect areas: the Nyangbal between the Evans River and about Broken Head, the Minyanbal to the north and the Gumbayngirr to the south of the Evans River. The Wiyabal and Banjalang adjoined the Nyangbal to the west (Crowley 1978).

4.3.2 Movement

From the few eye witness sources available for the North Coast we can suggest that contact between elements of the coastal clans was frequent and may have involved relatively large numbers. Bray records that the coastal Coodjinburra '...used to mix very much with the Ballina Richmond River Blacks' (Bray 1901:9). However it may have been a way of life that rapidly disappeared under the impacts of disease and restrictions on Aboriginal groups by 'authorities' on the movement of Aboriginal people. A review of sightings of Aboriginal coastal groups in Coleman's review of ethno historical sources led her to a conclusion that in the initial stages of European contact, observers of coastal groups describe, '...consistently high, semi sedentary local populations on the coast with a highly sophisticated organic material culture which vanished almost overnight with European contact' (Coleman 1982:7).

Population numbers on the coastal plain were high, possibly reflecting the wide variety and high productivity of coastal ecologies. Ainsworth (1922) is the most detailed of early sources for the coastal plain and estuary, writing specifically of the Aboriginal people of east and west Ballina. Ainsworth (1922:43) recorded '...In 1847 there were between 400 and 500 in the native tribes belonging to East and West Ballina'. Uniake an observer on John Oxley's ship 'Mermaid' estimated 200 men armed with spears observed the ship from Fingal Head following a brief exploration of the lower Tweed River (Uniake 1825:40). Bray observed in the 1860s, 600 camped on the Wollumbin plain near Murwillumbah. Pierce estimates that if on the basis that the 200 men observed by Oxley's expedition were drawn from coastal clans between the Brunswick and the Tweed Rivers, the population density between the rivers and inland for some miles was '...of about three per square mile...' (Pierce 1971:13). Population estimates by eye witnesses of Aboriginal numbers for the coastal regions immediately after European settlement are highly likely to be underestimates of pre contact numbers due to the impacts of diseases particularly small pox that spread throughout coastal groups prior to official settlement.

4.2 Other Heritage Registers: Indigenous & Historic Cultural Heritage

The following heritage registers were accessed on 12 April 2011 for Indigenous and historic places within the Ballina Shire LGA:

- **The World Heritage List**: Contains no place listings for the Ballina LGA.
- **The National Heritage List** (Australian Heritage Council): Contains no place listings for the Ballina LGA.
- **Commonwealth Heritage List** (Australian Heritage Council): Contains no place listings for the Ballina LGA.
- **Register of the National Estate** (Australian Heritage Council): Contains 14 place listings for the Ballina LGA. The closest places include: the Ballina Nature Reserve (approximately 550 ha to the south of Ross Lane); and the Lennox Head Bora Ring (see Appendix D for details of listing), which is approximately four kilometres east of the Project Area.
- **The State Heritage Register** (NSW Heritage Office): Contains one place listing, a house at 37 Norton Street, Ballina named 'Brundah'. It is not with close proximity to the Project Area.
- **Ballina Shire Local Environment Plan 1987:** Lists 23 Indigenous places. None are in close proximity to the Project Area. Nor are there any historic heritage items within close proximity to the Project Area.
- **Ballina Shire Development Control Plan 2009:** Contains no areas of Indigenous or historic heritage significance or cultural sensitivity in close proximity to the Project Area.
- **Ballina Draft Shire Wide Community Heritage Study 2008**: Lists a number of items that the study recommends for inclusion onto the LEP 1987. None are in close proximity to the Project Area, the closest being the dry stone walls located at Lennox Head, North Creek and Skennar's Head to the south east of the Project Area.

4.3 Synthesis of Archaeology and Ethnohistory

4.3.1 Settlement

The Aboriginal people of the Ballina/ Lennox Head area were part of a larger linguistic group, the Bundjalung, which spoke a range of dialects in the area between the Clarence and Logan Rivers extending west to Tenterfield. Dialect groups and sub clans composed of interlinked family groups occupied distinct areas within the wider Bundjalung association. Land belonged to individual clans whose territorial boundaries had been established in mythology (Creamer and Godwin 1984).

Contact between local clans and more distant groups took place for the purposes of exchange, intermarriage, armed conflict and during times of seasonally abundant food supply. A number of models have been proposed to account for the systematic use of the hunter gatherer environment of northern New South Wales and southern Queensland. Movement took place within territories in response to the availability of food supplies and across group territories for purposes of ceremonial occasions and tribal conflicts in addition to exploiting the seasonal abundance of particular food sources. However, it has been suggested that movement in the coastal river valleys does not seem to have been caused by food shortages as such, but rather to take advantage of different food types (Belshaw 1978:75). McBryde (1974 and 1978) argues for a seasonal movement of people between the coast in summer exploiting marine foods and hunting inland in winter.

On the ethno-historical evidence McBryde suggested that some seasonal movement was usual and that the basic subsistence economy of hunting, fishing and gathering was neither static, nor completely migratory, but characterised by movement between the coast and the foothills (McBryde 1974:337). A number of early references refer to seasonal movement on a limited scale including Ainsworth (1922) on the Richmond River and Dawson (1935) and McFarlane on the Clarence River (1934). Bray (1901) states that the Lismore 'tribe' used to go to Ballina at the mouth of the river. Sullivan (1964:20) recorded that inland groups were allowed to come to the Tweed coast for a time. The archaeological evidence for movement in the coastal river valleys is less conclusive (McBryde 1974:338).

Movement within a clan territory in response to local conditions or availability of different food sources also occurred. Aborigines at Byron Bay often shifted camps but seldom moved far from a flying fox camp (Sullivan 1964). Bundock noted that on the upper Richmond flying fox were taken more easily in wet weather (Bundock 1898:4-5). Davey on the Tweed suggests that movement may have been frequent (Davey 1948). Moehead recorded that near Lismore the Richmond Aborigines, '...camped on the river flats until the rain set in and would then retire to the hills' (Moehead nd:1).

At Ballina, Ainsworth describes movement over the short distance between the beaches and the 'big scrub', a distance of only a few kilometres. He suggests that Aborigines of east and west Ballina were scattered in small groups combining at times of abundant food resources:

'... the tribe usually camped in divisions at different places except during the oyster season when they assembled unitedly at Chickiba, on North Creek ... The blacks in the month of September each year flocked to the beaches for salmon fishing' (Ainsworth 1922:44).

An exception to normal movement practices across tribal boundaries was that documented by Petrie (1975) and Bundock (1898). Bundock recorded the movement of the upper Richmond River Aborigines in the Wyangarie area to the Bunya Mountain, '... every third year or so ... under a sort of 'Truce of God'... for the blacks went through each other territories unharmed' (Bundock 1898). These gatherings occurred every fourth year, attracting groups to their own traditionally defined camping areas and served to promote trade and strengthen kinship networks across a vast area of western Queensland, south-east Queensland, and north-east N.S.W.

4.3.3 Economy

According to Ainsworth (1922:43-44) the coastal Arakwal (Tindale 1974) or Nyangbal (Crowley 1978) people relied on '... fish and oysters and the varied products of the chase...' He refers to the spearing of salmon on the beaches and the netting of estuarine fish by means of '... a "tow-row"-a finely meshed net attached to a stick of bamboo bent in the shape of a bow ...' He is not specific about which estuarine fish were caught by this method, although an excavation of a North Creek shell midden at Ballina did indicate the exploitation of flathead and bream (Bailey 1975:55).Ainsworth places an emphasis on the consumption of oyster to the exclusion of other estuarine, coastal rock platform and open shore molluscs, all of which are recorded in local shell middens (Bailey 1975; Campbell 1982; Hughes 1991). Modern research supports Ainsworth's assessment as to the prominence of oyster at least for certain periods, in the diet of the Ballina group to the extent that this species comprises the greatest volume of estuarine shellfish represented in Aboriginal middens (Hughes 1991).

Terrestrial animal foods mentioned by Ainsworth (1922:43) include pademelons, wallabies, bandicoots, and iguanas. He reports that flying foxes provided a source of food and were easily brought down with the boomerang and pademelon stick. Bundock also records the hunting of flying fox '... by going into the camps where they sleep during the day, when it is raining heavily, as they will not fly...' (Bundock 1898). At Byron Bay flying fox were so prolific and reliable that the natives, though often shifting camp, seldom went far away on account of this source of food supply (Anon. n.d., b:1 in Sullivan 1978:107).

Ethnohistorical records are largely directed towards descriptions of hunting techniques which employed large groups of people and obvious types of technology requiring demonstrable physical skills: the use of spears, clubs, boomerangs, the 'tow-row' (net) etc. The role of plant foods in the local economy is often understated or overlooked entirely. Certainly, vegetable foods are given no particular prominence in Ainsworth's recollections at Ballina. He refers to yams obtainable in the scrubs, and to bread made from nuts which grew on the coastal headland (Ainsworth 1922:43). McFarlane (1934) writing of the Clarence River placed greater emphasis on the role of vegetable foods '... the woods supply much variety in the shape of fruit or berries but every description of vegetable contributed to the digestive requirements of the collector of food necessities...'
In the Tweed/Brunswick coastal zone the rhyzome of the Bungwahl Fern *(Blechnum indicum)* provided the major component of the vegetable diet. Thomas Pamphlett a shipwrecked convict observed that in the Moreton Bay region, '...fern root was a daily part of the diet and carried in bundles when the tribe moved. Women and children spent the bulk of the day procuring fern root...a part of which they gave the men in exchange for fish...' (Uniacke 1843:58).

The most detailed analysis of material culture of the North Coast has been that undertaken by McBryde (1978).The region of the Tweed, Richmond and Clarence Rivers would seem to form a distinct unit. This is particularly so in the case of fishing technology. The multi-pronged fishing spear and the shellfish hook are both absent from this region. Fish were caught in nets or speared in the shallows (McBryde 1978:187). Spears were single pointed fire hardened weapons (Dawson 1935:22), of both a lighter and heavier variety (Byrne 1946:3). Neither the woomera nor the spear throwing stick were used in this region (Dawson 1935:22). The range of materials is considered wider than central Australian tribes with fewer all purpose items, few composite tools and a number of specialised ones. This may reflect a more sedentary life style in a rich environment requiring fewer specialised tools (McBryde 1978:187). The stone tool element in the material culture was small and unspecialised. The archaeological evidence suggests changes to a simpler stone technology took place only centuries before European settlement. The stone tools in use immediately prior to European settlement, '... show little typological sophistication and did not demand highly skilled craftsmanship' (McBryde 1978:198).

4.3.4 Archaeological Context (Prehistory)

Coastal sites in northern N.S.W. date to within the Holocene period. Published sources indicate that the earliest of these is a shell midden at the base of Sexton Hill on the lower Tweed River where an occupation phase was dated between 4,700 BP and 4,200 BP (Appleton 1993:34). At Ballina a shell midden on Chickiba Creek was found to have accumulated between 1,750 BP and c.100 BP (Bailey 1975:52). Shell samples from the Angels Beach area are dated between 800 BP and 530 BP, with one sample at 900-1,000 BP (Rich 1994:195). Stone artefacts were assessed on technological grounds to date to within the past 2,000 years (Rich 1994:161). Bailey's basal date of 1,750 BP suggests that the modern resource-rich environment may not have been productive enough at an earlier time to support any more than small groups. In contrast, a Tweed River estuarine site was in use some 3,000 years earlier than this (Appleton 1993).

Beach foreshore sites investigated to date have been associated with more recent phases of occupation. Fore dune sites typically take the form of narrow bands of pipi shell, or surface scatters of pipi and stone artefacts. Pipi horizons at South Ballina and Broadwater have dated to 260 years BP and 200 years BP respectively (McBryde 1982:77). A more substantial pipi midden (AHIMS: #04-06-0061) investigated on the beach foreshore at Byron Bay had been used between approximately 1,000 and 400 years BP. The 80 cm deep midden deposit was overwhelmingly dominated by pipi shell, with minor inclusions of periwinkle, limpet, sand snail, oyster and cartrut. Bream was the most abundant vertebrate species. Although in lower quantities relative to bream, a broad range of fauna was represented in the midden, including other types of fish, tortoise, macropods, bandicoot, possums, rodents, birds and reptiles. The midden's stone assemblage was characterized by primary flaking debitage which reflected the poor knapping quality of the raw materials used. All of these materials are believed to have been collected from intertidal pebble beds adjacent to the site (Collins 1994).

The most extensive archaeological investigation of sites on Pleistocene sand substrate has been that conducted by Rich (1994) at what is now known as Angels Beach Estate, Ballina. This study resulted in the recovery of 40,000 shells and shell fragments, bone fragments, a piece of ochre and 9,000 stone artefacts. Rich's investigation at Angels Beach Estate produced results, which are largely in accord with those from other studies in the Lennox Head-Ballina area, revealing an assemblage of unmodified flakes, backed blades, cores, hammerstone, uni- and bifacially faked pebble tools, manufactured chiefly on chalcedony, chert and acid volcanic beach/river pebbles. Bone and shell fragments indicated exploitation of estuarine shellfish and

terrestrial animals in addition to fish. Rich concluded that evidence for the spatial distribution of intra-site activities, specifically meat butchering and tool manufacturing, suggested that the sites were not the product of itinerant or random occupation, but of repeated occupation by groups larger than a single family unit (Rich 1994:204). Radiocarbon determinations for shell samples revealed an occupation phase dating between c. 100 BP and 530 BP. On technological grounds, stone working events were dated to within the last 2,000 years (Rich 1994:9).

4.4 Previous Archaeological Assessments

Previous assessments of this locality can be grouped within three broad landform categories: coastal uplands and low hills which originally carried rainforests (Morand 1994:55), sand barriers and inter-barrier swamps of the coastal plain (Morand 1994:231, 232), immediate foreshores of North Creek. On the basis of soil type and topography, the landform under assessment is consistent with the landform elements of coastal plain and uplands west of the Newrybar Swamp wetlands.

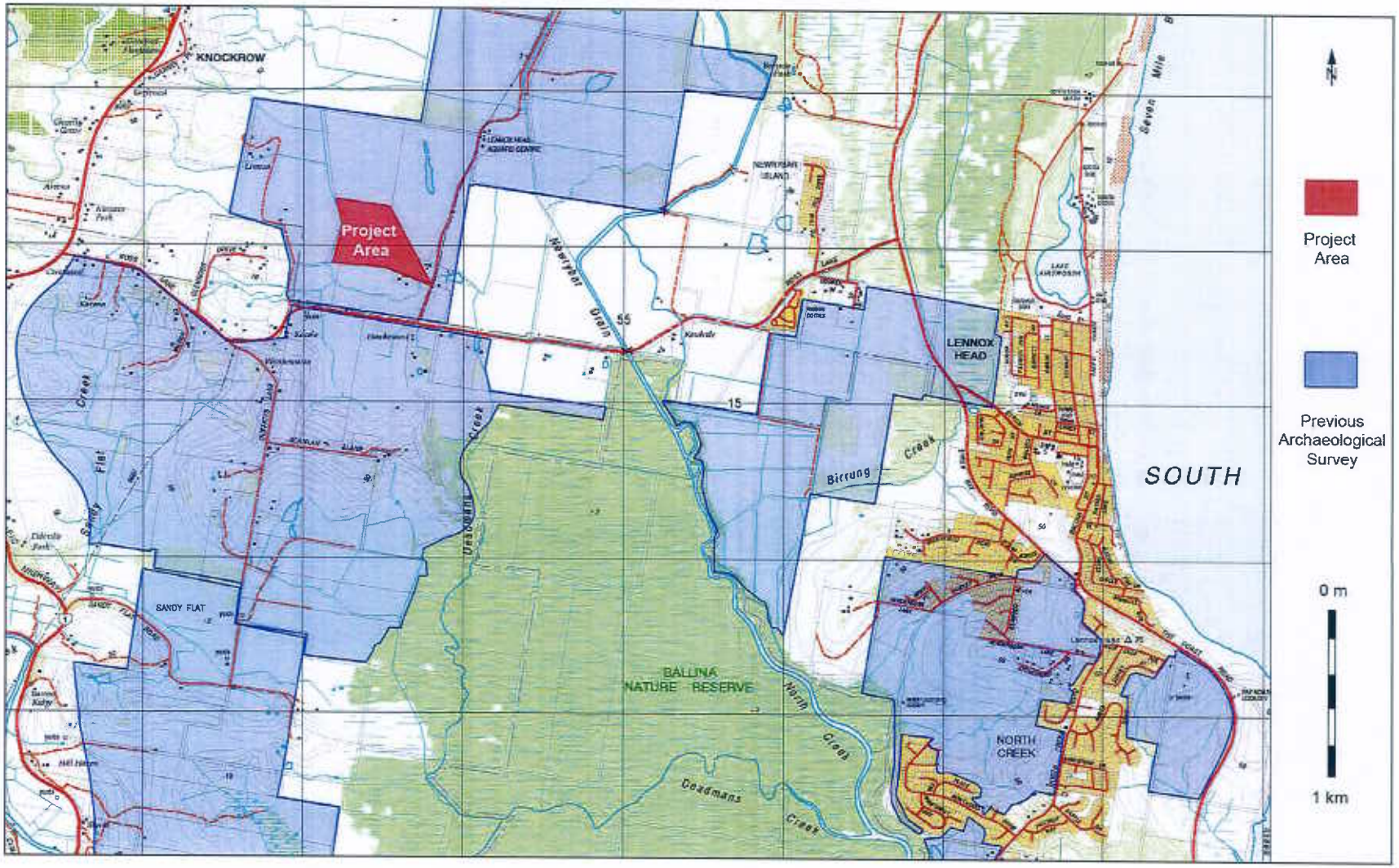

Figure 6: Previous archaeological survey areas within five kilometres of the Project Area

4.4.1 Coastal Plain: Newrybar - Ross Lane - Lennox Head

The following review of coastal plain archaeology refers to the sand plain from the Project Area east to Lennox Head village.

The earliest recording of sites in the sand barrier systems of the coastal plain are in the Lennox Head area in 1968-1969. The Sim Report (1968) indicates the presence of fore dune middens north to Lake Ainsworth. It is not clear which sites listed in the present OEH AHIMS register were the result of recordings made in 1968, but an open campsite (# 04-5-0031) recorded by Oakes in 1969 may have been one previously referred to in the 1968 report. The site contained pebble tools, large flakes and flaked pieces on the foreshore adjacent to Pacific Parade. McBryde (1974), who conducted studies of a generalised nature at Lennox Head, recorded a burial (# 04-5-0018) in the foredune, while Starling (1974) recorded a midden/open campsite (# 04-5-0029) in a foredune near Lake Ainsworth and a midden (04-5-0017) in the vicinity of the Lennox Head Public School. Bailey (1975) recorded '...open shore middens...' in the Lennox Head area (# 04-5-0029, # 04-5-0049, # 04-5-0052 and # 04-5-0054).

Studies on Pleistocene dune fields west of Lennox Head found an extensive open campsite/burial (# 04-5-0094) in the ecotone between sand fields and wetlands (Navin 1991; Navin and McConchie 1991; Dallas et al. (1991). The site was the focus of the archaeological investigation detailed in Collins and Piper (2000). The initial assessment of Site # 04-5-0094 (1991) was that it was an extensive and concentrated site with major archaeological potential. Artefact types identified included a large number of backed blades, blade and multi-platform cores, and uni-and-bifacial pebble tools. Identified raw stone materials included chert, chalcedony, jasper, basalt, limestone, quartz, quartzite and river/beach pebbles (Dallas et al. 1991: N.P.W.S. site file 1989). Its potential archaeological significance combined with the presence of one known human burial, meant that the site was of particular cultural significance to the Jali LALC. It was recommended that Site # 04-5-0094 be further recorded and mapped prior to final assessment.

An archaeological investigation by Collins and Piper (2000) at Site # 04-5-0094, found Aboriginal cultural materials were exposed intermittently from east to west for approximately 525 m. These materials were identified at six focal points on a sand rise between the dunefield extending to the north, and drained wetlands to the south. The study required that a shovel and auger test pitting investigation be conducted within four of the focal points (Area A, C, D, E) and at a 50 m radius of Area B where a known human burial and a

potential for others, precluded sub-surface investigation. 46 stone artefacts and 41 pieces of midden shell were recovered from 23 of the 68 test pits. 45 test pits contained no archaeological evidence. The results suggested that low-level scatters of artefacts will occur in surface sand across the sand rise and the sand plain (Collins and Piper 2000:3). An assessment of the floodplains and sand rise to the west confirmed that Aboriginal sites extend almost continuously between the Lennox Head-Byron Bay Road and Ross Lane (Piper 2002:37).

Site # 04-5-94, referred to as Area B, is the only known open campsite/burial in a sand plain environment remaining in the north coast region and one of the few surviving sites with links to the Lennox Head Bora Ground (Collins and Piper 2000:3-4). A sample (# 281) of the stone artefact component was dominated by white siliceous stone (53.4%), mudstone (18.9%), siltstone (14.2%) other materials included chert (5.7%), chalcedony (2.5%) and other (5.4%). (Collins and Piper 2000:29). These materials were believed to have been procured locally from three probable sources; Lennox Head headland, shingle beds fringing the Lennox Head/Ballina shoreline and Tintenbar c. 7km west of the study area. (Collins and Piper 2000:68). The total lithic assemblage was dominated by micro-debitage (36.7%) and unmodified flakes and blades (32.8%). Other artefact types included pebble fragments (10.7%), flaked pieces (6.2%), multi-platform (3.4%), single platform (0.3%) and bipolar (1.7%) cores, flake and nuclear tools (each 2.3%), rejuvenation flakes (0.6%), backed blades (0.6%) and block fractured pieces (0.3%). Unmodified pebbles made up 2.3% of the assemblage (Collins and Piper 2000:56).

The investigation concluded that although its archaeological value was undoubtedly diminished due to the activities of illegal collectors, Site #04-5-0094 is a regionally unique site type with further research potential. The value of the site was enhanced through its proximity to the Lennox Head Bora Ring and links which it appears to have with the Bora Ring locality. On this basis the site as a whole is assessed to have a high level of scientific/archaeological significance (Collins and Piper 2000:76). The site is considered to be of a high cultural/social significance stemming particularly from the existence of a known burial and a potential for others (Collins and Piper 2000:75).

In 1992 Collins conducted a survey on the dunefield in the vicinity of the Lennox Head Bora Ground (# 04-5-0029) north into a proposed housing subdivision. During the survey, a total of 154 stone artefacts were recorded at four separate locations (# 04-5-0105, # 04-5-0106 and # 04-5-0108) north from the Bora Ring. It was recommended that previously registered midden material adjacent to the Bora be investigated to

determine its spatial extent and that an investigation of the recorded artefact scatters be undertaken to establish whether *in situ* subsurface archaeological material was present (Collins 1992). The result of the subsurface (shovel test pit) component of the investigation was reported by Collins in 1993.

The investigation concluded that one area (Area B; Site # 04-5-0105) contained materials assessed to be *in situ* and therefore of archaeological significance. It was recommended that a *Consent to Destroy* (Section 90 Provisions of the *NPWA* 1974) be granted to the proponent to allow the proposed subdivision to proceed, providing a 10 m easement encompassing Site # 04-5-0105 was excluded from the development. It was further recommended that an embankment south-west of the Bora Ground be retained and protected in its present condition. Although highly disturbed, the embankment contains archaeological materials which are of high cultural heritage value due to their likely direct link with Bora Ground use.

Prior to the 1993 investigation it was assumed that the Bora Ground, strategically placed between beach foreshore and extensive former swamps, would have been a major focus for Aboriginal occupation. However, the low-density of artefacts (4.8 per 100 m²) and lack of extensive concentrated occupation deposit suggested that the area as a whole had not been subject to intensive prehistoric use. On the basis of the available evidence, it was concluded that shell deposits and reduced beach pebbles adjacent to the Bora Ground were most likely directly associated with its use. This was not necessarily the case with artefact finds further to the north which probably represented a prior function-specific activity by small local foraging groups (Collins 1993:31-33).

A preliminary cultural heritage assessment in relation to shared path development options included the Lennox Head village and sand plain to the west and north. Davies concluded that...'Study Area 2 comprises disturbed and modified terrain within the village of Lennox Head and areas of archaeological potential extending north from this disturbed environment. Both the Coast Road and sand track option are within areas not only with a high potential for the location of archaeological sites but also have a high potential to impact upon previously recorded sites...' (Davies 2008:24). The report recommended further archaeological surveys prior to final alignment of the sand track to the Byron Shire boundary and if the Coast Road became the preferred option. Aboriginal stakeholder respondents recommended appropriate signage, a cultural heritage study of the preferred route north of Lennox Head and expressed concerns that the preferred route may encroach on Jali LALC land (Davies 2008:26).

4.4.2 Newrybar—Cumbalum

The Project area was the subject of archaeological assessment by Bonhomme in 1988 as part of a survey extending from Ross Lane to north of Martins Lane east and west of the Newrybar Swamp Road. The Project area is located below the centre of the 'South –West Extension Area' (Bonhomme 1988: Figure 3. 16a).

The survey was conducted to assess the potential impact of mineral sands extraction over leases held by Australinmin Holdings Limited. The survey sampled raised sand deposits, sugar cane areas, remnant forest and low lying swamp lands. Most attention in the three day field inspection was concentrated on the raised sand areas where visibility ranged from 30-100% (Bonhomme 1988: 15).

The Bonhomme study recorded three sites short distances to the east and north east of the current Project area. These included a midden (# 04-5-0070) and two open campsites (# 04-5-0068 and # 04-5-0069). The midden (# 04-5-0070) was described as a very extensive site spread over 100m x 100m, containing subsurface shell in a layer 10cm thick. One hundred and fifty artefacts were exposed at the site, including a broken grindstone, hammerstones, cores and retouched flakes. The shell material was predominantly pipi (Plebidonax deltoids) with some Hercules club whelk (Pyrazus ebeninus). Artefacts had been fabricated on volcanic river pebbles, chert and chalcedony (Bonhomme 1998:29-30). The two open campsites recorded by Bonhomme (1988:25-28) were located south of the midden on the same dune and comprised low-density scatters of stone artefacts. A sample of artefacts included cores, flakes and flaked pieces fabricated on chert, chalcedony, quartz crystals and white siliceous stone. No sites were located in the current Project Area.

The Bonhomme study sites were subsequently investigated by Cane and Nicholson (1989) in response to an application for a Consent to Destroy ahead of mineral sand mining. One open site (# 04-5-0068) and the midden (# 04-5-0070) were augered to determine their subsurface content, revealing a low-density of materials. In all, 138 artefacts were collected from the three sites and the artefact content expanded to include backed blades and ochre. Cane and Nicholson concluded that the material was less significant than it had first appeared. They suggested that the sites were representative of a larger distribution of artefacts that extended throughout the dune complex in the Newrybar and Lennox Head area. The sites were interpreted as dinner-time camps associated with the activities of small groups ranging from North Creek, or transit camps at which materials were discarded between non-specific locations (Cane and Nicholson 1989:30-33).

4.4.3 Cumbalum - Tintenbar - Teven

A study by Piper (2002) of a former rainforested ridge on Emigrant Creek Dam at Teven, failed to find any archaeological evidence although ethnographic sources refer to the Aboriginal use of the general area for ceremonial and siliceous stone procurement (Collins 1996:13,31). The Ballina Heights Estate was assessed for Aboriginal sites without result (Piper 1997:17).

Collins (1996) assessed areas of Cumbalum, Teven and Tintenbar in relation to route corridor selection for the Ballina Bypass. The Collins (1996) study included an extensive area of Cumbalum within its area of review and subsequent predictive model. An overall lack of surface visibility due to heavy ground covers can hinder the effectiveness of surface inspections in most local conditions. The krasnozem soils of the ridge crests and spurs were considered unlikely areas for site detection due to limited surface exposures. The erodable podzol soils of the lower slopes were considered to have a higher potential for site detection because of their closeness to resource rich swamps and suitable camp sites, and the possibility that artefacts could deflate onto present ground surfaces. The Tintenbar area was considered by Collins to be an exception to the site prediction model for ridge top kraznozem soils (Collins1996). Ethnographic sources quoted by Collins report that the Tintenbar area was both a ceremonial area on at least one occasion and a source of opaline silica. Therefore the potential for evidence of stone quarrying and reduction of the core materials was considered much greater throughout the locality, although detection would be unlikely due to limited areas of surface visibility (Collins 1996:34,35). The Tintenbar village is only c. 3.5 km south west of the Project Area, therefore there is a distinct probability that stone materials quarried in the area would be found in the Project Area particularly on the eastern lower slopes and sand rises bordering the Newrybar Swamps and Ballina Nature Reserve.

An extensive area of the Cumbalum hills and Sandy Flat district extending from the Ballina Heights Estate to the vicinity of Ross Lane was the subject of a cultural heritage assessment (Robins 2010). A low inner barrier dune system was found to skirt the length of the Cumbalum hills projecting north across Ross Lane and for two kilometres in the line of the Newrybar Swamp Road. The study sampled low hills, sand rises, swamp forests and floodplain resulting in the location of one artefact scatter and two single artefacts. The sand mass of parallel ridges and plain extends almost continuously from north of Ross Lane south to Sandy Flat through the Lynn Barlow, Sheather and Vixsun Pty Ltd properties. It is elevated 2-3 m AHD above the floodplain and runs roughly parallel with the base of the coastal uplands. The Robins' study identified an artefact scatter (Sheather

1: #04-5-0222) at the southern end of the dune containing pebble cores, chalcedony cores, flakes, flaked pieces and a bevelled edged tool. The report proposed that '... the artefact scatter/open campsite identified in this report is evidence of an important association between a particular landform/environment and its use by Aboriginal people. Aboriginal people regard all the evidence of their history in this area as important and significant...' (Robins 2010:54).

Davies (2008) conducted an extensive test excavation investigation over the northern end of the dune terminating at Ross Lane. The artefact scatter previously recorded as Cumbalum 1 (#04-5-0154) is 500 m south of the Project Area and part of the same dune system used for sand extraction on the Newrybar Swamp Road immediately east of the Project Area. A particular difference between the contexts of the Project Area and the Bonhomme sites is that the Project Area is flood prone sand plain, whereas known Aboriginal archaeological sites and sand extraction sites have been identified on the raised dune. Davies (2008) concluded that millions of artefacts, and possibly burials, were contained within the site and that:

> *...PAD 2 / Cumbalum 1 are considered to be the remaining portion of a complex of sites that were present on a sand ridge that extends north from just south of Ross Lane. The archaeological material recovered from PAD 2 / Cumbalum 1 indicate relationships with sites to the north (#4-5-0068, #4-5-0069, and #4-5-0070) and south (Sheather 1) as well as to the east (e.g. #4-5-0094). Additionally, it is most likely that the remaining sites within Cumbalum Precinct B (e.g. PADs 1,3,4,6,7, Cumbalum 2, Cumbalum 3, CPB 1, CPB2 and the Isolated Artefact) were formed as a result of movement to and from these main camps located along the sand rises...* (Davies 2008:59).

To the author's knowledge no archaeological sites have been identified in this locality in what were swamps/ floodplain contexts and are now drained cultivation lands.

4.5 Aboriginal Sites and Features (Range and Nature)

From the review of previous archaeological and cultural heritage assessments in the Lennox Head sand plain and coastal uplands west of the Newrybar Swamp system, specific environmental contexts contain all of the known archaeological sites. These are the inner barrier elevated sand rises that skirt the Cumbalum and Tintenbar hills adjacent to wetlands or former wetlands of Newrybar Swamp, and level areas on lower slopes

and toe slopes of these hills. The following site types and potential types have been identified in the above contexts.

4.5.1 Isolated artefacts

These will consist of single stone artefacts, which may have been randomly discarded or lost. They may occur in almost any environmental context exploited by Aboriginal people. They are commonly stone axes, single cores, hammer stones, bevelled pounders, pebbles and flakes. Their presence may indicate that more extensive scatters of stone artefacts exist or existed nearby, perhaps obscured by vegetation or dispersed by mechanical means. Given that two artefact scatters (#04-5-00154, #04-5-0068) are located within 500 m and two artefact scatters (#04-5-0068, #04-5-0070) are 850 m and 1.3 km distant respectively, there is a high probability that single artefacts are within the Project Area.

4.5.2 Open Campsites / Artefact Scatters

They consist of scatters of stone artefacts and possibly bone and hearths. Their exposure to the elements means that evidence of food resources used on the site (with the exception of shellfish) is usually lacking. In the sand plain west of Lennox Head artefact scatters/open campsites are invariably found in elevated sand rise positions adjacent to creeks, wetlands/drained wetlands. An artefact scatter/ open campsite containing a large component of shell refuse may be described as a midden. They invariably consist of low or high density scatters of primary and secondary flakes in addition to the types of artefacts found as isolated finds. Open campsites may contain burials as in the case of site # 04-5-0094, when located on sand strata.

The close proximity of artefact scatters to the Project Area has been noted in 4.5.1. The potential for artefact scatters is high however the low terrain of the Project Area may have made the location a less favoured campsite than the adjoining land rise immediately east.

4.5.3 Middens

Middens are campsites which are dominated by shellfish remains. Middens are usually situated near a source of shellfish and comprise predominantly mature oyster, pipi, whelk, cockle and cartrut species in addition to terrestrial animal and fish bone, stone artefacts, and charcoal and ash from fireplaces. Human burials have been associated with a number of middens between the Tweed and Richmond Rivers (Barz 1980; Bailey 1975; Lourandos 1979). Middens may be composed of deep compacted debris reflecting consistent use over

long periods of time, or thin scatters of shell which reflect use on a single occasion by a small group, perhaps in transit or gathering food away from a base campsite. All recorded middens have been located in elevated positions beside estuarine waterways or on elevated sand substrates close to wetlands. The dominant species found in estuarine middens is oyster, while locations away from the waterways contain pipi or combinations of estuarine, open beach and rock platform species.

The potential for middens within the Project Area is the equivalent for artefact scatters, with the same condition that the low terrain as it now appears would be less suitable for campsites than the nearby sand rise to the east.

4.5.4 Quarry Sites

A stone quarry in this general locality may occur where a source of opaline silica exists, as reported at Tintenbar (Collins 1996:31) or other siliceous types of stone occur (e.g. chert, chalcedony and silcrete). To date the only confirmed quarry sites recorded in the broad coastal zone between Ballina and the Queensland border are on the Tweed Coast where greywacke outcrops have been excavated at several locations (Piper 1976:94). As the Project Area lands are composed of aeolian (wind driven) sands, there is no stone, therefore the potential for quarry sites to be found is nil. Relict shore lines that contain beach pebbles suitable for fabrication may exist at depth beneath the Project Area but unless exposed by deep erosion are unlikely to have been accessible as a resource.

4.5.5 Scarred Trees

The majority of scarred trees on the North Coast of NSW result from the removal of bark for use as a covering, shields, containers or canoes. No doubt, as an outcome of widespread intensive land clearing and natural causes, only one scarred tree has been discovered in the wider study locality. This tree (Bel-1, N.P.W.S. registration number unknown) carries a single oval scar around 1m long and 30 cm wide and stands on a flat adjacent to wetland bordering Belongil Creek at Byron Bay. The tree species has not been reported (Envirosciences 1994). There are no trees within the Project Area.

4.5.6 Burial Sites

All burials recorded to date in the Ballina-Lennox Head area occur in coastal dunes and or sandy soil substrates. They are most commonly found as individual or small group interments in association with

middens. On the lower Richmond, burials have been recorded at Patch's Beach (N.P.W.S.), South Ballina (Lourandos 1979) and in middens along the banks of the estuarine system (Bailey 1975). At Lennox Head, burials have been discovered in foredune contexts as well as on Pleistocene sand rises west of the village. A burial (#04-5-0018) is recorded in foredunes and one known burial is associated with an open campsite (#04-5-0094) on the dunefield adjacent to the Lennox Head/Byron Bay Road. Most of the known burials have been located by accidental means through mechanical disturbance or natural erosion. The low terrain mitigates against burials being located within the Project Area. Further, the acidic nature of the soils in the Project Area and the additional impact of land clearing, drainage works and cultivation make it highly unlikely a human burial could remain intact unless at depths over 1.5 m.

4.5.7 Ceremonial Sites

There is little potential for the Project Area to contain ceremonial sites in the order of Bora grounds, which contain raised features in the form of earth or stone mounds. Surviving Bora grounds in this coastal region are without exception found in elevated sand based ground. The Lennox Head Bora ground is an example nearby. There is reference to a ceremonial event having taken place in 1847 at Tintenbar on the Emigrant Creek flats attended by up to 300 Aborigines. This confirms the use of rainforested areas for both ceremonial and economic purposes (Collins 1996:13). Given the 'completeness' of clearing since approximately the 1940s, there is no possibility of stone or earth structures that would indicate ceremonial grounds although former sites may be known to the Aboriginal community.

4.5.8 Mythological Sites

These sites are natural features, which derive their significance from an association with stories of the creation and mythological heroes. In the upper Richmond and Tweed Valleys these include rock pinnacles, mountains, waterfalls and waterholes. A particular concentration of these sites exists in the headwaters of the Richmond and Tweed Rivers. A variant of the mythological site is the increase site or 'djurebil' (jurraveel in Byrne 1984:11) where rites were conducted to assure the continued productivity of plants and animals. On Mount Durigan in the upper Tweed is a jurraveel for cunjevoi, (Byrne 1984:11) a rainforest food plant used by Aboriginal people in this region. Collins recorded an 'increase centre' (djurebil) for the sand goanna on the coastline to the north of Black Head near Ballina. Its influence spread along the coastline and inland as far as North Creek (Collins 1993:27). A stone arrangement (Site #04-4-0032) near Bangalow may have had

mythological associations. However the feature is man made, therefore not a natural mythological site (Collins 1996).

4.6 Predictive Models – Land Use Strategies

Models to describe possible patterns of settlement and movement in the region vary. One suggests that groups ranged between the sea coast and foothills of the coastal ranges on a seasonal basis (McBryde1974). Early sources support this view to some extent as there are records describing the movement of inland groups of the Clarence River to the coast during winter (McFarlane1934; Dawson 1935:25). A second model suggests that movement of coastal people was not frequent, and that semi sedentary groups moved north and south within the coastal plain rather than to the upper rivers (Coleman 1982). The model is based on reports of numbers of small villages composed of dome shaped weatherproof huts between the mid-NSW coast and Moreton Bay. Flinders described a small group of huts in the vicinity of Yamba in 1799, and Perry described two villages on the banks of the lower Clarence in 1839 (McBryde 1974:9). Similar sightings were reported by Rous on the Richmond (McBryde 1974), Oxley on the Tweed (Piper 1976) and in Moreton Bay (Hali 1982). The 'solid' construction methods described for these huts seem to suggest occupation for periods of months at a base camp rather than a constant wide-ranging pattern of low-level land use. Godwin (1999) argues that neither of the above 'models' is supported by the archaeological record and that local conditions dictated exploitation strategies on the north coast of NSW.

The resources of sub-tropical rainforest were used extensively in the technology of the Richmond, which is heavily dependent on wood and bark fibre (McBryde 1978:197). McBryde's sources refer to shields (McFarlane 1934; Dawson 1935), single point fire-hardened spears, three types of boomerang (Dawson 1935), clubs-nulla nulla and pademelon sticks, bark and palm leaf bags, wooden water vessels, possum rugs, cane and shell necklaces and stone knives (Bundock 1898). Bark was used for containers and shelter. Stone axes are referred to by Dawson (1935:22) and Byrne (1946:2). Fishing nets and rope was made from twine spun from the flame tree (Byrne 19). Fishing nets were made a couple of yards long with a stick at each end used individually or in combination with many of the same (Seymour 1976). Bundock (1898) and Ainsworth (1922) described the same type of nets used for game drives in rainforests.

An indication of the importance of rainforest foods and material resources can be synthesised from chapters of '*Records of Times Past*', dealing with ethnohistory (Sullivan 1978:101) and *Museum Collections from the*

Richmond River District, edited by Isabel McBryde (1978). Items of material equipment and weapons fashioned from rain forest materials that are detailed in these sources include water carrying vessels (Bangalow Palm), string bag, woven bag (Stinging tree), shield (Stinging tree), nets (Stinging tree) tow row (Stinging tree, lawyer cane), axe handles (lawyer cane), necklets (lawyer cane, shelter supports (lawyer cane), cane bugles (lawyer cane) cordage (Stinging tree, fig tree), clubs (Black bean). Food sources identified include possums, paddymelon, bandicoot, Moreton Bay Chestnut, cunjevoi, macadamia, wild grapes, Burrawang tree or palm, wild cherries. These items are identified as pertaining to the Richmond River area and do not include more generally available resources more widely utilised such as rainforest birds and medicinal plants.

Any of the above could have been procured from the rainforested Cumbalum / Tintenbar hills to which the Project Area and sand rise to the east are adjoined. Given the close proximity of the Project Area to the Lennox Head Bora ground and the Tintenbar ceremonial ground (Collins 1996), and sources of opaline silica, with the occasional presence of large groups attending/ camping on North Creek and the sand plain and sand terraces for extended periods, it is reasonable to assume the Project Area was well used for its foods and material resources.

5. LANDSCAPE CONTEXT

5.1 Environment Locality

The Project Area is five kilometres west of Lennox Head and is accessed from Newrybar Swamp Road via Ross Lane. The Project area is 74 m west of the Newrybar Swamp Road at the closest point and can be accessed through the 'Ballina Sands' sand extraction site.

5.2 Topography

The site is a level and flat lying sediment basin located inland of the inner barrier system. Slope is 0-1%, relief 1-2m and elevation c. 2 m (Morand 1994:160). The area has been drained by a series of dish drains that fall east to west to a drainage network connected to the main Newrybar Drain.

The implication for archaeological assessments is that the location is probably frequently inundated and unsuitable for campsites, while at the same time, is well within the food and wood/fibre resource procuring range of the occupants of the adjoining sand rise.

5.3 Geology & Soils

Quaternary estuarine alluvium overlain by and or mixed with Quaternary (Pleistocene) sands. The sands are generally aeolian, originating from the adjacent beach ridges (Morand 1994: 160).

The implication for archaeological assessments is that there will be no stone resources occurring by natural means on the site unless relict shore lines at considerable depths have been exposed in the past and beach cobbles exploited. All siliceous stone will have been accessed from external local sources and transported to the site.

5.4 Vegetation

Original vegetation was tall open and closed- forest (swamp community) comprised of broad leaved paperbark (*Melaleuca quinquenervia*), swamp oak (*casuarina glauca*) and swamp mahogany (*Eucalyptus robusta*) in poorly drained areas (Morand 1994:160).

5.5 Land-use History

5.5.1 Historic Record of Land Use

European settlement began in the late 1860s in the hills of North Creek, Cumbalum and Tintenbar. Sugar cane cultivation and processing was first attempted by John Sharpe Senior and his sons at North Creek circa 1866-1870. The Newrybar Swamp flats do not appear to have been cleared extensively for grazing or cultivation until the extension of the Newrybar Drain, north of Ross Lane, in the 1930s and 1940s. Hazel Taylor lived on a farm at Glen Ross Drive overlooking the Project Area. In her reminiscences, she says of the swamp area north east of the farm '...there were lots of koalas...as there were lots of gum trees. Where the sugar cane farms are now along Ross Lane, was all heathland with paperbarks and koala feed trees...' (Wilson 2003:171). The description suggests an original vegetation mosaic of heathland on low sand rises

interspersed with lower poorly drained areas carrying swamp forests. The original purpose of clearing of the Newrybar flats was for dairy farming, followed in later years by sugar cane cultivation on the extensive scale of today. The most prominent sand ridge on the western margin of the Newrybar flats and immediately east of the Project Area has been subject to mineral sands extraction, from the area north and a short distance south of Ross Lane (Morand 1994:161). Sand quarrying continues on land adjoining the Project Area.

The brief overview of the probable land use impacts over the Project Area and Newrybar flats in general, indicates they are mainly restricted to disturbances due to clearing, drainage works and subsequently, grazing and cultivation. The impact of these activities upon 'in ground' archaeological sites is likely to be highly destructive in terms of '*in situ*' contexts. However surface and immediate sub-surface materials will still be retained within the sand mass and would be potentially of scientific and cultural heritage significance to Indigenous stakeholders. *In situ* materials at greater depths cannot be ruled out.

The exception to the above is those areas on Newrybar Swamp Road subject to mineral sand extraction and sand quarrying. Any cultural heritage materials/sites in those areas are effectively destroyed. In the case of the three Bonhomme sites, orders to destroy were issued under the Section 90 Provisions of the *NPWA* 1974 IN 1989.

5.5.2 A Review of Historic Aerial Photography

Historic aerial photographs of the Project Area were reviewed to ascertain the level of past ground disturbance. This information is used to assist in developing a predictive model for potential cultural heritage site locations. Aerial photographs from 1947, 1967, 1979, 1987 and 1997 were reviewed as part of this assessment (Appendix E).

The 1947 aerial photograph the Project Area is of quite poor quality, and past ground disturbance can only be identified at a very coarse scale. However, it is evident that almost two-thirds of the Project Area has been totally cleared of vegetation by 1947. Soil erosion may have been significant during this period, given the lack of vegetation and exposed nature of the site. Only one small stand of trees is evident in the north east of the site and thicker vegetation can be seen in the south east corner. As the clearing was undertaken pre 1947, it is likely that the clearing was undertaken by hand. However, subsequent stump removal may have resulted in significant ground disturbance. A small creek-line runs along the southern boundary and penetrates into the

south east portion of the Project Area. By 1967 trees and vegetation have regrown and cover a large amount of the Project Area. Additional sand exposures were caused along the length of the western drain, either as a result of vegetation clearing and / or drain maintenance. This was undertaken to a distinct vegetation line.

The 1979 aerial photograph shows that the western half of the Project Area is under crop or some kind of improved pasture. Tracks and fences that crisscross the property are visible. Land in the eastern portion of the Project Area is still quite heavily vegetated. By 1987 all land throughout the Project Area has been cultivated. This is further demonstrated in the 1997 aerial photograph. This would likely have resulted in extensive disturbance to any Aboriginal Objects located in this area. There is little change evident between the 1997 aerial photograph and contemporary satellite imagery.

Conclusions: The Project Area has a history of moderate to extensive ground disturbances since European settlement. The initial clearing activities were likely to have caused ground disturbance, subsequent erosion would have likely had a significant impact to the depositional integrity of any Aboriginal Objects. Additional disturbance would have been caused by grazing activities and the use of significant portions of the Project Area for cultivation or improved pastures.

6. PREDICTIONS

6.1 A Predictive Model of Aboriginal Cultural Heritage for the Project Area

The following discussion presents a summary of the archaeological, ethnographic and land use information provided above.

From the desktop review, there is a moderate to high potential association between the Project Area and Aboriginal cultural heritage. This would be in the form of isolated occurrences of stone artefacts and/or artefact scatters. This is due to the presence of two artefact scatters within 500 m and two within 1.3 km. Site #04-5-0154 500m south was evaluated by Davies to contain 3.8 million stone artefacts, and also possibly burials (Davies 2008: 51). However the context of the Project Area is low lying terrain, compared with the elevated sand rise on which all known sites previously discussed are located. This variation in context may greatly reduce but not eliminate the case for significant archaeological sites in the Project area.

While the Project Area may have contained food and wood/fibre resources, the physical evidence of access to these resources will not have survived unless stone tools used in their procurement remain. There is no possibility that cultural materials of organic materials such as wood, fibre or cordage would survive nor is there any possibility that above ground earth mound or stone arrangements could remain '*in situ*'. The location as a choice of burials is considered unlikely due to the low terrain, compared to the favourable conditions for interments in sand rises within 100 m at the closest southern point.

A background scatter of stone artefact materials from resource gathering activities by groups primarily occupying/exploiting the Lennox Head sand plain, sand rises and rainforested Cumbalum/Tintenbar hills is highly likely. The 'detectability' of scattered materials, if they exist, will be impeded by existing slashed ground cover. Stone artefacts will also be compressed in these sand conditions to greater depths through disturbances such as stock trampling and later by cultivation and frequent passes of heavy machinery.

6.2 Aboriginal Cultural Heritage Due Diligence Assessment

It is possible at this stage to assess the proposed development activities against the OEH Due Diligence Code. The entire Project Area has seen ground disturbance within the meaning of the Due Diligence Code. This would have occurred primarily through vegetation/forest clearing and subsequent land use practices such as cultivation and grazing since approximately the 1940s. (see discussion in Section 5 above). The proposed project activities will cause complete destruction to any Aboriginal Objects within the Project Area.

6.3 A Predictive Model: Historic Cultural Heritage

The desktop review identified no likely items of historic cultural heritage significance. It is assumed that the types of items of potential historic heritage significance would be associated with early settlement. As there are no dwellings or remnants of dwellings within the Project Area, this would generally be limited to farming infrastructure such as fences, drains, or evidence of significant land modification. However, the desktop review identified nothing of potential significance.

7. FIELD METHODS & RESULTS

7.1 Sampling Strategy & Survey Methods

The effectiveness of a sampling strategy is based upon the extent (%sq m) and 'quality' (eg: 5%, 90%) of surface visibility. The available area of surface visibility and its 'quality' is dependant upon natural erosional processes and man made (accelerated) erosional processes such as construction, cultivation (McDonald et al. 1990:92). 'Quality' or clearness is impeded or enhanced by a lack of vegetation cover.

The Project Area has been the subject of archaeological assessment by Bonhomme (1988) when the land was possibly under sugar cane unless it still 'carried' remnant swamp forest. The report does not state nor clearly show the varying land uses at the time but Figure 3 from the report clearly has the current Project Area within the 1988 study area. Bonhomme states '...Visibility in the sugar cane areas is 0-10% except along the margins and access tracks where some areas have a 50-100% visibility...' (Bonhomme 1988:15). The purpose of this survey was to assess if conditions had changed from those of 1988 and to comply with recent amendments to the *National Parks and Wildlife Act 1974* (NSW) (See Section 2 above).

In such a small area as this an intensive survey in systematic transects of the whole site would be feasible if not for a close ground cover of tea tree stubble. As a result, the only option available was a 'spot check' search of all possible exposed soils. These areas were largely limited to small areas of vehicle 'bog' tracks in the inundated conditions within the proposed new sand pit. Drain banks and spoil parallel to the eastern and western boundary was inspected where surface visibility was high at c. 80-100%.

The field inspection was conducted on foot and vehicle by the consultant and the Sites Officer of Jali LALC on 24 August 2011. Photographs were taken as a record of general features and conditions, to indicate the degree of surface visibility and the content of any sites found. Notes were made of the degree of surface visibility, the area of visibility, ground cover, land uses and any other relevant features. An over-view of surface conditions and site detection conditions is given in Sections 7.2 and 7.3. The field inspection was a broad ranging sampling assessment of exposed surfaces.

The area for the now laid access tracks was not surveyed because at the time the road was not in the development plans. However, it is unlikely that this area would have required significant survey due to the amount of ground disturbance along the access tracks, specifically the large berm directly adjacent them.

7.2 Survey Units

As the Project area is small and lacks any variation in ground features it is considered and described as a single landform unit-sand plain. The general conditions for survey are indicated below.

> Survey Area (Figures 6-10): sand plain. Waterlogged, closely vegetated with tea tree stubble. Area of surface exposure c. 1%. Type: vehicle tracks, drainage banks and spoil on the boundaries. Surface visibility: 80% - 100%.

Figure 7: View south east toward eastern boundary

Figure 8: View south west of central area

Figure 9: View west showing northern boundary

Figure 10: View east of dish drain system

Figure 11: View south east from north west corner

7.3 Survey Coverage

Table 1 indicates the extent to which survey data provides sufficient evidence for an evaluation of the distribution of archaeological evidence across the study area. An evaluation of survey coverage provides an approximate measure of the potential for the landform unit and or its sub element to reveal archaeological evidence. The figures in Table 1 do not provide an exact percentage of ground areas but a reasonable estimate.

Approximate total area for site detection in the proposed development area: 6820 sq m or 4% of total area. Included within this estimate is the drainage channels soil exposure component of approximately 4600 sq m. The northern boundary drain was not included as there was no practical visibility to record.

Table 1: Survey Coverage

LANDFORM ELEMENT	AREA (ha)	EXPOSURE %	AREA OF EXPOSURE (ha)	VISIBILITY %	AREA FOR SITE DETECTION (ha)	% of LF For SITE DETECTION	SITES FOUND
SAND PLAIN	17.04	5	0.85	80	0.68	4	0
SAND PLAIN BOUNDARY DRAINS	0.46	70	0.32	90	0.28	0.63	0

7.4 Results

7.4.1 Aboriginal Cultural Heritage

There were no Aboriginal Objects identified as a result of the field inspection.

During the site inspection the Jali Sites Officer discussed the locations of Aboriginal Objects outside of, but in the general region of, the Project Area that he had seen or had particular knowledge of. These were stone artefacts in the current sand quarry workings immediately north east of the Project Area, artefact scatters on the cane margins of Newrybar Swamp Road c. 150 m from the south east corner and stone axes on the eastern slopes of Knockrow/Tintenbar. These sites were not validated during the field inspection.

7.4.2 Aboriginal Cultural Heritage

There were no historical archaeological sites identified as a result of the field inspection.

8. ANALYSIS AND DISCUSSION

The field inspection could find no evidence of Aboriginal Objects. The Jali LALC is of the opinion that the Project is generally unlikely to significantly impact on Aboriginal cultural heritage. However, they have requested a cautionary inspection strategy prior to the Project commencing (see Section 11 and Appendix A). This is considered a reasonable approach to managing potential risks, and supported by the recommendations in this report.

Poor visibility due to a close ground cover and inundated conditions rendered the effectiveness of the field inspection as very limited. With average surface visibility at less than 5% overall, excluding the drainage margins, and the surface area able to be inspected at c. 0.68 ha of a total area of 17.5 ha, conclusions as to an absence of cultural materials cannot be well founded.

The Project Area was assessed by Bonhomme (1988) as part of a wider area north of Ross Lane. Three sites were located on the sand rise to the east. No sites were recorded within the current Project Area. It is unclear from the report whether the Project Area was cane land or swamp forest in 1988. The effectiveness of the survey was severely limited by low visibility in those vegetation/landform units. '... *Only access tracks were used as the primary source of surface exposure...*' (Bonhomme 1988:15). It seems that it may not have been possible to inspect land other than the perimeter of the current Project Area in 1988 if it was under sugar cane. The 1988 report states that most effort was made to walk all exposed areas on the sand rise (Bonhomme 1988:15) and not the low lying lands to the east and west of the Newrybar Swamp Road.

The key circumstance mitigating against definitive statements as to the absence of concealed Aboriginal Objects in the Project Area is the short distance to the sand rise to the east. This sand rise and its extension south of Ross Lane contains, and/or contained, all of the known Aboriginal archaeological sites west of the Newrybar Swamp system. It does not require imagination to suggest that the elevated dry sand conditions provided base campsite opportunities with immediate access to rainforest food and material resources, including opaline silica deposits in the Cumbalum-Tintenbar hills. In addition, the vast swamps of the Newrybar

Swamp and North Creek would have also provided food and material resources. The occupants of these base camp sites also availed themselves of marine resources that are indicated by pipi and club whelk archaeological deposits, found 5 km east, in two of the three sites destroyed under Section 90 of the *NPWA* 1974. The strategic position of these sites may have been further enhanced by two ceremonial grounds within 4 km at Tintenbar (Collins 1996) and Lennox Head. Davies (2008) referring to outcomes of test excavations at site Cumbalum 1 (#04-5-0154), 500 m to the south of the Project Area, concluded that the high volumes of stone artefacts, the variety of materials, and the '*in situ*' content of sites suggest they are significant and possibly greater than 10,000 years old (Davies 2008).

The Project Area is only short distances from several locations where large groups of people gathered and dispersed to various tasks, and returned, possibly over long periods of time. There can be no doubt that whatever food and material resources it afforded, they were exploited. While the focal points of habitation appear to have been based on the sand rise by virtue of the density of artefacts visible there, the actual boundaries of an open site, as opposed to the limited confines of a rock shelter, may extend well beyond the visible concentration of artefacts. The Jali Sites Officer drew attention to artefact scatters he had observed within 100 m and c. 150 m to the north east and south east not registered with the OEH AHIMS. It is prudent to propose that the Project Area may require additional measures than surface field inspection to establish that Aboriginal cultural heritage will not be destroyed by the proposed sand extraction.

Regarding what additional measures are appropriate, a key consideration is the nature of past ground disturbance across the Project Area. The Project Area has a history of low to moderate ground disturbance over the entire surface and sub surface. This has been due in part to clearing of original forest pre 1940 and a number of subsequent clearings of regrowth between the 1970's and 1987. The forest/vegetation clearing 'episodes' initially by hand and later mechanically would cause the complete destruction to cultural heritage sites in the order of scarred trees and shallow burials. Removal of stumps and roots in loose sand conditions would cause a degree of lateral and horizontal distribution of stone and shell materials if they exist. Exposed sands post clearing are subject to wind scouring and channelling which can cause archaeological deposits or single artefacts to collapse onto harder surfaces or simply to continually transfer horizontally through the sand mass. The scientific significance of 'reworked' materials by combinations of wave, wind action and taphonic process is diminished, as their depositional integrity may have been lost.

Cattle grazing on sand, in the initial stages may cause the trampling of larger stone artefacts and the crushing of shell until compaction takes place. Sugar cane/tea tree cultivation will simply continue the lateral and horizontal dispersal of stone and shell materials if they existed. In the Project area cultivation has continued for approximately 40 years. Ploughing and cultivation of young cane would tend to compress larger stone objects but continually turn over compressed materials within the plough depth. Smaller stone artefacts such as flakes, blades and smaller cores are more likely to deflect laterally from plough blades and cultivators and remain at the surface.

The location of the access tracks for this development falls within the sand rise mentioned above. As such, the access track are within an area that, prior to European settlement, would have had the potential to contain significant Aboriginal Objects. The access track for this Project was not subject to the archaeological survey. As is clearly evident from the satellite image of the Project Area (Figure 3), the access track has been cleared. The only portion of the access track that is not obviously identifiable as cleared in the satellite imagery is the far eastern portion. A large berm is currently situated in this portion, the construction of which also resulted in substantial ground disturbance. Additional works to form the access track will involve the importation of fill, with limited subsurface disturbance for drainage and a shakedown grid. Given the extensive ground disturbance already existing over this area, the potential to harm Aboriginal cultural heritage is considered extremely low.

9. SCIENTIFIC VALUES AND SIGNIFICANCE ASSESSMENT

9.1 Aboriginal Cultural Heritage

9.1.1 Principles of This Significance Assessment

The assessment of archaeological (scientific) significance is a key aspect of developing future management strategies for the proposed development. There are many considerations that go into evaluating a site or landscape's potential archaeological significance. Two important criteria, listed in the New South Wales *Aboriginal Heritage Standards and Guidelines Kit* (1997:88), are research potential (defined as the potential to elucidate past human behaviours) and educational potential. The primary considerations when evaluating a site's research potential are discussed below.

Rarity: This is related to how prevalent a particular site type is in a given region. Sites that are particularly scarce have the potential to contribute more to our knowledge of past behaviours relative to sites which are common place. For example, in the north coast of New South Wales, coastal (beach) middens would have been common prior to European settlement. However, the impacts of sand mining and development have resulted in coastal middens becoming relatively rare, thus increasing their archaeological significance.

Antiquity: The value in a site's antiquity is closely linked to its rarity. As a general rule, the numbers of particularly old sites will reduce as time progresses. When sites of great antiquity are identified, they are of high archaeological significance.

Representativeness: A site's representativeness indicates whether a site is considered to represent a particular pattern of past human behaviour. It is important to identify sites that have high representative value and conserve them for future generations (Pearson and Sullivan 1995:148). Representativeness is assessed based on current research questions and technologies and may change through time. It should be noted that a site's representativeness is also related to its cultural value, as distinct from its purely scientific value.

Complexity: A site may demonstrate a range of human behaviours and/or past climate and environmental changes (Pearson and Sullivan 1995:148).

Integrity: The stratigraphic integrity of a site relates to the subsequent disturbance of a site once it has entered the archaeological record. Disturbance may have been the result of impacts by humans (such as land clearing) or natural causes (such as erosion or bioturbation from ants). It is generally the case that the greater a site's integrity, the greater its archaeological significance.

Connectedness: A site should not be viewed in isolation, as the human behaviours that were responsible for the creation of the site were invariably connected to other sites reflecting different behaviours nearby.

9.1.2 Limitations

With all scientific research, including the assessment of 'scientific significance', it is important to acknowledge the limitations of any conclusions that have been drawn in relation to the assessment of the Project Area.

The assessment of archaeological significance is a highly subjective activity, and depends much on the values of the researcher(s) involved. In this assessment, we have looked to categorise that Project Area into areas of 'High', 'Moderate – High', 'Moderate', 'Low – Moderate', 'Low' and 'No/Nil' archaeological significance. The values we have used are not precise. They exemplify arbitrary distinctions that are necessary for ease of demonstrating the scientific value of the Project Area as a whole. These categories represent a relative continuum of significance, which is demonstrated by the diagram in Figure 12. The intention of Figure 12 is to show examples of the values used in this assessment. Of course, it is quite possible that even a single artefact may be of high archaeological significance, where it can be demonstrated that the artefact exhibits one or more of the criteria above.

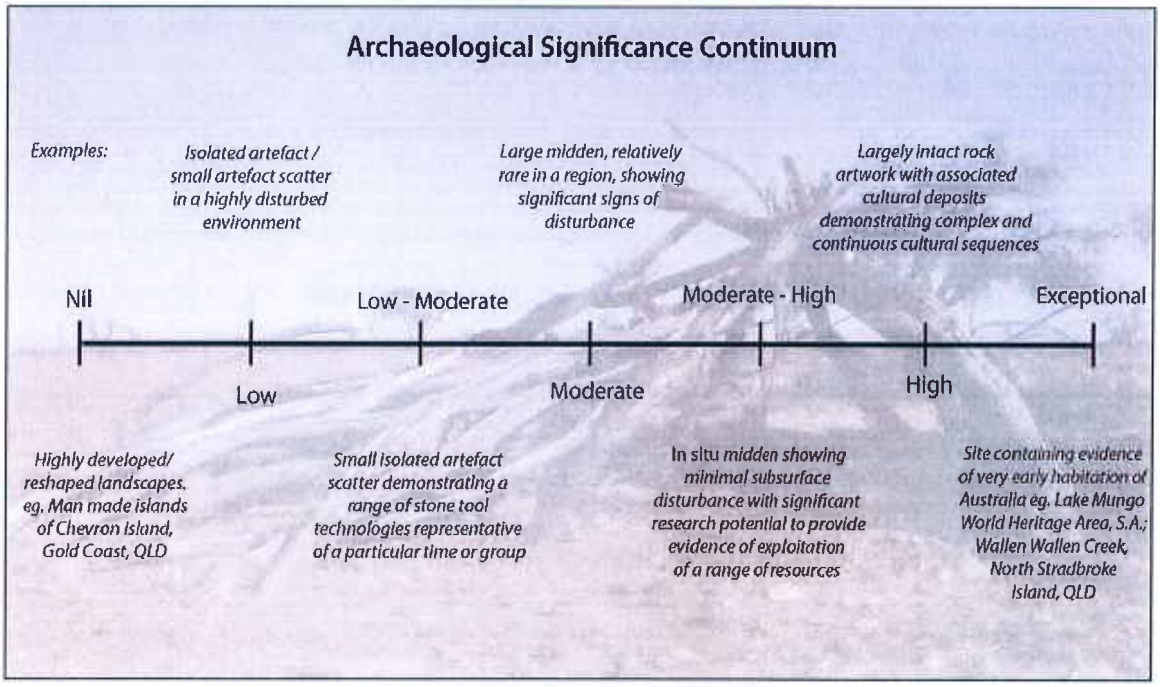

Figure 12: Archaeological Significance Continuum applied in this assessment

9.1.3 Aboriginal Cultural Heritage Statement of Significance

On the evidence available, the Project Area is situated within an area of low scientific significance. The Project Area would be an unlikely campsite location due to its low terrain. It is anticipated that if the area is to contain Aboriginal Objects, they would be isolated artefacts. Small artefact/shell scatters cannot be ruled out, owing largely to the Project Areas proximity to a number of known Aboriginal sites.

The Project Area has been disturbed by vegetation clearing and cultivation. Additional disturbance has been caused by drainage works on its perimeter. Surface and immediate sub surface cultural materials to tillage

depth are likely to be dispersed from '*in situ*' contexts and therefore of low scientific significance. In sand conditions such as this, stone tools will often have been compressed to greater depths.

Aboriginal connection to the land is generally strong, and although there are unlikely to be significant concentrations of Aboriginal Objects within the Project Area, this should not be taken as an indication that the area is not significant for cultural reasons. However, there are no geographic features (rock overhangs, resource areas or sand ridges) that make any parts of the Project Area likely to hold special cultural significance to local Aboriginal groups. The Jali LALC have not identified any areas of particular cultural or spiritual significance within the Project Area. The Jali LALC Sites Officer consulted during this project is extremely knowledgeable on the cultural heritage of the region. Everick also has extensive experience working in the immediate region. The potential for the Project to impact on significant intangible heritage values, not being values associated with any Aboriginal Objects, it considered low.

9.2 Historic Cultural Heritage

There are no items of potential historic heritage significance within the Project Area.

10. IMPACT ASSESSMENT

10.1 Indigenous Cultural Heritage Impact Assessment

The Project would likely result in the destruction of any Aboriginal Objects within the Project Area. As discussed in the significance assessment above, it is reasonably likely that isolated Aboriginal Objects are located within the Project Area. The potential for the Project activities to impact on Aboriginal cultural heritage must therefore also be considered high.

The likelihood of small concentrations of Aboriginal Objects (artefacts / shell scatters) being located within the Project Area is low, but cannot be ruled out entirely. Having regard to the unsuitability of the Project Area for a campsite location and the high levels of ground disturbance, the potential for the Project to impact of scientifically significant Aboriginal Objects is low.

Impact mitigation strategies are provided in Section 11 below to address this risk.

10.2 Historic Cultural Heritage Impact Assessment

There were no non-Indigenous cultural heritage sites or relics within the Project Area. It is considered highly unlikely that the Project will impact on any unidentified items of historic heritage significance.

11. RECOMMENDED MANAGEMENT & MITIGATION MEASURES

11.1 Aboriginal Cultural Heritage

The following recommendations are based upon the desktop review, the results of the field assessment and consultation with the Jali LALC.

As the Project Area is unlikely to contain scientifically significant Aboriginal Objects, or high concentrations of Aboriginal Objects, archaeological test or salvage excavations are not recommended. No Aboriginal Objects have been identified that would require an Aboriginal Heritage Impact Permit prior to the Project proceeding. There are no areas within the Project Area that are considered particularly likely to contain Potential Archaeological Deposits. Never-the-less, Recommendation 1 adopts a cautionary approach to managing Aboriginal cultural heritage, and is supported by the Jali LALC.

Recommendation 1: Additional Jali LALC Site Inspection

It is recommended that the Jali LALC are invited to inspect the initial clearing of vegetation and stripping of topsoil within the Project Area, prior to the Project commencing. The Jali LALC Sites Officer should be present as the clearing takes place, and should have input into which parts of the Project Area are cleared for inspection. Jali LALC Sites Officers are extremely knowledgeable on the heritage of the region, and will be able to identify those areas that require monitoring, being the areas closest to the eastern boundary of the Project Area. No less than 25% of the Project Area should be inspected in this manner.

Protocols for communication between the plant operator and the Jali LALC Sites Officer should be agreed prior to commencing the clearing. In the event that Aboriginal Objects are identified, the operator should cease all clearing activities immediately. The Find Procedure (Recommendation 3) should then be followed.

Recommendation 2: Aboriginal Human Remains

It is recommended that if human remains are located at any stage during earthworks within the Project Area, all works must halt in the immediate area to prevent any further impacts to the remains. The Site should be cordoned off and the remains themselves should be left untouched. The nearest police station, the Jali Local Aboriginal Land Council and the OEH Regional Office, Coffs Harbour are to be notified as soon as possible. If the remains are found to be of Aboriginal origin and the police do not wish to investigate the Site for criminal activities, the Aboriginal community and the OEH should be consulted as to how the remains should be dealt with. Work may only resume after agreement is reached between all notified parties, provided it is in accordance with all parties' statutory obligations.

It is also recommended that in all dealings with Aboriginal human remains, the Proponent should use respectful language, bearing in mind that they are the remains of Aboriginal people rather than scientific specimens.

Recommendation 3: Aboriginal Objects Find Procedure

It is recommended that if it is suspected that Aboriginal material has been uncovered as a result of development activities within the Project Area:

(e) work in the surrounding area is to stop immediately;

(f) a temporary fence is to be erected around the site, with a buffer zone of at least 10 metres around the known edge of the site;

(g) an appropriately qualified archaeological consultant is to be engaged to identify the material; and

(h) if the material is found to be of Aboriginal origin, the Aboriginal community is to be consulted in a manner as outlined in the OEH guidelines: *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010).

Recommendation 4: Notifying the OEH

It is recommended that if Aboriginal cultural materials are uncovered as a result of development activities within the Project Area, they are to be registered as Sites in the Aboriginal Heritage Information Management System (AHIMS) managed by the OEH. Any management outcomes for the site will be included in the information provided to the AHIMS.

Recommendation 5: Conservation Principles

It is recommended that all effort must be taken to avoid any impacts on Aboriginal Cultural Heritage values at all stages during the development works. If impacts are unavoidable, mitigation measures should be negotiated between the Proponent, OEH and the Aboriginal community.

11.2 Historic Cultural Heritage

There are no further actions or recommendations warranted.

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APPENDIX A: CORRESPONDENCE – JALI LALC

PO Box 1677 Ballina NSW 2478
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Mr Tim Robins
Everick Heritage Consultants Pty Ltd
PO Box 146
Red Hill QLD 4059

1st November 2011

Dear Mr Tim Robins

Re: Watsons Sandpit

The Jali Local Aboriginal Land Council supports the proposal of Watson's Sandpit and concurs with the findings outlined in the report.

The Jali LALC agrees with Recommendation 1 that an inspection of the initial clearing of vegetation and stripping of topsoil within the Project Area, prior to the Project commencing. The Jali LALC Sites Officer should be present as the clearing takes place, and should have input into which parts of the Project Area are cleared and the Jali LALC Site officer be present.

The NSW Aboriginal Land Council has designated Local Aboriginal Land Council boundaries based on traditional parish boundaries. Jali Local Aboriginal Land Council is the incorporated body responsible for Aboriginal issues within the survey area.

The Jali LALC role is to minimize risk, damage or destruction to heritage sites and limit environmental impacts. During excavation if any human remains are located at any stage of earthworks the project is to cease immediately and relevant parties to be notified.

If you have any queries please contact the Jali LALC office or email:
jalilalc@bigpond.com

Yours Sincerely

V Williams

Veronica Williams
Jali LALC CEO

APPENDIX B: OEH ARCHAEOLOGICAL CODE OF PRACTICE CHECKLIST

Checklist for Compliance with OEH NSW Aboriginal Archaeological Code of Practice Requirements				
REQUIREMENTS MET		**Yes**	**No**	**N/A**
Requirement 1: Review previous archaeological work				
	Requirement 1a – The Review of previous archaeological work:			
•	is appropriate to the scope of works	✓		
•	includes an AHIMS search	✓		
•	synthesises the known archaeology and ethnohistory of the region	✓		
•	evaluates the results of any previous reports for the subject area in light of current knowledge	✓		
•	describes the range and nature of Aboriginal sites & features present within & near the subject area	✓		
•	describes existing predictive models that are relevant to the project and subject area	✓		
•	is presented as a map showing the location of previously recorded sites / areas of previous surveys	✓		
	Requirement 1b – The AHIMS searches:			
•	are contemporaneous with the project	✓		
•	include an area larger than, and wholly containing, the subject area	✓		
•	include an area large enough to allow adequate landscape interpretation	✓		
•	include a search for any previous reports relevant to the subject area	✓		
•	have been assessed to determine the robustness of the search	✓		
•	the date of AHIMS search & AHIMS client service number is referenced in the Archaeological Report			
•	Other registers searched include NSW State Heritage Inventory & The Australian Heritage Database	✓		
Requirement 2: Review the landscape context				
	The landscape description:			
•	describes the landscape history at a an appropriate scale	✓		
•	describes the landforms present within the subject area using generally accepted classifications	✓		
•	identifies the primary modes of geomorphic activity in the subject area: aggraded, aggraded or eroded (stable), or eroded	✓		
•	determines if objects are likely to be concealed below the ground surface or revealed by erosional processes	✓		
•	identifies the forms of erosion within the archaeologically surveyed area, and subject area as a whole	✓		
•	describes the soils present and, where available, outlines their formation history	✓		
•	describes the land-use history of the subject area	✓		
•	describes, and/or maps the natural resources & features that will have influenced past use of the landscape	✓		
•	is explicitly referenced in the predictive model (see Requirement 4)	✓		
•	The landscape context is documented in the Archaeological Report as set out in Requirement 11.	✓		
Requirement 3: Summarise the local & regional character of Aboriginal land use and its material traces				
•	Requirements 1 & 2 are synthesises in the Archaeological Report	✓		

REQUIREMENTS MET		Yes	No	N/A
Requirement 4: Predict the nature and distribution of evidence				
	Requirement 4a – The Predictive model:			
•	integrates the distribution of known sites, landscape units interpreted in terms of their archaeological potential	✓		
•	characterises the patterning of material traces, evidenced in the ethnohistorical review	✓		
•	considers the distribution of natural resources, and the probable land-use strategies	✓		
•	considers the spatial and temporal relationships of sites	✓		
•	identifies what sorts of material traces are predicted to be present, and in what densities	✓		
•	makes inferences about past Aboriginal occupation of the landscape based on the evidence collected	✓		
	Requirement 4b – The Predictive model results:			
•	present statements of archaeological potential about areas that can be verified using archaeological methodologies	✓		
Requirement 5: Archaeological survey				
	Requirement 5a – The Survey sampling strategy:	✓		
•	includes all landforms that will potentially be impacted	✓		
•	places a proportional emphasis on those landforms deemed to have archaeological potential	✓		
•	describes how sampling relates to the footprint that is proposed to be impacted by the development	✓		
•	clearly states when a full coverage survey will be undertaken and justify when it is not	✓		
•	is documented in the Archaeological Report as set out in Requirement 11	✓		
	Requirement 5b – The archaeological survey has:	✓		
•	surveyed an area, on foot, for the purposes of discovering Aboriginal Objects	✓		
•	been conducted in accordance with the sampling strategy above	✓		
•	been carried out using accurately defined and named survey units (see Requirement 5c)	✓		
•	included representative photographs of survey units and landforms where informative			
	Requirement 5b – The archaeological survey has:			
•	recorded landform and general soil information (see Requirement 2) for each survey unit	✓		
•	recorded the land surface and vegetation conditions encountered during the survey	✓		
•	recorded any Aboriginal Objects (including those already on AHIMS) observed during the survey	✓		
•	recorded survey coverage – see Requirement 9	✓		
•	been used to calculate survey effectiveness – see Requirement 10, and	✓		
•	been accurately mapped and presented visually at an appropriate scale			✓
•	been documented and summarised in the Archaeological Report as set out in Requirement 11	✓		
	Requirement 5c – The archaeological survey units recorded include:	✓		
•	the beginning and end points of transects or boundaries of survey units as otherwise defined	✓		
•	the beginning, length, and end points of transects using a handheld GPS receiver			✓
•	the spacing between survey personnel			✓
•	the beginning and end of transects, or survey unit boundaries			✓
Requirement 6: Site definition has been described using the following criteria:				
•	the spatial extent of the visible objects, or direct evidence of their location			✓
•	obvious physical boundaries where present, e.g. mound sites and middens, a ceremonial ground			✓
•	identification by the Aboriginal community on the basis of cultural information			✓
Requirement 7: Site recording				
	Requirement 7a – Information to be recorded			

REQUIREMENTS MET		Yes	No	N/A
•	Site recording provides the information required to complete the current AHIMS Site Recording Form	✓		
•	when applicable used the appropriate AHIMS Feature Recording Form	✓		
•	identifies the site boundaries and indicate how they have been determined	✓		
•	provides an accurate site plan, using professional judgement to determine appropriate scale and precision	✓		
	Requirement 7b – Scales for photography			
•	All photographs include an appropriate graded metric scale	✓		
Requirement 8: Location information and geographic reporting				
	Requirement 8a – Geospatial information recorded using a GPS receiver includes:	✓		
•	the location of objects and sites	✓		
•	the location of survey units (both location and area of survey units)	✓		
•	the location of landscape units (Requirement 2)	✓		
•	the location of test excavation units (Section 3.1)	✓		
•	the location of other relevant features.	✓		
	Requirement 8b – Datum and grid coordinates are:			
•	reported as grid coordinates using the Map Grid of Australia 1994 (MGA94) cartesian coordinate system	✓		
•	checked and confirmed using a 1:25,000-scale topographic map (or the next best available scale)	✓		
Requirement 9: Record survey coverage data				
	When recording survey coverage data:	✓		
•	visibility and exposure are independently described for each survey unit	✓		
•	visibility has been determined and recorded to the nearest 10%	✓		
•	exposure has been described in terms of the natural erosion processes and / or contributing processes	✓		
•	exposure has been estimated to the nearest 10% of the surface area of the survey	✓		
•	obtrusiveness of above-surface archaeological features and vegetation is described	✓		
•	coverage appropriately quantified by describing any sampling procedures	✓		
Requirement 10: Analyse survey coverage				
•	The survey results are presented in table format (see examples) or include justification for other format	✓		
•	The survey results include a summary of effectiveness of the survey for each landform unit & whole of subject area	✓		
Requirement 11 – Archaeological Report content and format				
	General formatting compliance:	✓		
•	All pages must be numbered	✓		
•	All sections and sub-sections must be sequentially numbered	✓		
•	All tables, charts, plates, figures and appendices must be sequentially numbered	✓		
•	Headers or footers with a short project name should be included	✓		
•	Cover and title page complies with requirements	✓		
•	Report contents complies with requirements	✓		

APPENDIX C: AHIMS SEARCH RESULTS

Site ID	Site Name	Easting	Northing	Context / Type	Features
04-4-0092	Barrett 6	557460	6815250	open site	artefact
04-5-0009	Lennox Head Public School	557300	6813720	open site	artefact
04-5-0018	Lennox Head	558100	6814500	burial	burial
04-5-0029	Lennox Head near Gibbons St (NPWS Lennox Head Bora Ring)	557550	6814850	bora/ceremonial, midden	earth mound, shell, artefact, ceremonial
04-5-0030	Lake Ainsworth	557850	6815170	open site	artefact
04-5-0031	Lennox Head	557860	6814950	open site	artefact
04-5-0048	Lennox Head	557320	6813900	midden	earth mound, shell, artefact
04-5-0049	Lennox Head	556470	6816120	midden	earth mound, shell, artefact
04-5-0052	Lennox Head	558000	6813200	midden	earth mound, shell, artefact
04-5-0068	NS/2/88	554100	6816600	open site	artefact
04-5-0069	NS/88/1	553800	6816000	open site	artefact
04-5-0070	NS/3/88	554550	6816750	midden, open camp site	earth mound, shell, artefact
04-5-0094	Lennox Head Dune (Croftag P/L Aboriginal Site 3)	556800	6815120	burial; open camp site	artefact; burial
04-5-0095	Ballina N.R. Midden	555000	6813800	midden	earth mound, shell, artefact
04-5-0105	Barrett 4	557410	6815330	open site	artefact
04-5-0106	Barrett 3	557370	6815200	shelter with midden	earth mound, shell, artefact
04-5-0107	Barrett 5	557400	6814920	shelter with midden	earth mound, shell, artefact
04-5-0108	Barrett 2	557350	6815230	open site	artefact
04-5-0143	Site 1; Fern St	557300	6814575	open site	artefact
04-5-0153	North Creek 2	556520	6811250	midden, open campsite	earth mound, shell, artefact
04-5-0154	Cumbalum 1	553550	6814950	open site	artefact
04-5-0155	Cumbalum 2	553650	6814855	open site	artefact
04-5-0156	Cumbalum 3	553750	6814250	isolated find	artefact
04-5-0157	Cumbalum 4	552470	6813500	open site	artefact

04-5-0158	North Creek 1	556700	6811750	midden	earth mound, shell, artefact
04-5-0159	North Creek 2	556520	6811250	midden	earth mound, shell, artefact
04-5-0164	LHIA 1	553859	6816553	open site	artefact
04-5-0165	LHIA 2	553708	6816573	open site	artefact
04-5-0166	LHIA 3	553706	6816191	open site	artefact
04-5-0167	AF-1	556100	6815420	open site	artefact
04-5-0179	PAD 3, Ballina Bypass	551525	6813875	open site	PAD
04-5-0181	PAD 2, Ballina Bypass	551470	6813700	open site	PAD
04-5-0191	Tintenbar to Ewingsdale Aboriginal 6 (T2EA6)	554250	6820450	open site	artefact
04-5-0194	Tintenbar to Ewingsdale Aboriginal 3 (T2EA3)	553746	6815705	open site	artefact
04-5-0196	Tintenbar to Ewingsdale Aboriginal 1 (T2EA1)	551490	6817967	open site	artefact
04-5-0197	Ballina Bypass PAD 2	551470	6813790	open site	PAD
04-5-0212	CPB PAD 3	553900	6814200	open site	PAD
04-5-0213	CPB PAD 4	553110	6814979	open site	PAD
04-5-0214	CPB PAD 5	552504	6814580	open site	PAD
04-5-0216	CPB PAD 7	552032	6815198	open site	PAD
04-5-0217	CPB PAD 1	553750	6815000	open site	PAD
04-5-0218	Area C Isolated Artefact	553150	6814300	isolated find	PAD
04-5-0219	CPB 2	553735	6815021	open site	hearth
04-5-0220	CPB 1	553759	6815000	open site	hearth
04-5-0221	CPB PAD 2	553700	6815100	open site	PAD
04-5-0222	Sheathers 1	552950	6812320	open site	hearth, artefact
04-5-0224	PAD 1	551495	6816600	open site	PAD
04-5-0225	PAD2 Knockrow	552000	6817640	open site	PAD
04-5-0226	PAD6 Knockrow	552155	6817880	open site	PAD
04-5-0227	PAD7 Knockrow	552210	6817990	open site	PAD
04-5-0245	PAD3 Knockrow	552504	6814580	open site	PAD
04-5-0249	Hutley Drive 1	556650	6812325	open site	PAD
04-5-0250	PAD8 Knockrow	552125	6817690	open site	PAD

APPENDIX D: LENNOX HEAD BORA RING SITE DESCRIPTION FROM THE REGISTER OF THE NATIONAL ESTATE

Description: Raised ring of sand 20 cm-30 cm in height. External diameter: north south 31.5 m, east west 29.75 m. Internal diameter: north south 28.5 m, east west 26.75 m. There is a gap in the wall of the ring on its north west side. The centre of the ring is flat and compacted. The site is on the western outskirts of the town of Lennox Head. It is on cleared land, about 100 m west of Gibbon Street, Foster and Lennox Streets. To the south, west and north west of the fenced Bora Ring there is an extensive surface scatter of midden, predominantly pipi shell and occasional patches of oyster shell.

Shell is scattered over an area roughly 100 m x 200 m. It may extend further west in the uncleared bush. The southern extent can no longer be determined due to disturbance. Virtually no stone material is visible on the surface although there were a few unmodified waste flakes of hornfels in the southern area which probably came out of the sewerage pipe trenches. There are three drainage ditches running in an east west direction to the north of the Bora Ring enclosure. The first is approximately 10 m north of the enclosure, the drains are approximately 150 m-200 m apart. In the first drain patches of midden occur at the Bora Ring end of the drain, these are thin bands of shell approximately 3 cm-4 cm deep occurring at intervals along the drain. In the southern section they occur at ground surface level, in the northern section they occur approximately 50 cm below the surface but this is because the trench fill has been heaped on this side. At intervals there are also artefacts eroding from the drain wall. There are a few patches of shell between the first and second drains, but only in the southern part. There is no shell in the second and third drains but artefacts are found all the way along the drains. There are many more in the second. These are mostly unmodified waste flakes of hornfels, quartz and fine grained acidic volcanic rocks. Three baked blades and a small quartz core were noted. The stone material occurred in the base of the drains, eroding from the walls just below the original ground surface. In the third drain the stone material was only in the base and on the top of the mounded sand on the northern edge and there was a lot less than in the first and second drains.

The second drain is the richest for stone material. There are broken pebbles throughout but it is highly likely that these were broken during the excavation of the drains. One possibly reworked pebble, 11 cm diameter flakes removed and battering along one edge. The area has been cleared in the past, pipes have been laid

and soil dumped in the area 40 m-50 m south of the Bora Ring, the drainage ditches have disturbed the area at the same time as exposing stone material that was otherwise not visible on the surface.

Relation to other sites in locality: Adjacent to the Lennox Head Bora Ring.

Condition: Some flattening of ring due to natural weathering and visitation. Also other disturbance caused imminent danger from proximity of houses when subdivision completed. The site was reinspected in 1984 to assess possible damage to the site by the Ballina Shire Council during dewatering and sewerage works. The area is further threatened by a planned housing subdivision.

Statement of significance: Few such examples of well preserved earth Bora Rings remain in New South Wales. Scientific research into their form and distribution will contribute to an understanding of their function in traditional Aboriginal society. As former ceremonial venues, such sites are of significance to local Aboriginal communities. This site has been of long term interest to the residents of Lennox Head.

APPENDIX E: HISTORIC AERIAL PHOTOGRAPHY

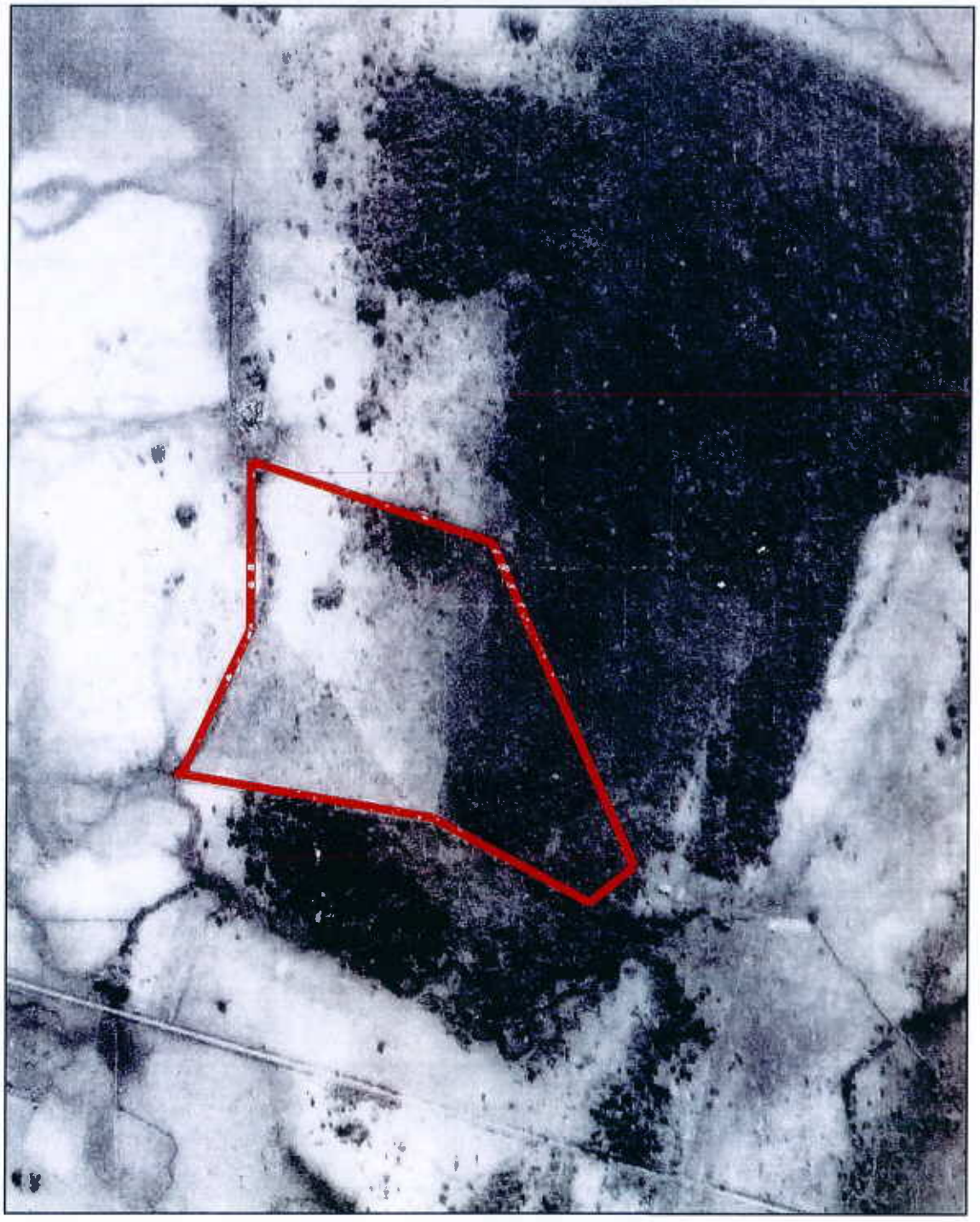

Figure 13: 1947 Aerial photograph of the Project Area

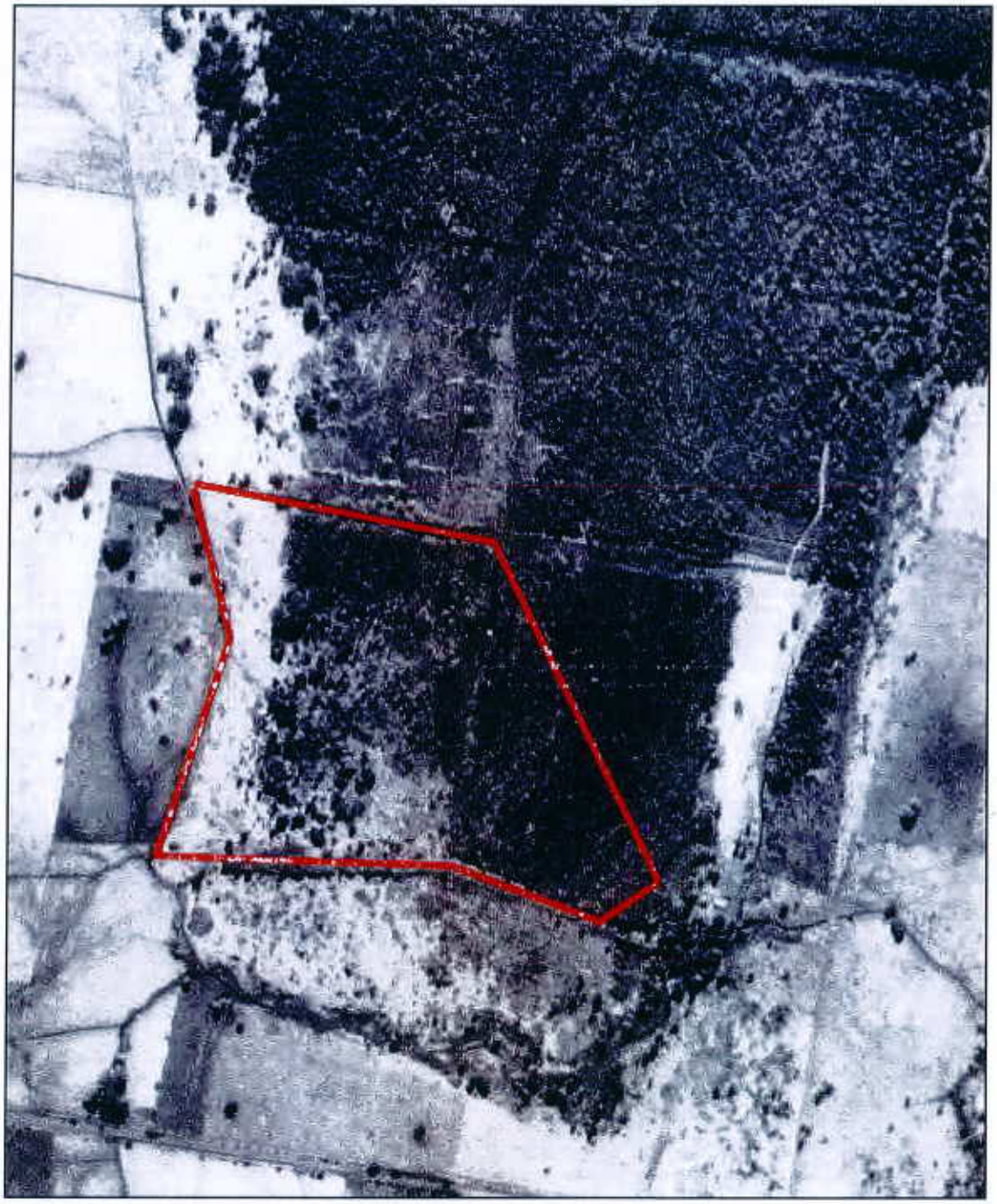

Figure 14: 1967 Aerial photograph of the Project Area

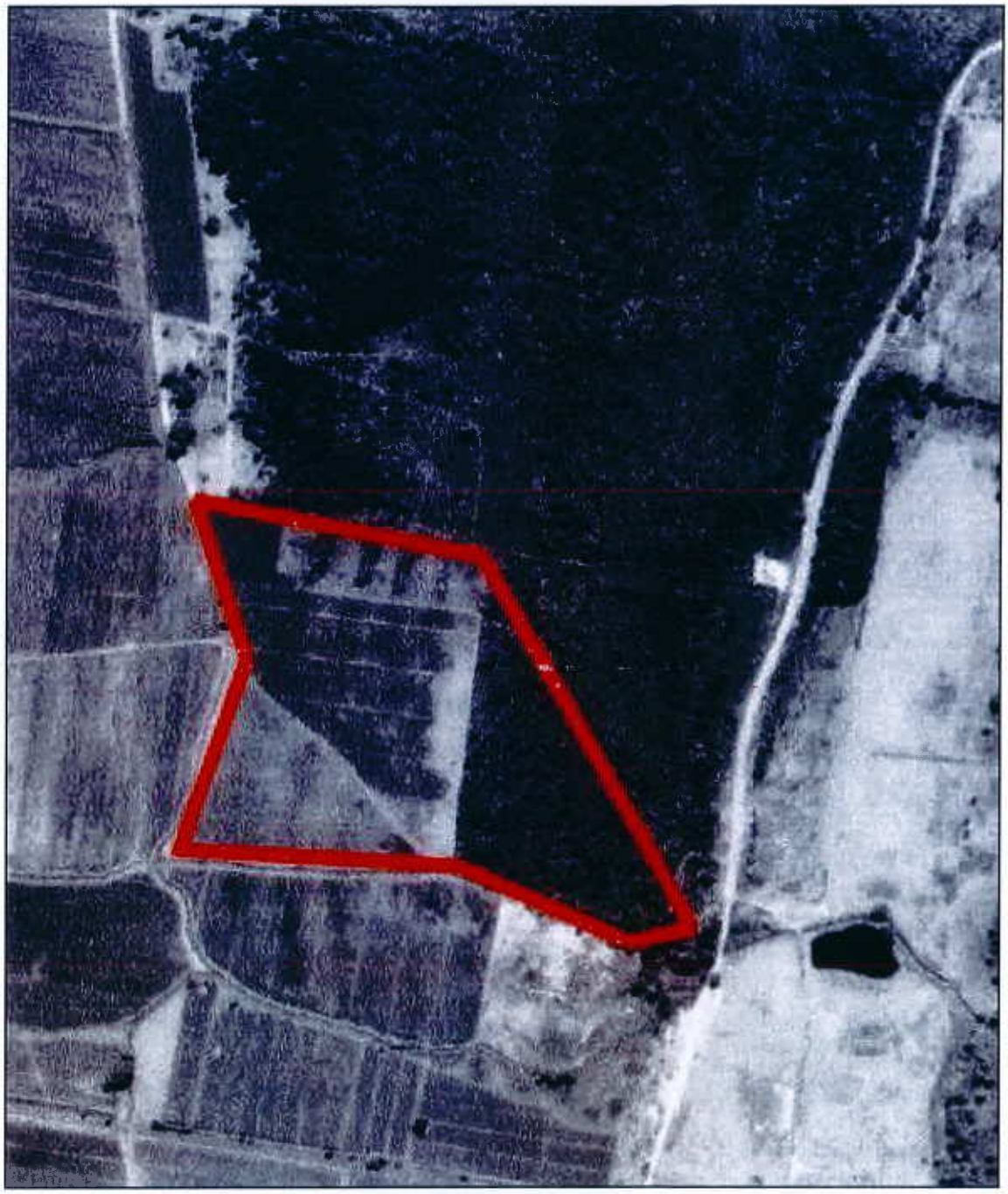

Figure 15: 1979 Aerial photograph of the Project Area

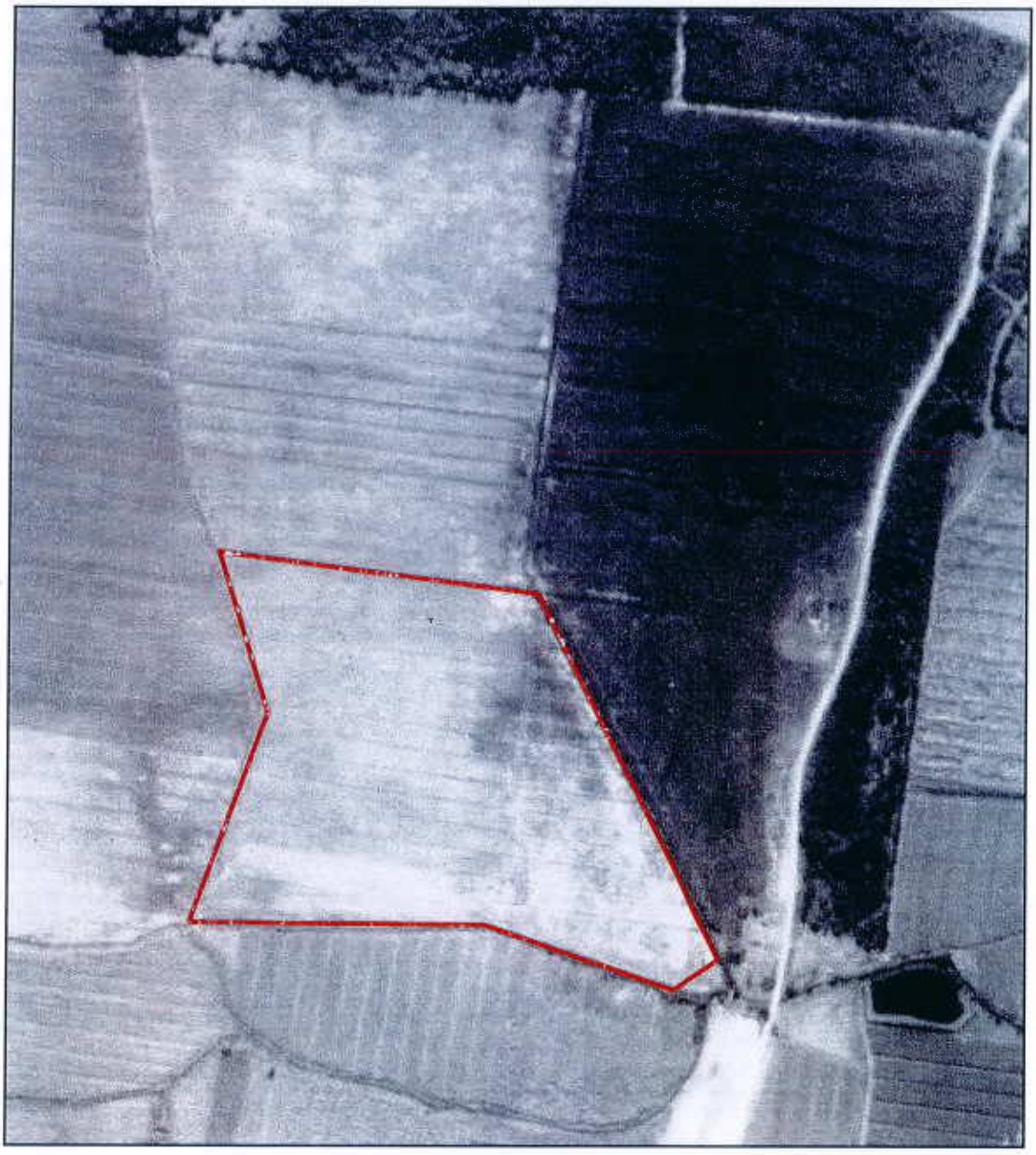

Figure 16: 1987 Aerial photograph of the Project Area

Figure 17: 1997 Aerial photograph of the Project Area