Hexham Train Support Facility

Aurizon

Aboriginal Due Diligence

1 | Final

27 February 2019

Hexham Train Support Facility

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Abbreviations and Acronyms

ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHRP	Aboriginal Cultural Heritage Consultation Requirements for Proponents
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
CHL	Commonwealth Heritage List
DECCW	Department of environment, Climate Change and Water NSW
Due Diligence Code	Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales
DPE	Department of Planning and Environment
EPBC	Act Environmental Protection & Biodiversity Act 1999
EIS	Environmental Impact Statement
EP&A	Act Environmental Planning and Assessment Act 1979
Heritage Act	The Heritage Act 1977
Km	kilometres
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
M	Metres
NPW	National Parks and Wildlife
NSW	New South Wales
OEH	Office of Environment and Heritage
PAD	Potential Archaeological Deposit
PAS	Potential Archaeological Sensitivity
SHR	New South Wales State Heritage Register

Executive Summary

This report presents the results of an Aboriginal Archaeological Due Diligence Assessment for a turning circle proposed within the Hexham Train Support Facility at Hexham, NSW. Construction of the turning angle requires modification to an existing State Significant Infrastructure (SSI) approval (MP07_0171). The turning circle would increase the functionality of the existing facility and increase its operational capacity.

The assessment has been prepared to ensure Aurizon Holdings Ltd exercises due diligence when carrying out the construction of the turning circle and that Aboriginal objects are not harmed. This report has been prepared to satisfy the *Due Diligence Code of Practice for the Protection of Aboriginal objects in New South Wales* (DECCW 2010). It aims to fulfil the Secretary's Environmental Assessment Requirements (SEARs) issued by the DPE for the Project and determine if further archaeological assessment is required to support preparation of an Environmental Impact Statement (EIS).

The results of the desktop assessment and site inspection confirm that there are no Aboriginal sites, objects, or PADs within the study area. Given the destruction of the original landform and the disturbance caused by historical land use of the area, the assessment concluded that it is highly unlikely that the proposed works would harm any identified or potential Aboriginal objects. No further Aboriginal archaeological assessment is therefore considered necessary prior to the commencement of works.

Important Note About This Report

The following assumptions and/or limitations apply to the provision of our services for this project.

- The sole purpose of this report is to satisfy Aurizon's requirements under the *Due Diligence Code of Practice for the Protection of Aboriginal objects in New South Wales* (the Due Diligence Code).
- This report does not include the views or knowledge held by Aboriginal community groups that may have a connection to the study area. Consultation with the local Aboriginal community would be required to understand the cultural significance of the study area.
- Data about the location of the proposed works and the boundary of the study area was derived from Aurizon.
- This report must be read in full with no excerpts to be representative of the findings.
- This report has been prepared exclusively for Jacobs' client and no liability is accepted for any use or reliance on the report by third parties.

1. Introduction

Jacobs Group (Australia) Pty Ltd (Jacobs) was commissioned by Aurizon Holdings Ltd (Aurizon) to provide an assessment of the Aboriginal archaeological values of a property at Hexham, a suburb of Newcastle in NSW. Aurizon is proposing to construct a turning angle on the property as part of the Hexham Train Support Facility (TSF). Construction of the turning angle requires modification to an existing State Significant Infrastructure (SSI) approval (MP07_0171). The turning circle would increase the functionality of the existing facility and increase its operational capacity.

This report has been prepared to satisfy the *Due Diligence Code of Practice for the Protection of Aboriginal objects in New South Wales* (DECCW 2010; hereafter referred to as the Due Diligence Code). This will ensure that Aurizon exercises due diligence when carrying out the construction of the turning angle and that Aboriginal objects are not harmed. It also aims to determine if further archaeological assessment is required to support preparation of an Environmental Impact Statement (EIS).

Secretary's Environmental Assessment Requirements (SEARs) for the proposed modification were issued by the Department of Planning and Environment (DPE) on 19 December 2018. Heritage was identified as a key issue by the DPE. This report aims to satisfy the following SEAR that relates to the management of Aboriginal objects and/or places:

> *11.1 The Proponent must identify and assess any direct and/or indirect impact (including cumulative impacts to the heritage significance of:*
>
> *(a) Aboriginal places and objects, as defined under the National Parks and Wildlife Act 1974 and in accordance with the principles and methods of assessment identified in the current guidelines;*
>
> *(b) Aboriginal places of heritage significance, as defined in the Standard Instrument – Principal Local Environmental plan.*
>
> *11.2 Where archaeological investigation of Aboriginal objects are proposed these must be conducted by a suitably qualified archaeologist, in accordance with Section 1.6 of the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW (DECCW 2010).*
>
> *Where impacts to Aboriginal objects and/or places are proposed consultation must be undertaken with Aboriginal people in accordance with the current guidelines*.

The Aboriginal due diligence assessment will form part of the detailed environmental assessment submission and support the modification application to MP07_0171.

1.1 Study Area

The proposed turning angle (the study area) is located at Hexham, approximately 12 kilometres north west of the Newcastle CBD. The property is situated on the western side of Maitland Road and is adjacent to Hexham swamp. The study area boundary, as shown in Figure 1.1, is located next to the railway track and lies within the Hexham TSF.

1.2 Project Description

The current TSF supports operations throughout the Hunter Valley. The facility contains an entry and exit however there is not a turning circle or angle that would aid in the better movement of locomotives and wagons. There is demand for this additional feature in the facility as it allows for more efficient management and to meet changing operational requirements.

The proposed turning angle would be located in the southern portion of the site. The proposed construction and operation of the turning angle would consist of:

Excavation works for railway track foundation and ballast;

- approximately 1.5km of rail track and associated signal and turnout infrastructure comprising:

- a single track straight of approximately 400m in length extending from the existing rail yard to the proposed turning angle;
- a turning angle with two arcs approximately 250m in length and a straight of approximately 275m;
- two 85m straight single tracks at either end of the turning angle;
- four tangential turnouts;

- construction of vehicular access tracks and associated lighting;
- installation of culverts within existing drainage channels, under the rail track and access tracks; and
- Associated civil and storm water works.

The proposed extent of works is shown in Figure 1.2.

1.3 Limitations and Assumptions

This report addressed the archaeological potential for Aboriginal objects and places only. It does not include an assessment of the Aboriginal cultural heritage values of the study area or any consultation with Aboriginal community groups or the local Aboriginal Land Council.

In addition, the non-Aboriginal heritage values of the study area are addressed in a separate Statement of Heritage Impact report prepared by Jacobs to support the environment assessment for the modification.

1.4 Authorship

This report was authored by:

- Fiona Leslie (Principal Archaeologist, Jacobs). Fiona holds a Bachelor of Science and a Bachelor of Arts with Honours from the University of Sydney and has over 18 years experience as an archaeologist; and
- Alexandra Seifertova (Graduate Archaeologist, Jacobs). Alexandra holds a Bachelor of Arts with Honours from the University of Sydney and has over one year of experience as an archaeologist.

Mapping was provided by:

- Hamid Karimi (Spatial Analyst, Jacobs); and
- Kahli Macnab (Spatial Analyst, Jacobs).

Legend

- Disturbance boundary
- Project boundary
- Major road
- Local road
- Main North Railway
- Waterway
- Waterbody

0 0.5 1 km

1:30,000 at A4

N

Data sources

NSW Spatial Services 2019
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Figure 1.1 Study area

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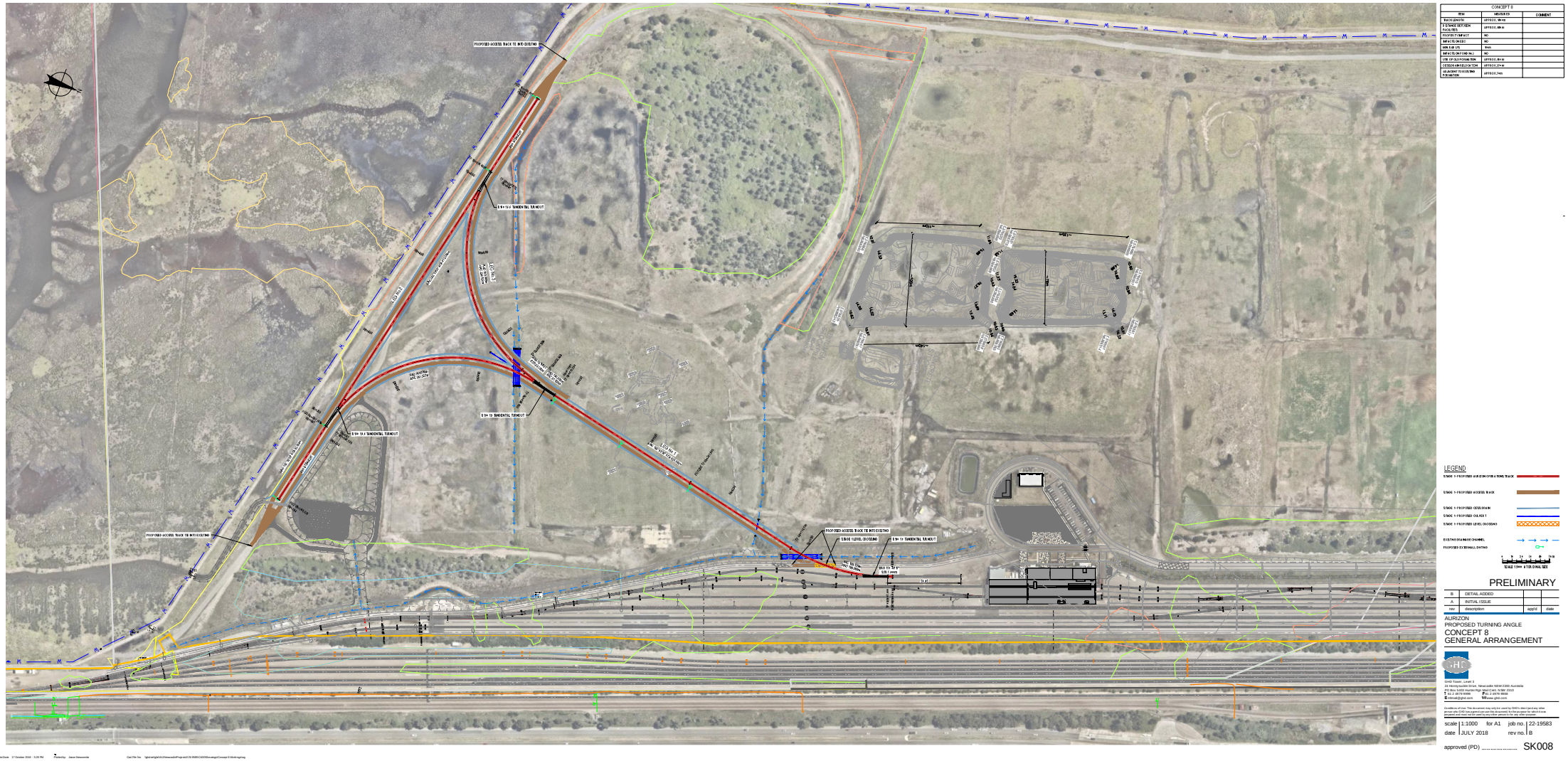


Figure 1.2: Extent of the proposed works (Courtesy of Aurizon, 2019).

2. Legislative context

The following sections outlines Aboriginal heritage legislation relevant to the assessment.

2.1 Environmental Planning & Assessment Act 1979 (EP&A Act)

The *Environmental Planning and Assessment Act 1979* (EP&A Act) provides the framework for environmental planning and assessment in NSW. The EP&A Act includes the requirement for environmental impacts to be considered prior to development approval. It includes a requirement for impacts or likely impacts upon Aboriginal cultural heritage to be assessed as part of a project's environmental approval, and for Local Government Areas (LGAs) to prepare Local environment plans and development control plans in accordance with the EP&A Act to provide guidance on the level of environmental assessment required. SEARs for the project were approved on 19 December 2018 by the Secretary of the Department of Planning and Environment.

National Parks and Wildlife Act 1974 (NPW Act) (OEH 2012)

The NPW Act provides for the protection of Aboriginal objects and Aboriginal places in NSW. Under section 5 of the Act, an Aboriginal object is defined as:

> *'any deposit, object or material evidence (not being a handicraft for sale) relating to indigenous and non-European habitation of the area that comprises New South Wales, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction, and includes Aboriginal remains'*

Under s90 of the NPW Act it is an offence to knowingly destroy, deface, damage or desecrate, or cause or permit the destruction, defacement, damage or desecration of an Aboriginal object or Aboriginal place, without the prior written consent from the Director-General of the NSW Office of Environment and Heritage (OEH).

2.2 Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales

This Due Diligence Code (Department of Environment Climate Change and Water (DECCW) 2010) aims to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for consent in the form of an Aboriginal Heritage Impact Permit (AHIP). A Due Diligence Code of Practice has been developed to guide proponents on how to ensure a defence to the 'strict liability' offence of harm to an Aboriginal object or place. A proponent would be found not guilty of the offence if it can be proved that the proponent demonstrated due diligence in investigating the likelihood of impact to Aboriginal heritage by the proposed activity.

Due diligence amounts to taking reasonable and practicable steps to protect Aboriginal objects. The Due Diligence Code of Practice (DECCW 2010) provides one process for satisfying the due diligence requirements of the NPW Act. It is not mandatory to follow this code. An individual or corporation can take other measures, provided that such measures are objectively reasonable and practicable and meet the ordinary meaning of exercising due diligence. Provisions relating to the due diligence system were effective from 1 October 2010.

2.3 Aboriginal Cultural Heritage Consultation Requirements for Proponents (ACHCRP) 2010

This document (DECCW 2010b) establishes the requirements for consultation (under part 6 of the NPW Act) with Aboriginal stakeholders as part of the heritage assessment process to determine potential impacts of proposed activities on Aboriginal objects and places and to inform decision making for any application for an AHIP.

2.4 Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales

The Code of Practice (DECCW 2010c) sets out the detailed requirements for archaeological investigations of Aboriginal objects in NSW for activities that require assessment under Part 4 or Part 5 of the EP&A Act. An AHIP or SEARS to undertake sub-surface testing are not required if complying with this Code, as sub-surface testing complying with this Code is excluded from the definition of harm to an Aboriginal object. The Code sets out in detail

- Minimum qualifications for anyone undertaking archaeological investigation under the Code in NSW.
- Assessment steps required to be undertaken for all archaeological investigation.
- Assessment steps that may be required to be undertaken to adequately characterise the Aboriginal objects being investigated.

2.5 Native Title Act (NSW) 1994

The *Native Title Act (NSW) 1994* was introduced to ensure that the laws of NSW are consistent with the Commonwealth *Native Title Act 1993*. The Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010b) stipulates that where relevant, consultation must be conducted with native title holders or registered native title claimants in accordance with the NSW *Native Title Act 1994.*

2.6 Native Title Act 1993

Recognises and protects native title and provides that native title cannot be extinguished contrary to the *Native Title Act 1993*. National Native Title Tribunal (NNTT) is a Commonwealth Government agency set up under this Act and mediates native title claims under the direction of the Federal Court of Australia. The following registers are mainlined by the NNTT: National Native Title Register, Register of Native Title Claim, Unregistered claimant applications, Register of Aboriginal land use agreements.

2.7 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* protects Aboriginal cultural property in a wider sense and includes any places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'. It may apply to contemporary Aboriginal cultural property as well as ancient sites.

2.8 Aboriginal Land Rights Act (NSW) 1983

The *Aboriginal Land Rights Act (NSW) 1983* recognises the rights of Aboriginal people in NSW and provides a vehicle for the expression of self-determination and self-governance. The purposes of the Act are:

- To provide land rights for Aboriginal persons in NSW.
- To provide for representative Local Aboriginal Land Councils (LALCs) in NSW.
- To vest land in those LALCs.
- To provide for the acquisition of land, and the management of land and other assets and investments, by or for those LALCs and the allocation of funds to and by those LALCs.
- To provide for the provision of community benefit schemes by or on behalf of those LALCs.

3. Environmental Context

3.1 Landform

The subject area is located approximately 2km west of the Hunter River and is within Hexham Swamp. Hexham Swamp covers over 900 hectares and is the largest freshwater swamp on the north coast of NSW (NSW National Parks and Wildlife Service 2008). The Hexham TSF study area is located south west of the Aurizon buildings and is accessed via unsealed roads.

The Williamtown – Salt Ash Floodplain Risk Management Study and Plan (BMT Eastern Australia Pty Ltd 2018) represents the most current and detailed modelling of Hunter River flood conditions in the estuary. Flood mapping from this study has been used to present representative flood conditions local to the turning angle site for the 5% AEP, 2% AEP and 1% AEP.

At the 5% AEP the turning angle site (which is situated atop the historic coal tailings fill) is effectively flood free. Convective flood waters are limited to the Hunter River channel, with surrounding areas of floodplain being non-convective flood storage.

At the 2% AEP the Hexham Swamp flood storage volume is substantially larger, although the flood waters are still largely non-convective. The southern extent of the proposed turning angle becomes flooded by backwater inundation.

At the 1% AEP the significant conveyance of flood waters through Hexham Swamp is evident, where the overtopping of the Pacific Highway and rail infrastructure acts as the principal local hydraulic control, as evidenced by the higher velocities. A minor flood flow path is also initiated over the coal tailings, within the footprint of the proposed turning angle works.

3.2 Geology and Geomorphology

Hexham is located in the Sydney Basin, bounded to the north by the New England Fold Belt, and the Lachlan Fold Belt to the south. The underlying geology of the study area, as can be viewed in Figure 3.1, is comprised of Triassic, Permian and Quarternary deposits. The Narrabeen group is made up by Triassic deposits, with the Newcastle Coal Measures dominating as the Permian deposits. These areas are characterised by alternating siltstone and sandstone layers, with coal, shale, tuff and conglomerates also present (Matthei 1995).

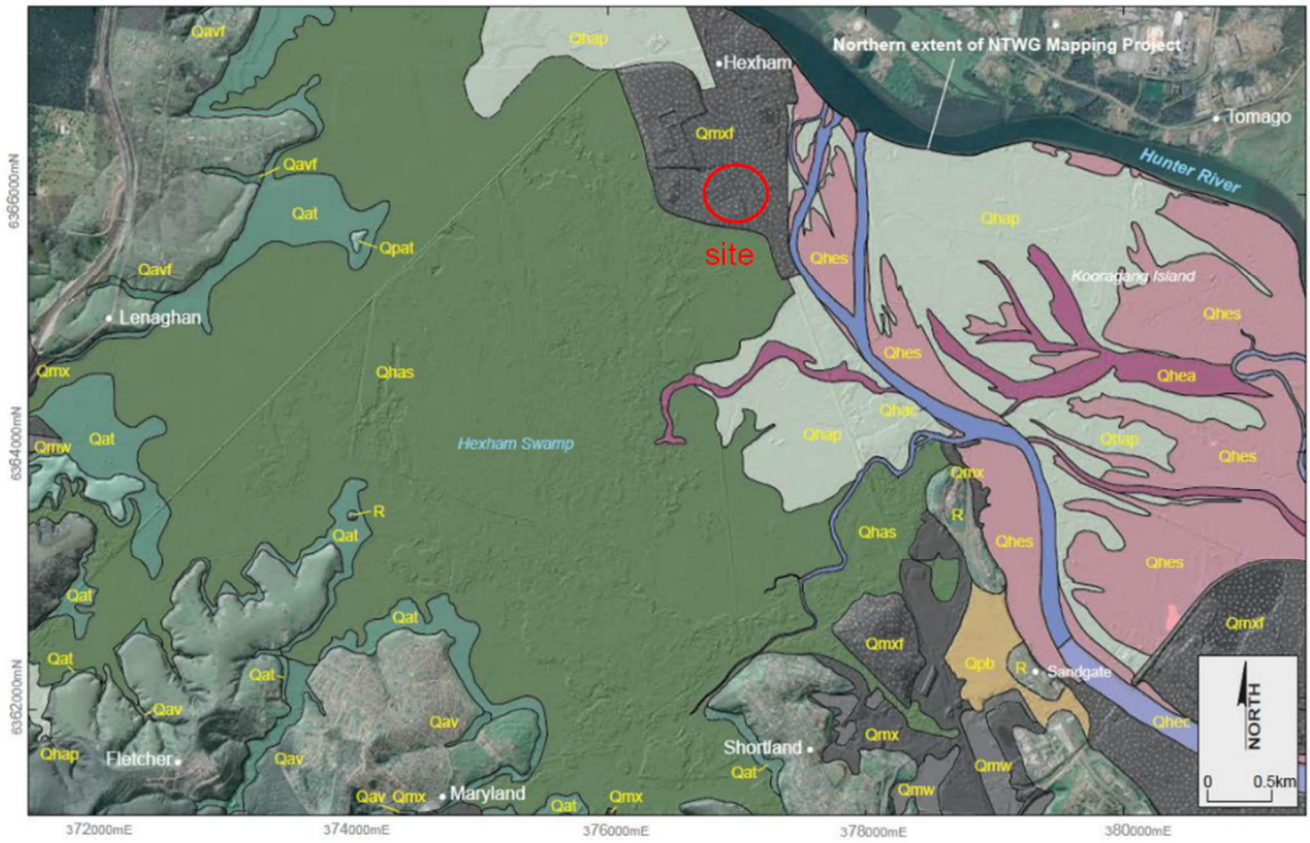


Figure 3.1: Underlying geology in the study area (Department of Industry, 2015 report as cited by Aurizon 2018)

Within the greater Hunter Valley, soils are typically duplex with discernible soil horizons that relate to weathering of the parent rock. Archaeologist often classify these soil horizons as A, B, and C Horizons. Topsoils are typically classified as the A horizon and are known to most typically contain Aboriginal objects. B horizon soils are subsoils and may contain Aboriginal objects at the interface with the A horizon. The C horizon is the parent rock. In the Hunter Valley, these soils typically comprise fine grained sand, slit, and clay fluvial deposits. This alluvium is derived from erosion of Bringelly Shale and may be suited to the preservation of chronologically discrete archaeological deposits. Although the study area has been disturbed it can be assumed that these soil horizons were previously present across the study area.

Important to note is the presence of Acid Sulphate Soils (ASS) which are naturally occurring sediments and soils containing iron sulphides (principally iron sulphide or iron disulphide or their precursors). A review of the ASS risk maps from the Australian Soil Resource Information System (ASRIS) database demonstrates that the study area sits within a zone of 'High Probability'.

3.3 Climate and Vegetation

The climate of the study area typically ranges from a minimum average temperature of 1 degree Celsius, to a maximum average of 43 degrees Celsius (Aurizon Operations Ltd 2018). It is typically warm, or warm to hot with humid summers and cool to mild winters. Annual rainfall is an average of 1155mm.

Hexham Swamp is the largest freshwater swamp on the north coast of NSW (NSW National Parks and Wildlife Service 2008). In the 1970 the swamp contained 11 of the 14 types of coastal wetland types found in NSW (NSW National Parks and Wildlife Service 2008, p. 9). Vegetation patterns of the area are relatively unknown prior to European settlement, however in 1978 the swamp was described as four main zones:

- The south-east zone - predominantly saltmarsh and mangroves. Dominated by grey mangrove, red samphire (*Sarcocornia quinqueflora),* saltwater couch, and paspalum.

- The central portion - predominantly a reed community dominated by *Fimbristylis ferruginea* with minor areas of the common reed (*Phragmites australis).*
- The upper reaches – described as freshwater meadows and seasonal freshwater swamps. Most diverse area and is dominated by cumbungi (*Typha australis*) and many other freshwater species, for example, water hyacinth (Eichhornia crassipes).
- To the north-west - freshwater grassy swamps consisting of submerged aquatic plants, reeds, paspalum, *Eleocharis spp*. and other agricultural fodder plants.

Hexham Swamp currently appears to be dominated by one single community, the reed *Phragmites*.

4. Cultural Context

4.1 Historical Land use

The Hunter Valley was settled by Europeans from 1804 when the Hunter River was used as an outpost for punishment for prisoners who had re-offended. The area subsequently developed into an agricultural area with a farming and dairy industry. The 2019 study area played a significant role within the coal industry from the 1930s onwards. In the mid-1930s coal preparation occurred on the site, and only increased in 1955 with the construction of a coal washery. The processing and washing of coal continued until 1967.

4.2 Aboriginal Context

4.2.1 Regional Context

Occupation of Australia has been established to have occurred over 60,000 years ago. Although Australia is a Late Pleistocene occupied continent, there are few sites dated to this age especially on the Eastern coastal strip. Well known Late Pleistocene sites occur within the Cumberland Plain, where occupation comes primarily from fluvial sand bodies next to the Parramatta and Hawkesbury Rivers (McLaren et al. 2018), with sites such as Shaws Creek KI and KII demonstrating human occupation from 15,000 years onwards (Williams et al. 2012).

Within the Central Lowlands of the Hunter Valley Aboriginal occupation commonly dates and/ or is associated with the Late Holocene Period around 3,000- 5,000 years ago (calibrated before present) (Hughes et al. 2014, p. 35). The sites that are common are open sites with surface scatters and lithics/ stone tools as the dominant archaeological material.

4.2.2 Ethnohistory

As in many places throughout Australia, there is not a significant amount of systematically recorded ethnographic accounts of Aboriginal people. Additionally, it is important to recognise that the accounts that do exist are not necessarily accurate or objective reflections of encounters with Aboriginal people.

The Pambalong (also known as the Bambalong) tribe have been recorded as occupying the Hexham Swamp area (Gunson 1974, p. 30). Due to mixed accounts, it is unclear whether the Pambalong were a sub-group of the Awabakal group or a separate group entirely. Threlkeld (1892) provides detailed ethnographic information on the Awabakal who are suggested to have occupied the Newcastle area (refer to Figure 4.1).

Hexham Swamp is referred to by local Aboriginal people as Burraghihnbihng (Dangar 1826 as cited in Hartley 1995, p. 87). There are some accounts which provide brief descriptions of the environment prior to European clearing. Hartley (1995) described the presence of Paperbark species surrounded by the shallow swamp margins, with these margins contained reeds, casuarinas, and a mix of eucalyptus undergrowth.

Other accounts in the area include James Askew, who in the early 1850s described an Aboriginal male as an '*old native, the last of his tribe, wall-eyes and nearly blind*', continuing on to describe him as a man of '*frankness and intelligence, [whose] wants were abundantly supplied by a few individuals residing near the river, on whose banks he spent much of his time basking in the sunshine.*' (Askew 1857, p. 298- 230).

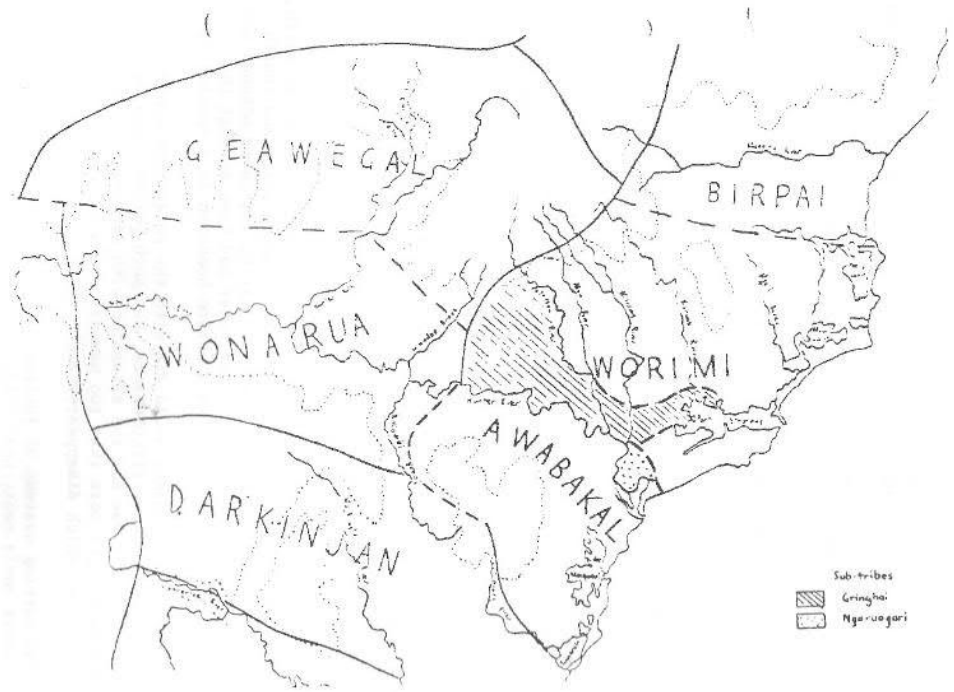


Figure 4.1: Tribes and their territories in the Hunter Valley (Wonnarua People 2014)

4.2.3 Social Organisation, Subsistence

The Awabakal were divided into several clan groups which had their country in different areas (refer to Figure 4.2). The clans were divided between the lands of the Pambalong (or Swamps District), Ash Island, Kurungbong, and Lake Macquarie. Each land allowed its clan to look for food and materials for tools and weapons. Specifically, in relation to the study is Ironbark Creek. This is an area which not only provided Aboriginal people with good resources, but also contained a knob or hillcrest. The knob was and still is highly significant spiritual area to Aboriginal people today.

The language of these tribes of the Awabakal group, as well as the wider region is called Worimi. It is part of the Pama- Nyungan languages (Dixon 2002).

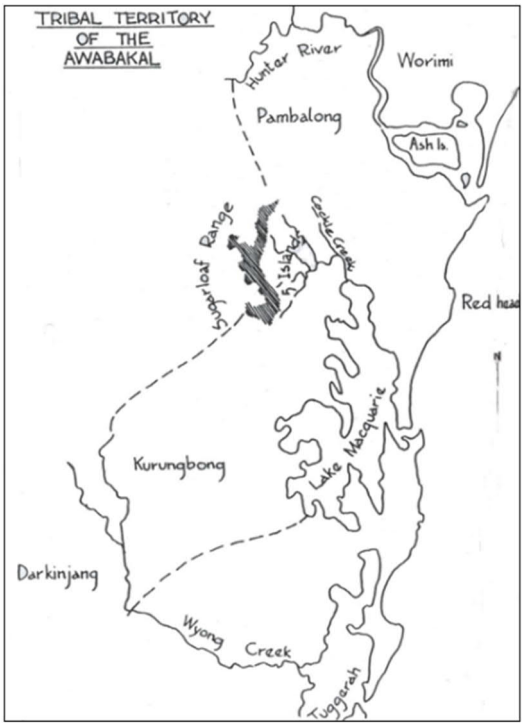


Figure 4.2: Tribal Territory of the Awabakal (Wonnarua People 2014)

4.3 Archaeological Context

4.3.1 Aboriginal Heritage Information Management System (AHIMS)

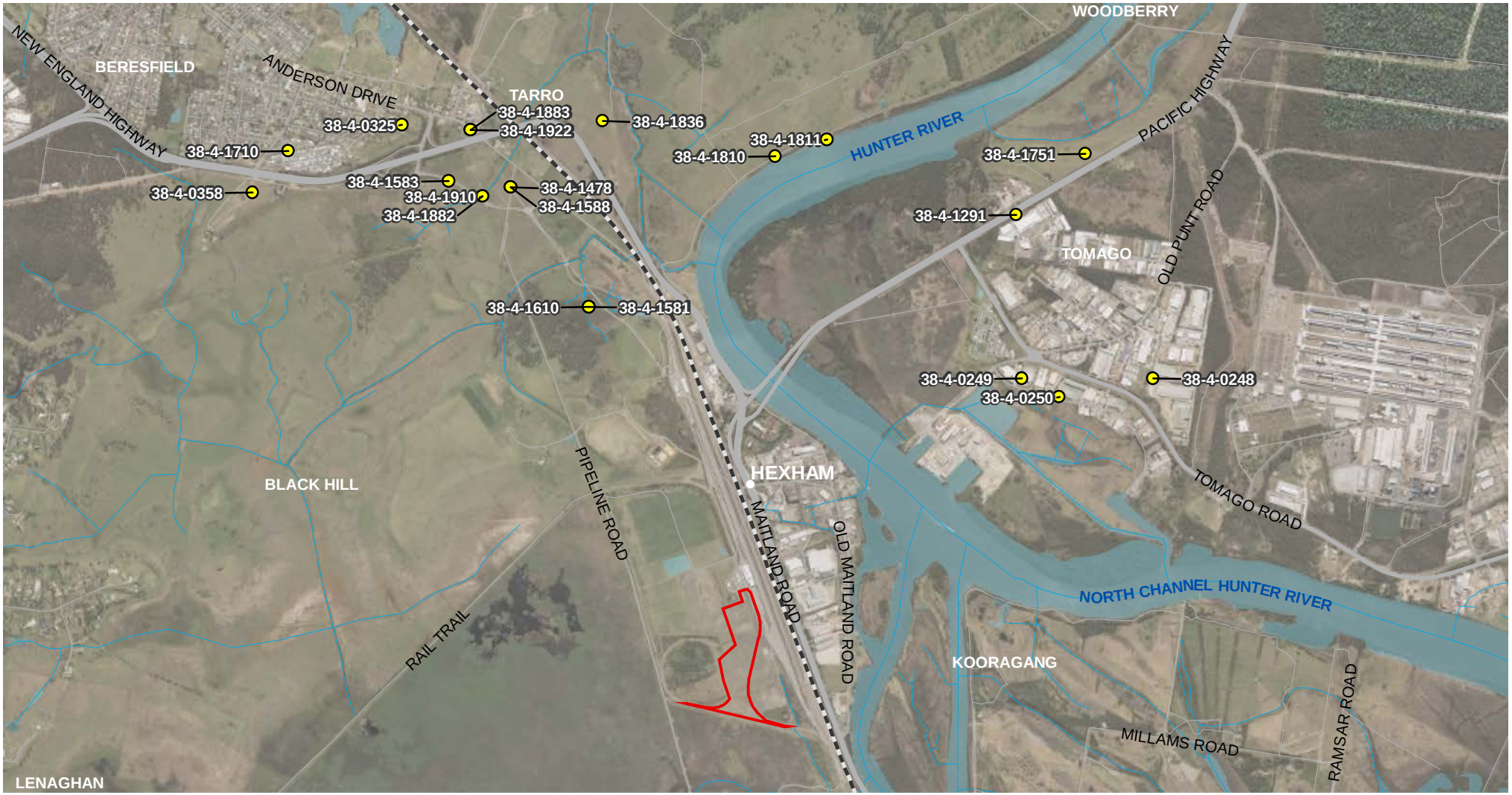
A search of Aboriginal objects, sites and places registered on the AHIMS within the study area was obtained on 22 January 2019. The search was conducted by Deborah Farina (Senior Archaeologist, Jacobs) and had a 2.5 km radius around the study area. No Aboriginal sites, objects or places were registered directly within the study area. However, 20 sites were registered on the northern and southern portion of Hexham swamp, reemphasising the theory that the ridges of the swamp were more favourable for Aboriginal occupation (refer to Figure 4.3). Table 4.1 below provides a list of AHIMS sites within the broader search area.

Table 4.1: AHIMS sites within 2.5km of the study area

AHIMS ID	Site Name	Datum	Coordinates (Zone 56) Eastings	Coordinates (Zone 56) Northings	Site Features	Site type
38-4-1291	RPS PHWY AS2	GDA	378274	6368460	Artefact: 8	
38-4-1751	HEXHAM M1RT 1	GDA	378643	6368784	Artefact: 1, Potential Archaeological Deposit (PAD): -	
38-4-1478	HS1 (Hexham Swamp 1)	GDA	375585	6368606	Artefact: -, Shell: -	
38-4-1610	HS PCD 1 (not a site)	GDA	376000	6367970	Potential Archaeological Deposit (PAD): 1	

AHIMS ID	Site Name	Datum	Coordinates (Zone 56) Eastings	Coordinates (Zone 56) Northings	Site Features	Site type
38-4-1583	HS2A	GDA	375255	6368640	Artefact: 3	
38-4-1588	HS 1	GDA	375585	6368606	Artefact: -, Shell: -	
38-4-1581	HS PCD 1(not a site)	GDA	376000	6367970	Potential Archaeological Deposit (PAD): -	
38-4-1710	TB IF2	GDA	374400	6368800	Artefact: -	
38-4-0358	Glenrowan;	AGD	374105	6368390	Artefact: -, Potential Archaeological Deposit (PAD): -	Open Camp Site
38-4-0249	T8;	AGD	378200	6367400	Artefact: -	Open Camp Site
38-4-0250	T8_A_(T9);	AGD	378400	6367300	Artefact: -	Open Camp Site
38-4-0325	Tarro;	AGD	374900	6368750	Artefact: -	Open Camp Site
38-4-0248	T7;	AGD	378900	6367400	Artefact: -	Open Camp Site
38-4-1910	Richmond Vale Rail Trail Isolated Find 2	GDA	375434	6368558	Artefact: -, Shell: -	
38-4-1922	Richmond Vale Rail Trail Isolated Find 3 (RVRT IF3)	GDA	375371	6368912	Aboriginal Resource and Gathering: -	
38-4-1810	Hunter River Isolated Find 1	GDA	376994	6368773	Artefact: 1, Potential Archaeological Deposit (PAD): 1	
38-4-1811	Hunter River PAD	GDA	377268	6368862	Potential Archaeological Deposit (PAD): 1	

AHIMS ID	Site Name	Datum	Coordinates (Zone 56) Eastings	Coordinates (Zone 56) Northings	Site Features	Site type
38-4-1882	RVRT IF2	GDA	375434	6368558	Art (Pigment or Engraved): 1	
38-4-1883	RVRT IF3	GDA	375371	6368912	Art (Pigment or Engraved): 1	
38-4-1836	Purgatory Creek 1	GDA	376073	6368959	Artefact: 1	



Legend

- AHIMS site
- Project boundary
- Major road
- Local road
- Main North Railway
- Waterway
- Waterbody

0 0.5 1 km

1:30,000 at A4

Data sources

NSW Spatial Services 2019
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Figure 4.3 AHIMS results in vicinity of study area

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4.3.2 Previous Archaeological Investigations

Previous investigations within the greater region have included reports by Dean-Jones and Mitchell (1993), Kuskie (2000), and Haglund (1999). They have highlighted a trend in site type and location across the region as well as the bias that occurs when focusing on certain landforms. These previous investigations have viewed that open camp sites are the dominant site type, closely followed by isolated finds. Other site types within the region include grinding grooves, scarred trees, rock shelters, shelters with art and burials although all of these site types occur to a lesser extent. The majority of sites seems to be located 50 metres from water, followed by sites located over 100 metres from water. This pattern of location appears to contradict the accepted site location theory where the majority of sites are located within 50 metres of a water sources.

In relation to the current study area, two previous Aboriginal archaeological assessments have been conducted. Their findings are as follows:

AMBS (2013)

AMBS (2013) was commissioned by Upper Hunter Valley Alliance UHVA to undertake an archaeology test excavation for the Hexham Relief Roads Project. The excavations were located on an alluvial plain near the margins of Hexham Swamp (north of the 2019 study area). Site distribution was predicted as:

- likely to be located within 200m of water sources, and on the margins of Hexham Swamp;
- some sites likely to have high numbers of artefacts, particularly if located on the margins of Hexham Swamp or the Hunter River; and
- some may occur within flat, open depression, simple slope and crest formations.

Furthermore, sites were predicted to contains flaked stone artefacts such as flakes and cores, often made from raw material such as silcrete and Indurated Mudstone/Tuff/Chert (IMTC), with smaller amounts of quartz and other materials. The excavation confirmed the prediction that the northern section of the study area was less favourable for occupation as it is low lying and water logged. Rather than using the swamp plain for occupation, the swamp edges would have supported long-term camping, while the plain would have provided rich resources.

McCardle Cultural Heritage Pty Ltd (2012)

The study area for the McCardle Cultural Heritage Pty Ltd (2012) report overlays with the current study area, with an extra extension north into land which was not part of the coal washing facility. The northern section is referred to as Survey Unit 1 and is a low-lying swamp/ flat which has been previously cleared for agricultural purposes and remains pasture land. The southern section is referred to as Survey Unit 2 and this is land which has had extensive land use, used as a coal stock pile and coal washery, which has meant the original landform has been significantly modified. The McCardle assessment of the Hexham region aimed to assess whether any Aboriginal material would be uncovered during construction of the TSF. The 2012 report provides a variety of site type and location predictions for archaeological material for the broader Central Lowlands of the Hunter Valley region. These predictions take into account previous archaeological reports and can be summarised as follows:

- a wide variety of site types are represented in the broader region with open campsites and isolated artefacts by far the most common;
- lithic artefacts are primarily manufactured from mudstone and silcrete with a variety of other raw materials also utilised but in smaller proportions;
- site numbers and artefact volumes are greatest within close proximity to water;
- there appears to be a secondary peak in site numbers and artefact volumes at distances over 100 metres from water; and
- creek lines, crest/ridges and slopes are the most archaeologically sensitive landforms.

Furthermore, McCardle Cultural Heritage Pty Ltd (2012) provides a more specific predictive model for Survey Unit 1, which was to the north of the Hexham TSF:

- Artefact scatters are the most common site type encountered within Survey Unit 1 and increase in numbers and density on low gradient landforms bordering wetlands and watercourses such as simple slopes, basal slopes and ridge crests/spur crests;
- Surface artefact scatters are generally low in numbers and density, but are not an indication of the numbers and density of any subsurface artefacts;
- Subsurface artefacts are typically located in the topsoil and shallow "A" horizons. Because of this, artefacts are particularly subject to post depositional processes, therefore affecting the integrity of a site;
- Isolated finds may be encountered in any landform;
- Middens may be found along the margins of the wetlands, but post-depositional processes may not have been favourable to their preservation. The potential for them to occur in the study area is considered low; and
- Other site types whose potential to occur is low include scarred trees, mythological/traditional sites, quarry sites, scarred trees and stone arrangements.

Of particular relevance to the current study area, McCardle assessed the current study area (Survey Unit 2) as being disturbed with none of the original landforms remaining (McCardle, 2012: 13).

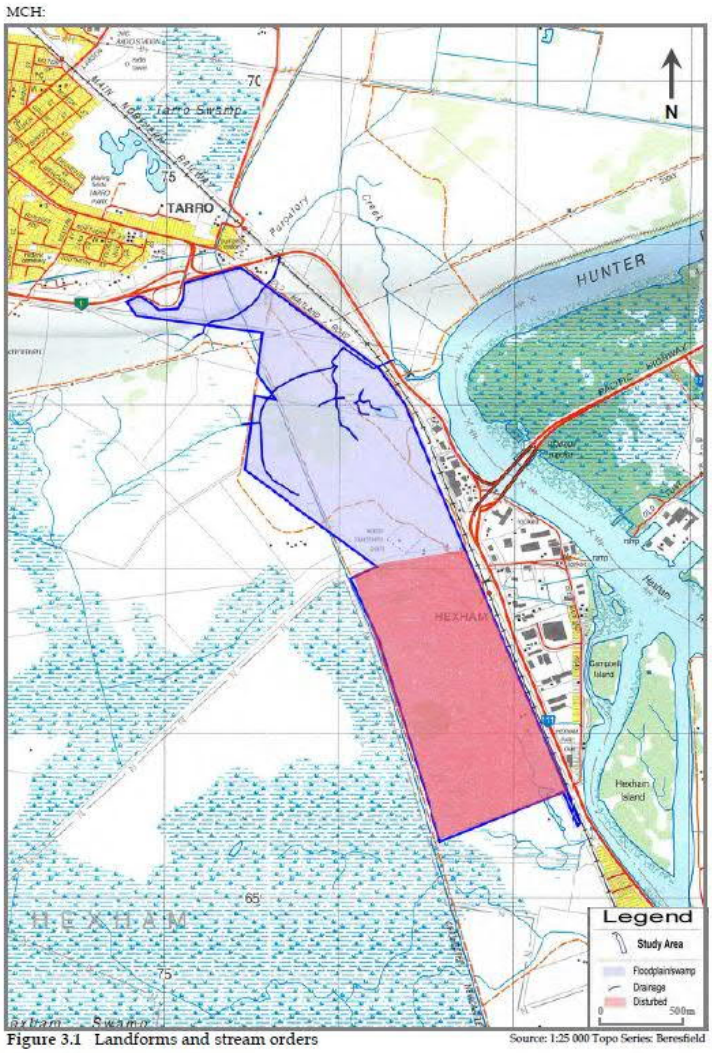

Figure 4.4: Previous archaeological assessment of the study area by McCardle (Figure reproduced from McCardle, 2012: 14)

4.4 Predictive Modelling

A review of previous archaeological reports suggests there is potential for Aboriginal archaeological sites, objects and deposits in certain landscape contexts to the north of the Hexham TSF. However, the current study area has been assessed to be significantly disturbed and has limited potential for Aboriginal objects or sites.

5. Site Visit

5.1 Timing and Personnel

An inspection of the site was undertaken by Jacobs archaeologists Clare Leevers and Alexandra Seifertova on 24 January 2018 with Aurizon representative, Harry Egan.

5.2 General Physical Context

The weather on the day of the site survey was dry with cloud cover. The general landscape was dry yet lush. The general landscape is used as pastoral land which is reflected in the grazed vegetation.

The study area was accessed via an unformed road which bounds the study area on its western side. The land is used as pastoral land for dairy cow and is heavily eroded in some locations (refer to Figures 5.1 and 5.2).

Located on the boundary of the study area are two large coal tailings fill spoil piles as can be seen in Figures 5.3 and 5.4. The spoil piles provide an indication of the amount of coal that was left during historical occupation of the site, as well as indicate that the landform across the study area has been completely modified.

The presence of these spoil piles and the knowledge that the entire landscape has had decades of coal deposition emphasises the destruction of the original landform.

Mixed in within the coal refuse is the presence of whole and fragmented shell as can be seen in Figure 5.5. This material is understood to have been brought in with bedding sand dredged from the Swansea Channel as fill material.

Also observed within the study area was the frequent occurrence of historical material such as timber, which may have been from the old turning circle (refer to Appendix C). Metal nails of varying size where also present, often pressed into the earth. Alongside this, on the southern section of the study area two stormwater inlets exist to assist during times of flooding (refer to Appendix C).

Figure 5.1: Study area used as pastoral land (Source: Jacobs, 2019)

Figure 5.2: Study area with eroded section (Source: Jacobs, 2019)

Figure 5.3: Coal tailings fill located on the outside of the study area boundary. Extent of coal is visible through erosion (Source: Jacobs, 2019)

Figure 5.4: Coal tailings fill located on the outside of the study area boundary (Source: Jacobs, 2019)

Figure 5.5: Prescence of shell material within the study area (Source: Jacobs, 2019)

5.3 Results

No new Aboriginal archaeological sites or objects were identified during the site visit. Examination of the study area confirmed that there are also no previously recorded Aboriginal sites within the area. Sites located in AHIMS are located on the boundaries of the swamp plain, predominantly to the north of the study area which is an area previously highlighted as containing potential objects and sites.

The study area was assessed to have a low potential for the presence of Aboriginal archaeological material. As the area was used as a coal production facility and a washery for over 30 years, the original landscape has been significantly modified and there is a low chance of any Aboriginal objects or sites remaining.

6. Impact Assessment

6.1 Potential Impacts

Excavation works for railway track foundation and ballast required for the construction of;

- approximately 1.5km of rail track and associated signal and turnout infrastructure comprising:
  - a single track straight of approximately 400m in length extending from the existing rail yard to the proposed turning angle;
  - a turning angle with two arcs approximately 250m in length and a straight of approximately 275m;
  - two 85m straight single tracks at either end of the turning angle;
  - four tangential turnouts;
- vehicular access tracks and associated lighting;
- installation of culverts within existing drainage channels, under the rail track and access tracks; and
- Associated civil and storm water works.

Given the absence of any Aboriginal objects, sites or places and the very low potential for such objects the impact of the proposed works is considered extremely low.

7. Conclusions and Recommendations

No Aboriginal sites, objects, or PADs were identified within the study area. Given the destruction of the original landform and the disturbance caused by historical land use of the area, it is highly unlikely that the proposed works would harm any identified or potential Aboriginal objects. There is a low potential for any Aboriginal objects or places to exist within the study area. No further archaeological assessment is therefore considered necessary prior to the commencement of works.

The following recommendations are made if Aboriginal objects or sites are unexpectedly found during excavation:

- All activity in the vicinity of the find should cease immediately. Aboriginal objects are protected by the *National Parks and Wildlife Act 1974*. It is an offence under the NPW Act 1974 to disturb or destroy an Aboriginal object without an AHIP. A qualified archaeologist should be contacted to assess the find and the OEH and the Local Aboriginal Land Council (LALC) notified.
- If human remains, or suspected human remains, are found during excavation, all work in the vicinity should cease immediately, the site should be secured and the NSW Police and the OEH should be notified.

8. Reference List

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Appendix A. AHIMS Basic Search

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : HEXHAM 2

Client Service ID : 394007

Jacobs Group (Australia) Pty Ltd - North Sydney

Date: 22 January 2019

Level 7 177 Pacific Highway
North Sydney New South Wales 2060

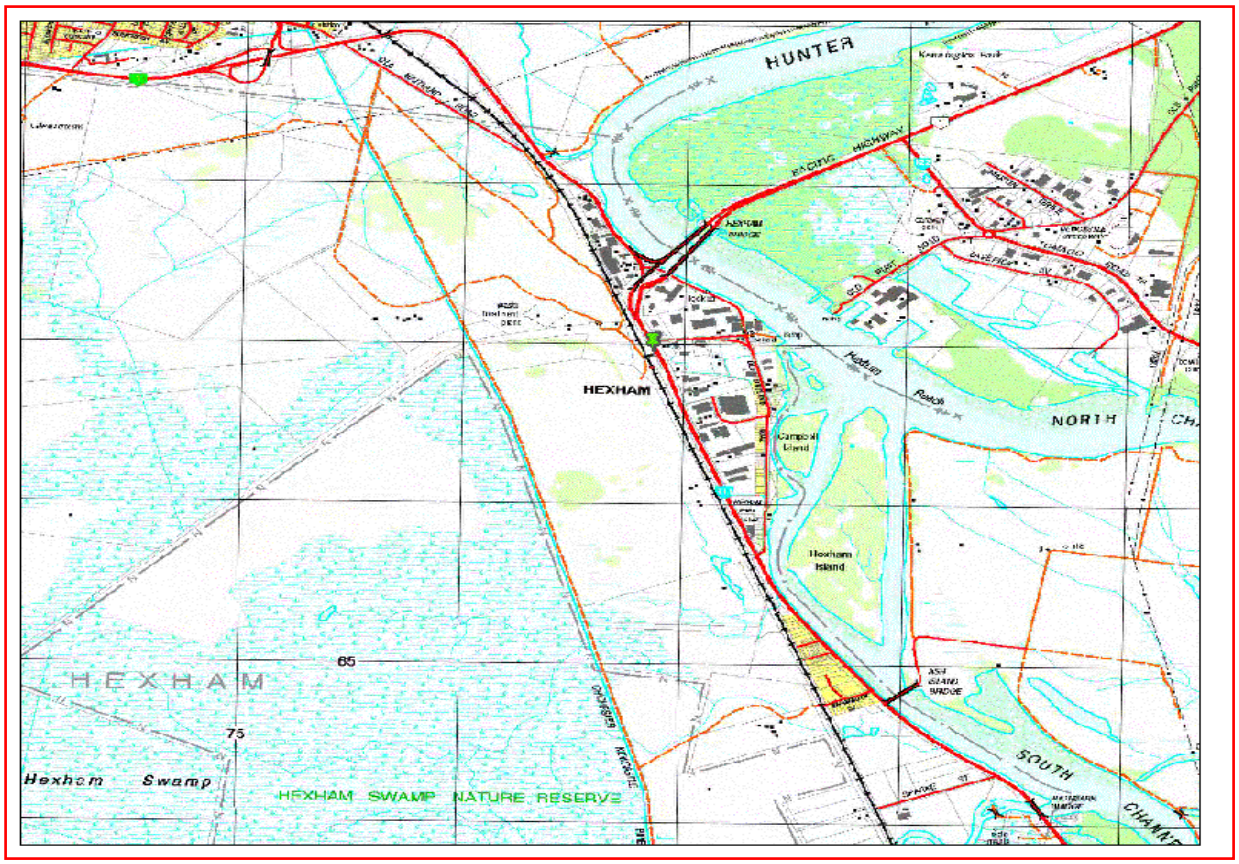
Attention: Deborah Farina

Email: deborah.farina@jacobs.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 374168 - 379168, Northings : 6363944 - 6368944 with a Buffer of 50 meters, conducted by Deborah Farina on 22 January 2019.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

20	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

Appendix B. AHIMS Extensive Search

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : HEXHAM 2

Client Service ID : 394007

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
38-4-1291	RPS PHWY AS2	GDA	56	378274	6368460	Open site	Valid	Artefact : 8		
	Contact	**Recorders**	RPS Australia East Pty Ltd -Hamilton,Miss.Philippa Sokol					**Permits**		
38-4-1751	HEXHAM M1RT 1	GDA	56	378643	6368784	Open site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Andrew Costello					**Permits**		
38-4-1478	HS1 (Hexham Swamp 1)	GDA	56	375585	6368606	Open site	Valid	Artefact : -, Shell : -		
	Contact	**Recorders**	Mrs.Jenna Weston,Mrs.Jenna Weston					**Permits**	3761	
38-4-1610	HS PCD 1 (not a site)	GDA	56	376000	6367970	Open site	Deleted	Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Ms.Penny McCardle					**Permits**		
38-4-1583	HS2A	GDA	56	375255	6368640	Open site	Destroyed	Artefact : 3		
	Contact	**Recorders**	Extent Heritage Pty Ltd - Pyrmont,Mrs.Jenna Weston					**Permits**	3761,3888	
38-4-1588	HS 1	GDA	56	375585	6368606	Open site	Valid	Artefact : -, Shell : -		
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting),Mrs.Jenna Weston					**Permits**		
38-4-1581	HS PCD 1(not a site)	GDA	56	376000	6367970	Open site	Not a Site	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Ms.Penny McCardle					**Permits**		
38-4-1710	TB IF2	GDA	56	374400	6368800	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd - Pyrmont,Extent Heritage Pty Ltd - Pyrmont,Miss.Stacey K					**Permits**	3761	
38-4-0358	Glenrowan;	AGD	56	374105	6368390	Open site	Partially Destroyed	Artefact : -, Potential Archaeological Deposit (PAD) : -	Open Camp Site	102568
	Contact	**Recorders**	Mr.Gordon Atkinson,Extent Heritage Pty Ltd - Pyrmont					**Permits**	3761	
38-4-0249	T 8;	AGD	56	378200	6367400	Open site	Valid	Artefact : -	Open Camp Site	1845,102116,102568
	Contact	**Recorders**	Pam Dean-Jones					**Permits**		
38-4-0250	T 8_A_(T9);	AGD	56	378400	6367300	Open site	Valid	Artefact : -	Open Camp Site	1845,102116,102568
	Contact	**Recorders**	Pam Dean-Jones					**Permits**	3993	
38-4-0325	Tarro;	AGD	56	374900	6368750	Open site	Valid	Artefact : -	Open Camp Site	102568
	Contact	**Recorders**	Pam Dean-Jones					**Permits**		
38-4-0248	T 7;	AGD	56	378900	6367400	Open site	Valid	Artefact : -	Open Camp Site	1845,102116,102568
	Contact	**Recorders**	Pam Dean-Jones					**Permits**		
38-4-1910	Richmond Vale Rail Trail Isolated Find 2	GDA	56	375434	6368558	Open site	Not a Site	Artefact : -, Shell : -		

Report generated by AHIMS Web Service on 22/01/2019 for Deborah Farina for the following area at Datum :GDA, Zone : 56, Eastings : 374168 - 379168, Northings : 6363944 - 6368944 with a Buffer of 50 meters. Additional Info : As part of an archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 20

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : HEXHAM 2

Client Service ID : 394007

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Artefact - Cultural Heritage Management ,Mr.ryan taddeucci					Permits		
38-4-1922	Richmond Vale Rail Trail Isolated Find 3 (RVRT IF3)	GDA	56	375371	6368912	Open site	Not a Site	Aboriginal Resource and Gathering : -		
	Contact	Recorders	Artefact - Cultural Heritage Management ,Mr.ryan taddeucci					Permits		
38-4-1810	Hunter River Isolated Find 1	GDA	56	376994	6368773	Open site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Virtus Heritage ,Mrs.Mary-Jean Sutton					Permits		
38-4-1811	Hunter River PAD	GDA	56	377268	6368862	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Virtus Heritage ,Mrs.Mary-Jean Sutton					Permits		
38-4-1882	RVRT IF2	GDA	56	375434	6368558	Open site	Not a Site	Art (Pigment or Engraved) : 1		
	Contact	Recorders	Artefact - Cultural Heritage Management ,Mr.Duncan Jones					Permits		
38-4-1883	RVRT IF3	GDA	56	375371	6368912	Open site	Not a Site	Art (Pigment or Engraved) : 1		
	Contact	Recorders	Artefact - Cultural Heritage Management ,Mr.Duncan Jones					Permits		
38-4-1836	Purgatory Creek 1	GDA	56	376073	6368959	Open site	Valid	Artefact : 1		
	Contact	Recorders	Jacobs Group (Australia) Pty Ltd - Newcastle,Mr.Andy Roberts					Permits		

Report generated by AHIMS Web Service on 22/01/2019 for Deborah Farina for the following area at Datum :GDA, Zone : 56, Eastings : 374168 - 379168, Northings : 6363944 - 6368944 with a Buffer of 50 meters. Additional Info : As part of an archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 20

Appendix C. Photos of Study Area

Legend for Figure 8.1	Description	Photo
A	Access to study area.	
B	Drainage present within study area. Located on the southern side.	

Legend for Figure 8.1	Description	Photo
C	Evidence of erosion of vegetation and soil by cows.	
D	Facing the north-east section of the study area. The location of the locomotives is approximately where one arm of the new turning circle/ angle will be located.	

Legend for Figure 8.1	Description	Photo
E	Concrete footings are present just outside of the study area.	
F	presence of natural angular stone fragments.	

Legend for Figure 8.1	Description	Photo
G	Southern section of the turning circle/ angle. Landscape is heavily eroded.	

Legend

X Photo location, direction and ID

Project boundary

Main North Railway

0 150 300 m

1:6,000 at A4

N

Data sources

Jacobs 2019

GDA94 MGA56

Figure 8.1 Map showing location of photos in Appendix C

Date: 26/02/2019 Path: F:\Data\GIS\Projects_NO_I_DRIVE\IA208200 - Hexham Train Support Facility\22_Spatial\GIS\Directory\Templates\Figures\IA208200_GIS_F004_DD_PhotoLocations_r1v1.mxd
Created by : KM | QA by : HK