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Sydney Metro – Western Sydney Airport

Technical Paper 4
Non-Aboriginal heritage

Sydney Metro - Western Sydney Airport

Technical Paper 4: Non-Aboriginal heritage

Report to Sydney Metro Authority

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EXECUTIVE SUMMARY

The *Greater Sydney Region Plan*[1] sets the vision and strategy for Greater Sydney to become a global metropolis of three unique and connected cities; the Eastern Harbour City, the Central River City and the Western Parkland City. The Western Parkland City incorporates the future Western Sydney International (Nancy-Bird Walton) Airport (hereafter referred to as Western Sydney International) and Western Sydney Aerotropolis (hereafter referred to as the Aerotropolis).

Sydney Metro – Western Sydney Airport (the project) is identified in the *Greater Sydney Region Plan* as a key element to delivering an integrated transport system for the Western Parkland City. The project would be located within the Penrith and Liverpool Local Government Areas (LGAs) and would involve the construction and operation of a new metro railway line around 23 kilometres in length between the T1 Western Line at St Marys in the north and the Aerotropolis in the south. This would include a section of the alignment which passes through and provides access to Western Sydney International.

The project is characterised into components that are located outside Western Sydney International (off-airport) and components that are located within Western Sydney International (on-airport), to align with their different planning approval pathways required under State and Commonwealth legislation.

Sydney Metro has sought for the project to be declared as State significant infrastructure and critical State significant infrastructure under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The project assessment has been divided into two areas – off-airport and on-airport. Determination for the project within on-airport lands would occur under the Commonwealth *Airports Act 1996.*

Off-airport summary of heritage impacts

The project would be located within, or in close proximity to, a number of listed and potential heritage items. This Technical Paper has assessed the potential direct, indirect, archaeological, vibration/settlement, and cumulative impacts to listed and potential heritage items and non-Aboriginal archaeological sites. The Aboriginal heritage assessment is provided in a Technical Paper 5 – Aboriginal Heritage of the Environmental Impact Statement.

Potential impacts to non-Aboriginal heritage items and archaeological sites located in or near the off-airport construction footprint for the project are outlined in the table below. The archaeological assessment for this Technical Paper identified potential archaeological remains at St Marys construction site only.

Item	Construction site	Listing	Significance	Impacts to Significance
St Marys Railway Station Group	St Marys	State Heritage Register (SHR) no. 01249 RailCorp s170 State Heritage Inventory (SHI) no. 4801036 Penrith Local Environment Plan (LEP) 2010 I282	State	Moderate

[1] Greater Sydney Commission 2018. *Greater Sydney Region Plan*.

Item	Construction site	Listing	Significance	Impacts to Significance
Queen Street Post-War Commercial Building	St Marys	Potential	Local	Negligible
St Marys Munitions Workers Housing	St Marys	Potential	Local	Negligible
Milestone	Claremont Meadows services facility	Penrith LEP 2010 I859	Local	Nil
Four winds	Claremont Meadows services facility	Penrith LEP 2010	Local	Nil
Brick house	Claremont Meadows services facility	Penrith LEP 2010	Local	Nil
Luddenham Road Alignment	Luddenham Road	Penrith LEP 2010	Local	Minor
Warragamba Supply Scheme	Off-airport corridor	WaterNSW s170 (SHI# 4580161)	State	Minor
Kennett's Airfield	Off-airport corridor	Potential	Possibly local	Major
McGarvie-Smith Farm	Off-airport corridor	Penrith LEP 2010 I857	Local	Major
McMaster Farm	Off-airport corridor	Potential	Local	Moderate
Former OTC Site Group	Aerotropolis Core	Liverpool LEP 2008 I5 Register of the National Estate (ID 100263)	Local	Nil
Two Water Tanks	Aerotropolis Core	Liverpool LEP 2008 I4	Local	Nil
Kelvin Park Group	Aerotropolis Core	SHR 00046 Liverpool LEP 2008 I8 Register of the National Estate (ID 3298)	State	Minor
Bringelly RAAF Base	Aerotropolis Core	Potential	Local	Major
Leeholme Horse Stud Rotunda	Permanent power supply route (Kemps Creek)	Penrith LEP 2010	Local	Nil

On-airport summary of heritage items

Non-Aboriginal heritage items and archaeological sites located in or near the on-airport construction footprint for the project are outlined in the table below.

Heritage item	Location	Listing details	Significance	Current status and management measures
Pennell's Property potential archaeological item	On airport corridor	Potential item, identified in Western Sydney International Environmental Impact Statement	Potentially local	Site removed under approved *Airport Plan*
Badgerys Creek Public School	On airport corridor and Airport construction support site	Liverpool LEP 2008 I3.	Local	Public school removed under approved *Airport Plan*; demolished following completion of archival recording mitigation measures outlined in CEMP for the Western Sydney International Stage 1 project.
St Johns Anglican Church and Cemetery	Airport construction support site	Liverpool LEP 2008, I2.	Local	Church and cemetery removed under approved *Airport Plan*; demolished following completion of exhumation plan and archival recording mitigation measures outlined in CEMP for the Western Sydney International Stage 1 project.
Badgerys Creek Road alignment	Airport construction support site	Potential item, identified in Western Sydney International Environmental Impact Statement	Local	Road modified in Western Sydney International Stage 1 Construction Impact Zone and managed in accordance with mitigation measures outlined in the Western Sydney International CEMP. Remainder of site approved for removal under the *Airport Plan*.
Braeburn Homestead potential archaeological site	Airport construction support site	Potential item, identified in Western Sydney International Environmental Impact Statement	Potentially local	Site approved for removal under the *Airport Plan*.
Orange Hill Homestead potential archaeological site	Airport construction support site	Potential item, identified in Western Sydney International Environmental Impact Statement	Potentially local	Site approved for removal under the *Airport Plan*.
Spredenburg potential archaeological site	Airport construction support site	Potential item, identified in Western Sydney International Environmental Impact Statement	Potentially local	Site approved for removal under the *Airport Plan*.

Recommendations

Mitigations measures and recommendations that would be implemented to address potential impacts on non-Aboriginal heritage items and areas of archaeological potential are listed in the table below.

Ref	Mitigation measure	Applicable location(s)
Construction		
NAH1	Potential moveable heritage items would be identified and assessed and a significant fabric salvage schedule would be prepared by an appropriately qualified and experienced heritage specialist for St Marys Railway Station, Bringelly RAAF Base, McGarvie-Smith Farm, McMasters Farm and Kennett's Airfield. Significant fabric would only be salvaged if it can be salvaged in such a way that it can be reused and is likely to be able to be reused.	• St Marys construction site • Off-airport construction corridor • Aerotropolis Core construction site
NAH2	Heritage advice would be sought to develop solutions to manage potential ground movement impacts to the St Marys Goods Shed.	• St Marys construction site
NAH3	Archival recording of heritage items which would be impacted or that would have their setting altered, would be carried out in accordance with the NSW Heritage Office's *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006). The following items would be archivally recorded: • St Marys Railway Station • Kennett's Airfield • Luddenham Road Alignment • McMaster Farm • McGarvie-Smith Farm • Kelvin Park Group • Bringelly RAAF Base.	• St Marys construction site • Off-airport construction corridor • Luddenham Road construction site • Aerotropolis Core construction site
NAH4	Kennett's Airfield will be physically investigated during later investigation phases of the project to confirm heritage significance through an assessment of significance. Appropriate management and mitigation measures would then be determined	• Off-airport corridor construction
NAH5	Archaeological investigation would be conducted for archaeological sites which would be impacted by the project. A non-Aboriginal Archaeological Research Design would be prepared for the project which would outline further archaeological investigation required for the project.	• St Marys construction site

Ref	Mitigation measure	Applicable location(s)
NAH6	The following heritage items would be monitored for potential vibration impacts during works: • St Marys Railway Station Group • Queen Street Post-War Commercial Building • St Marys Munitions Workers Housing • McGarvie Smith Farm • McMaster Farm	• St Marys construction site • Off-airport construction corridor
NAH7	The St Marys Station jib crane would be temporarily relocated during works, safely stored and appropriately maintained and reinstated. A detailed methodology for the removal and reinstatement of the jib crane would be prepared in consultation with an appropriately qualified heritage advisor.	• St Marys construction site
NAH8	A dilapidation survey of the Warragamba pipeline item would be undertaken prior to works commencing in the vicinity of this item	• Off-airport construction corridor
NAH9	If suspected human remains or unexpected items of potential heritage significance are discovered within the on-airport area, all activity would cease and the unexpected / chance finds requirements specified in the Western Sydney Airport European and Other Heritage Construction Environmental Management Plan would be followed	• On-airport
Operation		
NAH10	Design development for the project would endeavour to minimise adverse impacts to heritage buildings, elements, fabric, and heritage significant settings and view lines that contribute to the overall heritage significance of all identified listed and potential heritage items	• Off-airport
NAH11	The architectural design for the project would take account local heritage context and be sympathetic to local heritage character. This would include using sympathetic building materials, colours and finishes Design should aim to minimise visual impacts by ensuring that significant elements are not obstructed or overshadowed	• Off-airport

Ref	Mitigation measure	Applicable location(s)
	Design should adhere to the Sydney Metro – Western Sydney Airport Design Guidelines The Design Review Panel and Heritage Working Group would be consulted in regard to the design, form and material of new built structures that may impact heritage items.	
NAH12	Consultation with the Heritage Council would occur for State significant items including for St Marys Railway Station and Kelvin / Kelvin Park Group.	• St Marys Station • Aerotropolis Core Station
NAH13	A Heritage Interpretation Strategy would be prepared for the project identifying key stories and interpretive opportunities related to non-Aboriginal heritage. The strategy would address historic and contemporary heritage and community values and would identify innovative and engaging opportunities for interpretation.	• Off-airport
NAH14	A conservation management plan would be prepared for St Marys Railway Station, in accordance with NSW Heritage Council guidelines. The plan would address any changes to the station, including updated assessment of significance of elements and recommendations on curtilage changes. It would also provide site specific exemptions and management policies.	• St Marys Station
NAH15	Heritage inventory registers for all heritage items modified by the project would be updated to document their change in condition following the completion of construction works for the project.	• All

CONTENTS

FIGURES

TABLES

1.0 INTRODUCTION

1.1 Project overview and context

The *Greater Sydney Region Plan*[2] sets the vision and strategy for Greater Sydney to become a global metropolis of three unique and connected cities; the Eastern Harbour City, the Central River City and the Western Parkland City. The Western Parkland City incorporates the future Western Sydney International and Aerotropolis.

The project (see Figure 1) is identified in the *Greater Sydney Region Plan* as a key element to delivering an integrated transport system for the Western Parkland City. The project would be located within the Penrith and Liverpool Local Government Areas (LGAs) and would involve the construction and operation of a new metro railway line around 23 kilometres in length between the T1 Western Line at St Marys in the north and the Aerotropolis in the south. This would include a section of the alignment which passes through and provides access to Western Sydney International.

The project is characterised into components that are located off-airport and components that are located on-airport, to align with their different planning approval pathways required under State and Commonwealth legislation.

1.2 Key Project features

Key operational features of the project would include:

- around 4.3 kilometres of twin rail tunnels (generally located side by side) between St Marys (the northern extent of the project) and Orchard Hills
- a cut-and-cover tunnel around 350 metres long (including tunnel portal), transitioning to an in-cutting rail alignment south of the M4 Western Motorway at Orchard Hills
- around 10 kilometres of rail alignment between Orchard Hills and Western Sydney International, consisting of a combination of viaduct and surface rail alignment
- around two kilometres of surface rail alignment within Western Sydney International
- around 3.3 kilometres of twin rail tunnels (including tunnel portal) within Western Sydney International
- around three kilometres of twin rail tunnels between Western Sydney International and the Aerotropolis Core
- six new metro stations:
    - four off-airport stations:
        - St Marys (providing interchange with the T1 Western Line)
        - Orchard Hills
        - Luddenham Road
        - Aerotropolis Core
    - two on-airport stations:
        - Airport Business Park
        - Airport Terminal

[2] Greater Sydney Commission 2018. *Greater Sydney Region Plan*.

- grade separation of the track alignment at key locations including:
  - where the alignment interfaces with existing infrastructure such as the Great Western Highway, M4 Western Motorway, Lansdowne Road, Patons Lane, the Warragamba pipelines, Luddenham Road, the future M12 Motorway, Elizabeth Drive, Derwent Road and Badgerys Creek Road
  - crossings of Blaxland Creek, Cosgroves Creek, Badgerys Creek and other small waterways to provide flood immunity for the project
- modifications to the existing Sydney Trains station and rail infrastructure at St Marys (where required) to support interchange and customer transfer between the new metro station and the T1 Western Line
- a stabling and maintenance facility and operational control centre located to the south of Blaxland Creek and east of the proposed metro track
- new pedestrian, cycle, park-and-ride and kiss-and-ride facilities, public transport interchange infrastructure, road infrastructure and landscaping as part of the station precincts.

The project would also include:

- turnback track arrangements (turnbacks) at St Marys and Aerotropolis Core to allow trains to turn back and run in the opposite direction
- additional track stubs to the east of St Marys Station and south of the Aerotropolis Core Station to allow for potential future extension of the line to the north and south respectively without impacting future metro operations
- an integrated tunnel ventilation system including service facilities at Claremont Meadows and Bringelly
- all operational systems and infrastructure such as crossovers, rail sidings, signalling, communications, overhead wiring, power supply, lighting, fencing, security and access tracks/paths
- retaining walls at required locations along the alignment
- environmental protection measures such as noise barriers (if required), on-site water detention, water quality treatment basins and other drainage works.

1.2.1 Off-airport project components

The off-airport components of the project would include the track alignment and associated operational systems and infrastructure north and south of Western Sydney International, four metro stations, the stabling and maintenance facility, two service facilities and a tunnel portal.

1.2.2 On-airport project components

The on-airport components of the project would include the track alignment and associated operational systems and infrastructure within Western Sydney International, two metro stations and a tunnel portal. The on-airport components will be subject to approvals from the Commonwealth.

The key project features and the design development process are described in more detail in Chapter 7 (project description – operation) of the Environmental Impact Statement

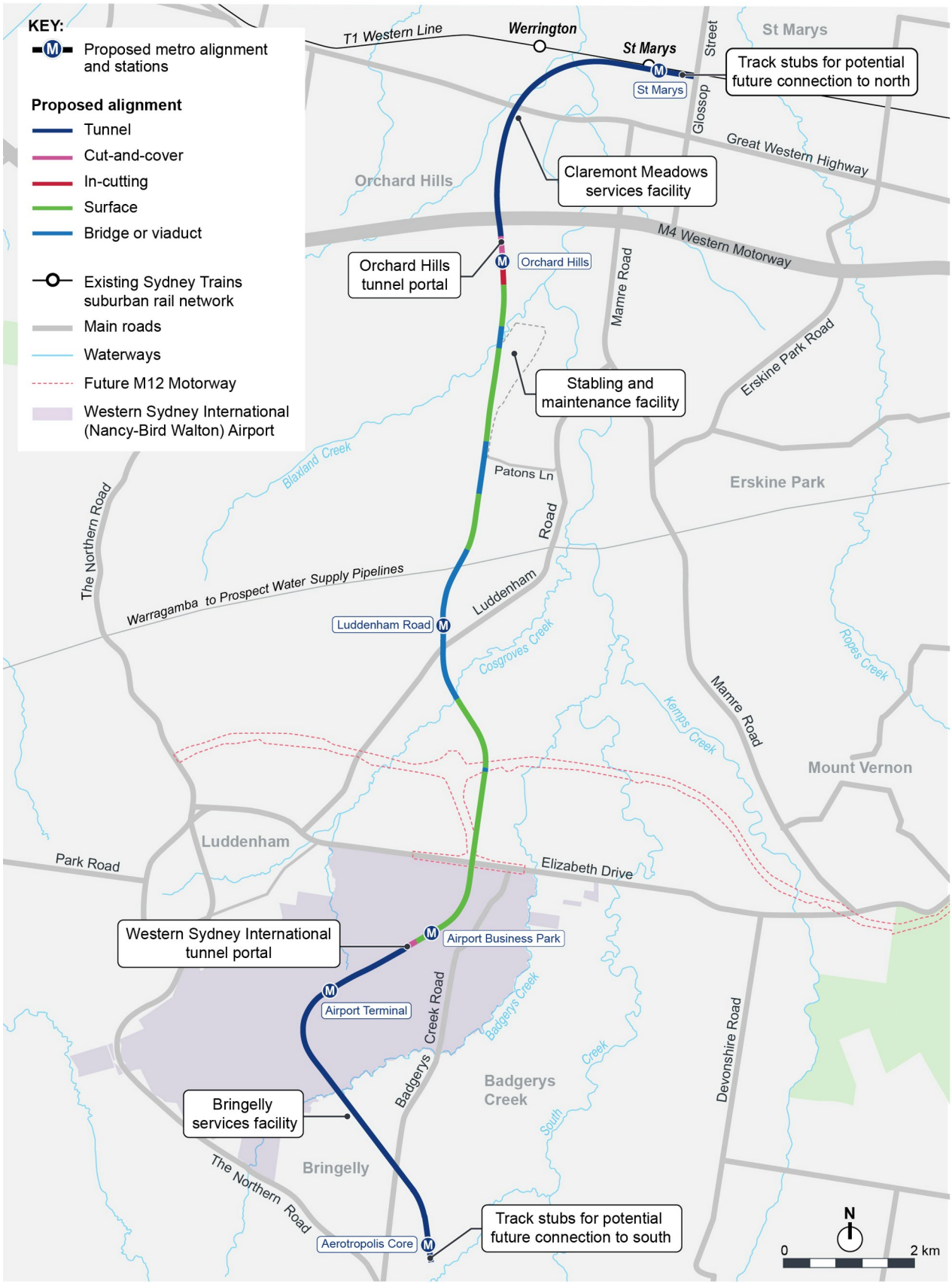

Figure 1: Project alignment and key features

1.3 Purpose of Technical Paper

This Technical Paper is one of several technical documents that form part of the Environmental Impact Statement for the project. The purpose of this Technical Paper is to identify and assess the non-Aboriginal heritage impacts of the project during construction and operation. It responds directly to the Secretary's Environmental Assessment Requirements outlined in Section 1.4. The Aboriginal heritage impacts of the project are assessed in Technical Paper 5 – Aboriginal heritage of the Environmental Impact Statement.

This Technical Paper considers the construction and operational impacts on listed and potential heritage items and potential archaeological resources within the study area (discussed in Section 5.0 and Section 6.0), and includes:

- Identification of items and areas of heritage significance that would be materially affected by the project during construction, by field survey and research, including any buildings, works, relics, views, or places of heritage significance
- Consideration of the potential impacts on the values, setting and integrity of heritage areas and items and archaeological resources located near the project, including items both above and below ground, and where such potential exists, the likely significance of those impacts
- Provide performance outcomes for the project and propose mitigation measures including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures.

This Technical Paper will work alongside the Sydney Metro – Western Sydney Airport Design Guidelines, which will ensure that elements and items of heritage significance will be appropriately managed and respected, and that opportunities are prioritised for heritage values to contribute to the celebration of local identity and place. These principles are informed by the *Better Placed – Design Guide for Heritage – Implementing the Better Placed policy for heritage buildings, sites, and precincts* guidelines.[3]

1.4 Assessment requirements

The Secretary's Environmental Assessment Requirements were issued for the project on 16 July 2020. The requirements specific to non-Aboriginal heritage, and where these are addressed in this Technical Paper, are outlined in Table 1.

[3] Government Architect of NSW, 2019. *Better Placed – Design Guide for Heritage – Implementing the Better Placed policy for heritage buildings, sites, and precincts.*

Table 1. Secretary's Environmental Assessment Requirements – non-Aboriginal heritage

Secretary's Environmental Assessment Requirements	Where addressed
1. 9.1 Identify direct and/or indirect impacts (including cumulative impacts) to the heritage significance of: **(b) environmental heritage**, as defined under the *Heritage Act 1977*; and (c) items listed on the State, National and World Heritage lists; (d) heritage items and conservation areas identified in environmental planning instruments applicable to the project area; (e) heritage items in Section 170 Heritage and Conservation Register; (f) potential heritage items and archaeological potential	Chapter 3.0 Chapter 5.0 Chapter 6.0 Chapter 7.0 Chapter 8.0 Appendix A Appendix B
2. 9.2 Where impacts to **State or locally significant heritage items or historical archaeology** are identified, the assessment must include: (a) relevant commitments made in Section 8.5.3 of the Scoping Report; (b) consistency of the project against conservation policies of any relevant conservation management plan; (c) identification of archaeological potential and significance; and (d) be undertaken by a suitably qualified heritage consultant(s) and/or historical archaeologist (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria); (e) consideration of alternatives and options to avoid or minimise heritage impacts. The assessment must contain sufficient detail to enable an understanding of why the preferred alternative to and option(s) are recommended.	Chapter 3.0 Chapter 5.0 Chapter 6.0 Chapter 7.0 Chapter 8.0
3. 9.3 Where harm to **historical archaeology** is identified, the assessment must include an appropriate mitigation strategy. In the event that harm cannot be avoided in whole or part, an appropriate Research Design and Excavation Methodology must be prepared to guide excavation.	Appendix B Archaeological Research Design report in preparation

The Commonwealth Minister for the Environment has advised that the on-airport components of the project would be assessed based on the provision of preliminary documentation. Further information was requested to guide the assessment of the on-airport components of the project. This information is included in this Technical Paper as well as in Appendix J of the Environmental Impact Statement.

1.5 Project location

1.5.1 The study area

The project has been divided into a number of discrete construction sites for the purposes of this assessment. These construction sites represent all the areas of surface-level ground disturbance. All above ground permanent structures would sit within this area, however, the permanent operational footprint is smaller than the construction footprint. This is discussed, as relevant, within the assessment.

Construction sites for the project and identified heritage items are shown in Figure 2, Figure 3, Figure 4, Figure 5 and Figure 6.

The study area for the project includes the construction footprint with a buffer zone of 100 metres to identify heritage items that may be visually impacted. In addition, heritage items located immediately above the tunnel alignment have been assessed for potential vibration and settlement impacts. These

areas comprise the study area for the assessment. Temporary and permanent power routes for the project were also assessed in this Technical Paper, with a discussion of potential impacts to a heritage site near to the permanent power route provided in Section 5.17.

Heritage items and archaeological sites which are located within the study area have been assessed for adverse impacts in this Technical Paper.

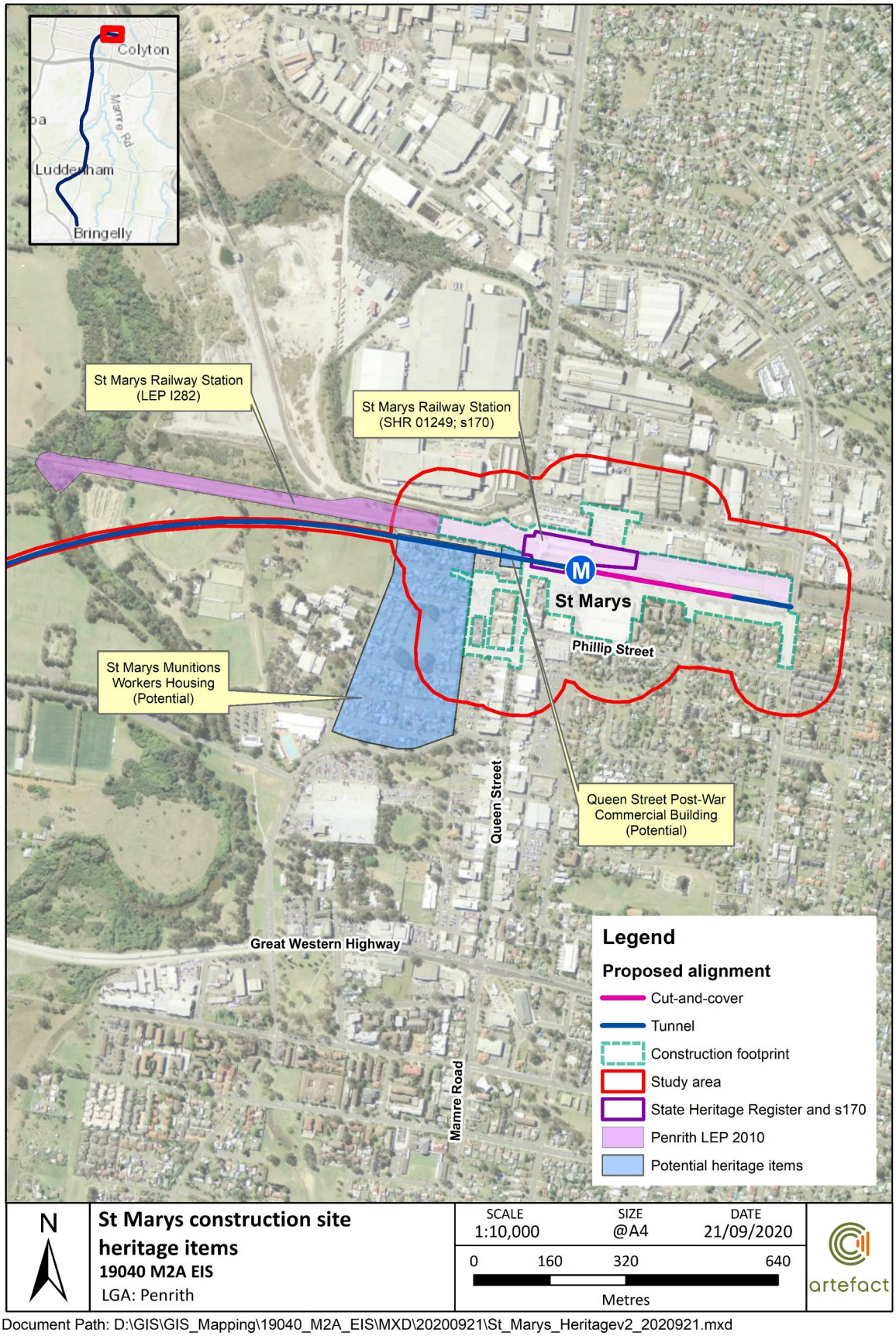

Figure 2. St Marys construction site heritage items

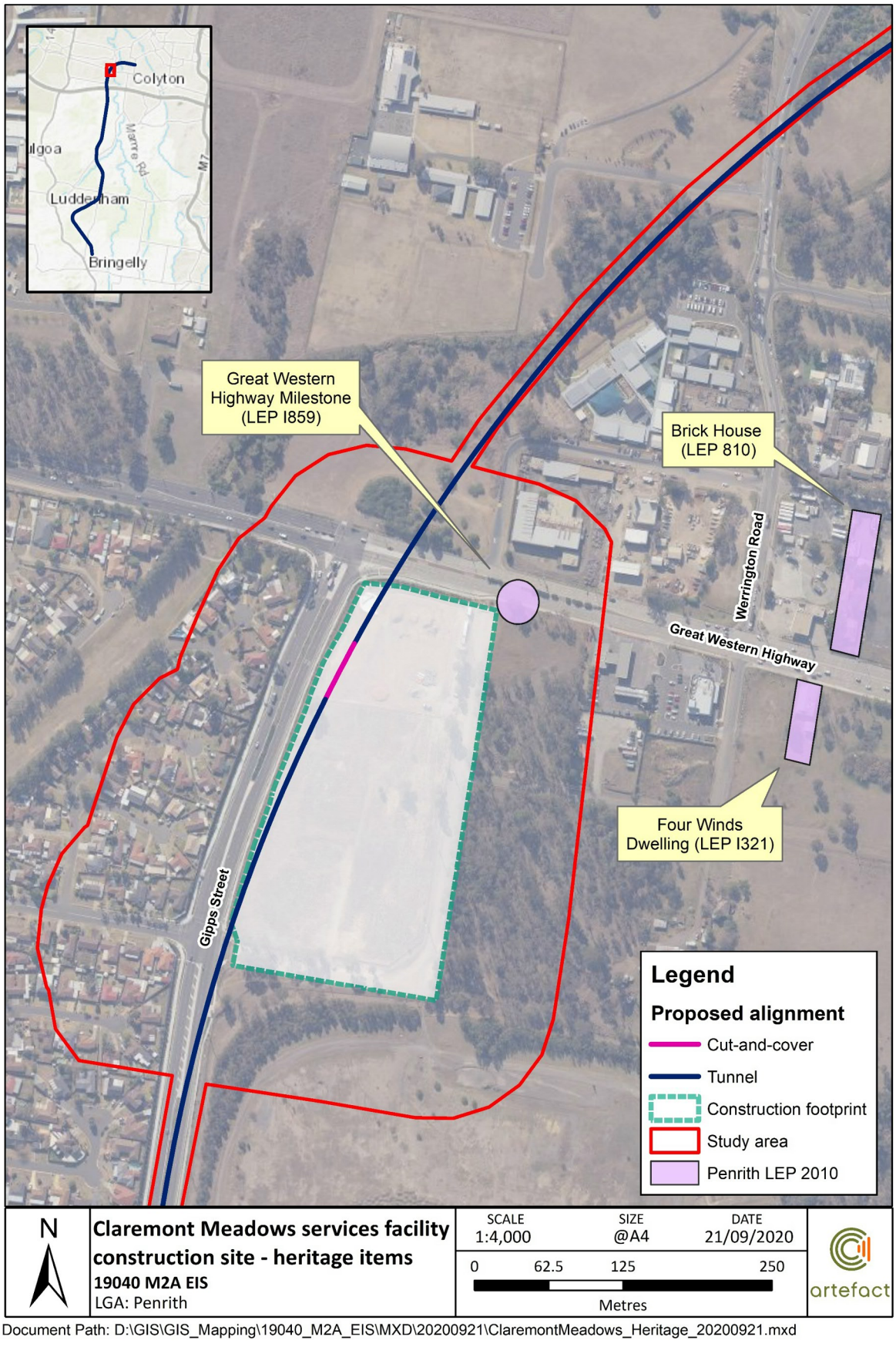

Figure 3. Claremont Meadows services facility construction site heritage items

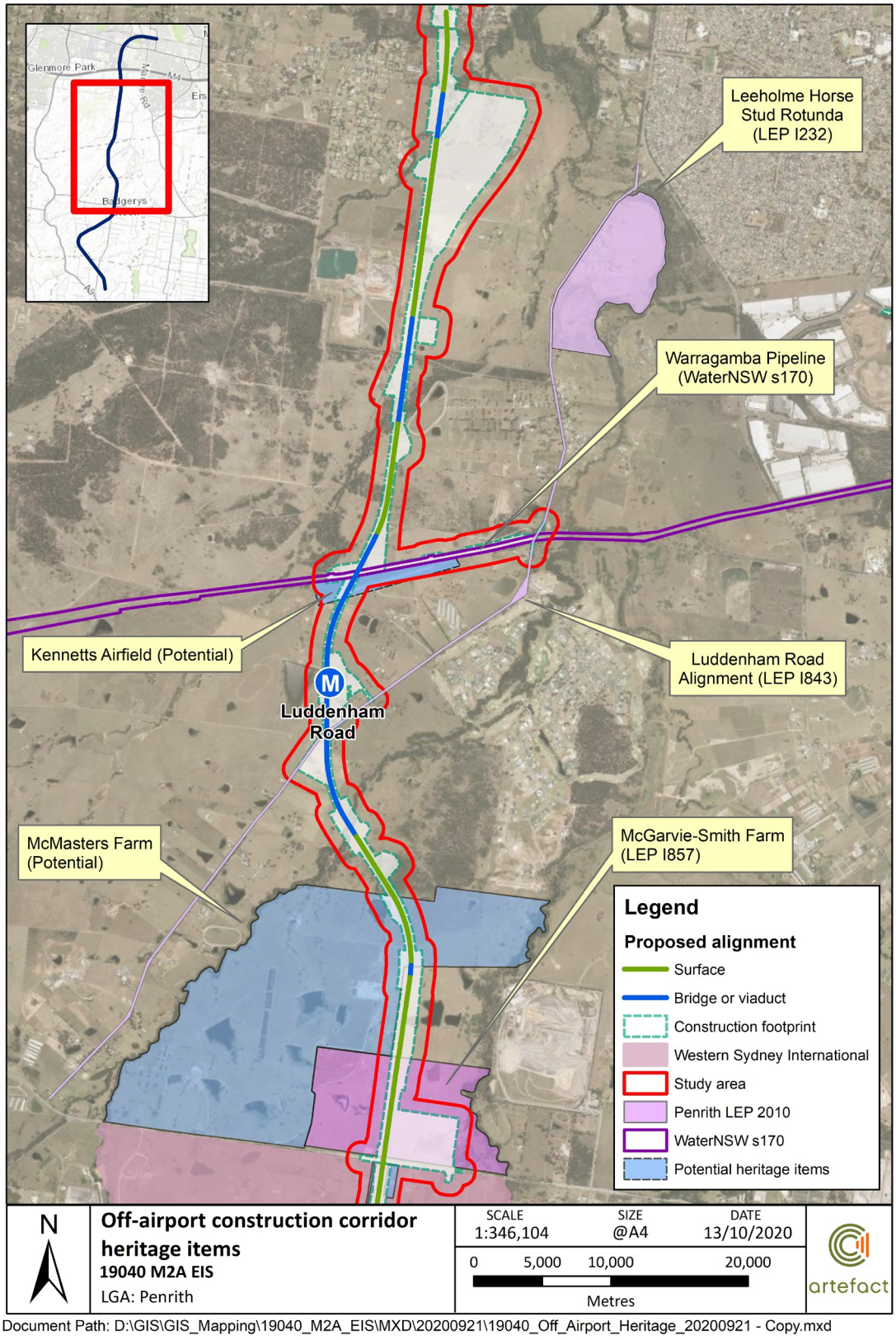

Figure 4. Off-airport construction corridor heritage items

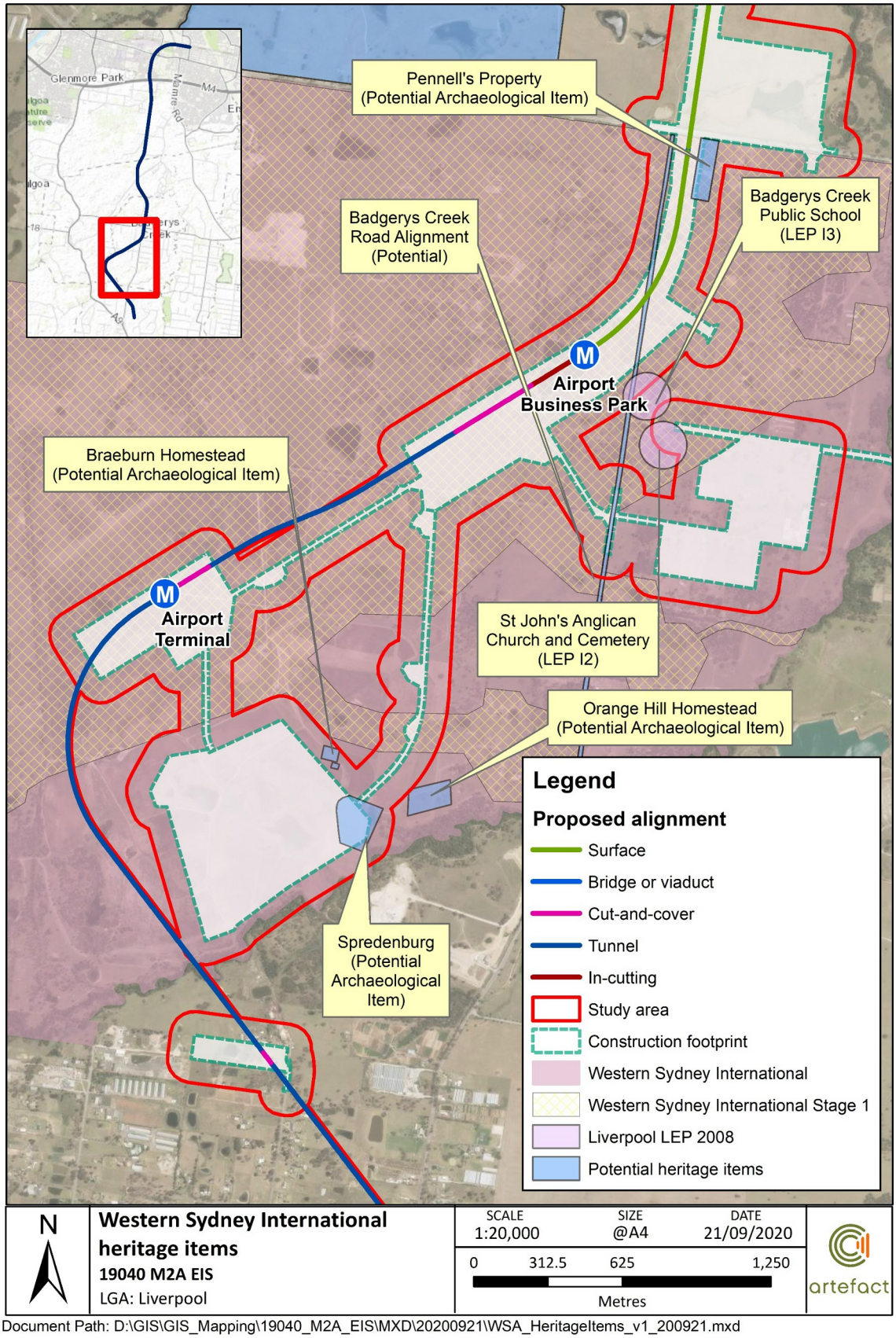

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Figure 5. Western Sydney International heritage items

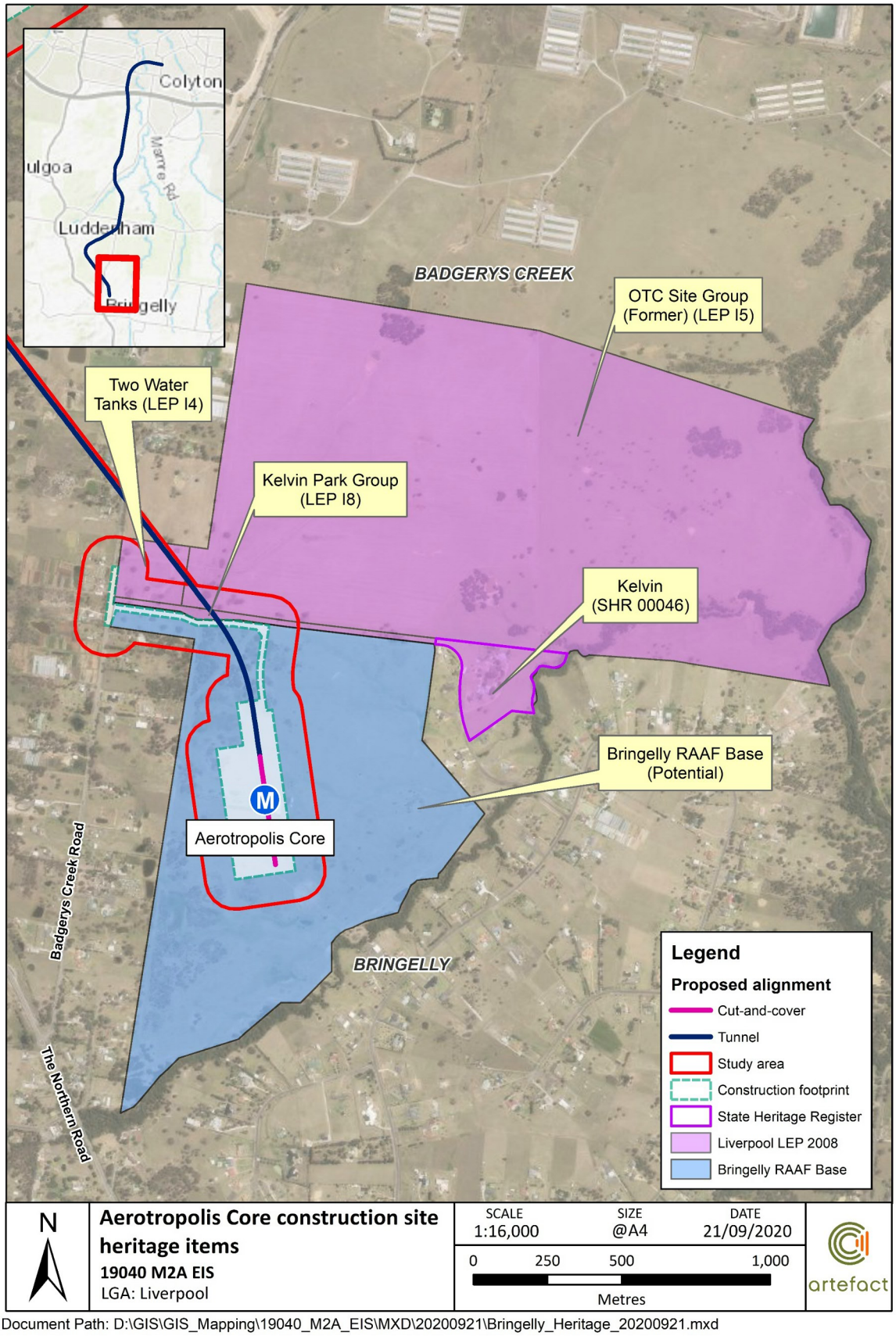

Figure 6: Aerotropolis Core construction site heritage items

1.6 Structure of Technical Paper

The structure and content of this Technical Paper is as follows:

- **Chapter 1.0** – (this chapter) – project overview
- **Chapter 2.0** – The heritage management framework including the legislative and policy context, and relevant criteria applicable to the project
- **Chapter 3.0** – An overview of the assessment methodology
- **Chapter 4.0** – An overview of the historical context of the study area
- **Chapter 5.0** – A description of the off-airport site and discussion of impacts to heritage items arising from the project
- **Chapter 6.0** – An assessment of archaeological potential and significance in the off-airport site and overview of impacts to archaeology arising from the project
- **Chapter 7.0** – A summary of heritage items of the on-airport site located within the project area
- **Chapter 8.0** – An assessment of cumulative impacts to heritage items arising from the project
- **Chapter 9.0** – Discussion of design justification and options assessment for the project
- **Chapter 10.0** – Discussion of performance outcomes and the provision of mitigation measures
- **Appendix A** – Provision of heritage significance information for heritage items discussed in this Technical Paper.
- **Appendix B** – Archaeological potential and significance assessment of identified sites in this Technical Paper

1.7 Technical Paper authorship

This Technical Paper was prepared by Sarah Hawkins (Heritage Consultant) and Duncan Jones (Principal) of Artefact Heritage. Dr Sandra Wallace (Managing Director) of Artefact Heritage provided management input and review.

The qualifications of the heritage consultants involved in the production of the Technical Paper are included in Table 2.

Table 2: Qualifications

Name	Qualification	Years' experience as heritage practitioner
Sarah Hawkins	MA Museum and Heritage Studies BA Archaeology (Hons)	5 years
Duncan Jones	BA Prehistory and Historic Archaeology (Hons)	13 years
Dr Sandra Wallace	PhD Archaeology BA Prehistoric and Historic Archaeology (Hons)	17 years

2.0 LEGISLATIVE AND POLICY CONTEXT

2.1 Introduction

There are several items of State and Commonwealth legislation that are relevant to the project. A summary of this legislation and potential implications is provided in this section.

2.2 Off-airport legislative and policy context

2.2.1 Commonwealth legislation and policy

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legislative framework for the protection and management of matters of national environmental significance, that is, flora, fauna, ecological communities and heritage places of national and international importance. Heritage items are protected through their inscription on the World Heritage List (WHL), National Heritage List (NHL) or the Commonwealth Heritage List (CHL).

The EPBC Act stipulates that a person who has proposed an action that will or is likely to have a significant impact on a World, National or Commonwealth Heritage site must refer the action to the Minister for the Environment (hereafter the Minister). The Minister would then determine if the action requires approval under the EPBC Act. If approval is required, an environmental assessment would need to be prepared. The Minister would approve or decline the action based on this assessment.

World Heritage Convention

The *Convention Concerning the Protection of World Cultural and National Heritage* (the World Heritage Convention) was adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) on 16 November 1972, and came into force on 17 December 1975. The World Heritage Convention aims to promote international cooperation to protect heritage that is of such outstanding universal value that its conservation is important for current and future generations. It sets out the criteria that a site must meet to be inscribed on the WHL and the role of State Parties in the protection and preservation of world and their own national heritage.

The WHL contains sites that have been listed by UNESCO as being of special cultural or natural significance. State Parties must nominate their national sites for UNESCO listing consideration. In Australia, this process is undertaken by the Australian branch of the International Council of Monuments and Sites (ICOMOS Australia) and places must be listed on the NHL for consideration of UNESCO listing.

The concept of a buffer zone was first included in the *Operational Guidelines for the Implementation of the World Heritage Convention* in 1977 and recognises the value of the environment that surrounds a site. The buffer zone acts as an additional layer of protection for World Heritage sites. It is a space that is itself not of outstanding universal value, but that influences the value of a World Heritage site.

Commonwealth Heritage List

The CHL was established by the EPBC Act to protect Indigenous, historic, and natural heritage places owned or controlled by the Australian Government. The CHL and EPBC Act contain provisions for the management and protection of listed places under Commonwealth ownership or control.

National Heritage List

The NHL was established by the EPBC Act to protect places of significant natural or cultural heritage value at a national level. The EPBC Act requires NHL places to be managed in accordance with the National Heritage Management Principles. Under sections 15B and 15C of the EPBC Act, a referral must be made to the Department of the Agriculture, Water and the Environment for actions that are likely to have a significant impact on NHL properties.

2.2.2 State legislation and policy

Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the framework for cultural heritage values to be formally assessed in the land use planning and development consent process. The EP&A Act requires that environmental impacts are considered prior to land development; this includes impacts on cultural heritage items and places as well as archaeological sites and deposits. The EP&A Act also requires that local governments prepare planning instruments (such as Local Environmental Plans [LEPs] and Development Control Plans [DCPs]) in accordance with the EP&A Act to provide guidance on the level of environmental assessment required. The current study area falls within the boundaries of the Penrith local government area (LGA) and Liverpool LGA.

Section 5.23(1) of the EP&A Act states that archaeological permits and exceptions under the Heritage Act are not required for State significant infrastructure projects and would therefore not be required for the project.

Penrith Local Environmental Plan 2010

The northern portion of the study area falls within the Penrith LGA and is administered under the Penrith LEP 2010. The Penrith LEP 2010 aims to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views; and to protect archaeological sites. The LEP stipulates development controls in relation to development proposed on or near heritage listed properties, archaeological sites, or Aboriginal places of heritage significance. The relevant DCP for the study area remains the Penrith DCP 2010.

Liverpool Local Environmental Plan 2008

The southern portion of the study area falls within Liverpool LGA and is administered under the Liverpool LEP 2008. The Liverpool LEP 2008 aims to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views; and to protect archaeological sites. The LEP stipulates development controls in relation to development proposed on or near heritage listed properties, archaeological sites, or Aboriginal places of heritage significance. The relevant DCP for the study area remains the Liverpool DCP 2008.

NSW Heritage Act 1977

The NSW *Heritage Act 1977* (Heritage Act) provides protection for items of 'environmental heritage' in NSW. 'Environmental heritage' includes places, buildings, works, relics, movable objects or precincts considered significant based on historical, scientific, cultural, social, archaeological, architectural,

natural or aesthetic values. Items considered to be significant to the State are listed on the SHR and cannot be demolished, altered, moved or damaged, or their significance altered without approval from the Heritage Council of NSW.

State Heritage Register

The SHR was established under Section 22 of the Heritage Act and is a list of places and objects of particular importance to the people of NSW, including archaeological sites. The SHR is administered by Heritage NSW, of the Department of Premier and Cabinet and includes a diverse range of over 1,500 items, in both private and public ownership. To be listed, an item must be deemed to be of heritage significance for the whole of NSW.

To carry out activities within the curtilage of an item listed on the SHR, approval must be gained from the Heritage Council by securing a Section 60 permit. In some circumstances, under Section 57(2) of the Heritage Act, a Section 60 permit may not be required if works are undertaken in accordance with the NSW Heritage branch document *Standard Exemptions for Works Requiring Heritage Council Approval*[4] or in accordance with agency specific exemptions. This includes works that are only minor in Section 5.23(1) of the EP&A Act states that:

> *The following authorisations are not required for approved State significant infrastructure (and accordingly the provisions of any Act that prohibit an activity without such an authority do not apply):*
>
> *(c) an approval under Part 4, or an excavation permit under section 139, of the Heritage Act 1977.*

Section 170 registers

Under the Heritage Act, all government agencies are required to identify, conserve and manage heritage items in their ownership or control. Section 170 (s170) requires all government agencies to maintain a Heritage and Conservation Register that lists all heritage assets and an assessment of the significance of each asset. They must also ensure that all items inscribed on its list are maintained with due diligence in accordance with State Owned Heritage Management Principles approved by the Government on advice of the NSW Heritage Council. These principles serve to protect and conserve the heritage significance of items and are based on NSW heritage legislation and guidelines.

Relics provisions

The Heritage Act also provides protection for 'relics', which includes archaeological material or deposits. According to Section 139 (Division 9: Section 139, 140-146):

(1) A person must not disturb or excavate any land knowingly or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, damaged or destroyed unless the disturbance is carried out in accordance with an excavation permit.
(2) A person must not disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.

[4] Heritage Council of New South Wales, 2009. *Standard Exemptions for Works Requiring Heritage Council Approval.*

(3) This section does not apply to a relic that is subject to an interim heritage order made by the Minister or a listing on the State Heritage Register.

(4) The Heritage Council may by order published in the Gazette create exceptions to this section, either unconditionally or subject to conditions, in respect of any of the following:

a. Any relic of a specified kind or description,
b. Any disturbance of excavation of a specified kind or description,
c. Any disturbance or excavation of land in a specified location or having specified features or attributes,
d. Any disturbance or excavation of land in respect of which an archaeological assessment approved by the Heritage Council indicates that there is little likelihood of there being any relics in the land.

Section 4 (1) of the Heritage Act (as amended in 2009) defines a relic as:

> *...any deposit, artefact, object or material evidence that:*
>
> *relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and is of State or local heritage significance*

A relic has been further defined as:

> *Relevant case law and the general principles of statutory interpretation strongly indicate that a 'relic' is properly regarded as an object or chattel. A relic can, in some circumstances, become part of the land be regarded as a fixture (a chattel that becomes permanently affixed to land).*[5]

Excavation permits are issued by the Heritage Council of NSW, or its Delegate, under Section 140 of the Heritage Act for relics not within SHR curtilages or under Section 60 for significant archaeological remains within SHR curtilages. An application for an excavation permit must be supported by an Archaeological Research Design and Archaeological Assessment prepared in accordance with Heritage NSW archaeological guidelines. Minor works that will have a minimal impact on archaeological relics may be granted an exception under Section 139 (4) or an exemption under Section 57 (2) of the Heritage Act.

2.3 On-airport legislative and policy context

2.3.1 Commonwealth legislation and policy

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides a legislative framework for the protection and management of matters of national environmental significance, that is, flora, fauna, ecological communities and heritage places of national and international importance. Heritage items are protected through their inscription on the WHL, NHL or the CHL.

[5] Heritage Branch, Department of Planning, 2009. *Assessing Significance for Archaeological Sites and 'Relics'*.

The EPBC Act stipulates that a person who has proposed an action that will or is likely to have a significant impact on a World, National or Commonwealth Heritage site must refer the action to the Minister for the Environment (hereafter the Minister). The Minister would then determine if the action requires approval under the EPBC Act. If approval is required, an environmental assessment would need to be prepared. The Minister would approve or decline the action based on this assessment.

Commonwealth Heritage List

The CHL was established by the EPBC Act to protect Indigenous, historic, and natural heritage places owned or controlled by the Australian Government. The CHL and EPBC Act contain provisions for the management and protection of listed places under Commonwealth ownership or control.

Airports Act 1996

The *Airports Act 1996* (the Airports Act*)* and associated regulations provide the assessment and approval process for development on Commonwealth-owned land leased from the Australian Government for the construction of Western Sydney International.

Airport Plan

Under Section 96B (1) of the Airports Act, the Airport Plan for Western Sydney International was determined by the Minister for Urban Infrastructure on 5 December 2016. The Airport Plan was prepared as a transitional planning document for the development of the Western Sydney International Airport.

Section 3.7.1 of the Airport Plan approves the following activities for the Western Sydney International Site:

> *Pre-existing site issues / demolition: All structures on the Airport Site (including structures with heritage value) may be demolished or removed.*

Construction Environmental Management Plan

Part 5 of the Airports Act requires that each airport develop an environment strategy which is included in its master plan. A Construction Environmental Management Plan (CEMP) has been prepared for the Western Sydney International project and provides recommendations and policies for the environmental management during the construction with the Western Sydney International Stage 1 Construction Zone, including for heritage and archaeology. This document is a live document and is regularly updated to address changes to the development and environmental program, with the most recent version addressed for this report dated December 2019.[6] Western Sydney International and all persons who carry out activities at the airport are obliged to take all reasonable steps to ensure compliance with the management measures the CEMP for non-Aboriginal heritage. The existing CEMPs for Western Sydney International contain protocols management of non-Aboriginal heritage sites. Sydney Metro would prepare CEMPs for the on-airport rail works, consistent with the existing CEMPs for Western Sydney International, for approval by the Commonwealth. Works conducted for the project would be carried out in consultation with Western Sydney.

Airports (Environment Protection) Regulations 1997

The objective of the *Airports (Environmental Protection) Regulations 1997* (the regulations) is to establish a system of regulation for activities at airports that generate or have the potential to

[6] Western Sydney Airport, December 2019. Western Sydney Airport European and Other Heritage Construction Environmental Management Plan. Accessed online https://westernsydney.com.au/sites/default/files/2019-12/WSA00-WSA-00400-EN-PLN-000008%20EOH%20CEMP_Rev%202.0.pdf

generate pollution or excessive noise. The regulations impose a general duty to prevent or minimise environmental pollution and have as one of their objects the promotion of improved environmental management practices at Commonwealth-leased airports.

Regulations related to heritage are specified in Part 4, Division 2, Section 4.04:

> *(1) The operator of an undertaking at an airport must take all reasonable and practicable measures to ensure that, in the operation of the undertaking, and in the carrying out of any work in connection with the undertaking:*
>
> *(a) there are no adverse consequences for (iii) existing aesthetic, cultural, historical, social and scientific (including archaeological and anthropological) values of the local area; and*
>
> *(b) there are no adverse consequences for (iii) sites of indigenous significance on the airport site*

3.0 ASSESSMENT METHODOLOGY

3.1 Introduction

This section outlines the heritage investigation methodology of this assessment. The assessment involved:

- detailed searches of statutory heritage registers for the whole of the study area
- historical research of the study area to identify any suspected potential archaeological sites
- assessment of existing secondary historical and archaeological written sources
- examination of historical mapping and historical aerial imagery of the study area
- a comprehensive site inspection of all properties for which access was available
- providing or updating heritage significance assessments for all identified listed and potential heritage items in the study area
- providing archaeological potential and significance assessments for potential archaeological sites identified during historical research and site inspections of the study area.

3.2 Identification of heritage listed items

3.2.1 Heritage registers

In accordance with the Secretary's Environmental Assessment Requirements for the project, the following heritage registers have been searched for listed heritage items within the study area:

- Heritage registers hosted on the Australian Heritage Database, including:
  - WHL
  - NHL
  - CHL
- Heritage registers hosted on the NSW State Heritage Inventory, including:
  - SHR
  - Liverpool LEP 2008
  - Penrith LEP 2010
  - S170 heritage and conservation registers
- Non-statutory registers, including:
  - Register of the National Estate
  - Institute of Architects Register

3.2.2 Potential heritage items

During review of previous assessments, historical research, and the site inspections, several potential heritage items were identified which were assessed as reaching the threshold for local and / or state heritage significance, in accordance with significance assessment criteria described in Appendix A.

Several potential heritage items within the study area which are not listed on any statutory heritage register were identified in previous heritage assessments of nearby projects. Significance and heritage impact assessments of these items are included in this Technical Paper. Potential items which were identified from earlier heritage assessments include the following items:

- McMaster Farm
- Bringelly RAAF Base
- Badgerys Creek Road Alignment
- Braeburn Homestead (potential archaeological item)
- Orange Hill Homestead (potential archaeological item)
- Spredenburg (potential archaeological item)
- Warragamba Supply Scheme
- St Marys Munitions Workers Housing.

The following new potential items were identified by Artefact during research and site inspections:

- Queen Street St Marys, Post War Commercial Building
- Kennett's Airfield.

3.2.3 Summary of heritage items off-airport

Heritage items within the study area located off-airport which are listed on statutory heritage registers, identified in previous heritage reporting or identified as potential heritage items are summarised in Table 3. These items are illustrated in Figure 2 to Figure 4.

Table 3. Summary of heritage items within the off-airport study area

Item	Listing	Significance	Address
St Marys Railway Station Group	SHR 01249 RailCorp s170 SHI 4801036 Penrith LEP 2010 I282	State	Station Street, St Marys
Kelvin	SHR 00046 Liverpool LEP 2008 I8	State	30 The Retreat, Bringelly
McGarvie-Smith Farm	Penrith LEP 2010 I857	Local	Elizabeth Drive
Milestone	Penrith LEP 2010 I859	Local	Great Western Highway
Two Water Tanks	Liverpool LEP 2008 I4	Local	Badgerys Creek Road, Bringelly
Former OTC Site Group	Liverpool LEP 2008 I5	Local	Badgerys Creek Road, Bringelly
Luddenham Road Alignment	Penrith LEP 2010	Local	Luddenham Road, Luddenham
Queen Street, St Marys, Post-War Commercial Building	Potential heritage item[7]	Local	1 – 7 Queen Street, St Marys

[7] This item was identified by Artefact during site inspections for the Project investigation. A discussion of the significance of this item is provided in Appendix A.

Item	Listing	Significance	Address
St Marys Munitions Workers Housing	Potential heritage item	Local	Between Camira St, Carinya Ave, Kungala St and Kalang Avenue, St Marys
Warragamba Supply Scheme	WaterNSW s170 Register	State	Warragamba to Prospect
Leeholme Horse Stud Rotunda	Penrith LEP I232	Local	391-395 Mamre Road, Orchard Hills
Kennett's Airfield[8]	Potential heritage item	Possibly local	Luddenham Road, Luddenham
McMaster Farm	Potential heritage item	Local	Elizabeth Drive, Badgerys Creek
Bringelly RAAF Base	Potential heritage item	Local	Badgerys Creek Road, Bringelly

3.2.4 Summary of heritage items on-airport

Heritage items within the study area located on-airport which are listed on statutory heritage registers, identified in previous heritage reporting or identified as potential heritage items are summarised in Table 4. Items identified in this table are illustrated in Figure 5. These items have previously been or would be removed in accordance with approvals and the CEMP for Western Sydney International.

Table 4. Summary of heritage items within the on-airport study area

Item	Listing	Significance	Address
Badgerys Creek Road Alignment	Potential heritage item	Local	Badgerys Creek Road, Badgerys Creek
Badgerys Creek Public School	Liverpool LEP 2008 I3	Local	Badgerys Creek Road, Badgerys Creek
St John's Anglican Church and Cemetery	Liverpool LEP 2008 I2	Local	Badgerys Creek Road, Badgerys Creek
Pennells Property	Potential archaeological site	Local	Elizabeth Drive
Braeburn Homestead	Potential archaeological site	Local	Western Sydney International lands
Orange Hill Homestead	Potential archaeological site	Local	Western Sydney International lands
Spredenburg	Potential archaeological site	Local	Western Sydney International lands

[8] This item was identified by Artefact during historical research conducted for the Project. A discussion of the significance of this item is provided in Appendix A.

3.3 Previous heritage studies

3.3.1 Western Sydney International non-Aboriginal heritage assessments

As part of the Environmental Impact Statement for Western Sydney International, RPS Consultants prepared a non-Aboriginal cultural heritage report in 2016.[9] Their assessment included historical and archival research, targeted field survey, and archaeological excavation. Twenty significant non-Aboriginal heritage items were identified in their assessment for land within the boundaries of Western Sydney International. Of these 20 items, seven were located within the study area of the project. These items are discussed in Section 7.0.

The RPS investigations informed the preparation of the Western Sydney International European and Other Heritage CEMP for Stage 1 of the development of the Western Sydney International. This report includes provisions for detailed site investigation, archival research, photographic recording and archaeological investigation within the boundaries of the Western Sydney International.[10] Listed and potential heritage items have been or will be removed and managed in accordance with the CEMP and the Airport Plan for Western Sydney International.

3.3.2 M12 Motorway non-Aboriginal heritage assessments

Jacobs, on behalf of Transport for NSW, prepared a non-Aboriginal heritage assessment[11] for the future M12 Motorway which would provide a vehicle route to the Western Sydney International between the M7 Motorway and The Northern Road. The future M12 Motorway route will partially intersect the study area of the project to the north of Western Sydney International. The future M12 Motorway project has not yet been approved.

The future M12 Motorway non-Aboriginal heritage assessment identified and investigated a number of heritage items which are also located within the study area for the project. Physical descriptions and significance assessments for these items have been reviewed in the preparation of this assessment and have been cited where relevant.

3.4 Site inspections

Site inspections of the construction footprint and heritage items within the wider study area, where access was available, were undertaken from August 2019 to June 2020. Site inspections were undertaken on foot, using physical maps and GPS where necessary. Photographs were taken to record different aspects of inspection sites including structures and known heritage items, as well as assessing ground for surface-level evidence of potential non-Aboriginal archaeological sites. Heritage items were photographed with detail of significant fabric as well as sightlines and the visual setting of each item. All built structures were examined during site inspections to ascertain if they were potential items of heritage significance.

3.5 Methodology for determining heritage significance

Determining the significance of heritage items or a potential archaeological resource is undertaken by utilising a system of assessment based on the *Burra Charter* (Australia ICOMOS 2013). The

[9] RPS, August 2016. *Western Sydney Airport EIS – European and other heritage technical report.* Report prepared for Department of Infrastructure and Regional Development.
[10] WSA Co., 2018. Western Sydney International Construction Environmental Management Plan – European and Other Heritage Construction Environmental Management Plan.
[11] Jacobs, 2019. *M12 Motorway Environmental Impact Statement: Non-Aboriginal Heritage Assessment Report*. Report prepared for Transport for NSW.

principles of the charter are relevant to the assessment, conservation and management of sites and relics. The assessment of heritage significance is outlined through legislation in the Heritage Act and implemented through the *NSW Heritage Manual*, the *Archaeological Assessment Guidelines*[12] and the 2009 *Assessing Significance for Historical Archaeological Sites and 'Relics.*[13]

If an item meets one of the seven heritage criteria, and retains the integrity of its key attributes, it can be considered to have heritage significance. The significance of an item or potential archaeological site can then be assessed as being of local or State significance. If a potential archaeological resource does not reach the local or State significance threshold, then it is not classified as a relic under the Heritage Act.

'State heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

'Local heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.[14]

3.5.1 NSW heritage assessment criteria

The NSW heritage assessment criteria, as identified in the Heritage Act, assesses places for listing against seven criteria. The assessment criteria and description are provided in Table 5.

Table 5. NSW heritage assessment criteria

Criteria	Description
A – Historical Significance	An item is important in the course or pattern of the local area's cultural or natural history.
B – Associative Significance	An item has strong or special associations with the life or works of a person, or group of persons, of importance in the local area's cultural or natural history.
C – Aesthetic or Technical Significance	An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the local area.
D – Social Significance	An item has strong or special association with a particular community or cultural group in the local area for social, cultural or spiritual reasons.
E – Research Potential	An item has potential to yield information that will contribute to an understanding of the local area's cultural or natural history.
F – Rarity	An item possesses uncommon, rare or endangered aspects of the local area's cultural or natural history.
G – Representativeness	An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places of cultural or natural environments (or the cultural or natural history of the local area).

[12] NSW Heritage Office, 1996. *NSW Heritage Manual, the Archaeological Assessment Guidelines*, 25-27
[13] NSW Heritage Branch, 2009. *Assessing Significance for Historical Archaeological Sites and Relics.*
[14] This section is an extract based on the Heritage Office, 2009. *Assessing Significance for Historical Archaeological Sites and Relics*, 6.

3.6 Non-Aboriginal heritage impact assessment methodology

This Technical Paper has been prepared in accordance with the NSW Heritage Office and Department of Urban Affairs and Planning *NSW Heritage Manual*[15] and the NSW Heritage Office *Statements of Heritage Impact.*[16] The guidelines pose a series of questions and prompts to aid in the consideration of impacts due to the project.

Impacts to heritage significance of items can be caused by a number of project activities which would overall result in the reduction in the significance of an item. Impacts to the heritage significance of an item are therefore assessed as both the overall heritage impact as well as specific impacts from particular works or activities.

Specific categories of impact types have been developed based on guidelines outlined in the ICOMOS document *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties.*[17] It is noted that these guidelines have been prepared specifically for holistic assessments of heritage impacts against WHL items. As such the definitions of these impacts have been developed from the ICOMOS guidelines to address item 9.1 outlined in the Secretary's Environmental Assessment Requirements for classifying direct and indirect impacts, for a consistent measure of environmental impacts for the project overall.

A description of each type of impact is provided in Table 6.

Table 6. Terminology for heritage impact types

Impact	Definition
Direct	Impacts resulting from works that would result in physical alterations or damage to the item that would alter its heritage significance.
Indirect	Impacts to significant view lines as well as heritage significant vistas and setting of the item, which would alter its heritage significance.
Settlement and vibration	Possible impacts resulting from increased noise, vibration and ground settlement which may result in changes to a heritage item. While these impacts would result in potential physical alterations to heritage significant items, these categories of impacts have been separated from other direct impacts to provide clarity in management response.
Cumulative	Cumulative impacts represent the incremental loss of – or modifications to – a historical or environmental resource over time in conjunction with other projects.
Archaeological	Impacts to potential archaeological remains predicted within the study area.

[15] NSW Heritage Branch, 1996. *NSW Heritage Manual.*
[16] NSW Heritage Office, 2002. *Statements of Heritage Impact.*
[17] ICOMOS, January 2011. *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*. Accessed online at: https://www.icomos.org/world_heritage/HIA_20110201.pdf

3.6.1 Assessment of direct and indirect impacts

In order to consistently identify the magnitude of impact resulting from the project, terminology and definitions adapted from ICOMOS guidelines[18] will be used throughout this document. These categories are also consistent with Heritage NSW guidelines on assessing the degree of heritage impact.[19] The terminology is provided and described in Table 7.

Table 7. Terminology for assessing the magnitude of direct and indirect heritage impacts

Grading	Definition
Major	Actions that would have a long-term and substantial impact on the significance of a heritage item. Actions that would remove or impact key historic building elements, key historic landscape features, intangible cultural heritage values, or significant archaeological materials. Major impacts would result in comprehensive and irreversible changes to the setting, landscape, or character of heritage items, thereby resulting in a change of historic character, or altering of a historical resource. These actions cannot be fully mitigated and would result in comprehensive changes to the significance of the item.
Moderate	Actions involving considerable changes to a heritage item which would impact the items significance, including altering the setting or landscape of a heritage item, partially removing archaeological resources, or the alteration of significant elements of fabric from historic structures. Moderate impacts may involve considerable changes to intangible cultural heritage. The impacts arising from such actions may be able to be partially mitigated.
Minor	Actions that would result in slight impacts to the significance of a heritage item, through changes to archaeological materials, historic building elements, few changes to key landscape elements that would result in slight changes to the visual setting. The impacts arising from such actions can usually be mitigated.
Negligible	Actions that would result in very minor changes to the significance of heritage items. These impacts would not usually require mitigation.
Nil	Actions that would have no change and therefore no impact to the significance of a heritage item.
Positive	Actions which improve the condition of fabric or local setting which improves the legibility of the significance of the heritage item.

3.6.2 Assessment of vibration and settlement impacts

Vibration arising from construction or excavation work has the potential to impact on the fabric of heritage items, potentially affecting structural integrity. In locations where heritage items are adjacent to demolition, construction or excavation works, or where heritage items are above underground tunnelling work, an assessment of potential vibration impacts has been undertaken.

[18] ICOMOS, January 2011. *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*. Accessed online at: https://www.icomos.org/world_heritage/HIA_20110201.pdf
[19] Heritage NSW 2020. *NSW Material Threshold Policy*.

Settlement caused by groundwater drawdown and ground movement from tunnelling and excavation activities can also cause damage to structures. This would involve differential settlement of the ground surface below buildings which can affect the structural integrity of those buildings.

It is noted that assessments of these types of impact are predicted probable impacts. As the extent of impact of this type is uncertain, and is heavily influenced by construction method, these categories of impacts have been separated from other direct impacts to provide clarity in management response.

3.6.3 Assessment of cumulative impacts

Cumulative impacts represent the incremental loss of – or modifications to – a heritage or environmental resource over time. These can result from individually minor, but collectively significant, actions and must therefore be considered in the wider developmental context in order to minimise impacts.

In order to address cumulative impacts, major infrastructure and commercial developments in the vicinity of the project are examined and the combined impact on the heritage significance of each item from these developments with the project impacts are assessed. Infrastructure and commercial developments which are assessed include only those developments for which publicly available project impact information is known, and/or for those projects which have been approved for commencement.

Developments which have been assessed as concurrent projects for the purposes of the cumulative impact assessment are discussed in Section 8.2.

Cumulative impacts to a class, category or type of heritage resource which would be impacted by the project is not assessed in this Technical Paper.

3.7 Non-Aboriginal archaeological assessment methodology

The non-Aboriginal archaeological assessment has been prepared based on desktop (historical, archival and cartographic) research to identify areas of interest for potential non-Aboriginal archaeological remains. This has been combined with a comprehensive site survey of all accessible areas within the construction footprint for the project to confirm the presence of suspected remains as well as to locate possible unanticipated archaeological sites.

Detailed discussions of land use history (to inform archaeological potential assessments) has only been provided for identified archaeological sites.

3.7.1 Assessment of archaeological potential

The assessment of historical archaeological potential discusses the study area's potential to contain historical archaeological resources. This assessment is based on consideration of historic land use, current ground conditions, analysis of the historical development of the study area, and considering whether subsequent actions (either natural or human) may have impacted on archaeological evidence for these former land uses.

'Archaeological potential' refers to the likelihood that an area contains physical remains associated with an earlier phase of occupation, activity or development of that area. This is distinct from 'archaeological significance' and 'archaeological research potential'. These designations refer to the cultural value of potential archaeological remains and are the primary basis of the mitigation measures included in this document.

Knowledge of previous archaeological investigations, understanding of the types of archaeological remains considering the land use history and previous ground disturbance that may have impacted any subsurface archaeological remains. This is presented using the grades of archaeological potential provided in Table 8.

Table 8. Grades of archaeological potential

Grading	Justification
Nil	No evidence of historical development or use, or where previous impacts such as deep basement structures would have removed all archaeological potential.
Low	Research indicates little or low intensity historical development, or where there have been substantial previous impacts, disturbance and truncation in locations where some archaeological remains such as deep subsurface features may survive.
Moderate	Analysis demonstrates known historical development and some previous impacts, but it is likely that archaeological remains survive with some localised truncation and disturbance.
High	Evidence of multiple phases of historical development and structures with minimal or localised later development impacts, and it is likely the archaeological resource would be largely intact.

3.7.2 Research potential and archaeological significance

In 1984, Bickford and Sullivan examined the concept and assessment of archaeological research potential; that is, the extent to which archaeological resources can address research questions. They developed three questions which can be used to assess the research potential of an archaeological site:

- Can the site contribute knowledge that no other resource can?
- Can the site contribute knowledge that no other site can?
- Is this knowledge relevant to:
  - General questions about human history?
  - Other substantive questions relating to Australian history?
  - Other major research questions?

In the 2009 guidelines *Assessing Significance for Historical Archaeological Sites and 'Relics'*, the Heritage NSW has since provided a broader approach to assessing the archaeological significance of sites, which includes consideration of a site's intactness, rarity, representativeness, and whether many similar sites have already been recorded, as well as other factors. This document acknowledges the difficulty of assessing the significance of potential subsurface remains, because the assessment must rely on predicted rather than known attributes.[20]

A site can have high potential for archaeological remains, and yet still be of low research potential if those remains are unlikely to provide significant or useful information.

[20] NSW Heritage Branch, 2009. *Standard Exemptions for Works Requiring Heritage Council Approval.*

3.7.3 Protection of 'Relics'

The Heritage Act provides additional protection for archaeological remains through the operation of the 'relics' provisions. The primary aim of an archaeological significance assessment is to identify whether an archaeological resource, deposit, site or feature is of cultural value or demonstrates research potential, and would be considered 'relics.'[21] Historical archaeological sites typically contain a range of different elements as vestiges and remnants of the past. Such sites will include significant relics in the form of deposits, artefacts, objects and usually also other material evidence from demolished buildings, works or former structures which provide evidence of prior occupations but may not be 'relics.'[22]

3.8 Limitations and constraints

This non-Aboriginal archaeological assessment provides an overview of predicted archaeological remains and their significance, as well as an assessment of potential impacts that would occur as a result of the project. This assessment does not provide detailed archaeological management recommendations for these impacts. Archaeological research designs and archaeological excavation methodologies would be developed during the preparation of the Submissions and Preferred Infrastructure reporting phase of the project to manage impacts to significant archaeological resources identified.

Only those portions of the study area within the construction footprint and that are publicly accessible were surveyed. Due to limited access to private residential properties within the study area, not all known or potential heritage items could be inspected for the preparation of this report. Further site inspections would be conducted for all properties and potential heritage items which were not accessible during the preparation of this Technical Paper during the Submissions and Preferred Infrastructure reporting phase of the project.

[21] Office of Environment and Heritage (OEH), Heritage Division, 2009. *Assessing Significance for Archaeological Sites and 'Relics'*, p. 4.
[22] Office of Environment and Heritage (OEH), Heritage Division, 2009. *Assessing Significance for Archaeological Sites and 'Relics'*, p. 2;7.

4.0 HISTORICAL BACKGROUND

4.1 European exploration in the Nepean Valley

4.1.1 Early exploration

The Hawkesbury-Nepean River forms the natural western and northern border of Sydney, beginning in highland tributaries at the south east and emptying into Broken Bay.[23] The Nepean River and its surrounds have been significant to Aboriginal Australians of various language groups for thousands of years. The Nepean, known as the Dyarubbin,[24] was an important resource, providing a constant supply of water, creating arable soils that grew edible plants and attracted wildlife and birds, which all would have served as food sources. Furthermore, Dyarubbin remains a culturally significant aspect of Aboriginal country and culture, with hundreds of cultural, "emotionally charged" places located in the area.[25] It may have also served as a travel corridor, linking various groups of Aboriginal peoples from Broken Bay to Camden.[26]

In January 1788, Captain Arthur Phillip arrived at Botany Bay but deemed the bay too shallow for a harbour and unsuitable for habitation on account of poor fresh water supply.[27] The colony was moved to Port Jackson, now Sydney Harbour,[28] and inland exploration via the major rivers, notably the Parramatta and Georges Rivers commenced soon after.

In 1789, Watkin Tench, a Marine Lieutenant, led an exploration party west of Parramatta to the base of the Blue Mountains, where he was one of the first Europeans to encounter the Nepean River. Safe harbours and rivers that could be used as routes to explore inland were sought after in the early years of the colony.[29] The arable soils situated alongside rivers were crucial for agriculture, and as such, many settlements organically formed along major rivers.[30] Early nineteenth century illustrations of the perceived idyllic landscape of the Nepean are provided in Figure 7 and Figure 8.

The Nepean region soon developed into an important agricultural centre. Early settlers in the Cumberland Plain included convicts, military officers and soldiers, missionaries and free settlers.[31] These settlers could be considered the founders of Australia's agricultural and pastoral industries and were responsible for supplying the colony with meat, grain, vegetables, fruit, and by the 1820s were also producing Australian wool and wine.[32]

Governor Macquarie had arrived in New South Wales in 1809, at a time when large areas of agricultural land had been destroyed by flooding.[33] In response, Macquarie founded towns and encouraged settlement in areas with arable soil suitable for agriculture. The Macquarie Towns included Castlereagh, just north of Penrith and situated on the eastern banks of the Nepean River, and Liverpool, located to the west of the Georges River. The study area is encompassed between these two Macquarie Towns and the history of the region is still closely related to the initial agricultural settlements, estates, and small farms designated in the early 1800s. A plan of early land grants for

[23] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 19.
[24] Karskens, G., 2009. *The Colony. A History of Early Sydney,* p. 29.
[25] Karskens, G., 2009. *The Colony. A History of Early Sydney,* p. 32.
[26] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 42.
[27] Dictionary of Sydney, 2011. 'Botany.' Accessed online 19/2/2019 at: https://dictionaryofsydney.org/entry/botany
[28] Encyclopaedia Britannica, 2017. 'Botany Bay.' Accessed online 19/2/2019 at: https://www.britannica.com/place/Botany-Bay
[29] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 20.
[30] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 20.
[31] Karskens, G., 2009. *The Colony. A History of Early Sydney,* p. 101.
[32] Karskens, G., 2009. *The Colony. A History of Early Sydney,* p. 101.
[33] Parsons, G., 2010. 'Lachlan Macquarie and the Idea of Newcastle.' In *AQ: Australian Quarterly*, Vol. 82, No. 2 pp.38-40. Accessed online via JSTOR on 4/6/2019 at: www.jstor.org/stable/23215342

the study area is provided in Figure 9 and an early twentieth century plan of the major historic estates of the area is shown in Figure 10.

The study area is located within the parishes of Rooty Hill, Claremont, and Bringelly, which form the western portion of the County of Cumberland.

Figure 7. Bents Basin at the Nepean River, located just west of Bringelly. Painted by Conrad Martens, c.1835. Source: Sydney Living Museums (SLM)34

[34] Conrad Martens, 1835. *Bents Basin, Nepean River.* Accessed online 26/7/2019 via Sydney Living Museums at: http://collection.hht.net.au/firsthhtpictures/picturerecord.jsp?recno=30918

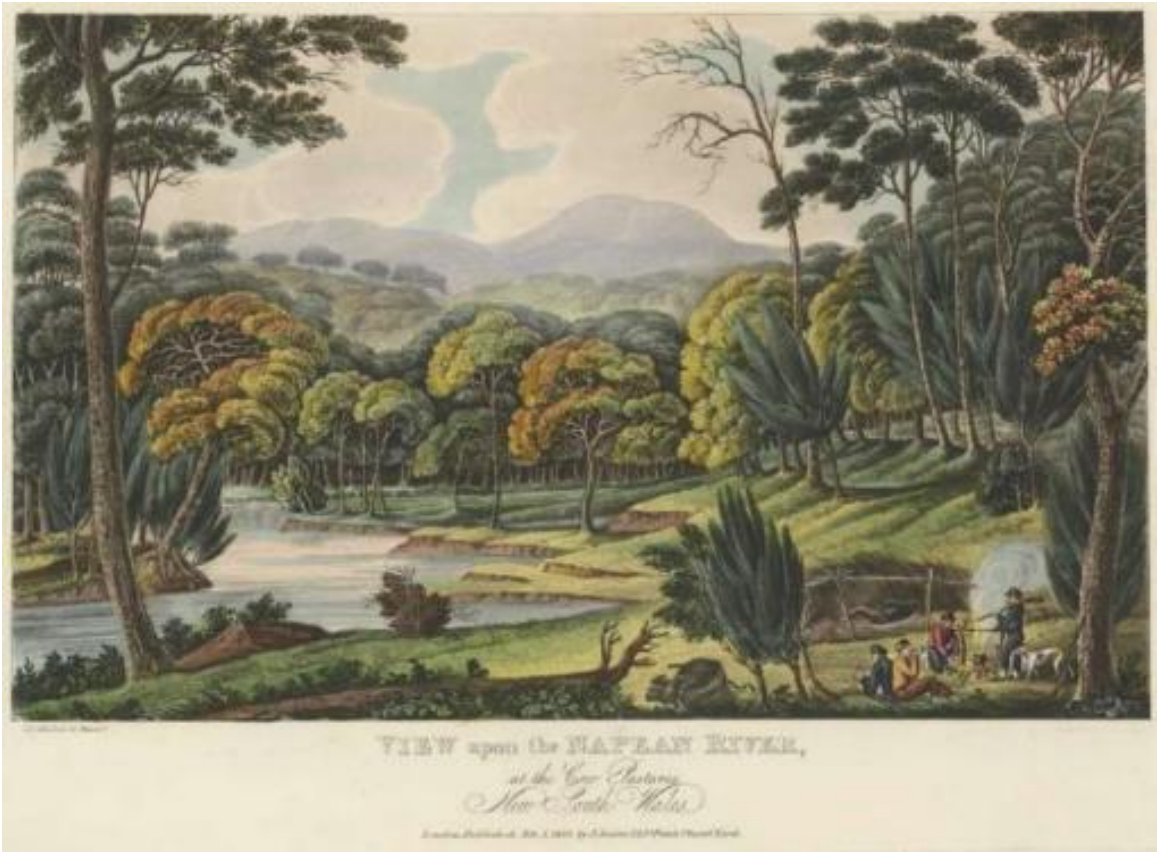

Figure 8. The Nepean River at the Cowpastures by Joseph Lycett, 1825. Source: National Library of Australia (NLA)[35]

[35] Joseph Lycett, 1825. *View Upon the Nepean River at the Cow Pastures, New South Wales.* Accessed online 26/7/2019 via Trove/National Library of Australia at: http://nla.gov.au/nla.obj-135702836/view

Figure 9. Detail of map of the County of Cumberland with study area in red, 1840. Source: National Library of Australia[36]

[36] Wells, William Henry, 1840. *A map of the County of Cumberland in the Colony of New South Wales / Compiled by W.H. Wells, Land Surveyor.* Accessed online 26/7/2019 via Trove/National Library of Australia at: http://nla.gov.au/nla.obj-229932091/view

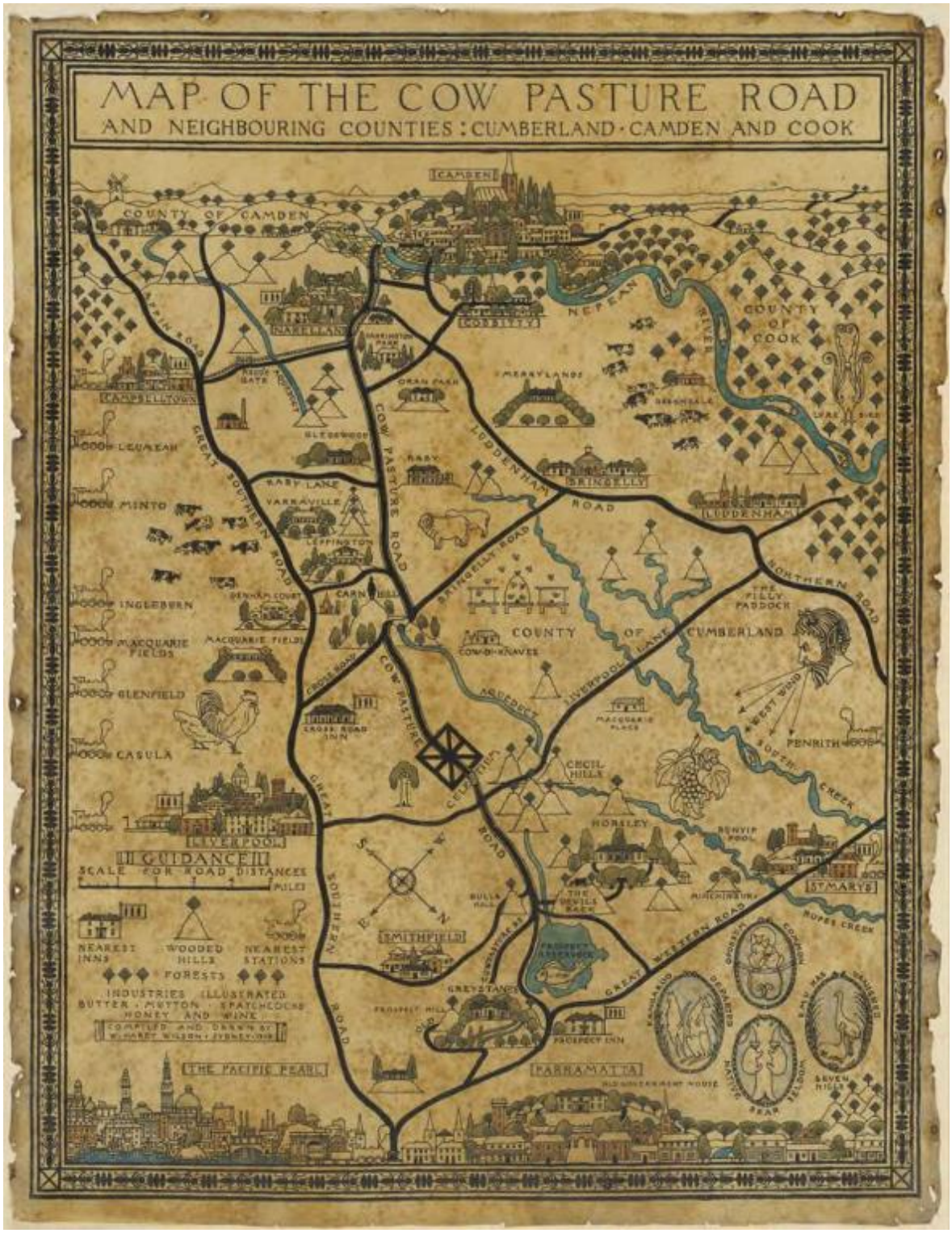

Figure 10. Map of the Cow Pasture Road and neighbouring counties, showing towns and estates, 1919. Source: National Library of Australia[37]

[37] Wilson, Hardy, 1919. *Map of the Cow Pasture Road and neighbouring counties: Cumberland, Camden and Cook / compiled and drawn by W. Hardy Wilson, Sydney, 1919.* National Library of Australia via Trove. Accessed online 4/11/2019 at: https://nla.gov.au/nla.obj-147888453/view

4.2 Early settlement and contact history

4.2.1 Early land grants and the development of estates

South Creek land grants

Following early colonial exploration of the Cumberland Plain, several land grants were dedicated within and around the study area, illustrated in Figure 11. The earliest land grant was owned by the Reverend Samuel Marsden, who purchased 38 acres of land at South Creek. In the following year, Marsden purchased the adjacent lot of 200 acres.[38] In 1799, Marsden established a farm which he named Mamre. By the early 1800s, the land grant was utilised for several agricultural endeavours, including wool production, growth of crops and orchards and sheep farming.[39] In 1804, Marsden received an adjoining 1030 acre grant. Throughout the 1820s, the Mamre Homestead was established as a country cottage with accommodation for Marsden's staff. The homestead was constructed in the Colonial Georgian style and between 20-30 staff worked at the farm.

Immediately to the south of Marsden's Mamre Estate, William Kent received 500 acres of land in c.1805. Kent was the Captain of the HMAS *Supply*, which had sailed to Sydney with the First Fleet, and was the nephew of Governor John Hunter.[40] Kent returned to England in 1805 and never returned to Sydney, dying at sea in 1812. A parish map dating to approximately 1916 labels Kent's grant as 'Lansdown Place', but no structures are evident on the property. It is uncertain who owned the land at this time or what structures were present.

In 1806, the children of Governor Phillip Gidley King both received land grants north of Marsden's, at South Creek (now St Marys). Maria King received 280 acres and Phillip Park King received 650 acres. These grants were not settled and developed until the 1820s, as the King family returned to England and then back to the colony of NSW.

In 1806, 600 acres of land was granted to Mary Putland, the daughter of Governor William Bligh. Maurice O'Connell received the adjoining grant and the couple were married in 1810. They combined their grants into the Frogmore Estate and owned the property until 1840. A house was built on the estate in c.1830 by the O'Connell's, which was likely a single storey. While there was certainly a homestead on the site, the O'Connell family were usually absent from the property, primarily living in Woolloomooloo.[41] At the time the area was known as South Creek as European settlement was concentrated around the creek for its alluvial soil.[42] The permanent water supply from South Creek enabled the land grants to be utilised as working holdings and an agricultural community developed. The location of the properties along the Great Western Highway ensured that they were conveniently situated.

Philip Parker King's mother, Anna King, returned to Australia in 1832 and renamed her property Dunheved (located immediately north of the study area). Dunheved House was built on her property by Philip Parker King and was one of the largest estates in the colony. The estate was used for breeding cattle, sheep, pigs and horses and the land was used for orcharding and grain crops. Approximately 80 to 100 staff worked for the King family at Dunheved.

[38] NSW Office of Environment and Heritage, 2000. 'Mamre.' Accessed online 24/6/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5045752
[39] NSW Office of Environment and Heritage, 2000. 'Mamre.' Accessed online 24/6/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5045752
[40] *Australian Dictionary of Biography*, 1967. 'Kent, William (1760-1812).' Accessed online 24/6/2019 at: http://adb.anu.edu.au/biography/kent-william-2300
[41] Western Sydney University, 2017. 'Werrington North', *University of Western Sydney*. Accessed online 21/6/2019 at: https://www.westernsydney.edu.au/uws25/25_year_history/places/werrington_north
[42] Penrith History, n.d. 'St Mary's.'

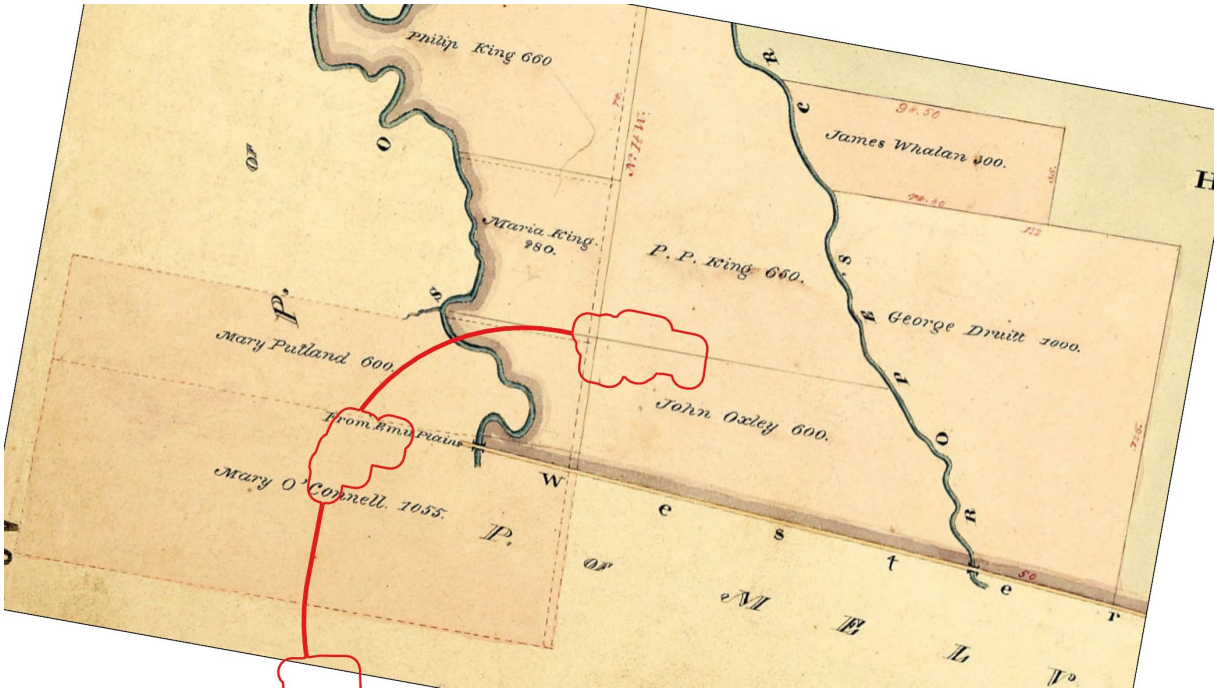

Figure 11. Map of the parish of Rooty Hill with study area in red, 1835. Source: Historical Land Records Viewer (Historical Land Records Viewer)

Gregory and John Blaxland

Gregory Blaxland received a land grant of 2000 acres on 29 November 1808, granted by the Lieutenant-Governor William Paterson and illustrated in Figure 12.[43] John received a grant of 6710 acres on 30 November 1813, which he named Luddenham after the Blaxland family land in England.[44] The brothers came to New South Wales as free settlers, encouraged by Joseph Banks, and quickly established themselves in the colony.[45] Gregory Blaxland primarily lived at his estate at Brush Farm, near Eastwood. It is most likely that his land grant at South Creek, known as Leeholme or Leeholm, was cleared by convicts and was primarily used for livestock. When Blaxland, along with William Lawson and William Charles Wentworth embarked on their journey to the Blue Mountains in 1813, they left from Leeholme with four servants, potentially Blaxland's convicts.[46] Blaxland determined that the Bathurst Plains on the western side of the Blue Mountains would be capable of supporting the colony for thirty years.[47]

The Luddenham Estate land was cleared and Blaxland used the land for cattle grazing, with the residential area of the property concentrated along the Nepean River at Wallacia.[48] John Blaxland did not live at Luddenham but employed staff to oversee the estate and run the various farming enterprises, including the livestock and crops.[49] An extensive homestead was constructed on the site, located on the western side of the Northern Road at a considerable distance from the study area. In

[43] Penrith City Local History, n.d. 'Land Grants,' *Penrith City Local History.* Accessed online 24/6/2019 at: https://penrithhistory.com/land-grants/
[44] Penrith City Local History, n.d. 'Luddenham.' Accessed online 24/6/2019 at: https://penrithhistory.com/luddenham/
[45] Conway, J., 1966. 'Blaxland, Gregory (1778-1853).' Accessed online 24/6/2019 at: http://adb.anu.edu.au/biography/blaxland-gregory-1795
[46] Blaxland, G., 1813. *The Journal of Gregory Blaxland.* The Gutenberg Project. Accessed online 11/5/2020 at: http://gutenberg.net.au/ebooks02/0200411h.html
[47] Conway, J., 1966. 'Blaxland, Gregory (1778-1853).' Accessed online 24/6/2019 at: http://adb.anu.edu.au/biography/blaxland-gregory-1795
[48] Aurecon Australasia, 2016. *M12 Motorway Strategic Route Options Analysis Heritage Working Paper*, p.22
[49] Penrith History, n.d. 'Luddenham,' *Penrith City Local History.* Accessed online 24/6/2019 at: https://penrithhistory.com/luddenham/

1842, Blaxland mortgaged his Luddenham Estate to the Australian Trust Company. He passed away in 1845 and his two sons, Edward and Arthur inherited the property, however it was sold to Sir Charles Nicholson in 1851.[50] In 1859 the property was described in *The Sydney Morning Herald* as "open forest land" with "no improvements."[51] Luddenham Road, located within the study area, was constructed by the brothers to connect their two land grants.

Gregory and his brother John Blaxland owned several land grants throughout Sydney, with their major estates at Newington and Brush Farm, and secondary land holdings at Rhodes, Eastwood and the Hermitage. As Grace Karskens states

> *"The Blaxland families could keep the houses of their kin always in view. It must have given them a great sense of power and success, this vista of lands, houses, mills, orchards, vineyards and paddocks spread out along the broad river, all linked by family ties.*[52]

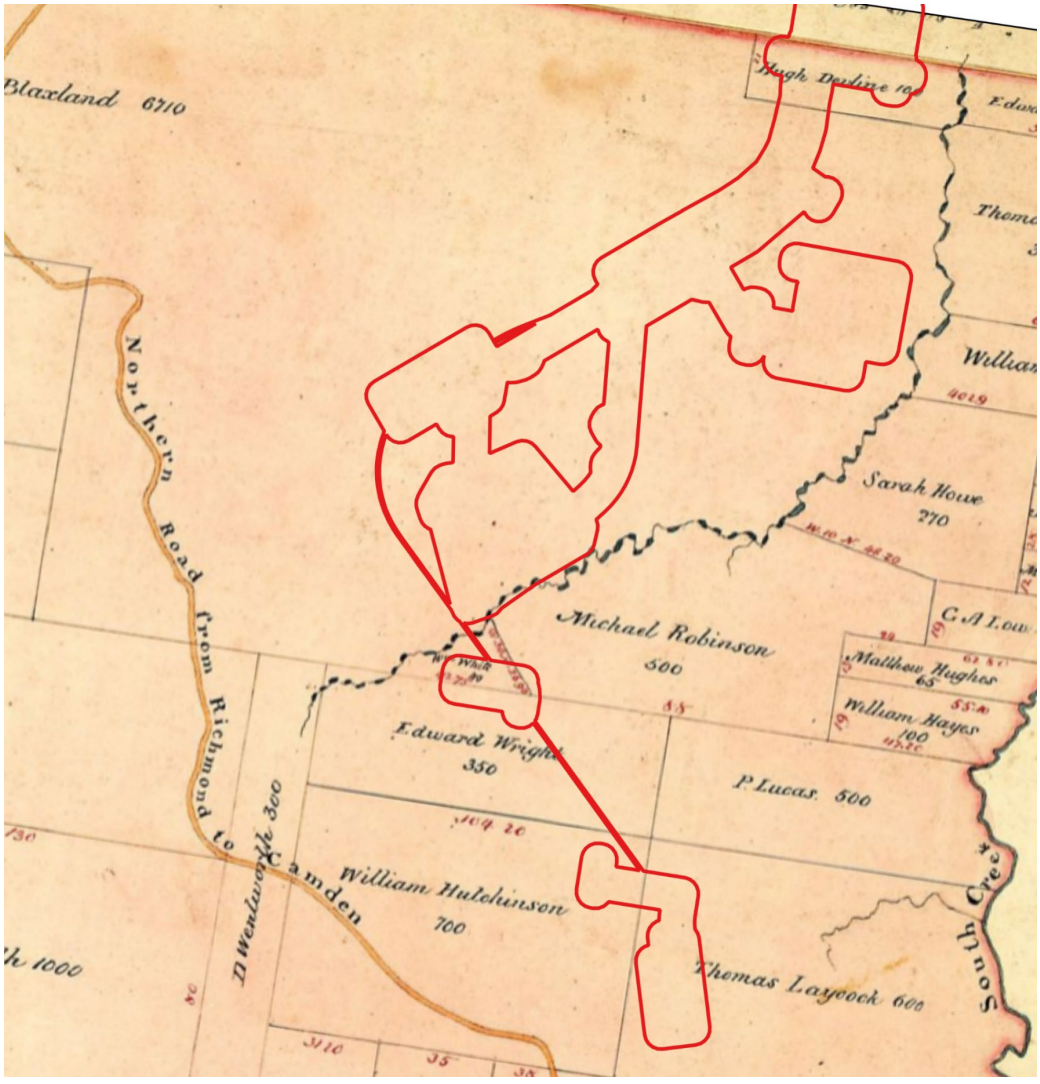

Figure 12. Parish of Bringelly with study area in red, n.d. (likely 1830s-40s). Source: Historical Land Records Viewer

[50] RPS, 2016. *Western Sydney Airport EIS European and other heritage technical report*, p. 92
[51] RPS, 2016. *Western Sydney Airport EIS European and other heritage technical report*, p. 92.
[52] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 145.

Other land grants

In 1811 Phillip Hogan received a land grant near South Creek, illustrated in Figure 13. He was able to draw cattle from Government herds in 1812, suggesting that he had a respectable enough reputation.[53] By 1822 the Hogan also owned land at Liverpool, as documented in the census.[54] In 1825 he was documented as owning 120 acres of land at Bringelly, granted sometime between 1822 and 1825 and located in the Luddenham Road portion of the study area.[55] Hogan had several children and as his family was recorded as living at Bringelly, it is most likely that a dwelling of a considerable size would have been present. It is uncertain whether any convicts were employed by Hogan, however there is no evidence to suggest so. Hogan presumably continued to practice small-scale farming or cattle grazing at Bringelly, particularly considering his experience with cattle. Outbuildings such as a barn and sheds would have been required to support cattle grazing or other farming practices, however there is no record suggesting or illustrating the location of a homestead or external buildings at Hogan's estate.

In 1817, Thomas Laycock received a 600-acre grant in Bringelly, which he named Cottage Vale.[56] By January 1820, Laycock and his family were living at Cottage Vale.[57] Cottage Vale is located in the Aerotropolis Core site, at the southernmost portion of the study area. He constructed a brick homestead, dairy, cellar, coach house and other buildings.[58] At Cottage Vale various crops were grown and cattle was raised as Laycock was a large provider of meat to the colonial commissariat.[59] Major improvements were also undertaken from 1822, with twenty-two convicts – including carpenters and bricklayers - assigned to Laycock and led by William Mitchell.[60] The presence of carpenters and bricklayers indicates that work on the second, more substantial brick house was occurring in this period. It is possible that the original home on Laycock's land was adapted into a kitchen or convict accommodation after the completion of the new house.[61] A detailed history on the site is provided in the discussion on Kelvin in Section 0.

John Wood was granted 570 acres of land at Bringelly in 1818 and resided at his estate, known as Chipping, near Mulgoa. He had large stocks of cattle and sheep and several convicts assigned to him, including James Haffenden, who was involved in a "celebrated confrontation" with bushrangers at Chipping in 1827.[62] At the time, John was not at the estate when the 'Ward Gang' attacked the property, which was being managed by John's wife.[63] This news report does not describe the property of Chipping or any of the structures located on it.

At the south-eastern boundary of John Blaxland's Luddenham land grant, 350-acres were granted to Edward Wright by 1819. His land is largely located by the southern tunnel alignment of the study area. Wright appears in *The Sydney Gazette and New South Wales Advertiser* in 1819 and 1821, in a "list of persons who have tendered supplies of fresh meat for the use of His Majesty's Stores." In both years, Wright tendered to supply 4000 pounds of fresh meat (1814.4 kilos) to Governor Macquarie.[64]

[53] State Records of New South Wales, n.d. 'Colonial Secretary Index, 1788-1825 Hogan, H to Hogan, Thomas.' Accessed online 25/7/2019 at: http://colsec.records.nsw.gov.au/h/F26c_ho-03.htm
[54] Australian Royalty, n.d. 'Philip John Hogan.'
[55] Australian Royalty, n.d. 'Philip John Hogan.'
[56] Australian Museum Consulting, 2014, p. 22. Cited in: RPS, 2016. *Western Sydney Airport EIS European and other heritage technical report*, p. 27.
[57] Form Architects, 2006. *Kelvin Park, Bringelly Conservation Management Plan*, p. 15.
[58] RPS, 2016. *Western Sydney Airport EIS European and other heritage technical report*, p. 27.
[59] Form Architects, 2006. *Kelvin Park Bringelly Conservation Management Plan*, p. 15.
[60] Form Architects, 2006. *Kelvin Park Bringelly Conservation Management Plan,* p. 15
[61] Form Architects, 2006. *Kelvin Park Bringelly Conservation Management Plan*, p. 16.
[62] Freeman, N., 2015. 'James Haffenden,' *Convict Records.* Accessed online 24/6/2019 at: https://convictrecords.com.au/convicts/haffenden/james/79443
[63] Freeman, N., 2015. 'James Haffenden,' *Convict Records.*
[64] *The Sydney Gazette and New South Wales Advertiser*, 24 April 1819. Accessed online 24/7/2019 at: https://trove.nla.gov.au/newspaper/article/2178661?searchTerm=%22Edward%20Wright%22%20Bringelly&searc

From the tender records, this appears to be roughly the median amount. From this evidence, it is apparent that Wright utilised his land for cattle grazing and feeding and therefore that suitable structures, including barns and sheds would have been present.

Other available records show that Wright utilised convict labour at Bringelly. On 6 January 1824, William Dwyer was forwarded to Wright's Bringelly property, where he worked for almost two years.[65] On 29 November Dwyer was sent to Port Macquarie with a colonial sentence, after being tried at Bringelly by Robert Lowe Esq.[66] It is uncertain how many convicts were employed at Wright's land in Bringelly, however it is evident that employee housing would have been apparent, likely in close proximity to the main house.

William Hutchinson received two land grants, of 200 acres and 700 acres, which subsequently became the site of the Bringelly town. Hutchinson's properties were separated into separate titles which were then sub-divided and let to tenant farmers.[67] A homestead was therefore never built on his holdings. Hutchinson eventually became Superintendent of convicts in 1809. On his return to Sydney he was appointed principal superintendent of convicts and public works. In the 1828 Census, Hutchinson and his family were listed as living on George Street, Sydney, however, Hutchinson owned 1915 acres of land; 250 acres of which were cleared and 80 were cultivated. In addition, he owned 103 horses and 873 cattle.[68]

Additional land grants in the study area were given to several landholders, some of whom are prominent in NSW history, and others who are relatively unknown. During the early to mid-1800s, it was expected that land grants would be somewhat improved. In the absence of any other evidence, it is likely that some parts of the land were cleared of vegetation, and that formal fences would have been established along the boundaries of the properties. As little is known about the landowners, it is possible that these were the only plots of land they owned, and therefore that they were used as residential farms. No structures have been illustrated on sighted parish maps or survey maps at this stage, however survey maps did not often record structures.

Other original land grants include:

- Captain John Piper, Naval Lieutenant, granted 1000 acres at Bringelly
- Thomas Nichols, carpenter, granted 200 acres at Bringelly
- Daniel Wellings, granted 50 acres at Bringelly
- Samuel Beckett, granted 60 acres at Bringelly
- William Sherries, granted 40 acres at Bringelly
- Peter Workman, granted 100 acres at Bringelly
- William Johnson, grated 500 acres at Bringelly
- Andrew Nash, former convict and businessman, purchased 80 acres at Bringelly in mid-1820s

hLimits=; *The Sydney Gazette and New South Wales Advertiser*, 24 February 1821. Accessed online 24/7/2019 at: https://trove.nla.gov.au/newspaper/article/2180110?searchTerm=%22Edward%20Wright%22%20Bringelly&searchLimits=

[65] Shelley, J. et al., 2014. *Convicts Transported to Port Macquarie Under Colonial Sentence 14th September 1825 – 20th April 1829.* p. 104. Accessed online 24/7/2019 at: http://static1.1.sqspcdn.com/static/f/822236/27639254/1501210186453/CONVICT+Vol+1+A+to+L.pdf?token=HQgp48SWMnEcwvH1ANV5RO7L6CI%3D

[66] Shelley, J. et al., 2014. *Convicts Transported to Port Macquarie Under Colonial Sentence 14th September 1825 – 20th April* 1829, p.104.

[67] Liverpool City Council, n.d. *History of our suburbs: Bringelly.*

[68] AMAC (Archaeological Management and Consulting Group), 2008. *Preliminary non-aboriginal heritage assessment, The Northern Road Upgrade, Camden NSW, Vol 1: Report*, report for the Roads and Traffic Authority of NSW.

- John Oxley, surveyor, received 600 acres at South Creek in 1823
- William White, Superintendent of Liverpool, received 40 acres at Luddenham/South Creek

Figure 13. Detail of the Parish of Claremont land grants with study area in red, n.d. (likely 1830s). Source: Historical Land Records Viewer

4.2.2 Early contact with Aboriginal people and European settlers

Context of post-contact tensions

Settlement within the study area occurred against the historical background of rising tensions between colonists and Aboriginal people within the Cumberland Plain. The expansion of settlements and land grants had resulted in the dispossession of Aboriginal peoples throughout Sydney as they

were separated from traditional country and resources, including water, food supplies, and former hunting grounds. In 1800 there were rumours of planned uprisings by colonists around Parramatta and Prospect, with raids by Aboriginal warriors on colonial estates commencing in 1801 in response.[69] These were led by Pemulwuy, a Bidjigal (Bidgigal) warrior, who became a "legendary figure within the colony."[70] Pemulwuy was killed in 1802 and his son Tedbury continued to lead the Aboriginal resistance effort on the Cumberland Plain in his place.

Against the background of the war on the Cumberland Plain, there appears to have been various relationships between settlers and Aboriginal people of the area. At Mamre, Marsden had seemingly developed a friendly relationship with the Gomerrigal-Tongarra Aboriginal people of the area. An Aboriginal camp had been located at Mamre or close by prior to European settlement, however after European settlement Marsden 'permitted' the Gomerrigal-Tongarra to camp at Mamre. Marsden then successfully encouraged the Gomerrigal-Tongarra people to work at Mamre in exchange for food and clothing, and they acted as guides through the region for many settlers. Marsden's staff who had been educated at the Native Institution were literate[71] and when Charles Darwin visited Mamre briefly in January 1836, he was impressed by the Gomerrigal-Tongarra people that he met.[72]

During tensions in Parramatta in 1801, Marsden had a man gaoled for refusing to join military-led raids to apprehend – and presumably kill – Aboriginal people around Parramatta. Marsden stated that "there would never be any good done until there was a clear riddance of the natives."[73] At the time, Governor King had made it illegal for Aboriginals to approach settlers properties and settlers were not allowed to provide Aboriginal people with food, shelter or clothing.[74] However, by 1905 Marsden had attended the conference at Prospect with Aboriginal people from the Cowpastures, Prospect, and Parramatta, with an aim to establishing a truce.[75]

Tensions elsewhere however had continued to rise despite the murder of Pemulwuy and Reverend Marsden's attempts for a truce. Governor King had actively blamed Aboriginal people for the outbreak of violence, moving from his earlier perspective which acknowledged the role of settlers in inciting the violence.[76] For several years the war continued with opportunistic raids and attacks throughout the Cumberland Plain. Upon Governor Lachlan Macquarie's arrival in the Colony in 1810, Macquarie was given orders to remain amicable with Aboriginal peoples and attempt to repair the fractured relationship. He adopted an attitude of paternalism,[77] and for the next few years, the war slowed.[78] However, extreme flooding and drought throughout from 1800-1810 had placed immense pressure on food supplies through the destruction of crops.[79] Macquarie toured much of the Sydney Basin, including the Hawkesbury, Nepean, Liverpool, and Campbelltown districts, which were then declared open for settlement. Tensions, loss of resources and dispossession of Aboriginal people from their land were exacerbated by the 1814 drought.

By the end of 1815 Macquarie had stationed groups of soldiers at large estates, such as Camden Park and at Bringelly.[80] Despite this, a group of servants on George Palmer's farm at Bringelly (out of the study area) were massacred by Aboriginal warriors. The surviving servants took matters into their own hands, again resulting in the escalation of conflict. The group crossed the Nepean into the Blue Mountains, however their attempt at revenge was a failure, as they were easily disarmed by the

[69] Gapps, S., 2018. *The Sydney Wars*, p. 146.
[70] Gapps, S., 2018. *The Sydney Wars,* p. 150.
[71] Penrith City History, n.d. 'St Marys.'
[72] Penrith City History, n.d. 'St Marys.'
[73] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 479.
[74] Karskens, G., 2009. *The Colony. A History of Early Sydney,* p.487.
[75] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 488.
[76] Gapps, S., 152.
[77] Gapps, S., 2018,
[78] George Suttor, letter to Joseph Banks, November 1812. Cited in Gapps, S., 2018, p. 199.
[79] Gapps, S., 196.
[80] Gapps, S., 2018, p. 213.

Aboriginal warriors.[81] By 1816 soldier outposts were numerous and spread throughout the entirety of the Sydney basin, well into the Illawarra. Several isolated attacks and raids on farms along the Nepean River (all out of the study area) were reported in 1816. In retaliation, Macquarie commenced the "largest military campaign the colony had yet witnessed.,[82] approving military led punitive expeditions, abductions of Aboriginal women and children, and the murder of any who resisted arrest. [83] Several colonists, including Charles Throsby, Hamilton Hume, and Joseph Kennedy expressed their disapproval of Macquarie's policies[84] and attempted to protect the Aboriginal people they knew from the military expeditions.[85]

The years of growing tension culminated with the approach of soldiers led by Wallis at campfires at Broughton's Pass, Appin. This event, now referred to as the Appin Massacre, resulted in the murder of at least fourteen Aboriginal people. Macquarie wrote in his journal that he was satisfied with the outcome of the expeditions and the Appin Massacre has since been perceived as ending the war in the Cumberland Plain. However, isolated deaths, military operations, continued land dispossession, appropriation of resources, and separation from family and culture continued and expanded throughout the following years.[86]

4.2.3 The Great Western Highway and road development

In 1813, Gregory Blaxland, William Lawson and William Wentworth sought to cross the Blue Mountains, beginning their expedition in Emu Plains, immediately west of Penrith and the Nepean River.[87] The party reached Mount York (now Mount Blaxland) after 21 days, from which they saw an expanse of forest and grassland suitable for agriculture to the west. In 1814 the surveyor George Evans journeyed further west and surveyed a route that extended from Penrith to the eventual site of Bathurst. The following year a road was constructed along Evans route, which became the Great Western Highway, originally known as the Great Western Road.[88] The Great Western Highway travelled through South Creek towards Penrith, at the base of the parish of Rooty Hill, and increased the number of travellers and residents in the area. As a result business began to grow in the area, with an accessible route linking South Creek to Sydney and Parramatta, and resulting in the establishment of inns and public houses throughout South Creek and neighbouring towns.

The intersection of the Great Western Road and the original Northern Road (now Bringelly Road, west of the study area) was inspected in 1817 by Major George Druitt,[89] who was a civil engineer at the time and supervised the construction of many roads and bridges throughout the colony.[90] Druitt named the area the Cross Roads, and over the next fifty years the area became a small, sparsely populated town.[91] At this time, many of the roads were dirt tracks leading between districts, utilised by drovers herding their cattle, wood carts, and regular traffic.[92] Much of the land was left uncleared and

[81] *Op. Cit.*
[82] Gapps, S., 2018, 223.
[83] Macquarie, L. 10 April 1816. *The Governors Diary & Memorandum Book Commencing on and from Wednesday the 10th Day of April 1816.* Lachlan and Elizabeth Macquarie Archive at Macquarie University. Accessed online 15/4/2020 at: https://www.mq.edu.au/macquarie-archive/lema/1816/1816april.html
[84] Throsby, C., 1816. Cited in Gapps, S., 2018 p. 227.
[85] Gapps, S., 2018, 234.
[86] Gapps, S., 2018, 234.
[87] State Library of New South Wales, 2017. 'Crossing the Blue Mountains, Sydney.' Accessed online 7/2/2019 at: https://www.sl.nsw.gov.au/blogs/crossing-blue-mountains-sydney
[88] National Museum of Australia, n.d. 'Blue Mountains Crossing.' Accessed online 7/2/2019 at: http://www.nma.gov.au/online_features/defining _moments/featured/blue_mountains
[89] Stacker, L., n.d. 'Kingswood History,' *Penrith City Local History*.
[90] Austin, M., 1966. 'Druitt, George (1775 – 1842),' *Australian Dictionary of Biography*. Accessed online 21/6/2019 at: http://adb.anu.edu.au/biography/druitt-george-1994
[91] Stacker, L., n.d. 'Kingswood History,' *Penrith City Local History.*
[92] Stacker, L., n.d. 'Kingswood History,' *Penrith City Local History.*

the area became known as King's Bush or King's Wood by locals. As the area was heavily timbered, industries including timber getting, sawmilling and tanning flourished in the area.[93]

Elizabeth Drive dates from the early 1800s and was originally constructed as a corduroy road, using round logs as a bade. It was established to provide access to local land grants and was originally known as the Orphan School Road as it extended west from the Orphan School in modern Bonnyrigg. Its name was later changed to Mulgoa Road, in reference to its western extent, but was renamed again in 1964 to honour Queen Elizabeth II after she visited Australia.[94]

Luddenham Road was first constructed in the 1800s to connect Luddenham and Lee Holme, the estates of brothers John and Gregory Blaxland respectively.[95] The road became an important route in the area, connecting Bringelly and St Marys. In 1887 the road was 'metalled' – covered with small crushed stones – reflecting the importance of the road and suggesting that it was heavily trafficked

In 1808 James Badgery was granted an 840-acre land grant near Bringelly (east of the study area). He named the estate Exeter Farm after his home in Devon, England, and quickly constructed a wattle and daub hut on the property.[96] At Exeter Farm, Badgery produced grain and bred cattle, sheep and horses.[97] In 1815 Badgery created a road through the neighbouring property of Lord Folly, to connect two of his own properties. The road was named Badgerys Creek Road.[98]

4.3 Subdivisions and the development of townships

4.3.1 Establishment of the town of St Marys

In 1837, the King family selected a location for a parish church. The church was named the St Mary Magdalene Anglican Church, presumably after the Church Philip and Harriet King had been married at in England. The foundation stones were laid in November 1837 and the completed church was consecrated in April 1840. In the late 1830s, the town of South Creek began to grow.

In 1841 the O'Connell's subdivided part of their land into thirty-five town allotments, and in the following year offered another 400 hectares (988 acres) for sale, which was referred to as the Village of St Marys.[99] While sale was slow, the small village of St Marys had been established.[100]

The first school and inn opened in 1839, and in the following year the Post Office opened. In the 1850s, tanning became a major industry in South Creek, and it developed further throughout the mid-1800s. By the 1850s, a small number of houses were built, in addition to butchers, ironmongers, and a grocer.[101] The town developed even more rapidly after the opening of St Marys Station in 1863 (please see Appendix A for full detailed history of St Marys Railway Station).

4.3.2 Subdivision of Kingswood and establishment of Werrington

In 1856 Andrew McCulloch purchased the land grant that had initially belonged to Mary O'Connell, located on the eastern side of Kingswood (within the Claremont Meadows portion of the study area). The property was subdivided into farming lots. In 1881, several lots of land at the south-eastern

[93] Stacker, L., n.d. 'Kingswood History,' *Penrith City Local History.*
[94] NSW Government Gazette, Friday 18 December 1964. Issue 144 p. 4158.
[95] NSW Office of Environment and Heritage, 2008. 'Luddenham Road Alignment.' Accessed online 24/7/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2260843
[96] RPS, 2016. *WSA EIS Volume 4 Appendix M2 European and other heritage,* p. 21; Paul Davies Pty Ltd, 2007. P. 13
[97] *Sydney Gazette and New South Wales Advertiser,* 1823, p.2.
[98] RPS 2016, *WSA EIS Volume 4 Appendix M2 European and other heritage*, p. 23.
[99] Thorp, W., 1987. *St Marys Industrial Heritage Study,* p.9.
[100] Thorp, W., 1987. *St Marys Industrial Heritage Study*, p.9.
[101] Thorp, W., 1987. *St Marys Industrial Heritage Study*, p.9.

intersection of the Great Western Highway and the Northern Road (Bringelly Road) were subdivided and put up for sale, known as the Penrithville Estate, located directly opposite of the Cross Roads Station. The following year, another 175 lots were put up for sale as Penrith Park Estate, which included land on either side of the Main Western Railway Line. By 1885 several local stores had opened in the area, including a general store, blacksmith, two fruit stores, as well as several small farms and orchards. At least 25 houses, and a railway siding with two sawmills was also present.[102] In 1885, local shopkeepers requested a postal service be provided to the town, which was eventually provided and operated out of the general store.[103]

4.3.3 Subdivision of the Luddenham Estate

Throughout the 1800s the rural small-scale farmers in the Cumberland Plain had essentially created their own rural culture, isolated from the Regency and Victorian settlements and societies in Sydney and Parramatta.[104] In the Nepean region, the residents were descendants of emancipist settlers, convicts, free settlers, and had learned to read the Nepean environment.[105] They came to understand the river patterns, soil types, and many European women had learned to collect and cook native Australian plants, possibly learning from Aboriginal women, and continued this tradition into the 1940s.[106] An early nineteenth century illustration of a small farm on the Cowpasture Road is shown in Figure 14.

In many cases, the European settlements combined natural environment of the colony with familiar vegetation from home, which often travelled from England as seeds for plantation.[107] Cumberland Plain landholders, including Eliza Marsden, D'Arcy Wentworth, and John Piper, incorporated native trees into their formal gardens, notably the Norfolk Island Pine.[108]

During the mid- and late-1800s the town of Luddenham experienced the migration of many working families, particularly from Germany, who worked on vineyards in the region on five-year contracts.[109] When these working periods were completed, many of the migrant families stayed in the region and established their own vineyards.[110]

Between 1860 and 1882 the Luddenham Estate was subdivided by Charles Nicholson, who purchased the site following sale by John Blaxland. Sites were acquired by James Green (painter, Sydney); Ebenezer Vickery (merchant, Sydney); and Richard Watkins (contractor, Waverley).[111] In November 1860, Luddenham Public School opened and the estate began to develop into a small town concentrated around the intersection of the Northern Road and Elizabeth Drive. In 1870, the foundations were laid for the St James' Anglican Church on the Northern Road, and in 1886 Luddenham Town Hall was built.[112] In the 1890s a public school was constructed at the neighbouring suburb of Badgerys Creek also.[113] Further subdivision occurred at the turn of the century, with the

[102] Stacker, L., n.d. 'Kingswood History,' *Penrith City Local History.*
[103] Stacker, L., n.d. 'Kingswood History,' *Penrith City Local History.*
[104] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 154.
[105] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 154.
[106] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 154.
[107] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 267.
[108] Karskens, G., 2009. *The Colony. A History of Early Sydney*, p. 267.
[109] Australian Museum Consulting, 2014. *Badgerys Creek Initial Environmental Survey: Historic Heritage,* p.24. Accessed online 24/7/2019 at: https://www.westernsydneyairport.gov.au/files/Appendix_B_Historic_Heritage_Report.pdf
[110] Australian Museum Consulting, 2014. *Badgerys Creek Initial Environmental Survey: Historic Heritage*, p. 24.
[111] RPS, 2016. *Western Sydney Airport EIS European and other heritage technical report*, p. 92.
[112] Penrith History, n.d. 'Luddenham,' *Penrith City Local History.* Accessed online 24/6/2019 at: https://penrithhistory.com/luddenham/
[113] RPS, 2016. *Western Sydney Airport EIS European and other heritage technical report*, p. 103.

land used for small farms of various types, including poultry farms,[114] dairies, wineries, cattle or horse breeding, or orcharding.[115] Many small farms were occupied by tenant farmers.[116]

In the 1890s much of the area was subdivided into small land parcels which attracted city-dwellers who had been hit hard by the depression. While the land was affordable and attractive to many, the area was still somewhat undeveloped. Major roads such as Mulgoa Road (Elizabeth Drive) and Bringelly Road were in poor condition and the closest rail station was at St Marys. Perishable goods could not be sent to Sydney via waterways either, and as such, much of the area was used to supply Liverpool with fruit and milk.[117] As taken to the Liverpool Council Committee in 1904 by William Leggo of Wallacia, the isolation in the region and lack of transport routes and services limited what could be grown in the region.[118]

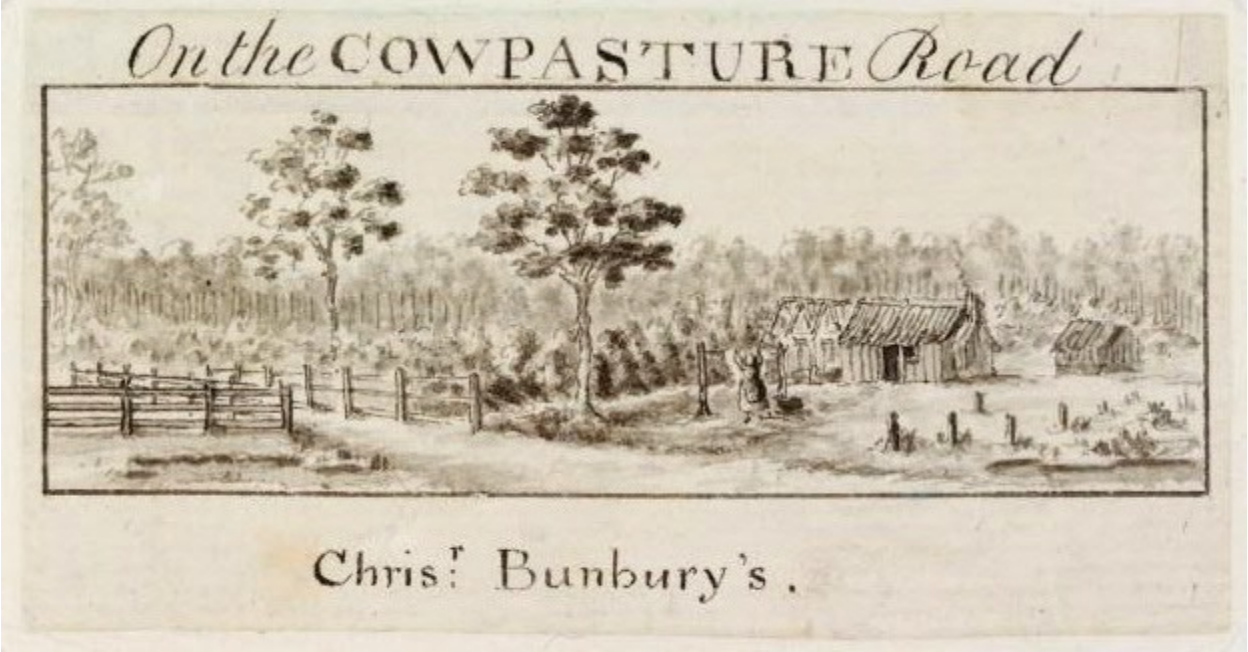

Figure 14. Woman hanging out washing *On the Cowpasture Road* by Edward Mason, n.d. Source: SLNSW[119]

4.3.4 Early development of Orchard Hills

In the early 1800s the economy in the region was largely driven by agriculture, and the area eventually came to supply the town of Liverpool with crops, vegetables and fruit, and dairy products. By the 1860s however, agriculture in the district had declined and industrial businesses had been established. In 1856 the southern railway line was extended to Liverpool, which encouraged business development and a convenient way to transport goods by rail into Sydney.[120] The decline in agriculture was also influenced by a catastrophic onset of rust disease and poor seasons in the

[114] RPS, 2016. *Western Sydney Airport EIS European and other heritage technical report*, p. 93.
[115] Penrith History, n.d. 'Luddenham,' *Penrith City Local History*. Accessed online 24/6/2019 at: https://penrithhistory.com/luddenham/
[116] Australian Museum Consulting, 2014. *Badgerys Creek Initial Environmental Survey: Historic Heritage,* p.24.
[117] Australian Museum Consulting, 2014. *Badgerys Creek Initial Environmental Survey: Historic Heritage*, p. 26.
[118] Australian Museum Consulting, 2014. *Badgerys Creek Initial Environmental Survey: Historic Heritage,* p. 27
[119] Edward Mason, c.1821-1823. 'On the Cowpasture Road / Chrisr: Bunbury's' in *Views of Sydney and Surrounding District* / by Edward Mason.
[120] Aurecon Australasia, 2016. *M12 Motorway Strategic Route Options Analysis Heritage Working Paper*, p. 22.

1860s, which resulted in crops, particularly wheat being transferred to the western side of the Great Dividing Range.[121]

Industrial businesses in the area came to include a tanning pit, brickfields, a quarry, paper mills, steam mills, a windmill, and shipbuilding yards along Brickmakers Creek in Liverpool.[122] By the end of the 1800s there were extensive complaints from the public about the noxious industries around Liverpool and their impacts on the environment, particularly around the Georges River.[123]

4.4 Modernisation

4.4.1 St Marys

Dunheved

In 1941, the land that had formed the King family's Dunheved Estate was resumed by the Australian Government for defence purposes.[124] At the time the property was owned by Frederick Pye, who was compensated at a rate of 7 pounds and 10 shillings per acre.[125] Remnant features on the site, including a brick cottage, observatory, timber shed, a workshop, kitchen, wells, the barn and coach-house were dilapidated[126] and as part of the resumption works the estate buildings were demolished in 1946.[127] While St Marys and much of greater Penrith had enjoyed industrial success throughout the early twentieth century, however the industries had slowed in the interwar years (1918-1939).[128]

On the resumed land, which now totalled 1500 hectares, several munitions factories were constructed, including explosives factories. A large munitions depot was constructed just north of St Marys Railway Station and a branch railway – the Ropes Creek line - was constructed to take workers between St Marys Railway Station and the factories. An aerial image of these facilities from the 1940s is provided in Figure 15.

The Ropes Creek line was 5.6 kilometres long, and opened to Dunheved on 1 March 1942 and Ropes Creek on 29 June 1942.[129] To house the staff, duration cottages – intended to only last the duration of the war – were built to the east of the munitions factories and south of the main railway line (see Appendix A for a detailed history). Over 3000 workers were employed at the Explosives and Filling Factory, working over three shifts.[130] In the early 1950s, a new filling factory was constructed at St Marys adjacent to the World War II factory. This factory was opened in December 1957 by Prime Minister Robert Menzies and intended to increase munitions productions for the Korean War.[131] The town benefited from the industrial presence and new community services, stores, and housing was

[121] GML, 1997. *Draft Environmental Impact Statement WSA,* p.5-23. Accessed online 25/7/2019 at: https://www.westernsydneyairport.gov.au/files/eis/Draft_Environmental_Impact_Statement_1997_Second_Sydney_Airport_Proposal_Technical_Paper_12_Non-Aboriginal_Cultural.pdf
[122] Aurecon Australasia, 2016. *M12 Motorway Strategic Route Options Analysis Heritage Working Paper*, p.22.; GML, 1997. *Draft Environmental Impact Statement WSA*, p. 5-23.
[123] GML, 1997. *Draft Environmental Impact Statement WSA*, p. 5-23.
[124] NSW Office of Environment and Heritage, 2008. 'Explosives Storehouse'. Accessed online 18/6/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2260869
[125] NSW Office of Environment and Heritage, 2008. 'Explosives Storehouse'. Please use correct citation
[126] Casey & Lowe, 1994. *Historical Archaeological Survey St Marys Munitions Factory,* p.12..
[127] Penrith City Library, 1986. 'Site of Dunheved House, Between South Creek and Links Road, Dunheved.' Accessed online 18/6/2019 at: http://www.photosau.com.au/penrith/scripts/ExtSearch.asp?SearchTerm=SM001
[128] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p.23.
[129] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p.24.
[130] Penrith City Council Library, 1944. 'Aerial Photograph, St Marys Munitions Factory.' Accessed online 18/6/2019 at: http://www.photosau.com.au/penrith/scripts/ExtSearch.asp?SearchTerm=002999; NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p.23.
[131] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact,* p.26.

constructed for factory workers and managers, resulting in rapid growth.[132] In Thorp's words "the development of the factory completely changed the character of the town from a quiet rural backwater to a thriving industrial centre."

Figure 15. Aerial photograph of the St Marys Munitions Factories, 1944. Source: Penrith City Library[133]

Queen Street and Post-War Development

Throughout its history, Queen Street has previously been known as Dickson Lane, Mamre Road, Windsor Road, and Station Street. The name was changed to Queen Street in 1897, in celebration of Queen Victoria's Diamond Jubilee. In the late 1890s, the street was rural, with frequent newspaper reports of cows and other animals wandering in the streets after escaping from nearby farms (Figure 16). Queen Street was the original commercial centre of St Marys and led from the Great Western Highway to the Railway Station. Development was concentrated at the southern end of Queen Street until World War II, focused at St Marys Corner, which was the intersection of Queen Street and the Great Western Highway.

Queen Street originally extended north of the railway line, accessed by a level crossing for vehicles prior to the road closure in the mid-1900s. On the northern side of St Marys Station and east of

[132] Thorp, W., 1987. 'Appendix D: Historical Archaeological Component.' In *Heritage study of the City of Penrith. Prepared of behalf of Penrith City Council by Fox & Associates*, p. 76. Accessed online 24/7/2019 at: http://heritagensw.intersearch.com.au/heritagenswjspui/retrieve/2ef159db-ce3d-4f3b-8db9-4cac02bbfcd6/000019605%20-%20HERI.pdf
[133] Penrith City Library, 1944. 'Aerial photograph, St Marys Munitions Factory.' Accessed online 25/6/2019 at: http://www.photosau.com.au/penrith/scripts/ExtSearch.asp?SearchTerm=002999

Queen Street, the Inglis Cattle Sale Yards and the Shane's Park Hotel were present and faced the railway line. Further east there were several houses with yards facing the railway line.

1943 aerial imagery shows that the rail corridor was not crossed with a bridge, but rather with a boom barrier rail crossing. The same imagery shows that much of Queen Street was still undeveloped, with extensive areas of grass and several residential properties along the eastern side of the street. Several residential properties and associated yard structures are pictured along Phillip Street, and a large area of land to the east of East Lane is still uncleared bushland with several tracks or creeks evident. The Inglis Cattle Yards and Dunheved branch line rail are also evident in the imagery on the northern side of the railway.

Figure 16. Queen Street, St Marys, n.d. Source: Penrith City Library[134]

Decline of Industry in St Marys

At the end of the Second World War in August 1945, the production of munitions slowed. Buildings on the site were leased or sold to private industrial firms.[135] The 'down' line – the western track that went towards the factories - of the Ropes Creek branch railway line was removed in the late 1940s due to a severe rail shortage in Sydney, however the line was relaid in 1956 after the new factories were constructed.[136] The line was electrified in the following year.[137] In 1986, the line was officially closed and storage sidings were removed, however the line itself was not removed. The first kilometre has continued to be used as a storage siding.[138]

By the end of World War II, much of St Marys early industry had closed, including tanneries, saw-mills and cattle yards. With the sale of the munitions factory to industrial firms, the Dunheved Industrial Estate began to develop. While the munitions factories had closed, many of the workers stayed in St Marys to work in the new industries that had developed, leading to an increase in the population of

[134] Penrith City Library, n.d. 'Queen Street, St Marys.' Accessed online 25/6/2019 at: http://www.photosau.com.au/penrith/scripts/ExtSearch.asp?SearchTerm=AE00073
[135] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p.23.
[136] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p.24.
[137] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p. 24.
[138] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p.26.

the town.[139] After the closure of the Ropes Creek branch line in 1986, the area was purchased by the State Rail Authority as a train maintenance and storage facility for the Tangara trains.[140] Early earthworks occurred, however the project never eventuated. In 1999 the area was later used as a fill site for material excavated from the Northside Sewerage Tunnel Project.[141] In 2001 the site was acquired by FreightCorp and then by Pacific National in 2002.[142] The northern part of the area includes the Wianamatta Regional Park, which was created in 2008.

4.4.2 Luddenham, Badgerys Creek, and Bringelly

Twentieth century

Throughout the late 20th century, much of the private land in Luddenham and Bringelly continued in its original use as farming land for a variety of resources. Dairy and poultry farms remained common, while other properties were involved in wine production, bee keeping, timber getting, and market gardening.[143]

Vicary's Winery was located on Gregory Blaxland's estate, which had been the first vineyard in Australia to produce and import wine in the 1820s. The land was purchased by Cecil Vicary in 1916 and was first used for dairy.[144] In 1918 the vineyard was planted and in 1923 Vicary's produced and sold its first wines. The winery flourished throughout the 20th century and was a popular location for tourists and the community well into the 2010s.

The area continued to grow as further subdivision occurred and associated infrastructure and community facilities were established or upgraded. The Northern Road and Elizabeth Drive had become major roads in South-Western Sydney, connecting Camden, Liverpool and Campbelltown to Penrith and the Blue Mountains. Great connection to Sydney and the surrounding areas came as a result of major infrastructure projects, such as the construction of the M4. Maps from c.1974 show the plans of the M4, marked 'expressway', proceeding through Marsden's land. In 1975 the farm was purchased by the NSW Planning and Environment Commission and leased to Maclaurin until his death in 1978. In 1984 the property was leased to the Sisters of Mercy as a training area for unemployed locals. The estate is currently run by CatholicCare Western Sydney and Blue Mountains and major restoration works were completed in 2016.[145]

From the 1980s the potential of constructing a second Sydney Airport between Badgerys Creek and Luddenham was discussed.[146] As extensions to Sydney Kingsford Smith occurred in the early 1990s the proposal was delayed, but was revisited upon the Howard Government's election.[147] A process of land acquisition occurred throughout the late 1990s and early 2000s.

4.4.3 Twenty-first Century Luddenham and Bringelly

Into the twenty-first century much of the area around Luddenham, Badgerys Creek and Bringelly maintained its rural character and continued to be an important agricultural area for dairy, vineyards, poultry farms and orcharding. The surrounding townships of Penrith, Campbelltown and Liverpool had become major urban towns, and rapid subdivision and suburban development had occurred as far

[139] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p.26.
[140] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p.26.
[141] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p.26.
[142] NGH Environmental, 2019. *St Mary's Freight Hub Statement of Heritage Impact*, p.26.
[143] Australian Museum Consulting, 2014. *Badgerys Creek Initial Environmental Survey: Historic Heritage*, p. 28
[144] NSW Office of Environment and Heritage, 2017. 'Vicary's Winery Group.' Accessed online 24/7/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=1970098
[145] NSW Office of Environment and Heritage, 2000. 'Mamre.'
[146] Australian Museum Consulting, 2014. *Badgerys Creek Initial Environmental Survey: Historic Heritage,* p.29.
[147] Australian Museum Consulting, 2014. *Badgerys Creek Initial Environmental Survey: Historic Heritage*, p. 29.

south as Camden. Some suburban development had occurred at Bringelly and Luddenham however much of the area maintained its rural nature and continued to be utilised for small-scale farming.

The confirmation of the Western Sydney International location at Badgerys Creek resulted in a major change for the area throughout the mid-2010s, as private residents and businesses relocated. Vicary's Winery closed in 2015, and at the time was the longest consistently operating winery in Australia. In preparation for the opening of the airport, several infrastructure projects have been investigated or approved in the region, including the upgrades of Elizabeth Drive, The Northern Road, Bringelly Road, and the development of the future M12 Motorway, connecting the M7 to the Western Sydney International. Construction of the airport officially began in September 2018. In March 2019 it was announced that the Western Sydney International would be named after Nancy-Bird Walton, one of Australia's pioneering female pilots who was instrumental in the development of the Royal Flying Doctors.

5.0 OFF-AIRPORT BUILT HERITAGE IMPACT ASSESSMENT

5.1 Introduction

This chapter provides an assessment of potential heritage impacts to listed and potential heritage items that may result from the project in off-airport lands. Items listed on statutory heritage registers located within the study area (off-airport) are described within this section. Significance assessments and historical backgrounds for each heritage item are within Appendix A: Off-airport heritage item significance assessments (listed and any identified potential items).

A discussion of the design options considered, and the justification for the project is provided in Section 9.0.

5.2 St Marys Railway Station (SHR# 01249)

5.2.1 Listing information

St Marys Railway Station is listed on the SHR, RailCorp s170 Register and the Penrith LEP 2010. A summary of the relevant listings is provided in Table 9 and their separate curtilages are illustrated in Figure 17. The RailCorp s170 curtilage is identical to the SHR curtilage.

An illustration of the location of significant fabric at St Marys Railway Station Group is provided in Figure 18. Further information on the St Marys Railway Station Group including discussions of significant fabric is provided in Appendix A St Marys Railway Station Group.

Table 9. St Marys Railway Station Heritage Listings

Listing Register	Listing Name	Listing ID	Significance
State Heritage Register[148]	St Marys Railway Station Group	SHR 01249 (SHI 5012221)	State
RailCorp s170[149]	St Marys Railway Station Group	(SHI 4801036)	State
Penrith LEP 2010[150]	St Marys Railway Station	LEP I282 (SHI 2260282)	State

[148] NSW Office of Environment and Heritage, 2010. 'St Marys Railway Station Group.' *NSW Office of Environment & Heritage*.
[149] NSW Office of Environment and Heritage, 2008. 'St Marys Railway Station Group.' *NSW Office of Environment & Heritage*. Accessed online 30/10/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?id=4801036
[150] NSW Office of Environment and Heritage, 2006. 'St Marys Railway Station.' *NSW Office of Environment & Heritage*. Accessed online 30/10/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2260282

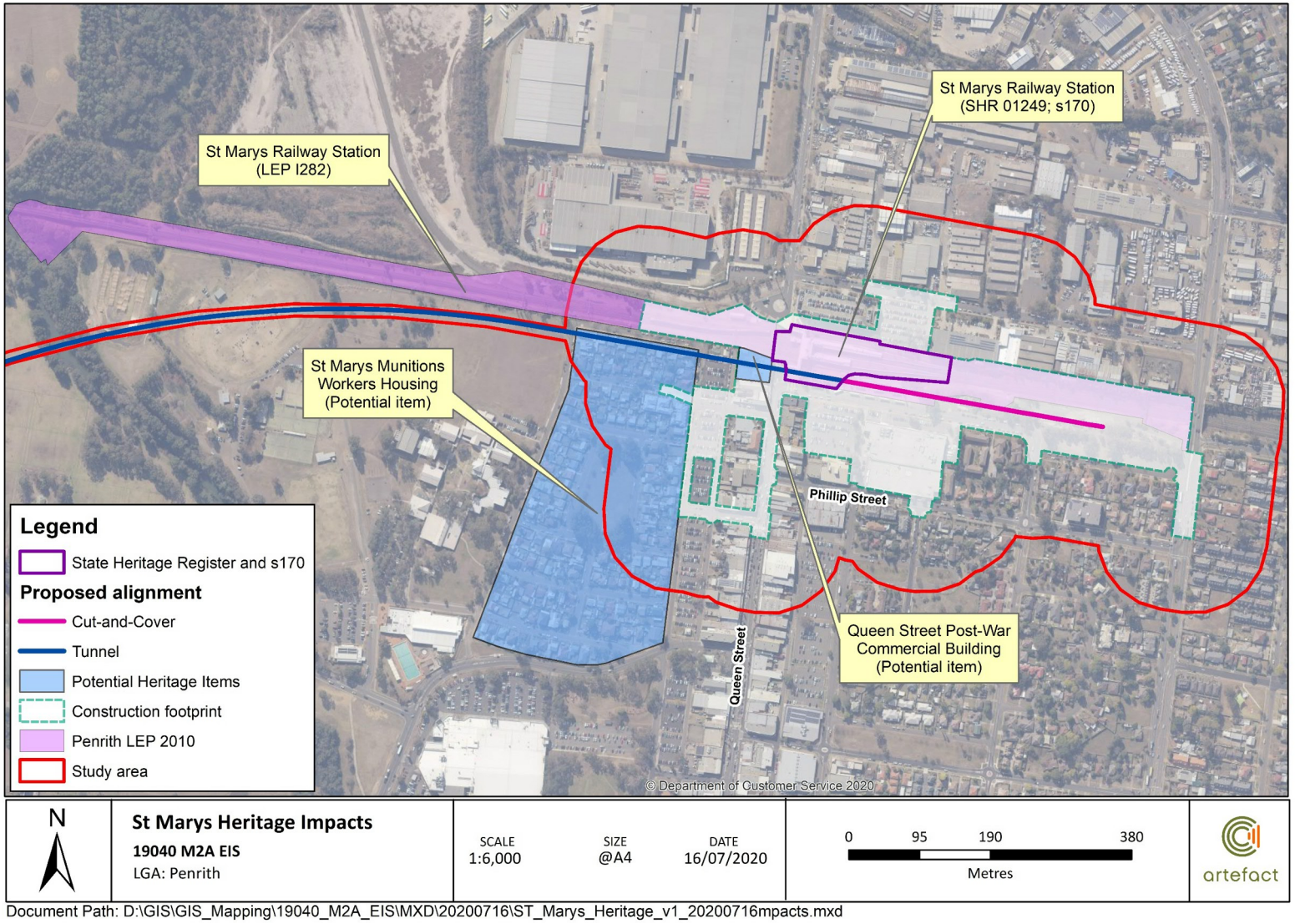

Figure 17. Construction footprint and heritage items in St Marys

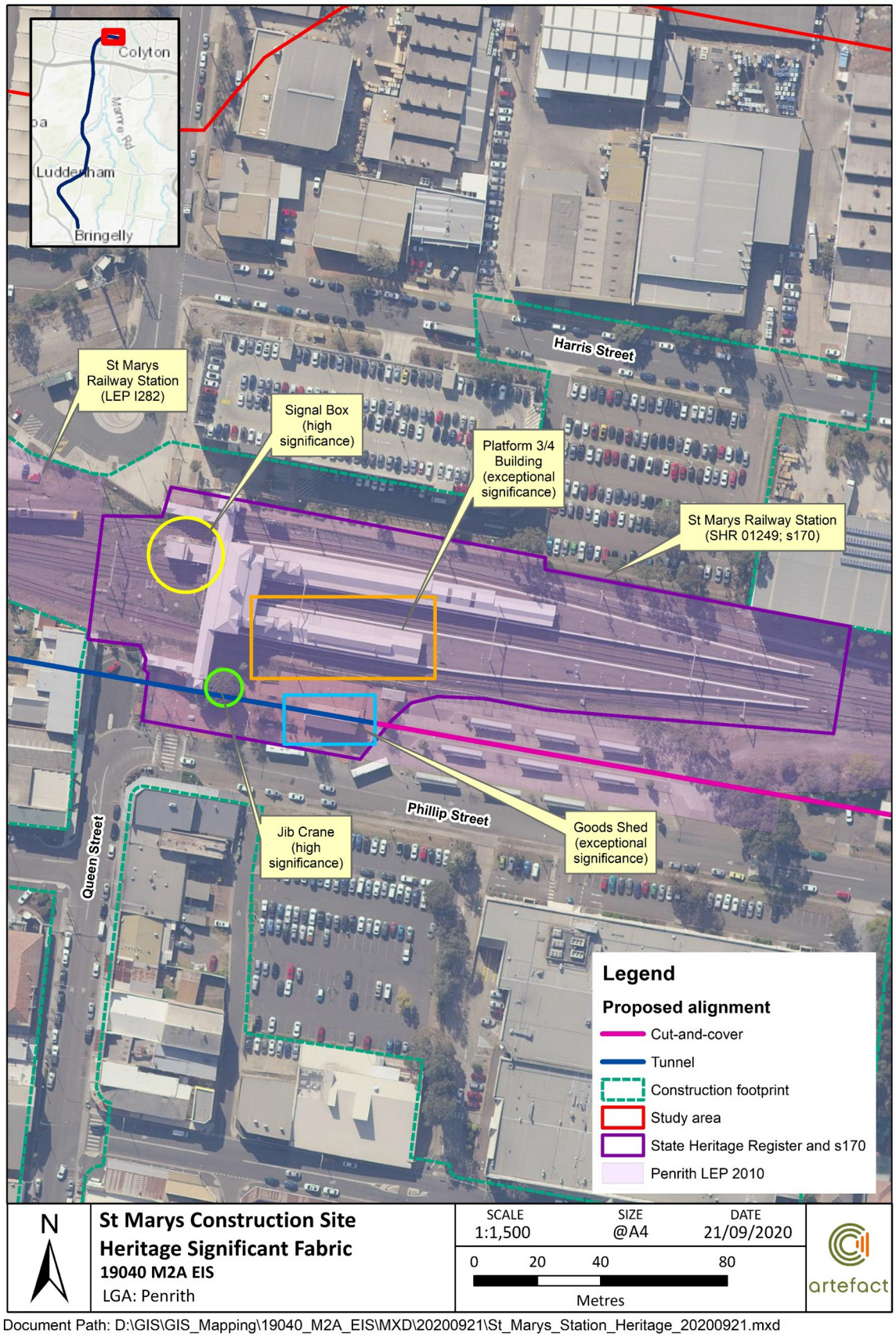

Figure 18: Location of heritage significant fabric at St Marys Railway Station

5.2.2 St Marys Station concept design

St Marys Station would consist of an underground cut-and-cover station with platforms located below the existing surface level. The station would provide an island platform in an east-west orientation located to the south and parallel to the existing Sydney Trains T1 Western Line. The station box would be located to the east of the existing State significant Goods Shed, which would be retained as part of the project. Escalators and lifts would provide access from the metro platform to the ground surface and the new pedestrian aerial concourse. Elevations of the proposed underground metro station in relation to the new aerial concourse to connect to the existing Sydney Trains St Marys Station is shown in Figure 19 and Figure 20.

The new aerial concourse would be about 90 metres in north-south extent and would about13 metres in height above ground level. It would be situated to the east of the Goods Shed and Platform 3/4 station building at an approximate 25 metre set back from these buildings. The station is subject ongoing design development. Indicative design features and architectural treatments include steel gabled roof forms for the aerial concourse overlying steel and glass above some sections of the station box as well as new clear gabled canopies over escalators to connect the aerial concourse to the platforms (which would land close to edge of the platform 3/4 building and would not require direct physical connection). An indicative visual render of the design is provided in Figure 21.

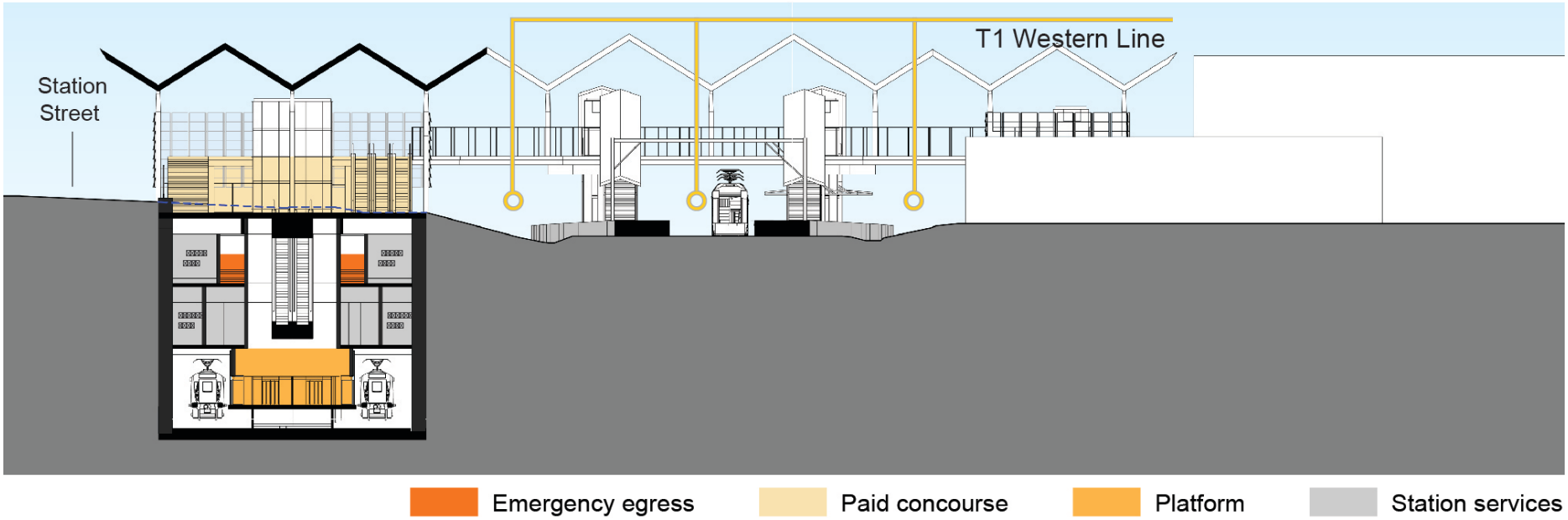

Figure 19: Cross section of St Marys station box and aerial concourse (facing west).

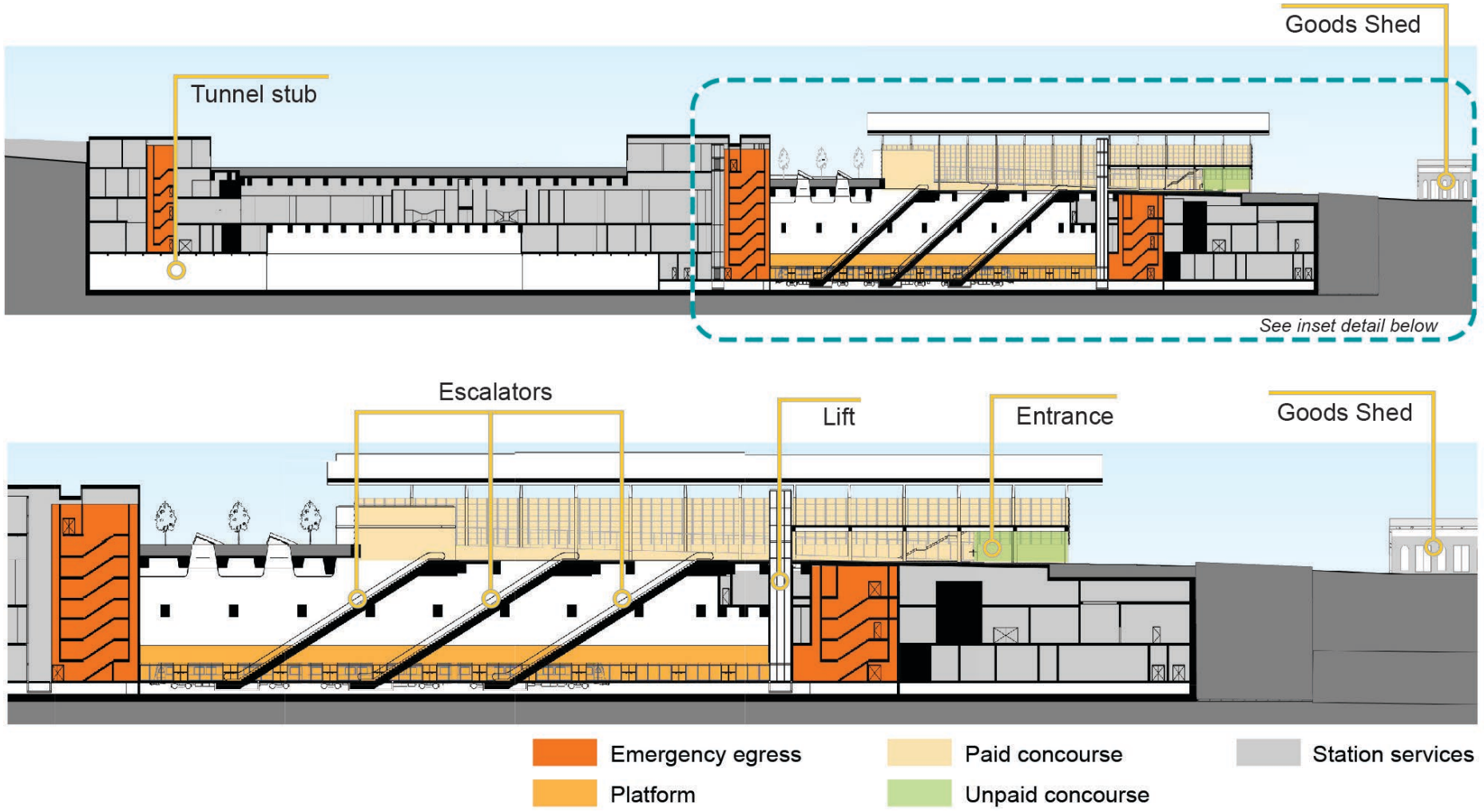

Figure 20. St Marys - indicative elevation

Figure 21: St Marys aerial concourse visual render

5.2.3 Direct impacts

The proposed excavation for the cut-and-cover station box would occur within the LEP listing curtilage of St Marys Railway Station Group, and would abut but not enter the SHR and s170 curtilages and would not impact significant fabric associated with the existing Sydney Trains St Marys Railway Station. The construction of the aerial concourse with connections to the St Marys Railway Station Group would occur within the SHR and s170 curtilage. These works, particularly the construction of the aerial concourse and vertical transport would result in modifications to Platform 3/4 (of moderate heritage significance) and Platform 1/2 (little heritage significance). The proposed aerial concourse would include two new lifts on the each of the existing Sydney Trains St Marys Railway Station platforms, with additional localised impacts associated with the concourse support pillars. Additional platform excavation would occur for the construction of lift shafts and station service buildings for the new metro station.

The proposed works would not result in direct impacts to the Platform 3/4 building or the Goods Shed, both of which are elements of exceptional significance. The project would not result in direct impacts to the signal box, which is of high significance. The proposed St Marys Station Plaza, which contains the Goods Shed and the significant 1940s jib crane, would be subject to precinct works, for example including resurfacing, street furniture and wayfinding. The jib crane would be temporarily relocated during construction and a mature tree located adjacent to the jib crane would likely be removed as part of the project.

The project would have a **minor** impact on significant fabric at St Marys Railway Station due to modifications to the existing platform 3/4 which is an element of moderate significance.

5.2.4 Indirect impacts

Permanent indirect impacts

The project would involve the construction of an aerial pedestrian concourse that would provide access between Station Street, Harris Street, the existing St Marys Station and the new metro station. Indicative architectural renderings (provided in Chapter 7 of the Environmental Impact Statement) illustrate the proposed design of the aerial concourse, which would be constructed to the east of the existing Sydney Trains railway station and would comprise a mostly glass façade with elevators and modern hipped roof design.

Overall, the design of the aerial concourse would not be sympathetic in material and scale with the Victorian-era architecture and character of the St Marys Platform 3/4 building and the Goods Shed. The indicative roof profile mirrors and amplifies the gabled roof pitch of the Goods Shed and visually references the heritage structure. Overshadowing caused by the larger scale of the proposed design is partially mitigated by the separation between the new concourse and heritage significant structures, and views of both the Goods Shed and Platform 3/4 building would be preserved from the majority of vantage points. However, the new aerial concourse would encapsulate a large portion of the eastern (city-end) of the station and restrict views to heritage significant structures from the platform.

In the end state, the bus interchange would be to the east of the new aerial concourse and this would result in the bus interchange being screened by the new concourse from the perspective of the station platforms and the Goods Shed. The removal of existing intrusive and opaque platform canopies and their replacement with glass hipped canopies would improve the view lines within the station precinct.

Due to the large and prominent scale of the proposed aerial concourse, despite the physical separation of old and new fabric at the station, the project would result in a **moderate** indirect impact to St Marys Railway Station.

Temporary (construction phase) indirect impacts

The construction phase of the project would require the establishment of a large site compound, laydown areas, storage facilities and Tunnel Boring Machine (TBM) retrieval site in the vicinity of St Marys Railway Station. An acoustic shed and crane may be required during construction. The station box excavation and construction of the new aerial concourse would also result in significant visual impacts for several years. The establishment of the site compounds and associated construction areas surrounding St Marys Railway Station would result in substantial alteration of the setting of the Station Street area from a post-war retail district to a construction site. Following completion of the project, the construction site, laydown facility and site compound areas would be restored to their extant condition.

The project would result in **moderate** temporary indirect impacts.

5.2.5 Vibration and settlement impacts

Vibration

Vibration guidelines for heritage buildings indicate that vibration levels should not exceed 5 millimetres per second peak particle velocity if the building is structurally sound, or 2.5 millimetres per second peak particle velocity if the building is structurally unsound. Vibration assessments undertaken for the project have determined that ground-borne vibration impacts resulting from tunnelling and rock-breaking activities may reach up to 4.1 millimetres per second peak particle velocity for the St Marys Goods Shed and jib crane, due to their proximity to excavation works. As the jib crane would be removed from its present location for the duration of works, vibration impacts to this item would not occur. However, vibration may have the potential to result in cosmetic structural damage to the Goods Shed which would be retained in situ. The applicable vibration criteria for the Goods Shed would be confirmed as part of detailed construction planning, including through surveys to confirm the condition of the building.

As such, the potential vibration impact to the Goods Shed would be **minor**, while potential vibration impacts to other heritage significant structures of the St Marys Railway Station Group would be **negligible**. Vibration trigger levels, requirements for vibration monitoring and, as required, the implementation of further mitigation would be defined in accordance with the Construction Noise and Vibration Standard.

Settlement

The St Marys Station construction site would include a TBM extraction site, subsurface tunnelling, cut-and-cover excavation, demolition works and the establishment of a site compound and laydown facilities in close proximity to the SHR listed St Marys Railway Station. The TBM route would pass directly beneath the St Marys Railway Station Goods Shed.

Settlement impacts resulting from the project within the vicinity of St Marys Railway Station have been assessed for the project (refer to Chapter 15 of the Environmental Impact Statement). Settlement impacts resulting from ground movement (particularly the TBM tunnelling) are predicted to result in a maximum predicted movement of 54 millimetres, which would place the Goods Shed and Jib Crane within the 'slight impact' category.[151] It has been recommended that the jib crane be relocated temporarily during works and that further assessment occurs for the Goods Shed.[152] Additional impacts associated with settlement are anticipated to involve movement of the T1 Western Line rail tracks between 5-30 millimetres and negligible levels of platform movement, potentially resulting in

[151] Sydney Metro, September 2020. 15-31.
[152] Sydney Metro, September 2020. 15-31.

negligible movement to the significant Platform 3/4 building. Monitoring of settlement / movement of the platform and tracks would be required.

Chapter 15 of the Environmental Impact Statement recommends that “further assessment of properties identified as having slight or very slight settlement risk would be undertaken” (mitigation measure GW1) and that “detailed hydrogeological and geotechnical models”, including “assessment of the potential for damage to structures” should be prepared (mitigation measure GW2).

Overall, settlement has the potential to result in **minor** impacts to the Goods Shed at St Marys Station. Impacts to the platforms and platform 3/4 building will be **negligible**.

5.2.6 Cumulative impacts

The St Marys Intermodal Terminal would involve the construction of a new multistorey freight rail container terminal to the north-west of St Marys Station. This new terminal would be largely screened from views from St Marys Station and would not further contribute to the change in the character of the wider setting of the St Marys Railway Station Group.

Overall, the cumulative impacts to this item would be **negligible**.

5.2.7 Summary of impacts

The proposed works within the vicinity of St Marys Railway Station Group would involve extensive cut-and-cover excavation, the construction of a new aerial concourse, sub-surface tunnelling, temporary relocation of the jib crane, and impacts to the existing platforms. The accumulation of these works would see an overall **moderate** impact to the heritage significance of the St Marys Railway Station Group.

A summary of impacts to St Marys Railway Station Group is provided in Table 10.

Table 10. Summary of impacts to St Marys Railway Station Group

Impact	Assessment
Overall	Moderate
Direct	Minor
Indirect	Permanent: Moderate Temporary: Moderate
Vibration and settlement	Settlement impacts: Minor to the Goods Shed Settlement impacts: Negligible to platforms and Platform ¾ building Vibration impacts: Minor to the good shed Vibration impacts: Negligible to other significant station components
Cumulative	Negligible

5.3 St Marys Post-War Commercial Building (potential item)

5.3.1 Listing information

The Queen Street, St Marys, Post-War Commercial Building is located at 1-7 Queen Street, St Marys. This building is not listed on any statutory or non-statutory heritage register. This item was identified as having potential heritage significance during historical research and site inspections for the Environmental Impact Statement. A review of the Penrith LEP 2010 shows that several Inter-War and one Post-War building within Penrith itself have been listed on the LEP, however Inter-War and Post-War buildings within St Marys have not been assessed or included in the previous LEP. Previous heritage studies within St Marys have focused primarily on the industrial areas and the Dunheved Precinct, and have not assessed the commercial district of Queen Street.

For further information on the St Marys Post-War Commercial Building please see Appendix A Queen Street, St Marys, Post-War Commercial Building (potential item).

5.3.2 Direct impacts

The commercial buildings at the northern end of Queen Street, including this potential heritage item, are not located within the construction footprint for the project. There would be no direct impacts to the potential item resulting from the project.

Due to the location of the Post-War Commercial Building outside of the construction footprint, the project would result in a **nil** direct impact to the Queen Street Post-War Commercial Building.

5.3.3 Indirect impacts

Permanent indirect impacts

The proposed works within the vicinity of the Post-War Commercial Building would involve the construction of the St Marys Station. The proposed St Marys Station would be located at the eastern side of the existing Sydney Trains St Marys Railway Station Group and would not interrupt or obstruct potentially significant views between the Post-War Commercial Building and the St Marys Railway Station, including the Goods Shed. The existing platform buildings and Goods Shed would largely obstruct views to the proposed St Marys Station and aerial concourse, minimising the visual impacts resulting from the project. The proposed development of St Marys Station is not expected to impact significant views to the Post-War Commercial Building.

Additional permanent works associated with the project, such as the demolition of the St Marys Station Plaza would not alter the streetscape or impact the significant views associated with the Post-War Commercial Building. Views of these impacts would largely be obstructed by the existing commercial buildings on the east side of Queen Street.

Due to the development of the new St Marys Station, which would be partially obscured by the St Marys Railway Station, the project would result in a **negligible** visual impact to the Queen Street Post-War Commercial Building.

Temporary (construction phase) indirect impacts

The construction of the project would result in the establishment of a laydown area and construction site to the north, east, and south of the Queen Street Post-War Commercial Building. The conversion of the area into a laydown area for approximately three to four years during construction works would include the construction of hoarding and protective fencing in car parks to the east of Carinya Avenue,

which would be visible from the Post-War Commercial Building potential heritage item. There would be views – although partially obstructed – to the large laydown area, construction site, cut-and-cover excavation areas, and the proposed at grade crossing associated with the construction of St Marys Station. The use of the surrounding area as a laydown area (particularly in the areas currently utilised as public parking, would not significantly alter the setting. Impacts associated with the cut-and-cover excavation may result in more significant and intrusive visual impacts, both affecting views to the existing Sydney Trains St Marys Railway Station and of the overall Station Street setting.

The project would result in a **minor** temporary indirect impact to the St Marys Munitions Workers Housing.

5.3.4 Vibration and settlement impacts

Vibration

Vibration guidelines for heritage buildings indicate that vibration levels should not exceed 5 millimetres per second peak particle velocity if the building is structurally sound, or 2.5 millimetres per second peak particle velocity if the building is structurally unsound. Vibration assessments undertaken for the project have determined that ground-borne vibration impacts resulting from tunnelling and rock-breaking activities may reach up to 4.1 millimetres per second peak particle velocity in the vicinity of the Post-War Commercial Building, due to the proximity to excavation works and location directly above the tunnelling route. The building appears to be structurally sound and under this assumption, the potential vibration levels would not exceed the recommended 5 millimetres per second peak particle velocity. The applicable vibration criteria for the Post-War Commercial Building would be confirmed as part of detailed construction planning, including through surveys to confirm the condition of the building.

As such, the potential vibration impact to the Queen Street Post-War Commercial Building would be **negligible**. Vibration trigger levels, requirements for vibration monitoring and, as required, the implementation of further mitigation would be defined in accordance with the Construction Noise and Vibration Standard.

Settlement

The St Marys Station construction site would include a TBM extraction site, subsurface tunnelling, and the establishment of a site compound and laydown facilities in close proximity to the Queen Street Post-War Commercial Building potential heritage item. The TBM route would be bored subsurface adjacent to the Post-War Commercial Building.

Potential settlement impacts resulting from the project within the vicinity of the Post-War Commercial Building have been assessed in Chapter 15 of the Environmental Impact Statement. Settlement impacts resulting from ground movement (particularly the TBM tunnelling) are predicted to result in a maximum predicted movement of 35 millimetres on a maximum slope of between 1:500 to 1:200, which would place the Post-War Commercial Building within the ‘slight impact’ category, which may result in some superficial or cosmetic damage only. Cosmetic damage is readily reparable and would not impact the structural integrity of buildings and is not considered likely to adversely alter the heritage significance of the item. Potential damage from settlement would result in a negligible heritage impact. Chapter 15 of the Environmental Impact Statement recommends that “further assessment of properties identified as having slight or very slight settlement risk would be undertaken” (mitigation measure GW1) and that “detailed hydrogeological and geotechnical models”, including “assessment of the potential for damage to structures” should be prepared (mitigation measure GW2).

Overall, settlement has the potential to result in **negligible** impacts to the Post-War Commercial Building.

5.3.5 Cumulative impacts

Nearby infrastructure projects assessed in this Technical Paper would not alter the physical fabric of the buildings nor contribute to an alteration of the setting of this item. There would be no cumulative impacts from other projects to the heritage significance of this item.

5.3.6 Summary of impacts

The project would not result in direct impacts to the Queen Street Post-War Commercial Building, however potential impacts from vibration and settlement, and indirect impacts associated with new development may result in an overall **negligible** permanent impact to the heritage significance of the item.

A summary of impacts to the Queen Street Post-War Commercial Building is provided in Table 11.

Table 11. Summary of impacts for the Queen Street Post-War Commercial Building

Impact	Assessment
Overall	Negligible
Direct	Nil
Indirect	Permanent: Negligible Temporary: Minor
Vibration and settlement	Negligible
Cumulative	Nil

5.4 St Marys Munitions Workers Housing (potential item)

5.4.1 Listing information

The St Marys Munitions Workers Housing is not listed on any statutory or non-statutory heritage register and was identified as a potential item from historical research and during the site inspection for the project. The Penrith heritage study identified this item as an item of local heritage significance but did not support its listing at that stage in 2007.[153] It was noted that conservation of the buildings was 'challenging' due to the use of asbestos materials and future development plans for the area.[154]

For further information on the St Marys Munitions Workers Housing please see Appendix A – St Marys Munitions Workers Housing (potential item).

[153] Peter Davies Pty Ltd 2007. *Penrith Heritage Study volume 3,* p. 296 - 298.
[154] Peter Davies Pty Ltd 2007. *Penrith Heritage Study volume 3*, p. 296 – 298.

5.4.2 Direct impacts

While the St Marys Munitions Workers Housing is located partially inside of the construction footprint for the project, works in this area include the alteration of parking, and utility adjustments for temporary bus arrangements and vehicle access. This would not modify significant fabric of the heritage item in any way.

The project would result in **nil** direct impact to the St Marys Munitions Workers Housing.

5.4.3 Indirect impacts

Permanent indirect impacts

Project demolition works in the vicinity of this item works would not alter the visual setting of the former worker's housing and would not be visible from the potential heritage item. The street setting, of heritage significance, would not be modified.

The project would result in a **nil** indirect impact.

Temporary indirect impacts

The construction phase of the project would result in the adjacent area to the east of Carinya Avenue to be used temporarily for alternate bus parking and vehicle access arrangements. This temporary use would not result in changes to the setting of the area, as this location is currently utilised as a public parking space. These works would not intrude within the boundaries of this item and would not alter the setting of this item. While this area is within the construction footprint for the project, no construction activities would occur within the area.

The project would result in a **nil** temporary indirect impact to the St Marys Munitions Workers Housing.

5.4.4 Vibration and settlement impacts

Vibration

The TBM alignment would travel beneath the northern-most block of the St Marys Munitions Workers Housing potential heritage item. Vibration assessments undertaken for the project have determined that ground-borne vibration impacts resulting from the St Marys to Orchard Hills tunnel would not exceed 1.1 millimetre per second peak particle velocity, and would not exceed the recommended level of 5 millimetre per second peak particle velocity (or 2.5 millimetres per second peak particle velocity if the building is structurally unsound). Therefore, it is anticipated that the project would result in **negligible** impacts to fabric associated with the St Marys Munitions Workers Housing.

Settlement

The TBM path would be located beneath the northern-most block of St Marys Munitions Workers Housing (adjacent and south of Camira Street). Settlement from tunnelling below the item has been assessed as potentially resulting in ground movement settlement impacts of between three millimetres and five millimetres. These impacts have been classified as Risk Category 1 and have been graded as negligible and with superficial damage unlikely. The project would result in **negligible** settlement impacts to the St Marys Munition Workers Housing heritage item.

5.4.5 Cumulative impacts

Nearby infrastructure projects assessed in this Technical Paper would not alter the physical fabric of the buildings nor contribute to an alteration of the setting of this item. There would be no cumulative impacts from other projects to the heritage significance of this item.

5.4.6 Summary of impacts

The proposed works would involve tunnelling beneath part of the St Marys Munitions Workers Housing, and would see some visual impacts in the vicinity of the potential item arising from demolition of surrounding structures, construction of new structures, and temporary use of the surrounds as construction sites. Overall, the project would result in a **negligible** impact to the significance of the St Marys Munitions Workers Housing.

A summary of impacts to the St Marys Munitions Workers Housing is provided in Table 12.

Table 12. Summary of impacts to the St Marys Munitions Workers Housing

Impact	Assessment
Overall	Negligible
Direct	Nil
Indirect	Permanent: Nil Temporary: Nil
Vibration and settlement	Vibration: Negligible Settlement: Negligible
Cumulative	Nil

5.5 Great Western Highway Milestone (Penrith LEP 2010 I859)

5.5.1 Listing information

The Great Western Highway Milestone is listed on the Penrith LEP 2010 as an item of local significance (LEP# 859).

For further information on the Great Western Highway Milestone please see Appendix A Great Western Highway Milestone (Penrith LEP 2010).

5.5.2 Direct impacts

The Great Western Highway Milestone would be located approximately 20 m to the east of the boundary of the proposed services facility to be constructed at the intersection of the Great Western Highway and Gipps Street. Project works would include establishing the new compound with vehicle access from Putland Street and Reserve Road off the Great Western Highway. The Milestone would not be directly affected by construction works in this area.

The preservation of the Milestone in its current location as well as the lack of physical modification to the item would result in a **nil** direct impact on the Great Western Highway Milestone.

5.5.3 Indirect impacts

Permanent indirect impacts

The new services facility would consist of a small building sited approximately 100 metres from the Milestone. The new building would be situated within the Gipps Street property and would be sited away from the street. This new building would not overshadow or obscure views of the Milestone nor would it alter the views between the Milestone and the Great Western Highway.

Therefore, there would be a **nil** permanent indirect impact to the Great Western Highway Milestone.

Temporary indirect impacts

Project construction works near the Milestone would involve the establishment of a water treatment facility, site compound and several temporary laydown areas. These would be located approximately 100 metres to the southwest of the Milestone. These temporary facilities are spaced far enough away from the milestone that they would not affect the setting or fabric of the item.

Temporary protection measures on the milestone to prevent inadvertent harm are likely to conceal the item. These protective measures would result in a **minor** temporary indirect impact to the Great Western Highway Milestone.

5.5.4 Vibration and settlement impacts

Vibration

The TBM alignment would be located approximately 85 metres from the Great Western Highway Milestone. Vibration impacts have been assessed as reaching a maximum threshold of 0.4 millimetres per second peak particle velocity and would not reach or exceed the recommended level of 5millimetre per second peak particle velocity. Therefore, the project would result in a **nil** vibration impact to the Great Western Highway Milestone.

Settlement

The route of the TBM and tunnel alignment would be located approximately 85 metres west of the Great Western Highway Milestone. The excavation of the services facility shaft would occur in proximity to the Milestone. Ground settlement assessments for the project indicate that ground subsidence would not occur in the vicinity of the heritage item.

5.5.5 Cumulative impacts

No identified infrastructure and development projects would not occur in the vicinity of this item.

5.5.6 Summary of impacts

The proposed works see temporary visual impacts resulting from the Claremont Meadows Intermediate Services Facility and would overall result in **nil** impacts to the significance of the Great Western Highway Milestone.

A summary of impacts to Milestone is provided in Table 13.

Table 13. Summary of impacts to 'Milestone'

Impact	Assessment

Overall	Nil – temporary indirect impacts to the Milestone would be reverted following the completion of project works
Direct	Nil
Indirect	Permanent: Nil Temporary: Minor
Vibration and settlement	Vibration: Nil Settlement: Nil
Cumulative	Nil

5.6 Four Winds – Dwelling (Penrith LEP 2010 I321)

5.6.1 Listing information

Four Winds - Dwelling is listed on the Penrith LEP 2010 and the Department of Planning, Industry and Environment s170 heritage and conservation register. A summary of the relevant listings is provided in Table 14.

For further information on the Four Winds – Dwelling please see Appendix A Four Winds – Dwelling (Penrith LEP 2010 I321).

Table 14. Four Winds Heritage Listings

Listing Register	Listing Name	Listing ID	Significance
Penrith LEP 2010	Four Winds – Dwelling	I321	Local
Department of Planning, Industry and Environment s170	Four Winds	SHI 3490036	Local

5.6.2 Direct impacts

The construction footprint would not be located within the heritage curtilage of the Four Winds item. The project would result in a **nil** direct impact to Four Winds.

5.6.3 Indirect impacts

Permanent indirect impacts

The Claremont Meadows services facility would consist of a small building sited approximately 300 metres from the Four Winds building. The new building would be situated within the Gipps Street property and would be sited away from the street. The proposed building would not overshadow or obscure views of the Four Winds building.

Therefore, the project would result in a **nil** permanent indirect impact to Four Winds.

Temporary indirect impacts

Construction of the Claremont Meadows services facility would not involve the development of any temporary structures which would overshadow or block significant view lines of the Four Winds building due to the distance away from the construction site. Therefore, the project would result in a **nil** temporary indirect impact to Four Winds.

5.6.4 Vibration and settlement impacts

Vibration

The TBM alignment would be located approximately 350 metres from the location of the Four Winds – Dwelling heritage item. Vibration impacts have been assessed as reaching a maximum threshold of 0.4 millimetre per second peak particle velocity and would not reach or exceed the recommended level of 5 millimetre per second peak particle velocity. Therefore, the project would result in a **nil** vibration impact to the Four Winds – Dwelling heritage item.

Settlement

The route of the TBM and tunnel alignment would be located approximately 350 metres west of Four Winds. Excavation of the services facility lift shaft would also occur within proximity to the item. The potential settlement impacts associated with the TBM would not reach the location of Four Winds.

5.6.5 Cumulative impacts

There are no known other projects that would affect the heritage significance of this item.

5.6.6 Summary of impacts

The project would result in **nil** impacts to the significance of Four Winds – Dwelling on account of the temporary visual impacts associated with the Claremont Meadows Intermediate Services Facility.

A summary of impacts to Four Winds is provided in Table 15.

Table 15. Summary of impacts to the Four Winds heritage item

Impact	Assessment
Overall	Nil
Direct	Nill
Indirect	Permanent: Nil Temporary: Nil
Vibration and settlement	Vibration: Nil Settlement: Nil
Cumulative	Nil

5.7 Brick House (Penrith LEP 2010 I810)

5.7.1 Listing information

The Brick House is listed on the Penrith LEP 2010 as an item of local heritage significance (I810). The house is located at 565 Great Western Highway, Werrington.

For further information on the Brick House please see Appendix A Brick House, 565 Great Western Highway, Werrington (Penrith LEP 2010 I1810).

5.7.2 Direct impacts

The construction footprint for the project would not be located within the heritage curtilage of the Brick House item. The project would result in a **nil** direct impact to Brick House.

5.7.3 Indirect impacts

Permanent indirect impacts

The Claremont Meadows services facility would consist of a small building sited approximately 320 metres from the Brick House building. The proposed building would be situated within the Gipps Street property and would be sited away from the street. This new building would not overshadow or obscure views of the Brick House building.

Therefore, the project would result in a **nil** permanent indirect impact to Brick House.

Temporary indirect impacts

Construction of the Claremont Meadows services facility would not involve the development of any temporary structures which would overshadow or block significant view lines of the Brick House building due to the distance away from the construction site. Therefore, the project would result in a **nil** temporary indirect impact to Brick House.

5.7.4 Vibration and settlement impacts

Vibration

The TBM alignment would be located approximately 400 metres from the location of the Brick House heritage item. Vibration impacts have been assessed as reaching a maximum threshold of 1.1°millimetre per second peak particle velocity and would not reach or exceed the recommended level of 5 millimetre per second peak particle velocity. Therefore, the project would result in a **nil** vibration impact to the Brick House heritage item. Surface vibration impacts would be nil, as the Brick House is outside of the minimum safe working distance for construction impacts.

Settlement

The route of the TBM and tunnel alignment would be located approximately 360 m west of the Brick House. The potential settlement impacts associated with the TBM would not reach the location of the

Brick House.[155] Therefore, the project would result in **nil** vibration and settlement impacts to Brick House.

5.7.5 Cumulative impacts

There are no known other projects that would affect the heritage significance of this item.

5.7.6 Summary of impacts

The project would result in **nil** impacts to the significance of Brick House on account of the temporary visual impacts associated with the Claremont Meadows Intermediate Services Facility.

A summary of impacts to Brick House is provided in Table 16.

Table 16: Summary of heritage impacts to Brick House

Impact	Assessment
Overall	Nil
Direct	Nil
Indirect	Permanent: Nil Temporary: Nil
Vibration and settlement	Nil
Cumulative	Nil

5.8 Luddenham Road Alignment (Penrith LEP 2010 I843)

5.8.1 Listing information

The Luddenham Road Alignment is listed on the Penrith LEP 2010 as an item of local heritage significance (I843).

For further information on the Luddenham Road Alignment please see Appendix A Luddenham Road Alignment (Penrith LEP 2010 (I843).

5.8.2 Direct impacts

Works within the curtilage of the Luddenham Road alignment heritage item would include the construction of the viaduct structure over Luddenham Road, localised intersection works for access to the Luddenham Road Station precinct and trenching works along the edge of the road. These works are illustrated in Figure 22 and Figure 23.

As discussed in Appendix A, the significance of Luddenham Road is largely related to the alignment of the road as it is expected that the physical fabric of the original road would have been removed during multiple phases of road resurfacing works. Timber post fencing, indicated as significant fabric for this item, is not present in the vicinity of project works on Luddenham Road and would not be

[155] Arup, May 2020. Drawing 'GMIA 2 year Predicted Construction Movement Drawing – Sketch 5.'

affected. The project would not result in permanent changes to the road alignment nor would it remove any significant timber post fencing, and as there is no original road fabric in the area of Luddenham Road where works are being conducted, there would be no impacts to significant fabric.

The project would therefore result in **nil** direct impacts to the Luddenham Road alignment.

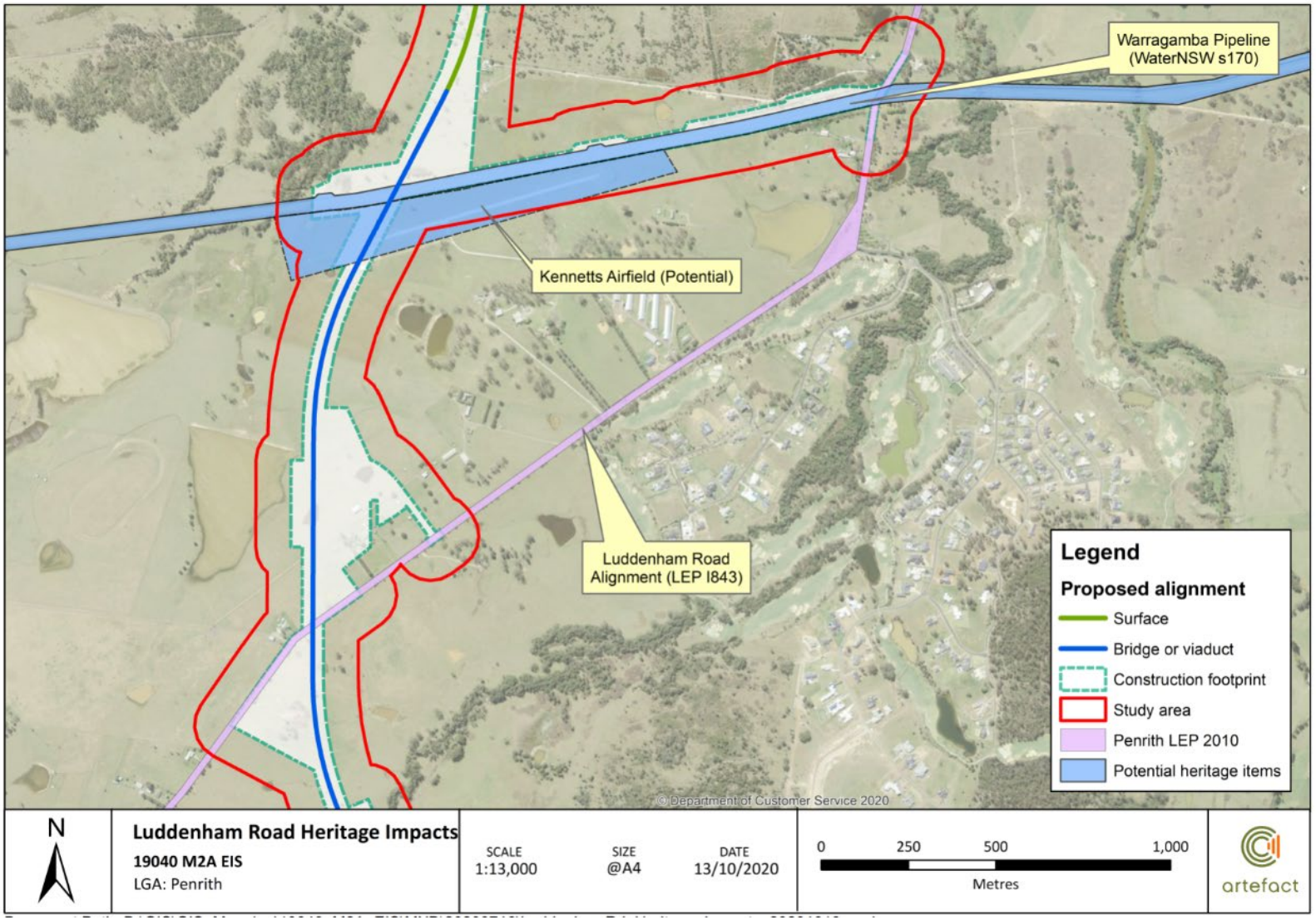

Figure 22: Location of Luddenham Road, Warragamba Supply Scheme and Kennett's Airfield heritage items with respect to the construction footprint

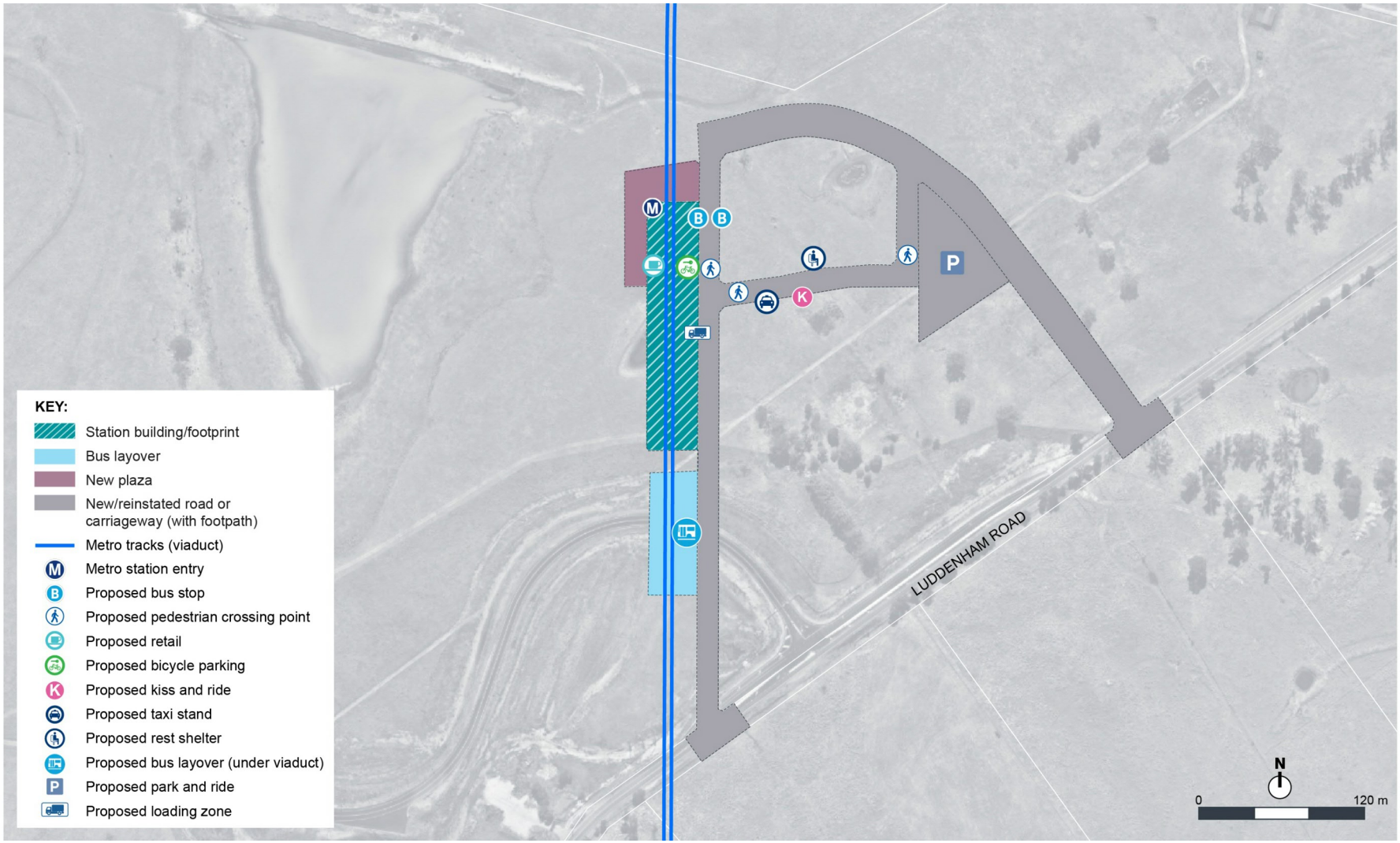

Figure 23. Luddenham Road Station - indicative layout and key design elements

5.8.3 Indirect impacts

The proposed location of the Luddenham Road Station is approximately 150 metres from the heritage curtilage of Luddenham Road. The station would be located above ground on a viaduct structures, with the platforms approximately 11 metres above the existing ground surface (see Figure 24, Figure 25 and Figure 26). The station, including architectural design is subject to ongoing design development. Indicative architectural treatments for the station include steel mesh cladding to the full height of the viaduct. Due to the size and proposed modern material palette of the station, it would be clearly visible from Luddenham Road. The proposed setback from the road would ensure that the project would not directly overshadow or dominate the landscape or Luddenham Road although its prominence would reduce the rural setting around the road in that location.

The proposed viaduct structure would cross Luddenham Road and this crossing would be visible on the northwest and southeast sides of Luddenham Road for several hundred metres (see Figure 26). The structure would likely be constructed using cast in situ concrete piles, columns and headstocks with precast girders between the columns. The concrete material and overall size of the structure would also noticeably alter the rural setting surrounding the heritage item.

The rural character surrounding Luddenham Road is considered part of the heritage significance of the item. The introduction of the new station and raised viaduct would alter this rural character in a localised area of the road. Luddenham Road is nine kilometres in length and the station and viaduct would be visible for up to one kilometre of the road. While the change in rural setting within this localised section of the road is considered high, the works would not alter the overall regional character surrounding the entire road.

Therefore, the project would result in a **minor** indirect impact to the item.

Temporary indirect impacts

The construction phase of the project would result in the establishment of a site compound and construction site on either side of Luddenham Road within the study area (see Figure 26). The construction of the station and viaduct, and the establishment of the site compounds would alter the setting of Luddenham Road within a localised area. Following the completion of construction, the site compounds would be dismantled, and it is assumed that surplus areas within the construction footprint that are not further required for the project would be restored to their pre-existing condition.

Therefore, the project would result in **minor** temporary indirect impacts.

Figure 24. Luddenham Road Station – artist's impression looking west towards the proposed station

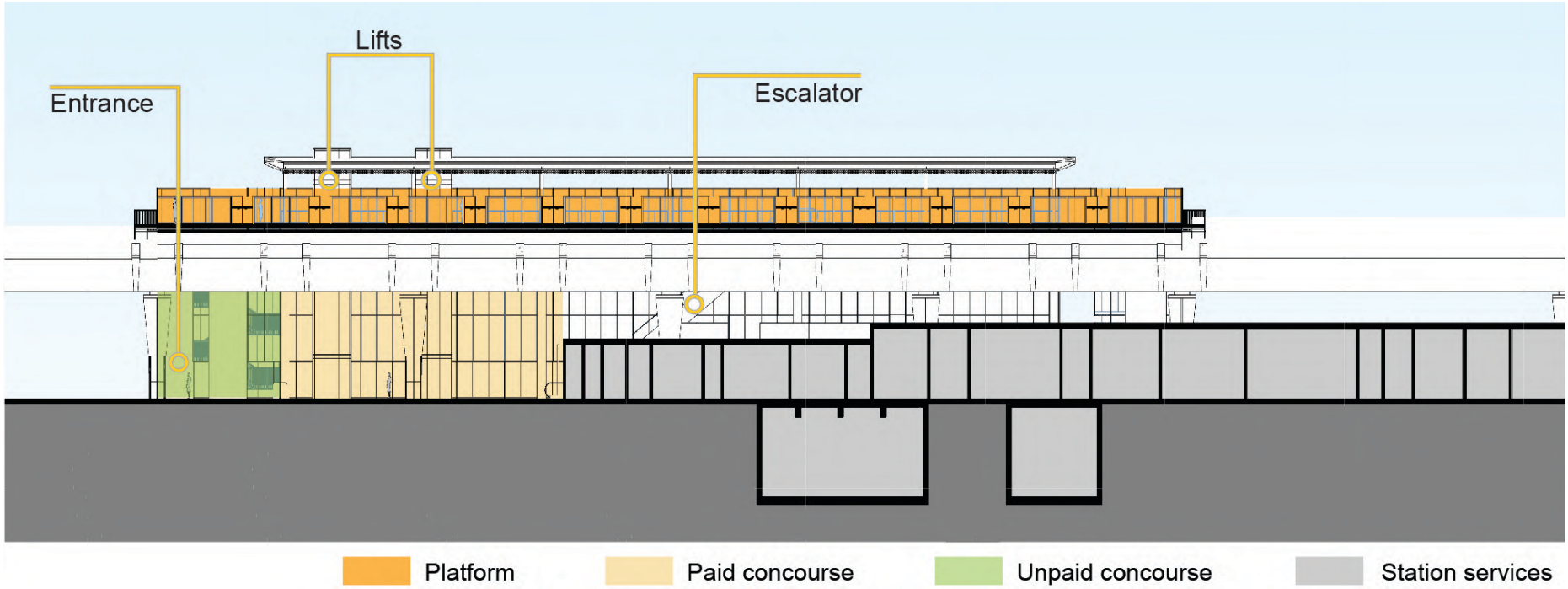

Figure 25. Luddenham Road Station – indicative elevation

Figure 26: Visual render of proposed Luddenham Road viaduct crossing.

5.8.4 Vibration and settlement impacts

It is unlikely that vibration associated with the construction of the viaduct bridge over Luddenham Road would result in impacts to Luddenham Road. Potential vibration impacts would not impact the significance of Luddenham Road, as the significance of the item is associated with its alignment and associative significance.

Therefore, the project would result in **nil** vibration and settlement impacts to the Luddenham Road alignment.

5.8.5 Cumulative impacts

The construction of the future M12 Motorway would involve the new highway crossing over Luddenham Road approximately five kilometres to the south of the project works on and near Luddenham Road. This would not involve altering the heritage significant alignment of Luddenham Road, although it would further impede on the heritage significant rural landscape within which the Luddenham Road heritage item is located. There would be **minor** cumulative impacts from the alteration on the setting of Luddenham Road in conjunction with similar landscape changes from the introduction of the metro viaduct in the northern portion of the item.

5.8.6 Summary of impacts

The construction of the Luddenham Road Station and the viaduct structure would introduce an intrusive visual element to Luddenham Road, overall resulting in a **minor** impact on the significance of the Luddenham Road Alignment.

A summary of impacts to Luddenham Road Alignment is provided in Table 17.

Table 17. Summary of impacts to the Luddenham Road Alignment

Impact	Assessment
Overall	Minor
Direct	Nil
Indirect	Permanent: Minor Temporary: Minor
Vibration and settlement	Nil
Cumulative	Minor

5.9 Warragamba Supply Scheme (WaterNSW s170 register)

5.9.1 Listing information

The Warragamba to Prospect Water Supply Pipelines (hereafter ‘the pipelines’) are listed on the Water NSW s170 Heritage and Conservation Register as part of the Warragamba Supply Scheme. They are not listed on any non-statutory heritage register however previous assessments prepared by

Graham Brooks and Associates[156] assessed the pipelines as having significant fabric of state significance as a part of the wider Warragamba Supply Scheme.

For further information on the Warragamba Supply Scheme please see Appendix A Warragamba Supply Scheme.

5.9.2 Direct impacts

The pipelines within the study area are located to the west of Luddenham Road. The project passes over the pipelines on a viaduct to the west of Luddenham Road and east of the livestock crossing. The project would include use of the existing access track for the pipelines (east / west between the two pipelines) for heavy vehicle use and the construction of the rail viaduct on a north-south alignment over the pipelines. The viaduct would likely be constructed using cast in situ concrete piles, columns and headstocks, with precast girders installed between the columns. The viaduct would be constructed approximately 200 metres to the east of Kennett's Crossing and would not physically connect to the pipelines or the livestock crossing in any way. Construction works may involve the use of the livestock crossing for intermittent light vehicle access across the pipelines. This would not require minor modification to the structure.

The project would result in a **negligible** direct impact to the Warragamba Supply Scheme.

5.9.3 Indirect impacts

Permanent indirect impacts

The project would result in the construction of a large concrete viaduct structure over the pipelines portion of the Warragamba Supply Scheme item. This would introduce an intrusive, large elevated structure into the rolling topography and rural landscape surrounding the pipelines which are considered contributory to the significance of the item as a whole. While the viaduct would be large and visually dominant in a localised area towards Luddenham Road, the viaduct would only be visible within a minor portion of the Warragamba Supply Scheme curtilage.

The new viaduct would provide new publicly accessible views of the pipelines for metro commuters, however these new views would not mitigate the visual impacts resulting from the viaduct structure or the loss of some views from Luddenham Road and surrounding areas.

The project would result in a **minor** indirect impact to the Warragamba Supply Scheme.

Temporary indirect impacts

Construction of the project would result in the establishment of a construction site within the Warragamba Supply Scheme curtilage. Construction works would involve vegetation clearance and earthworks to provide ample space for the installation of support pylons for the viaduct. Sites would be protected with fencing and hoarding during works. These works would obstruct views of the pipelines in a small localised area.

The project would result in **minor** temporary indirect impacts to the Warragamba Supply Scheme.

5.9.4 Vibration and settlement impacts

Vibration

[156] Graham Brooks and Associates, 2010. *Warragamba Supply Scheme Conservation Management Plan – Draft.*

The Warragamba Supply Scheme, notably the pipelines, is located within the construction footprint for the project. The Pipeline and other elements of significant fabric such as the Kennett's crossing bridge are located within the minimum safe working distance for the viaduct construction. Viaduct support structures would be constructed approximately 5 m from the pipelines, involving pile boring rigs and excavators. These machines would operate outside of the minimum safe working distance of the structure (4 m).

In accordance with mitigation measure NV3 in Technical Paper 2 – Noise and Vibration, [157] further assessment and consultation with WaterNSW would be conducted to ensure that vibration from construction works would not exceed 2.5 millimetres per second peak particle velocity. Works would be undertaken in accordance with the *Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines*, which uses the DIN standard of 2.5 millimetres per second peak particle velocity.[158]

There would be **minor** vibration impacts to the item as a result of the project.

Settlement

The project would cross the pipelines with a viaduct structure and would not involve any underground boring or tunnelling. As such, ground settlement is not expected to occur from works near this item and there would be no impact to this item from settlement.

5.9.5 Cumulative impacts

There are no other infrastructure or development projects identified in this Technical Paper that would affect the heritage significance of this item.

5.9.6 Summary of impacts

The proposed construction of a large viaduct structure over the Warragamba to Prospect Water Supply Pipelines (part of the Warragamba Supply Scheme) which would introduce an intrusive and unsympathetic structure into the setting and potentially result in vibration impacts. These considerations result in an overall **minor** impact to the Warragamba Supply Scheme.

A summary of impacts to the Warragamba Supply Scheme is provided in Table 18.

Table 18: Summary of impacts to Warragamba Supply Scheme heritage item

Impact	Assessment
Overall	Minor
Direct	Negligible
Indirect	Permanent: Minor Temporary: Minor
Vibration and settlement	Vibration: Minor Settlement: Nil

[157] M2A, June 2020. *Sydney Metro Western Sydney Airport Technical Paper 2: Noise and Vibration*. Report prepared for Sydney Metro. p. 65, p.123.
[158] WaterNSW 2020. *Guidelines of Development Adjacent to the Upper Canal and Warragamba Pipelines*.

Impact	Assessment
Cumulative	Nil

5.9.7 Assessment against relevant Warragamba Supply Scheme CMP policies

A draft CMP was prepared for the Warragamba Supply Scheme heritage item by Graham Brooks and Associates in 2010.[159] Table 19 assesses the project against relevant conservation policies from the draft CMP.

Table 19: Assessment of the project against relevant Warragamba Supply Scheme CMP policies

CMP Policy	Discussion
11.5.5 Change of use or operational capacity *Adaptation of structures and landscapes considered to be of Primary Significance and Contributory Significance is acceptable if the change is compatible to the physical characteristics of the item/area, can be achieved without undue loss of significant fabric, and does not degrade the overall significance of the building or complex.*	Construction of the project would not result in physical alterations to significant fabric of the pipelines, however it would introduce a large structure into the setting of the item, which is considered to contribute to the significance of the item as a whole. This new structure would be visually dominant in a localised area over the pipeline to the west of Luddenham Road.
11.5.7 New construction *New construction within the Warragamba Dam site heritage curtilage, is acceptable provided the new work has been assessed by a heritage specialist and adverse heritage impacts have been minimised.*	Construction of the proposed viaduct is described in Chapter 8 of the Environmental Impact Statement and mitigation measures developed to minimise the adverse impacts to the heritage significance of the pipelines have been recommended. The scale, location and material of the proposed viaduct is not considered sympathetic to the pipelines and would result in visual impacts to elements of significant fabric in a localised area. Measures to minimise potential visual impacts of the project would be considered as part of future design development and construction planning.
12.10 The Pipeline fabric *SCA should conserve Significant and Contributory fabric which relates to the construction era and ongoing operation phases of the Dam. This fabric includes: the actual pipes and overall structure including concrete casing in the Nepean gorge. Alteration of this fabric should only be undertaken in accordance with the policies in Section 11.5*	The project would not result in physical alteration to significant fabric of the pipelines. Construction works in the vicinity of the pipeline would follow relevant measures outlined in the *Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines*.[160]

5.10 Kennett's Airfield (potential item)

5.10.1 Listing information

The Kennett's Airfield is not listed on any statutory or non-statutory heritage register. This item was identified as having heritage significance during historical research and site inspections from nearby properties.

[159] Graham Brooks and Associates, 2010. *Warragamba Supply Scheme Conservation Management Plan Draft*
[160] WaterNSW 2020. *Guidelines of Development Adjacent to the Upper Canal and Warragamba Pipelines*.

For further information on the Kennett's Airfield please see Appendix A Kennett's Airfield (potential heritage item).

5.10.2 Direct impact

The project would introduce a large viaduct structure over the western portion of Kennett's Airfield that would remove approximately 85 metres of the runway and the presence of the viaduct would likely make the airfield inoperable for use.

The project would also require the removal of existing airfield support structures (hangars) to construct the viaduct.

Due to the removal of significant fabric at the site and the inability for the site to continue in operation as an active airfield, the project would result in a **major** direct impact to the heritage significance of Kennett's Airfield.

As the project would result in a major direct impact to this item, assessment of other types of impacts (indirect, settlement and vibration, or cumulative heritage impacts to this item) is considered redundant and have not been assessed.

5.10.3 Summary of impacts

The project would see the demolition of the west portion of Kennett's Airfield and the construction of the large viaduct structure over the airfield, resulting in permanent decommissioning of the airport and the removal of the majority of structures. The direct and visual impacts would overall result in a **major** impact to the significance of the Kennett's Airfield.

A summary of impacts to the Kennett's Airfield potential heritage item is provided in Table 20.

Table 20: Summary of heritage impact to Kennett's Airfield potential heritage item

Impact	Assessment
Overall	Major
Direct	Major
Indirect	Not applicable
Vibration and settlement	Not applicable
Cumulative	Not applicable

5.11 McGarvie-Smith Farm (Penrith LEP 2010 I857)

5.11.1 Listing information

The McGarvie-Smith Farm is listed on the Penrith LEP 2010 as an item of local significance (I857). For further information on the McGarvie-Smith Farm please see Appendix A McGarvie-Smith Farm (Penrith LEP 2010 I857).

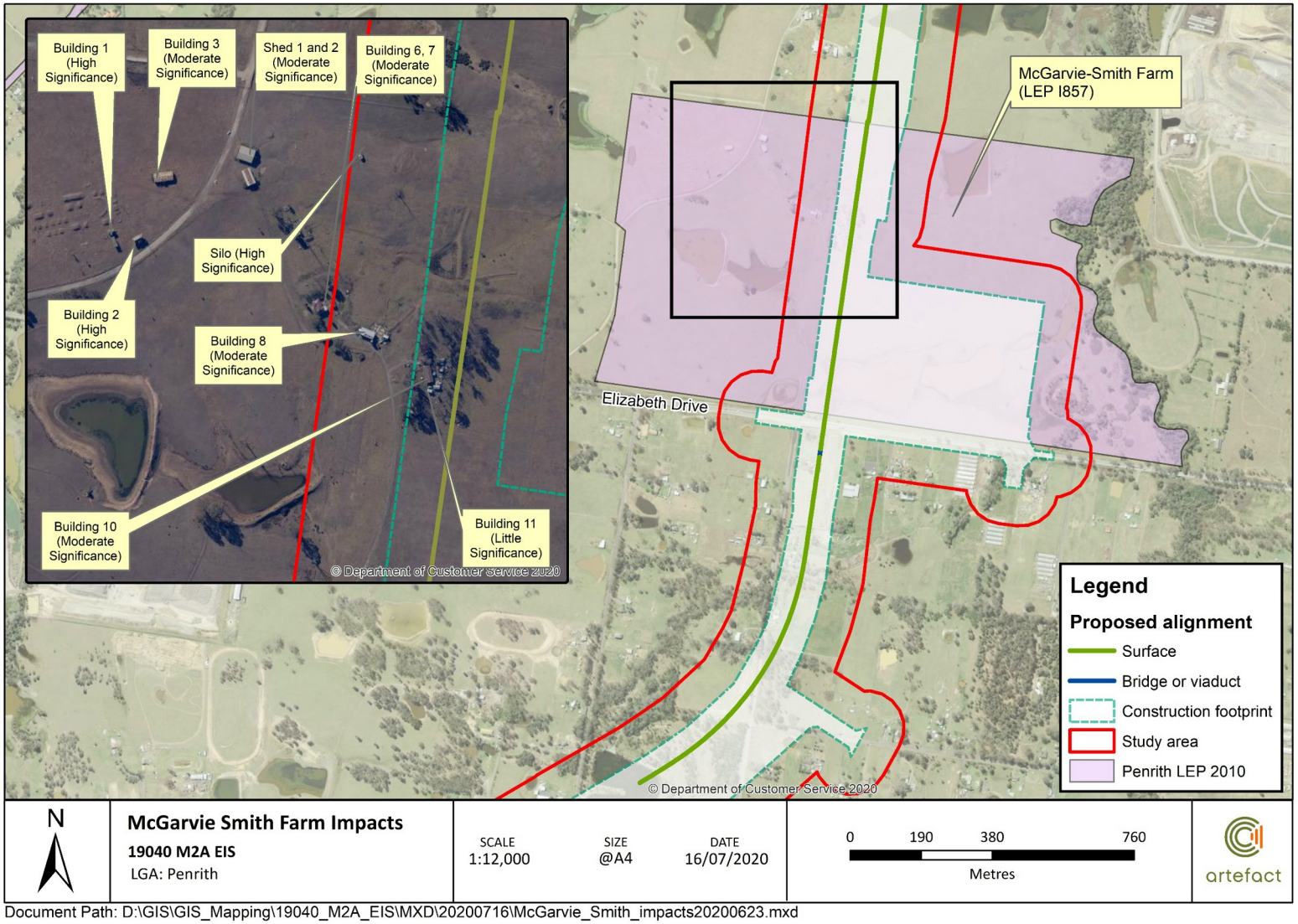

Figure 27: Location of McGarvie Smith Farm in relation to the project construction footprint

5.11.2 Direct impacts

The project would result in the construction of surface rail track and rail sidings on a north-south alignment through the McGarvie-Smith Farm, comprised of cut-and-fill earthworks. The project would result in extensive landscape modification and the demolition of sheds and two buildings (10 and 11) of the central complex of buildings of the McGarvie-Smith Farm building complex. These buildings have been assessed as being of moderate value to the heritage significance of the item overall. Buildings of high significance (buildings 1 and 2) would not be impacted.

It is expected that the project would result in irreversible changes to the significant rural farming landscape that is directly associated with the history of the McGarvie-Smith Farm, including the removal of dams, mounds and ditches of moderate heritage significance. Widespread landscaping and drainage works would remove or heavily modify several dams located within the eastern portion of the property. The rural landscape and the landscape modification for agriculture forms part of the item's significance. Impacts to these areas would result in adverse impacts to the significant landscape features.

The works would also result in the excision of the eastern portion of the site from the current curtilage of the item.

The project would result in a **moderate** direct impact to the significance of the McGarvie Smith Farm.

5.11.3 Indirect impacts

The visual relationship of the rural landscape, including the undulating topography and dams, with the agricultural built structures, forms part of the significance of the McGarvie-Smith Farm. The project would adversely affect the significance of the McGarvie-Smith Farm as the introduction of the rail corridor would reduce the integrity of the landscape and divide the eastern and western portions of the curtilage, obstructing views throughout the site.

The introduction of rail track and rail sidings through the McGarvie-Smith Farm would introduce an intrusive element within the surrounding rural landscape. The rail track in this area is expected to be at surface, however, would still result in the introduction of large modern infrastructure elements into the significant rural environment and setting. This would result in adverse impacts to the significance of the item, due to the impacting of the rural character, and the introduction of an intrusive element into the curtilage.

The project would result in a **major** indirect impact to the McGarvie-Smith Farm.

As the proposed construction works would involve a permanent alteration to the fabric and landscape of the McGarvie Smith Farm, there would be no temporary impacts to the significance of this item and temporary impacts are not assessed below.

5.11.4 Vibration and settlement impacts

Vibration

The McGarvie-Smith Farm heritage item is partially located within the construction footprint for the project, which would be at surface in this area. A concrete silo of high significance may be located within the minimum safe working distance for the construction works. As the silo is in poor physical condition, it is possible that structural damage could occur to this structure from nearby vibration caused by construction plant and equipment. Two buildings of high heritage significance which would

be preserved (see Section 5.11.5) would be located outside of the minimum safe working distance of the project.

Due to the potential damage to the concrete silo of this item during the construction of the project, the project is likely to result in minor vibration impacts to the McGarvie-Smith Farm heritage item.

Settlement

The project would be at surface alignment in this location and there would be no subsurface tunnelling or boring. As such, there would be no ground settlement which would affect the item.

5.11.5 Cumulative impacts

If approved, the construction of the future M12 Motorway immediately to the west of the project alignment would result in the removal of all other significant structures on the farm except for Buildings 1 and 2. Buildings 1 and 2 are among the earliest and most significant structures within the heritage item and are graded as high significance fabric, however the demolition of all other buildings and bulk earthworks for both the future M12 Motorway and the project would leave an isolated and reduced portion of the item which would effectively isolate the preserved buildings from their original and significant landscape.

This assessment of impacts may require updating once the future M12 Motorway project has been determined. Following determination for the future M12 Motorway project, this cumulative impact assessment should be updated if required. Further assessment would be required at that stage to confirm whether this heritage item would continue to meet the threshold for local heritage significance due to impacts from both projects.

In conjunction with the future M12 Motorway project, the project would result in a **major** cumulative impact to the heritage significance of the McGarvie Smith Farm.

5.11.6 Summary of impacts

The project would require the demolition of several significant buildings, earthworks resulting in the modification of landscape features such as dams, and the construction of the rail corridor at surface through the McGarvie-Smith Farm. The accumulation of these impacts, and the impacts resulting from the future M12 Motorway, would overall result in a **major** impact to the heritage significance of the McGarvie-Smith Farm.

A summary of impacts to the McGarvie-Smith Farm is provided in Table 21.

Table 21. Summary of impacts to the McGarvie-Smith Farm

Impact	Assessment
Overall	Major
Direct	Major
Indirect	Permanent: Major Temporary: Not applicable
Vibration and settlement	Vibration: Minor Settlement: Nil
Cumulative	Major

5.12 McMaster Farm (potential item)

5.12.1 Listing information

The McMaster Farm is not listed on any statutory heritage register. It is identified as a potential heritage item as part of the Environmental Impact Statement for the future M12 Motorway on account of the historical, associative, and social significance values of the item.[161]

For further information on the McMaster Farm potential item please see Appendix A McMaster Farm (potential heritage item).

5.12.2 Direct impacts

The construction footprint for the project is located largely on the eastern margin of the property. The project would include a new cutting in the northern portion of the property. Significant elements of this item within the construction footprint consist of one remnant dam (moderate significance) as well as two former feeding troughs (moderate significance). These elements would be removed as a result of the construction of the project. However, about 18 built structures of significance associated with the farm would not be removed or modified by the project.

The project would result in **minor** direct impacts to the McMaster Farm potential heritage item.

5.12.3 Indirect impacts

Permanent indirect impacts

The project would result in the construction of rail track on a roughly north to south alignment immediately to the east the McMaster Farm, including surface alignment track, viaduct, and cut-and-fill works. These works would involve widespread earthworks which would cut into or build over the rolling topography of the farm, as well as removing significant dam structures along the route. As such, the project would result in irreversible changes to the rural farming landscape of heritage significance for the McMaster Farm heritage item. The rural landscape and setting contributes to the significance of the item, and is closely linked to the agricultural history of the property. The landscape modification, notably the construction of dams, is linked to the historical development of the site and

[161] Aurecon, 2016. *M12 Motorway – Non-Aboriginal Heritage Assessment*; Jacobs, 2019.

reflects the scientific achievements on the property, while also contributing to the significant setting. The reduction in the integrity of the landscape would adversely affect the significance of the McMaster Farm.

The introduction of rail track through the McMaster Farm would be an intrusive element within the surrounding rural landscape. The rail track in this area is expected to be a largely at-surface or in-cutting track, with a viaduct structure at the north of the McMaster Farm, primarily out of view from the main building complex. This viaduct and at-grade metro line would not be sympathetic to the rural landscape which is significant to the item.

However, works would largely be located to the east of the item and in the far north of the item. Views would be preserved to the west and the setting of the farm complex would not be isolated by the works. The project would result in a **minor** permanent indirect impact to McMaster Farm.

Temporary indirect impacts

Construction works in and near this heritage item would involve widespread landscaping and earthmoving excavation. These works would alter the rural landscape associated with the heritage item. This would result in **minor** temporary impact to McMaster Farm.

5.12.4 Vibration and settlement impacts

Vibration

The project would result in a new surface alignment directly to the east of heritage significant structures of the McMasters farm. Heavy earthmoving equipment may result in vibration to heritage significant structures which are in fair physical condition. As such, there is the potential for cosmetic structural damage to occur to these buildings. There is the potential for **negligible** vibration impacts to the McMaster Farm potential heritage item from the project works.

Settlement

The project would be located at surface alignment in this location of the route and there would be no subsurface tunnelling. As such, settlement impacts would not be expected from project works to this item.

5.12.5 Cumulative impacts

If approved, the future M12 Motorway project works immediately to the west of the project alignment would not remove any significant buildings of the McMasters Farm. However, combined with the future M12 Motorway, the project would result in enclosing the significant structures of the farm between large infrastructure alignments.

However, as the future M12 Motorway project has not been approved nor development consent granted for specific works, cumulative impacts from this future project cannot be determined.

If approved, this would result in a further reduction of the rural setting of the item and would result in a **moderate** cumulative impact to the heritage significance of the item.

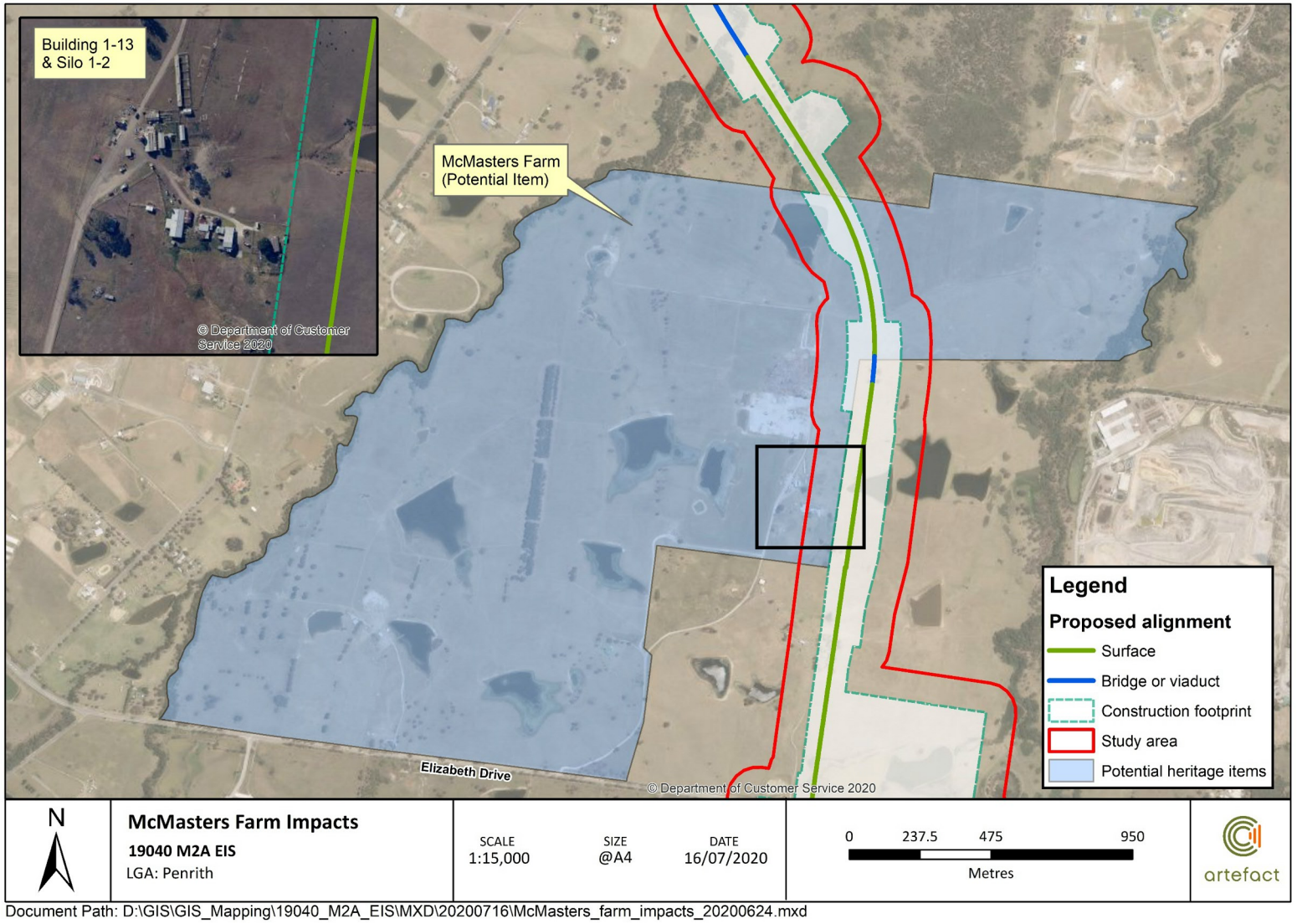

Figure 28: Location of the McMasters Farm in relation to the project construction footprint

5.12.6 Summary of impacts

The project would see the construction of 600m of surface alignment track within the McMaster Farm, which would result in minor visual impacts. However, combined with the anticipated impacts from the future M12 Motorway, the project would overall result in a **moderate** impact to the McMaster Farm.

A summary of impacts to the McMaster Farm is provided in Table 22.

Table 22. Summary of impacts to the McMaster Farm

Impact	Assessment
Overall	Moderate
Direct	Minor
Indirect	Permanent: Minor Temporary: Minor
Vibration and settlement	Vibration: negligible Settlement: Nil
Cumulative	Moderate

5.13 Former OTC Site Group (Liverpool LEP 2008 I5)

5.13.1 Listing information

The Former OTC Site Group is listed on the Liverpool LEP 2008 as an item of local heritage significance (I5). The site is also listed on the Register of the National Estate as the Bringelly Receiving Station.

For further information on the Former OTC Site Group please see Appendix A Former OTC Site Group (Liverpool LEP 2008 I5).

5.13.2 Direct impacts

The project would tunnel underneath the OTC Site Group (former). These works would not have any direct impact on significant fabric associated with the OTC Site Group as significant fabric of this item has been previously demolished.

Therefore, the project would result in a **nil** direct heritage impact to the OTC Site Group heritage item.

5.13.3 Indirect impacts

Permanent indirect impacts

The project would involve tunnelling underneath the OTC Site Group (Former). The Aerotropolis Core Station would only be partially visible from within the curtilage of this item. The provision of new road access to the Aerotropolis Core Station would be located near this item. Most of the significant fabric associated with the OTC Site Group (Former) has been previously demolished and the project would not result in permanent visual impacts to the setting.

The project would result in a **nil** indirect impact to the OTC Site Group (Former).

Temporary indirect impacts

Tunnelling would not alter the visual setting of this item. Construction works at the Aerotropolis Core Station and road building would be located approximately 650 m from the boundary of the item would not alter the visual setting of this item. During construction, the project would result in **nil** indirect impacts to the OTC Site Group (Former).

5.13.4 Vibration and settlement impacts

Tunnelling would occur within the curtilage of the OTC Site Group (Former); however, it is unlikely that these works would result in any settlement or vibration impacts to any significant fabric associated with the OTC Site Group (Former) as all significant fabric has been previously demolished.

5.13.5 Cumulative impacts

There are no known other projects that would affect the heritage significance of this item.

5.13.6 Summary of impacts

As no significant fabric associated with the former OTC Site Group (Former) remains, the proposed works in the area would result in **nil** impacts to the significance of the item. A summary of impacts to the Former OTC Site Group is provided in Table 23.

Table 23. Summary of impacts to the OTC Site Group (Former)

Impact	Assessment
Overall	Nil
Direct	Nil
Indirect	Permanent: Nil Temporary: Nil
Vibration and settlement	Nil
Cumulative	Nil

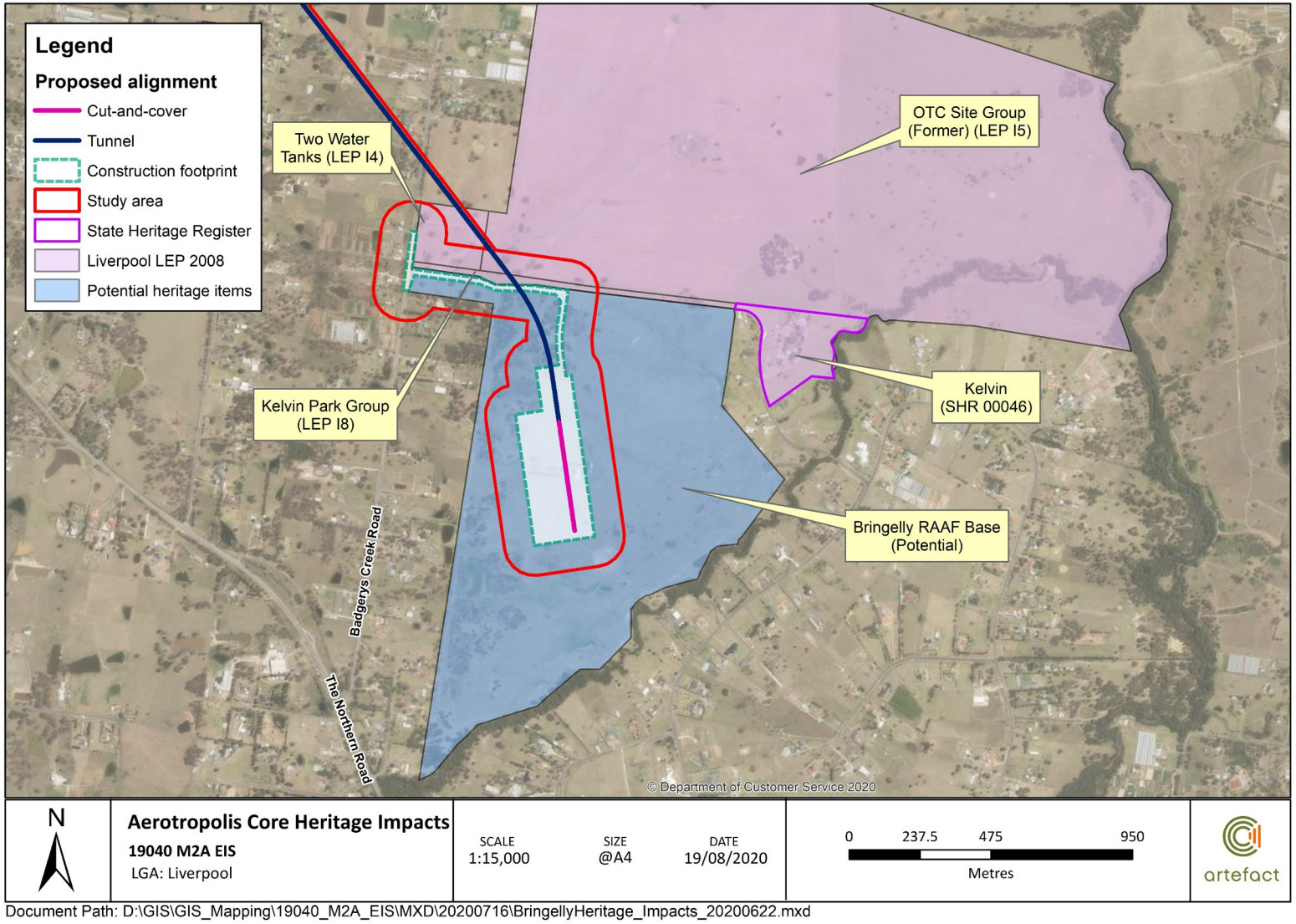

Figure 29: Location of OTC Site, Former Water Tanks, Kelvin Park Group and Bringelly RAAF Base with respect to construction footprint

5.14 Two Water Tanks (Liverpool LEP 2008 I4)

5.14.1 Listing information

The Two Water Tanks item is listed on the Liverpool LEP 2008 as an item of local heritage significance (I4).

For further information on the Two Water Tanks please see Appendix A Two water tanks (RAAF receiving station site and former water supply to OTC staff) (Liverpool LEP 2008 I4).

5.14.2 Direct impacts

The site inspections confirmed that all significant fabric associated with the Two Water Tanks item had been previously demolished, with the exception of brick footings and a concrete pad near Badgerys Creek Road.

The project would tunnel below this item. No surface works would be conducted within the property boundary of this item. The project would result in a **nil** direct impact to the Two Water Tanks heritage item.

5.14.3 Indirect impacts

Permanent indirect impacts

The project would involve tunnelling near the northern water tank remains. Significant fabric associated with the Two Water Tanks has been largely demolished with only brick and concrete footings of the former tanks remaining. Below ground tunnelling for the project would not alter the visual setting of the former item.

Therefore, the project would result in a **nil** indirect impact to the Two Water Tanks.

Temporary indirect impacts

Tunnelling activities would not alter the visual setting of this item. Construction works at the Aerotropolis Core Station and road building would not alter the visual setting of this item as there are no view lines to the remnant footings of the former water tanks to or from the construction site or new road. During construction, the project would result in **nil** indirect impacts to the Two Water Tanks.

5.14.4 Vibration and settlement impacts

Remnant significant fabric for this item is restricted to the brick and concrete footings of the former water tanks. While these structures are in poor condition, it is considered that vibration to these footings would not be likely diminish the footings' heritage legibility any further. As such, vibration and settlement effects caused by tunnelling would not result in any adverse impacts to the heritage significance of this item.

Therefore, the project would result in **nil** vibration and settlement impacts to the Two Water Tanks.

5.14.5 Cumulative impacts

There are no known other projects that would affect the heritage significance of this item.

5.14.6 Summary of impacts

The proposed works would occur within the curtilage of the Former Water Tanks, however as there is no significant remnant fabric, the project would result in **nil** impacts to the significance of the item. A summary of impacts to the Former Water Tanks heritage item is provided in Table 24.

Table 24. Summary of impacts to Two Water Tanks

Impact	Assessment
Overall	Nil
Direct	Nil
Indirect	Permanent: Nil Temporary: Nil
Vibration and settlement	Nil
Cumulative	Nil

5.15 Kelvin (SHR 00046) and Kelvin Park Group (Liverpool LEP 2008 I8)

5.15.1 Listing information

Kelvin Park Group is listed on the SHR and the Liverpool LEP 2008. A summary of these listings is provided Table 25.

The State Heritage Inventory website provides several separate entries for the various elements of Kelvin, which were previously listed however were collated into the 'Kelvin Park Group' listing on the Liverpool LEP 2008.

For further information on Kelvin please see Appendix A Kelvin (SHR 00046) and Kelvin Park Group (Liverpool LEP 2008 I8).

Table 25. Kelvin Park Group Heritage Listings

Listing Register	Listing Name	Listing ID	Significance
State Heritage Register[162]	Kelvin	Item 00046 (SHI 5045191)	State
Liverpool LEP 2008[163]	Kelvin Park Group	Item 8 (SHI 1970073)	Local

5.15.2 Direct impacts

No project works would occur within the SHR curtilage for this item and as such, no modification to any structures of the Kelvin Homestead would occur from the project.

[162] NSW Office of Environment and Heritage, 2005. 'Kelvin.' *NSW Office of Environment & Heritage*. https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5045191
[163] NSW Office of Environment and Heritage, 2017. 'Kelvin Park Group.' https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=1970073

The project would involve tunnelling below the LEP curtilage of this item, as well as constructing a new access road directly adjacent to the LEP curtilage of Kelvin Park Group. No significant structures have been identified in this LEP curtilage of the item. Therefore, the project would result in a **nil** direct impact to the Kelvin Park Group heritage item.

Figure 30. Aerotropolis Core - indicative station layout

5.15.3 Indirect impacts

Permanent indirect impacts

The proposed Aerotropolis Core Station would be a cut-and-cover station excavated in approximately the same location as the current primary buildings of the Bringelly RAAF Base. The station would be below ground with a large concourse canopy at ground level over the station entrance (see Figure 31).

The indicative design for the station includes a flat canopy about 100 metres in length supported on inverted trellis supports. It is likely the canopy would be directly visible from the homestead. The proposed station canopy would be a prominent new structure within a new pedestrian plaza development and would alter the rural character of the wider setting of Kelvin. Sightlines from Kelvin over the surrounding rural terrain, including the western aspect, are considered heritage significant views. However due to the approximately 650 metre distance between the heritage significant structures of the homestead and the proposed Aerotropolis Core the new development would not overshadow or obstruct sightlines.

Overall, the change in the rural setting would result in a **minor** permanent indirect impact to the heritage significance of the Kelvin Park Group heritage item.

Temporary indirect impacts

The construction of the project would require the establishment of a site compound within the RAAF base area for the Aerotropolis core construction site, to which there are direct lines of sight from Kelvin. The construction of the station, associated infrastructure such as the park and ride and bus layover, and the establishment of the site compounds would alter the rural setting to the west of Kelvin. The construction site would be of a significant size and there would be direct views from Kelvin to the construction site over a period of around four years of construction works. Following the completion of construction, the site compounds and any other above-ground temporary structures would be dismantled.

Therefore, the project would result in **minor** temporary indirect impacts to the heritage significance of this item.

Figure 31. Aerotropolis Core visual render of station

5.15.4 Vibration and settlement impacts

Vibration

The tunnel alignment would be partially located within the LEP curtilage and former driveway alignment of Kelvin however there are no significant structures of this item directly above the tunnel. Vibration from tunnelling works would therefore not result in any adverse impacts to this item. Significant fabric associated with Kelvin homestead is not anticipated to be located within this area and would be approximately 600 metres from the construction footprint beyond the minimum safe working distance. The project would therefore result in **nil** vibration impacts to the heritage significance of this item.

Settlement

Significant fabric associated with Kelvin, notably the homestead, is located more than 600 metres from the study area. Predicted settlement impacts associated with tunnelling would result in ground movement within the Kelvin LEP curtilage directly above and immediately surrounding the tunnel alignment. Impacts however, are not anticipated to extend into the SHR curtilage of Kelvin, and as such, would not result in impacts or damage to significant fabric associated with the item. Overall, settlement would result in **nil** impacts to the heritage significance of the Kelvin Park Group.

5.15.5 Cumulative impacts

The Western Sydney International would introduce a large new airport complex approximately three kilometres to the northwest of the Kelvin item. While the homestead is relatively elevated, direct views to the northeast are blocked by low ridgelines between the heritage item and the Western Sydney International. However, the size of the new airport development would result in some visible changes to the pastoral landscape to the north. Non-Aboriginal heritage assessments prepared for the Western Sydney International indicated that there would be indirect impacts to the Kelvin Park Group due to the reduction in the extent of the surrounding rural setting for the item.[164]

The introduction of the new Aerotropolis Core station would noticeably alter the rural setting of Kelvin to the west of the heritage item; however, heritage significant rural landscapes to the north and north-east would be preserved. As the Western Sydney International would not be predominant in comparison to new development for the Aerotropolis Core Station, indirect impacts from the construction of the airport would not exacerbate the change in setting to the Kelvin Park Group.

The works would result in a **negligible** cumulative impact to the heritage significance of the item.

5.15.6 Summary of impacts

The project would not see direct impacts to significant fabric associated with Kelvin, however the visual impacts associated with the construction of the Aerotropolis Station would result in an overall **minor** impact on the significance of Kelvin.

A summary of impacts to the Kelvin Park Group is provided in Table 26.

[164] RPS, August 2016. *Western Sydney Airport EIS European and other heritage technical report*, 74.

Table 26. Summary of impacts to Kelvin Park Group

Impact	Assessment
Overall	Minor
Direct	Nil
Indirect	Permanent: Minor Temporary: Minor
Vibration and settlement	Vibration: Nil Settlement: Nil
Cumulative	Negligible

5.16 Bringelly RAAF Base (potential item)

5.16.1 Listing information

The Bringelly RAAF Base is not listed on any statutory or non-statutory heritage register, however previous heritage assessments prepared by ERM identified the item as having local heritage significance.[165] ERM also assessed that the Bringelly RAAF base does not meet the threshold for listing on the CHL.[166]

For further information on the Bringelly RAAF Base please see Appendix A Bringelly RAAF Base (potential heritage item).

5.16.2 Direct impacts

The Aerotropolis Core construction site would be located in the area currently occupied by several buildings within the RAAF Base, including the main receiving building, main receiving tower, fire hose shed, and dangerous goods store, all of which have varying levels of significance independently, however contribute to the local significance of the item. The project would require the demolition of these buildings, in addition to the removal of additional elements of high significance, such as landscaping around and to the west of the main receiving building, several lamp posts, and surface remains of the former staff housing on the site.

The proposed demolition of these buildings would leave only three ancillary buildings of moderate and little significance which would be insufficient for the item to retain its local heritage significance.

As the Bringelly RAAF Base would no longer reach the threshold for local heritage significance, the project would result in a **major** direct impact on the potential heritage item.

As the project would result in a major direct impact to this item, assessment of other types of impacts (indirect, settlement and vibration, or cumulative heritage impacts to this item) is considered redundant and have not been assessed.

[165] ERM, April 2011. p. 84
[166] *Ibid*, p. 79 – 80.

5.16.3 Summary of impacts

All heritage significant structures within the Bringelly RAAF Base would be demolished for the project, there would be a **major** impact to the significance of the Bringelly RAAF Base.

A summary of impacts to the Bringelly RAAF Base is provided in Table 27.

Table 27. Summary of impacts to the RAAF Bringelly site

Impact	Assessment
Overall	Major
Direct	Major
Visual	Not applicable
Vibration and settlement	Not applicable
Cumulative	Not applicable

5.17 Leeholme Horse Stud Rotunda (Penrith LEP 2010 I180)

5.17.1 Listing information

The Leeholme Horse Stud Rotunda is listed on the Penrith LEP 2010 as an item of local heritage significance (I180). The heritage item is located at 391–395 Mamre Road, Orchard Hills.

For further information on the Leeholme Horse Stud Rotunda please see Appendix A Leeholme Horse Stud Rotunda, 391-395 Mamre Road, Orchard Hills (Penrith LEP 2010 I180).

5.17.2 Direct impacts

The project would involve the construction of permanent bulk power supply east from Patons Lane, Orchard Hills, through to connect with the industrial area at Erskine Park. An indicative location for this supply is provided on Figure 32. The proposed works would involve the excavation of trenches outside of but near to the southern border of the Leeholme Horse Stud Rotunda heritage curtilage. No items of significant fabric would be altered by the trenching works. The project would result in a **nil** direct impact to the Leeholme Horse Stud Rotunda.

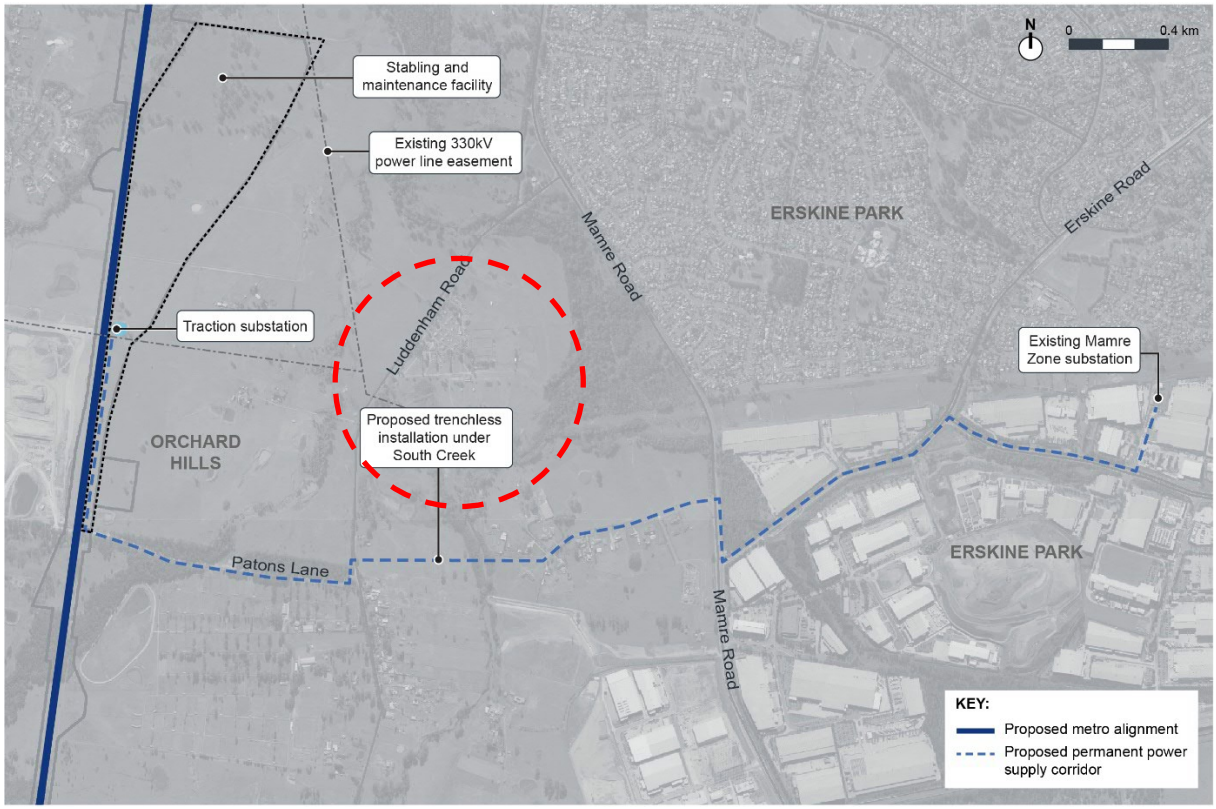

Figure 32: Location of permanent power supply route with location of the Leeholme Horse Stud Rotunda indicated in red circle

5.17.3 Indirect impacts

Permanent indirect impacts

The project would involve the construction of permanent bulk power supply between the stabling and Maintenance Facility (via Patons Lane, Orchard Hills,) and an existing substation in the industrial area at Erskine Park. The proposed works would involve the excavation of trenches in proximity to the southern border of the Leeholme Horse Stud Rotunda heritage curtilage, however trenches would be filled and the ground surface restored following the completion of works.

The project would result in a **nil** indirect impact to the Leeholme Horse Stud Rotunda.

Temporary indirect impacts

Trenching works for the permanent bulk power supply would not be visible from significant elements of the heritage item such as the rotunda and stable buildings. The project would result in a **nil** temporary indirect impact to the item.

5.17.4 Vibration and settlement impacts

Vibration

Trenching works for installing the permanent bulk power supply would not result in any physical damage to any significant structures of the heritage item from vibration

Settlement

Construction works for the project near this heritage item would not involve any subsurface tunnelling or boring and ground settlement on this item is not anticipated. Horizontal underboring beneath the creek is not anticipated to result in any ground settlement effects beyond the footprint of the cable route.

5.17.5 Cumulative impacts

There are no known other projects that would affect the heritage significance of this item.

5.17.6 Summary of impacts

The proposed permanent bulk power supply for the project would not impact fabric or the setting of the Leeholme Horse Stud Rotunda, and therefore the project would have **nil** impacts on the significance of the item.

A summary of impacts to Leeholme Horse Stud Rotunda is provided in Table 28.

Table 28. Summary of impacts to Leeholme Horse Stud Rotunda

Impact	Assessment
Overall	Nil
Direct	Nil
Indirect	Permanent: Nil Temporary: Nil
Vibration and settlement	Vibration: Nil Settlement: Nil
Cumulative	Nil

5.18 Statement of heritage impact

5.18.1 Introduction

A statement of heritage impact for the project has been prepared according to Heritage NSW guidelines[167] which apply the following questions to projects which may impact items of heritage significance:

> *What aspects of the Proposal respect or enhance the heritage significance of the study area?*
>
> *What aspects of the Proposal could have a detrimental impact on the heritage significance of the study area?*
>
> *Have more sympathetic options been considered and discounted?*

[167] Heritage NSW, 2002. *Statements of Heritage Impact*.

These questions are addressed in the subsections below.

5.18.2 Respecting the heritage significance of the study area

Design development has prioritised the retention of all heritage significant structures at St Marys Station. In conjunction with heritage sympathetic concourse design - which would involve low heights, neutral colouring and material finishes, and the limitation of bold design features - and potential heritage interpretive media, opportunities to highlight the heritage of the existing Sydney Trains St Marys Station could be amplified with the increased volume of commuters who would utilise the proposed metro station.

5.18.3 Detrimental impacts to the heritage significance of the study area

The project would involve the construction of a new large aerial concourse structure which would encroach on existing heritage significant buildings at St Marys Station. This would result in a moderate adverse indirect impact to the item, which is listed on the SHR as an item of State significance.

The project would involve ground excavation and tunnelling below the St Marys Station Goods Shed, an element of exceptional heritage value to the State significant heritage item. Tunnelling below the Goods Shed has the potential to result in ground settlement which may result in minor long-term impacts to the significant building.

Ground excavation works for the St Marys construction site would impact potential locally significant archaeology associated with the former St Marys goods yard, first St Marys Station as well as the former platform 1/2 1888 station building.

The project would involve the construction of a viaduct over and through Kennett's Airfield in Luddenham, a potential heritage item of local significance. This would result in a moderate to major impact to the heritage significance of the item.

The project would involve the construction of the rail track at surface through the central portion of the McGarvie Smith Farm, an item of local heritage significance. These works would remove two buildings of moderate heritage value as well as a number of dams which are considered contributory to the significance of the item. The project would also permanently alter the rural heritage character of the item. These works would result in moderate impacts to the heritage significance of this item.

The project would involve the construction of rail tract at surface within the curtilage of McMaster Farm potential heritage item, and within proximity to significant structures of the item. While no significant fabric would be affected by the project works, the rural landscape which is part of the item's significance would be permanently altered, resulting in moderate impacts to the heritage significance of the item.

The proposed Aerotropolis Core Station would be constructed in the current location of the former Bringelly RAAF Base, a potential heritage item of local heritage significance. This would involve the demolition of all significant elements of the Bringelly RAAF Base, and result in a major direct impact to that item. In addition, the introduction of the station would permanently alter the rural landscape and would also impact heritage significant view lines to and from the Kelvin Park Group.

Opportunities to further minimise impacts to heritage significant items would be undertaken as part of the design development and construction planning.

5.18.4 Discounted heritage sympathetic options

Design options for the development of the project involved consideration of constructing the St Marys Station to the north of the existing Sydney Trains St Marys Station, which would have resulted in fewer direct and indirect heritage impacts to the item. However, this option was not selected for a number of reasons, including technical challenges relating to relatively shallow tunnels crossing underneath the existing Sydney Trains rail line, implications for existing transport interchange infrastructure (commuter car parking) and that a station to the north of the existing Sydney Trains rail line would not meet transport interchange and precinct requirements for the project at St Marys. However, project design at St Marys Station has prioritised the retention of all heritage significant structures at the station and ongoing heritage management has been incorporated into the mitigation measures for the project and subsequent design development and construction planning stages.

5.19 Off-airport summary of heritage impacts

A summary of adverse impacts to the heritage significance of items identified in off-airport lands for this assessment is provided in Table 29.

Table 29. Summary of heritage items within the study area in off-airport lands

Item	Construction site	Listing	Significance	Overall Impacts to Significance
St Marys Railway Station Group	St Marys	SHR 01249 RailCorp s170 SHI 4801036 Penrith LEP 2010 I282	State	Moderate
Queen Street Post-War Commercial Building	St Marys	Potential	Local	Negligible
St Marys Munitions Workers Housing	St Marys	Potential	Local	Negligible
Milestone	Claremont Meadows services facility	Penrith LEP 2010 I859	Local	Nil
Four winds	Claremont Meadows services facility	Penrith LEP 2010	Local	Nil
Brick house	Claremont Meadows services facility	Penrith LEP 2010	Local	Nil
Luddenham Road Alignment	Luddenham Road	Penrith LEP 2010	Local	Minor
Warragamba Supply Scheme	Off-airport corridor	Potential	State	Minor
Kennett's Airfield	Off-airport corridor	Potential	Possibly local	Major
McGarvie-Smith Farm	Off-airport corridor	Penrith LEP 2010 I857	Local	Major

Item	Construction site	Listing	Significance	Overall Impacts to Significance
McMaster Farm	Off-airport corridor	Potential	Local	Moderate
Former OTC Site Group	Aerotropolis Core	Liverpool LEP 2008 I5 Register of the National Estate (ID 100263)	Local	Nil
Two Water Tanks	Aerotropolis Core	Liverpool LEP 2008 I4	Local	Nil
Kelvin Park Group	Aerotropolis Core	SHR 00046 Liverpool LEP 2008 I8 Register of the National Estate (ID 3298)	State	Minor
Bringelly RAAF Base	Aerotropolis Core	Potential	Local	Major

6.0 OFF-AIRPORT NON-ABORIGINAL ARCHAEOLOGICAL IMPACT ASSESSMENT

6.1 Introduction

This off-airport archaeological assessment discusses the St Marys construction site only. To date, based on field survey undertaken for the project, St Marys construction site is the only site determined to have archaeological sensitivity. Additional sites, pending archaeological field survey, may be identified in subsequent archaeological assessments for the project, such as future Archaeological Research Designs which would be prepared for the project.

6.2 St Marys construction site

6.2.1 Location and summary significant archaeological resources

Archaeological resources at the St Marys construction site have been identified in the vicinity of the St Marys Railway Station Group. There is moderate potential for the identification of subsurface remains related to the first railway station at St Marys, which may be of local heritage significance.

An archaeological potential and significance assessment for these remains is provided in Section 0.

6.2.2 Archaeological impact assessment

Proposed works at the St Marys construction site would involve excavation in areas where the potential for locally significant archaeological remains have been identified. Excavation works for the development of St Marys Station box would involve impacting remains associated with the St Marys goods yard and former late nineteenth and early twentieth century commercial, industrial, and residential remains. Construction works for the development of the concourse-to-platform stairs and lifts may impact archaeological remains associated with the first St Marys Station as well as the former platform 1/2 1888 station building.

Overall, the project would result in **moderate** impacts to significant archaeological remains within the St Marys construction site.

Archaeological remains which would be impacted by the proposed works would be managed in accordance with an Archaeological Research Design prepared for the project.

7.0 ON-AIRPORT HERITAGE ASSESSMENT

7.1 Introduction

This chapter provides an overview of heritage items which are located within Western Sydney International, based on previous heritage assessments for Western Sydney International[168] and supplemented with Artefact site inspections for those items which remained. Heritage items in Western Sydney International have been approved for removal under the *Airport Plan* and mitigation and management measures for those items are outlined under Western Sydney Airport Stage 1 Construction Environmental Management Plan (CEMP), prepared by WSA Co. in 2019.[169] Sydney Metro would prepare CEMPs for the on-airport rail works, consistent with the existing CEMPs for Western Sydney International, for approval by the Commonwealth.

7.2 On-airport summary of heritage items

A summary of identified heritage items within Western Sydney International with the status and management recommendations for each site is provided in Table 30.

Table 30: Heritage items within Western Sydney International lands

Heritage item	Listing details	Significance	Current status and management measures
Pennell's Property potential archaeological item	Potential item, identified in Western Sydney International Environmental Impact Statement [170]	Potentially local	Site already removed under *Airport Plan*
Badgerys Creek Public School	Liverpool LEP 2008 I3.	Local	Public school removed under *Airport Plan*; demolished following completion of archival recording mitigation measures outlined in CEMP for the Western Sydney International Stage 1 project.
St Johns Anglican Church and Cemetery	Liverpool LEP 2008, I2.	Local	Church and cemetery removed under *Airport Plan*; demolished following completion of exhumation plan and archival recording mitigation measures outlined in CEMP for the Western Sydney International Stage 1 project.
Badgerys Creek Road alignment	Potential item, identified in Western Sydney International Environmental Impact Statement [171]	Local	Road modified in the Western Sydney Airport Stage 1 Construction Impact Zone and managed in accordance with mitigation measures outlined in the Western Sydney International CEMP.

[168] RPS, August 2016. *Western Sydney Airport EIS European and other heritage technical report*. Report prepared for Department of Infrastructure and Regional Development.
[169] WSA Co., 24 September 2018. Western Sydney Airport Construction Environmental Management Plan: European and Other Heritage Construction Environmental Management Plan.
[170] *Ibid.*
[171] *Ibid.*

Heritage item	Listing details	Significance	Current status and management measures
			Remainder of site approved for removal under the *Airport Plan*. Sydney Metro would liaise with Western Sydney International to manage future impacts to the item.
Braeburn Homestead potential archaeological site	Potential item, identified in Western Sydney International Environmental Impact Statement [172]	Potentially local	Site approved for removal under the *Airport Plan*. Sydney Metro would liaise with Western Sydney International to manage future impacts to the item.
Orange Hill Homestead potential archaeological site	Potential item, identified in Western Sydney International Environmental Impact Statement [173]	Potentially local	Site approved for removal under the *Airport Plan*. Sydney Metro would liaise with Western Sydney International to manage future impacts to the item.
Spredenburg potential archaeological site	Potential item, identified in Western Sydney International Environmental Impact Statement [174]	Potentially local	Site approved for removal under the *Airport Plan*. Sydney Metro would liaise with Western Sydney International to manage future impacts to the item.

[172] *Ibid.*
[173] *Ibid.*
[174] *Ibid.*

8.0 CUMULATIVE HERITAGE IMPACTS

8.1 Introduction

Cumulative benefits or impacts have the potential to occur when benefits or impacts from a project interact or overlap with benefits or impacts from other projects and can potentially result in a larger overall effect (positive or negative) on the environment or local communities. Cumulative impacts may occur during construction stages when projects are constructed or operated concurrently or consecutively. Concerning heritage, cumulative impacts can result from the successive, incremental and/or combined effects of a single project or multiple projects affecting the same item.

The extent to which another development or activity could interact with the construction and/or operation of the project would depend on its scale, location and/or timing of construction. Generally, cumulative impacts would be expected to occur where multiple long-duration construction activities are undertaken close to, and over a similar timescale to, construction activities for the project, or where consecutive construction occur in the same area. Additionally, operation of the project could cause cumulative benefits or impacts when it interrelates or possibly enhances the construction or operation of other projects.

The following sections provide an overview of concurrent and future infrastructure projects near to the project study area and summarises the cumulative impacts from each separate nearby infrastructure development for heritage items that would be impacted by the project.

8.2 Concurrent projects

This assessment has considered the following projects for possible cumulative impacts to the significance of heritage items discussed in this assessment.

- Western Sydney International Stage 1 – Stage 1 of Western Sydney International would include a single runway, terminal and other relevant facilities for an operational capacity of approximately 10 million passengers annually, as well as freight traffic. Other facilities would include a business park to provide offices for government agencies, service providers and airport-related businesses. This project commenced construction in 2018 and is expected to be complete in 2026.
- M12 Motorway – A new east–west motorway between the M7 Motorway near Cecil Hills and The Northern Road at Luddenham. The future M12 Motorway will serve as the major access route to Western Sydney International and connect to Sydney's motorway network. This project has had an Environmental Impact Statement prepared and has yet to be approved. Construction is expected to operate between 2020 and 2026.
- The Northern Road – Transport for NSW has commenced the upgrade of 35 kilometres of The Northern Road, a key north–south arterial link, as part of the Western Sydney Infrastructure Plan road investment program. The upgrade is being delivered in six stages. All stages are expected to be operational by 2021 except Stage 5: Littlefields Road, Luddenham to Glenmore Parkway, Glenmore Park, which is expected to be operational by 2022. Stage 1 has been completed.

- St Marys Intermodal – Pacific National is proposing the staged construction and operation of an intermodal terminal (road and rail) and container park near St Marys. An Environmental Impact Statement for this project has been prepared and the project was determined on 7 May 2020.

8.3 Discussion of cumulative heritage impacts

8.3.1 Western Sydney International

The construction of the Western Sydney International would involve the removal of 20 identified and potential heritage significant sites within the boundaries of that project. Impacts to these items have been approved under the *Airport Plan* for the development.

The construction of the Western Sydney International would alter the largely rural and semi-rural landscape into a large and prominent transportation hub, which would be visible from a significant distance from the airport. This would result in diminishing the remnant rural landscapes which is associated with several heritage items identified in this Technical Paper.

However, due to the rolling topography and large distance between the Western Sydney International and remnant heritage items which have significant viewsheds, the Western Sydney International would not noticeably alter the heritage settings of these items as the airport would not be clearly or prominently visible from these items. Only one item, Kelvin, would have indirect cumulative impacts caused by the Western Sydney International project, which would be considered negligible and would not strongly exacerbate indirect impacts that would be a result of the project.

8.3.2 M12 Motorway

The future M12 Motorway project would involve the removal of six heritage significant structures and the project would involve the removal of three heritage significant structures as well as the majority of dams and canals on the McGarvie-Smith Farm property. Two of the original buildings would remain. While the two buildings which would be retained are considered of high heritage value to the site, these buildings would be isolated from their original surrounding structures and would be surrounded by rail and highway infrastructure. The majority of the curtilage of this item (approximately 80%) would be removed by both projects. Remnant fabric at the McGarvie Smith Farm is in poor condition, and with the loss of all other structures and farm infrastructure, as well as the complete renovation of the rural topography into modern rail and roadways, the cumulative impacts of these projects on the heritage item would be major.

In comparison, neither the future M12 Motorway project or this project would impact any of the moderately significant structures present on the McMaster Farm. The future M12 Motorway would traverse the western portion of the property however, while the project would traverse predominantly along its eastern boundary. While all significant structures would be conserved, the envelopment of new infrastructure on either side of the buildings would remove the heritage significant setting of the item, as well as removing remaining significant agricultural infrastructure elements (dams, out-sheds, former feeding troughs). These projects would result in moderate cumulative impacts to the McMaster Farm.

Following the project determination for the future M12 Motorway project, this cumulative impact assessment should be updated if required. Further assessment would be required at that stage to confirm whether the McGarvie-Smith and McMaster Farm heritage items would continue to meet the threshold for local heritage significance due to impacts from both projects.

8.3.3 The Northern Road Upgrade

Construction and road development work for the Northern Road Upgrade are located approximately two kilometres to the west of the project at its closest extent. Due to the distance from the Northern Road Upgrade and the project, there would not be any alterations to any heritage items or heritage significant views that would also be modified by the project.

8.3.4 St Marys Intermodal

The St Marys Intermodal project would involve the development of a multi-storey freight rail terminal approximately 500 metres to the northwest of St Marys Station. The Environmental Impact Statement prepared for the St Marys Intermodal Terminal project indicated that the size and mass of the new intermodal terminal, despite the significant set-back from the existing Sydney Trains St Marys Station, would still increase the modern visual clutter in the vicinity of the station, resulting in a minor indirect impact to the heritage item.

The construction of the proposed aerial concourse for St Marys Station would involve the introduction of further large-scale modern materials into the St Marys Station precinct, which would further overshadow heritage significant buildings at the station. Overall, the project would contribute a negligible cumulative heritage impact to the existing Sydney Trains St Marys Railway Station heritage item.

9.0 DESIGN OPTIONS AND JUSTIFICATION

9.1 Route alignment options heritage assessment

Design development information and options assessment is provided in Chapter 6 of the Environmental Impact Statement for the project. The following subsections discuss design options which would result in alternate outcomes for impacts to heritage items.

9.1.1 St Marys Station design options

Design optimisation at St Marys considered five main station design options:

- Option 1 – A cut-and-cover station (east–west orientation) located to the south of the T1 Western Line, generally between the T1 Western Line and Station Street. This station design would consist of a station platform up to 25 metres below the ground surface and would interface with the existing heritage Goods Shed and bus interchange.
- Option 2 – – A cut-and-cover station (east–west orientation) located to the north of the T1 Western Line, between the T1 Western Line and Harris Street. This station design would consist of a station platform up to 25 metres below the ground surface. The design would also interface with the existing park-and-ride structure to the north of the station and T1 Western Line rail operations.
- Option 3 – A deep cavern station (north–south orientation) below the T1 Western Line. This station design would consist of a station platform up to 45 metres below the ground surface.
- Option 4 – A cut-and-cover station (north–south orientation) to the south of the T1 Western Line, generally between East Lane and Gidley Street. This station design would consist of a station platform up to 25 metres below the ground surface.
- Option 5 – A cut-and-cover station (north–south orientation) generally to the south of the T1 Western Line, generally between Carinya Avenue and West Lane. This option would consist of a station platform up to 25 metres below the ground surface.

Out of these design options, Option 2 would be considered to have resulted in the least heritage impact to the State significant St Marys Station, as it would have involved ground excavation and station development on the northern side of the station, at the furthest distance away from significant structures which are clustered on the southern side of the station. This design would have involved a relatively reduced risk of direct and indirect impacts to the SHR listed station compared with other options. This option was discounted due to the lack of effective integration with the public St Marys Station Plaza and transport interchange locations on the southern side of the station which would not meet transport integration requirements for the project.

Option 1 was selected as the preferred St Marys Station location for the project. This option was selected as it ensured that significant heritage elements of the station, such as the Goods Shed and Platform buildings, would not require modification or removal. Although this option includes the temporary relocation of the jib crane and some direct impacts to the existing platforms, ongoing heritage input into the project has minimised impacts to the significance of the St Marys Railway Station Group. The location of the station interface and aerial concourse connecting to the south and

west of the existing Sydney Trains station was considered the best solution to meeting transport interchange objectives for the project.

10.0 PROPOSED MANAGEMENT AND MITIGATION MEASURES

10.1 Approach to management and mitigation

This chapter describes the environmental management approach for the project for non-Aboriginal heritage during construction and operation. Further details on the environmental management approach for the project are provided in Chapter 25 of the Environmental Impact Statement (Management and mitigation measures).

A Construction Environmental Management Framework (CEMF) (Appendix F of the Environmental Impact Statement) describes the approach to environmental management, monitoring and reporting during construction. Specifically, it lists the requirements to be addressed by the construction contractor in developing the CEMP, sub-plans, and other supporting documentation for each specific environmental aspect. The CEMPs and their subplans would apply to the on-airport and off-airport environment depending on the scope of works to be completed by the contractors.

A Heritage Management Plan would be developed for the project as identified by Section 9 of the CEMF.

This chapter includes a compilation of the performance outcomes as well as mitigation measures, including those that would be included in the Heritage Management Plan.

10.2 Performance outcomes

The performance outcomes for the project in relation to non-Aboriginal heritage are provided in Table 31.

Table 31: Performance outcomes for the project in relation to Non-Aboriginal heritage

SEARS desired performance outcome	Project performance outcomes	Timing
The design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage The design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage	Impacts on the State heritage significant St Marys Railway Station Group are avoided or minimised so that the overall heritage value of the item is maintained	Construction
	Impacts on non-Aboriginal heritage items and archaeology are minimised or where possible avoided	Construction
	The design of St Marys Station is sympathetic to retained and adjacent heritage items	Operation
	An appropriately qualified and suitably experienced heritage architect and relevant stakeholders are consulted during design development	Operation
	The design of the project incorporates non-Aboriginal heritage interpretation	Operation

10.3 Proposed mitigation measures

Mitigation measures to minimise and manage adverse heritage impacts for the project are described in Table 31. Measures in Technical Paper 2 – Noise and Vibration (in relation to Warragamba Pipeline) and Chapter 15 groundwater and geology of the Environmental Impact Statement (in relation to ground movement) are also relevant to managing potential heritage impacts.

Table 32. Non-Aboriginal heritage mitigation measures

Ref	Mitigation measure	Applicable location(s)
Construction		
NAH1	Potential moveable heritage items would be identified and assessed and a significant fabric salvage schedule would be prepared by an appropriately qualified and experienced heritage specialist for St Marys Railway Station, Bringelly RAAF Base, McGarvie-Smith Farm, McMasters Farm and Kennett's Airfield. Significant fabric would only be salvaged if it can be salvaged in such a way that it can be reused and is likely to be able to be reused.	• St Marys construction site • Off-airport construction corridor • Aerotropolis Core construction site
NAH2	Heritage advice would be sought to develop solutions to manage potential ground movement impacts to the St Marys Goods Shed.	• St Marys construction site
NAH3	Archival recording of heritage items which would be impacted or that would have their setting altered, would be carried out in accordance with the NSW Heritage Office's *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006). The following items would be archivally recorded: • St Marys Railway Station • Kennett's Airfield • Luddenham Road Alignment • McMaster Farm • McGarvie-Smith Farm • Kelvin Park Group • Bringelly RAAF Base.	• St Marys construction site • Off-airport construction corridor • Luddenham Road construction site • Aerotropolis Core construction site
NAH4	Kennett's Airfield will be physically investigated during later investigation phases of the project to confirm heritage significance through an assessment of significance. Appropriate management and mitigation measures would then be determined	• Off-airport construction corridor
NAH5	Archaeological investigation would be conducted for archaeological sites which would be impacted by the project. A non-Aboriginal Archaeological Research Design would be prepared for the project which would outline further archaeological investigation required for the project.	• St Marys construction site
NAH6	The following heritage items would be monitored for potential vibration impacts during works: • St Marys Railway Station Group	• St Marys construction site • Off-airport construction corridor

Ref	Mitigation measure	Applicable location(s)
	• Queen Street Post-War Commercial Building • St Marys Munitions Workers Housing • McGarvie Smith Farm • McMaster Farm	
NAH7	The St Marys Station jib crane would be temporarily relocated during works, safely stored and appropriately maintained and reinstated. A detailed methodology for the removal and reinstatement of the jib crane would be prepared in consultation with an appropriately qualified heritage advisor.	• St Marys construction site
NAH8	A dilapidation survey of the Warragamba pipeline item would be undertaken prior to works commencing in the vicinity of this item	• Off-airport construction corridor
NAH9	If suspected human remains or unexpected items of potential heritage significance are discovered within the on-airport area, all activity would cease and the unexpected / chance finds requirements specified in the Western Sydney Airport European and Other Heritage Construction Environmental Management Plan would be followed	• On-airport
Operation		
NAH10	Design development for the project would endeavour to minimise adverse impacts to heritage buildings, elements, fabric, and heritage significant settings and view lines that contribute to the overall heritage significance of all identified listed and potential heritage items	• Off-airport
NAH11	The architectural design for the project would take account local heritage context and be sympathetic to local heritage character. This would include using sympathetic building materials, colours and finishes Design should aim to minimise visual impacts by ensuring that significant elements are not obstructed or overshadowed Design should adhere to the Sydney Metro – Western Sydney Airport Design Guidelines The Design Review Panel and Heritage Working Group would be consulted in regard to	• Off-airport

Ref	Mitigation measure	Applicable location(s)
	the design, form and material of new built structures that may impact heritage items.	
NAH12	Consultation with the Heritage Council would occur for State significant items including for St Marys Railway Station and Kelvin / Kelvin Park Group.	• St Marys Station • Aerotropolis Core Station
NAH13	A Heritage Interpretation Strategy would be prepared for the project identifying key stories and interpretive opportunities related to non-Aboriginal heritage. The strategy would address historic and contemporary heritage and community values and would identify innovative and engaging opportunities for interpretation.	• Off-airport
NAH14	A conservation management plan would be prepared for St Marys Railway Station, in accordance with NSW Heritage Council guidelines. The plan would address any changes to the station, including updated assessment of significance of elements and recommendations on curtilage changes. It would also provide site specific exemptions and management policies.	• St Marys Station
NAH15	Heritage inventory registers for all heritage items modified by the project would be updated to document their change in condition following the completion of construction works for the project.	• All

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APPENDIX A: OFF-AIRPORT HERITAGE ITEM SIGNIFICANCE ASSESSMENTS

St Marys Railway Station Group

Location and physical description

St Marys Railway Station is listed on the SHR (01249), RailCorp s170 Register (SHI 4801036), and the Penrith LEP 2010 (LEP I282). St Marys Railway Station Group is located on Station Street, St Marys, NSW.

St Mary's Railway Station is located within the northern portion of the construction footprint and tunnel alignment. The railway station is situated at the northern end of Queen Street, north of Station Street, and south of Harris Street. St Mary's Station is on the Sydney Trains/TfNSW T1 Western Line and T5 Cumberland Line. The area to the south of St Marys Railway Station is largely commercial, including commercial buildings along Queen Street, the St Marys Station Plaza and its associated carpark. To the north of the railway station is a multistorey commuter carpark and medium sized industrial and commercial warehouses on Harris Street.

The St Mary's Railway Station complex comprises of a station building on platforms 3/4, which is a Type 3 building constructed of brick, dated to 1888.[175] The station includes two island platforms: Platform 3/4 dates to 1888 and Platform 1/2 dates to 1942.[176] A steel footbridge extends each platform and railway line, connecting the southern plaza to the southern end of Forrester Road. At the western end of the station complex there is a non-standard signal box, constructed in 1942. At the southern side of the railway station, located within a plaza area and immediately west of the extant bus interchange, is the Goods Shed and jib crane. The Goods Shed is a subtype 2 brick building constructed in 1880.[177] The jib crane was installed in 1943,[178] however it may have been relocated slightly west of its original location in c.1956. Landscape features within the precinct are limited to a small number of trees within the St Marys Station Plaza around the Goods Shed.

An overhead booking office was designed by Spooner Harris & Associates in 1995 and was incorporated into the original 1942 steel beam footbridge structure.[179] In 1995 the 1942 station building on platform 1/2 was demolished.[180] Additional platform canopies were installed in 2001.

[175] NSW Office of Environment and Heritage, 2010. 'St Marys Railway Station Group.' *NSW Office of Environment & Heritage*. Accessed online 30/10/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5012221
[176] NSW Office of Environment and Heritage, 2010. 'St Marys Railway Station Group.' *NSW Office of Environment & Heritage*.
[177] NSW Office of Environment and Heritage, 2010. 'St Marys Railway Station Group.' *NSW Office of Environment & Heritage*.
[178] NSW Office of Environment and Heritage, 2010. 'St Marys Railway Station Group.' *NSW Office of Environment & Heritage*.
[179] NSW Office of Environment and Heritage, 2010. 'St Marys Railway Station Group.' *NSW Office of Environment & Heritage*.
[180] NSW Office of Environment and Heritage, 2010. 'St Marys Railway Station Group.' *NSW Office of Environment & Heritage*.

Figure 33. Modern (1990s) footridge and booking office, north-east aspect

Figure 34. Multi-storey commuter carpark, northern aspect

Figure 35. View to platform 3/4 station building, eastern aspect

Figure 36. Interior of adapted platform 3/4 heritage building, southern aspect

Figure 37. Platform 1/2 canopy, north-eastern aspect

Figure 38. Location of proposed cut & cover excavation, western aspect

Figure 39. Goods Shed, south-eastern aspect

Figure 40. Jib crane, north-western aspect

Historical background

South Creek Station

During the mid-1800s the development of a railway into the west was a considered a priority by the NSW Government in order to exploit the resources of the Bathurst and Western Plains. In 1848 the *Sydney Railway Company* announced proposals to establish a railway line to Bathurst. In 1855 the first railway line in New South Wales opened between Sydney and Granville, before being extended to Parramatta in 1860 and Penrith in 1863. Over the next four years, railway engineers sought to develop a solution to the geographical obstacle posed by the Blue Mountains.[181] The line was extended to Bowenfels, west of Lithgow, with the completion of the Great Zig Zag in 1869.

In 1863 South Creek Station opened as part of the Great Western Railway extension to Penrith, located at the northern extent of the study area. In August 1885, the station became officially known as St Mary's Railway Station, signified by a name-change on the railway timetable. In 1886 the Great Western Railway was duplicated, and a second platform was added at St Mary's. The current heritage building on Platform 3 & 4 was constructed by John Ahearn and William King in 1888. The building is a type 3 second class station constructed of brick, and originally included a central waiting room with two small wings on either end. Several heritage features of the building are still extant, including timber posts, exposed rafters, and decorative timber bargeboards.

Figure 41. Sketch of St Marys Station, c.1890. Source: Penrith City Library[182]

[181] Croft & Associates, 1985., p. 40.
[182] Penrith City Library, c.1890. 'Sketch of St Marys Railway Station,' Accessed online 25/6/2019 at: http://www.photosau.com.au/penrith/scripts/ExtSearch.asp?SearchTerm=AE00074

Figure 42. Platform 3/4 Building at St Marys prior to renovation, 1984. Source: Penrith City Library[183]

The Goods Shed and Jib Crane

The St Mary's Goods Shed was constructed in approximately 1880 as a Subtype 2 brickwork Goods Shed and is the only remaining example of this type. Sydney Trains plans show that in 1956 the Goods Shed was adapted to house a parcels office, with an internal office constructed in the south-eastern corner of the structure. Shelving was installed in the larger open area, and the location of the extant jib crane is marked on the plan. Photographs show that as late as the 1970s, the Goods Shed was located within the rail yard, fenced off from the public, and that the surrounding land on the east was used as a carpark.

The jib crane dates to 1943 and is a type 1 jib crane manufactured by Frederick Gregory & Co. The crane has a five ton capacity and its official number is T 166.[184] It is uncertain if the crane is currently in its original location. 1943 aerial imagery does not show the crane in its current location, and it is possible that the crane was located closer to the Goods Shed than it currently is. 1956 Sydney Trains plans describe the crane as in a "refixed position", and show an "existing foundation," possibly belonging to the crane in its earlier location. Plans for a new concrete foundation dating to the 1950s further show that the crane was relocated, however the purpose for the relocation is uncertain.

[183] Penrith City Library, 1984. 'St Marys Railway Station.' *Penrith In Pictures*. Accessed online 24/7/2019 at: http://www.photosau.com.au/penrith/scripts/ExtSearch.asp?SearchTerm=003023
[184] NSW Office of Environment and Heritage, 2008. 'St Mary's Railway Station Group'. Accessed online 18/6/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=4801036

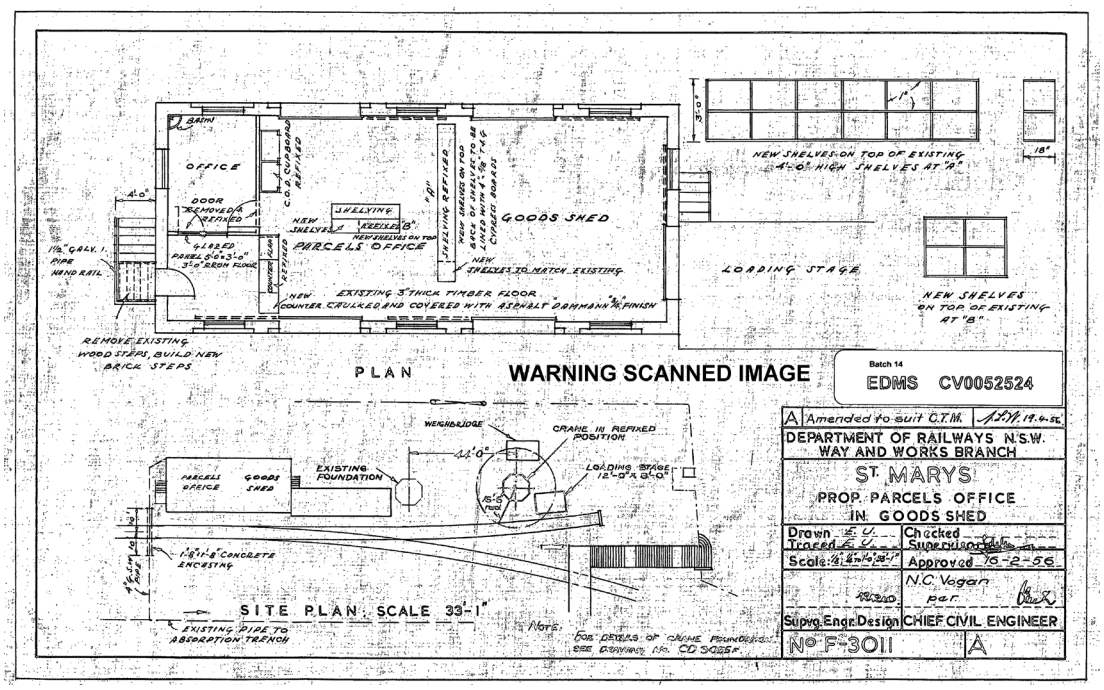

Figure 43. Sydney Trains Plan of St Marys Goods Shed, 1956. Source: Sydney Trains Plan Room[185]

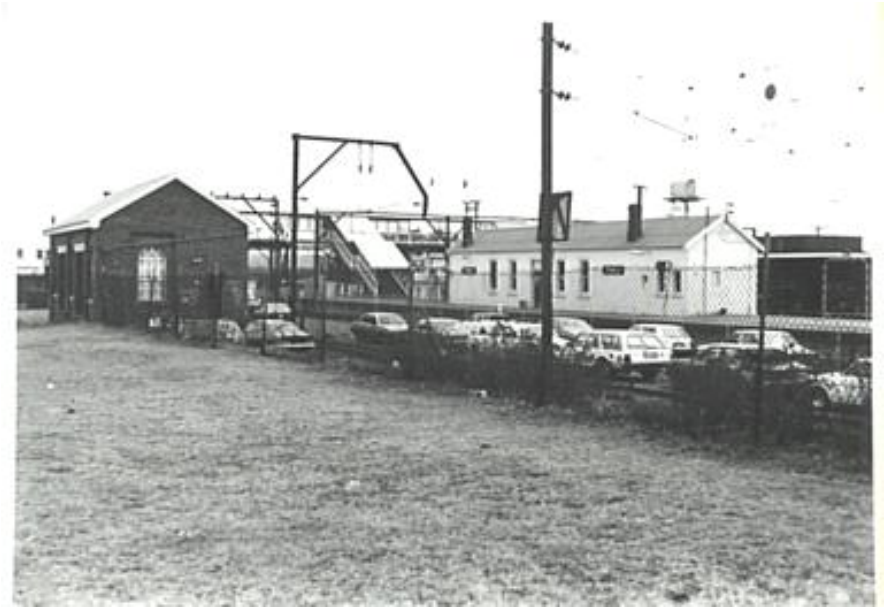

Figure 44. St Marys Railway Station, with the Goods Shed at left, 1986. Source: Penrith City Library[186]

[185] Sydney Trains, Department of Railways NSW Way and Works Branch. *St Marys Prop. Parcels Office in Goods Shed.* Batch 14: EDMS CV0052524

[186] Penrith City Library, 1986. 'St Marys Railway Station, Station Street & Queen Street, St Marys.' Accessed online 25/6/2019 at: http://www.photosau.com.au/penrith/scripts/ExtSearch.asp?SearchTerm=SM005

Figure 45. St Marys Railway Station with Goods Shed visible in mid-shot, 1970. Source: Penrith City Library[187]

Figure 46. The Goods Shed at St Marys Station (looking east), 1970. Source: Penrith City Library[188]

[187] Penrith City Library, 1970. 'St Marys Railway Station.' Accessed online 25/6/2019 at: http://www.photosau.com.au/penrith/scripts/ExtSearch.asp?SearchTerm=003028
[188] Penrith City Library, 1970. 'St Marys Railway Station.' *Penrith In Pictures.* Accessed online 24/7/2019 at: http://www.photosau.com.au/penrith/scripts/ExtSearch.asp?SearchTerm=003029

Figure 47. Detail of St Marys Station, showing Goods Shed (blue), Jib Crane (red) and approximate current location of jib crane (orange), 1943. Source: SixMaps

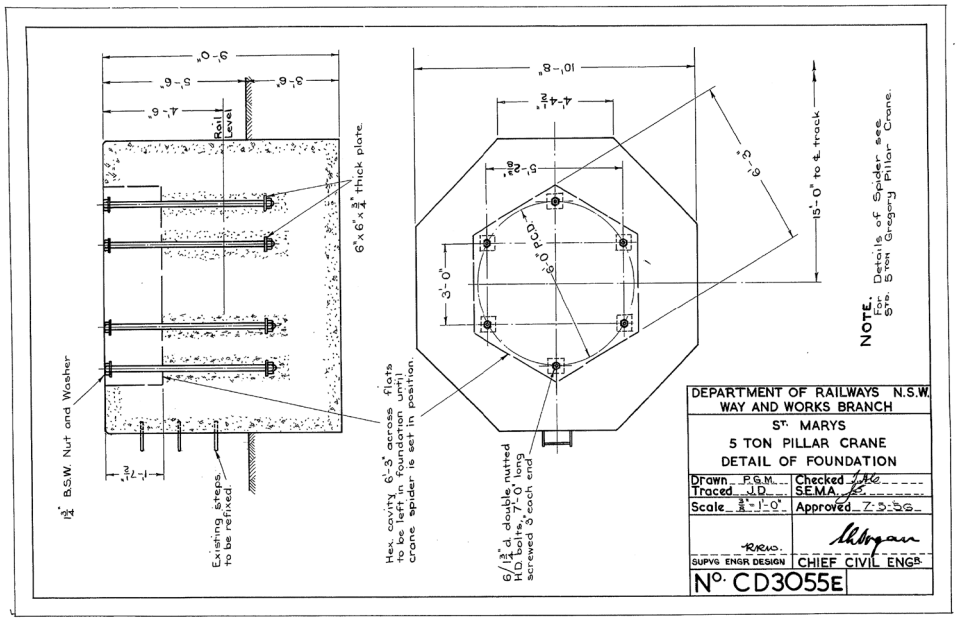

Figure 48. Sydney Trains plan showing St Marys Pillar Crane foundation, 1956. Source: Sydney Trains Plan Room[189]

[189] Sydney Trains, Department of Railways NSW Way and Works Branch, 1956. *St Marys 5 Ton Pillar Crane Detail of Foundation.* EDMS CV0379531.

St Marys Station in the 20th century

Throughout the 1940s, several changes were made to St Mary's station. The Platform 1 & 2 building was constructed, as was a footbridge and the signal box. The signal box was constructed in 1942 and provided signal and track control over both the main line and the Ropes Creek branch line, servicing the munitions factories at Dunheved and Ropes Creek. Both of St Mary's platforms were made into island platforms. In stages, the goods line to Ropes Creek was also opened. The Ropes Creek line sought to increase the track capacity between Lidcombe and St Mary's during World War II, in order to transport goods from the American ammunition and general store at Ropes Creek.

In 1978 the Great Western Railway at St Mary's was quadrupled. The footbridge was upgraded in the mid-1990s, with a canopy added. The Platform 1 & 2 canopies were replaced in 1995, and additional canopies were constructed in 2001.

Statement of significance

The following statement of significance has been extracted from the SHR listing for St Marys Railway Station Group:

> *St Marys Station Group is of state significance as an early station opened in the 1860s when the Great Western Railway was extended from Parramatta and for the role it played in handling the increased traffic for the American ammunition and general store built at Ropes Creek during World War II. The station, in particular the signal box, has strong associations with the operations of the once important rail system to Dunheved and Ropes Creek, and with the development of local industry and residential expansion of St Marys after 1942. The place has research and technical potential for its ability to provide evidence on the construction techniques and operational system of the NSW Railways in the 1880s and during the World War II period.*
>
> *St Marys Station Group has representative significance combining a range of buildings and structures dating from the 1880s and World War II period to the present day including the station building, goods shed, signal box, crane and footbridge substructure. St Marys Station Group features a number of rare structures including the goods shed, the only brick example of its type in the state and the associated crane, one of a few remaining cranes in the Sydney area. The signal box is one of few remaining such structures using utilitarian materials in a non-standard style.*[190]

Assessment of significance

The Significance Assessment in Table 33 has been extracted from the SHR listing for St Marys Railway Station Group.[191]

[190] NSW Office of Environment and Heritage, 2010. 'St Marys Railway Station Group.' *NSW Office of Environment & Heritage*.
[191] NSW Office of Environment and Heritage, 2010. 'St Marys Railway Station Group.' *NSW Office of Environment & Heritage*.

Table 33. St Marys Railway Station Group Significance Assessment

Criterion	Discussion
A) Historical Significance	St Marys Station Group is of historical significance as one of the early railways stations opened when the Great Western Railway was extended from Parramatta and for its role during World War II in handling the increased traffic for the American ammunition and general store built at Ropes Creek. The signal box is also of historical significance as a wartime box built as a result of the important branch line workings to the Rope Creek munitions factory. **St Marys Railway Station Group reaches the threshold of state significance under this criterion.**
B) Associative Significance	**St Marys Railway Station Group does not reach the threshold of state significance under this criterion.**
C) Aesthetic Significance	St Marys Station Group is of aesthetic significance for its collection of railway structures including an early station building, goods shed and crane dating from the 1880s and 1940s featuring typical architectural elements of their types. The aesthetic significance of the station, however, has been reduced by the addition of extensive metal canopies on both platforms affecting the visual quality of the 1880s building and the overall station. The goods shed is aesthetically significant as a good example of its type and dominant feature within the station precinct. The signal box is a good example of the Inter-War period 'Modern' design box built with utilitarian materials in a non-standard style. **St Marys Railway Station Group reaches the threshold of state significance under this criterion.**
D) Social Significance	The place has the potential to contribute to the local community's sense of place and can provide a connection to the local community's past. **St Marys Railway Station Group reaches the threshold of state significance under this criterion.**
E) Research Potential	St Marys Station has research and technical potential for its ability to provide evidence on the construction techniques and operation system of the NSW Railways in the 1880s and during the World War II period. **St Marys Railway Station Group reaches the threshold of state significance under this criterion.**
F) Rarity	St Marys Station Group features a number of rare items in that the goods shed is the only example of a side goods shed in NSW. Furthermore, the goods shed is rare, as only a few goods sheds remain in the Metropolitan area, being once a common structure at all major railway station sites. The signal box is rare as one of a few such signal boxes left in the state. **St Marys Railway Station Group reaches the threshold of state significance under this criterion.**

Criterion	Discussion
G) Representativeness	St Marys Station Group is a representative example of railway station arrangements combining a range of buildings and structures dating from the 1880s and World War II period to the present day including the main station building, goods shed, signal box, crane, footbridge substructure and overhead booking office. It provides physical evidence of railway operations and policies that were established and shaped in accordance with the politics and war industries. The station building is a representative example of 'type 3' second class railway station buildings. **St Marys Railway Station Group reaches the threshold of state significance under this criterion.**

Heritage significant fabric

St Marys Railway Station Group is of state significance and is relatively intact. There are several elements of significant fabric within the station group.

The platform 3/4 building, dating to 1888, is of exceptional significance. The Goods Shed, constructed in 1880, is also of exceptional significance. The signal box located at the country end of the station was constructed in the 1940s and is of high significance. The jib crane located within the pedestrian plaza, which dates to 1943 and was relocated in c.1956, is of high significance. Later elements, including the footbridge, overhead booking office, and canopies are of little significance.

Significant fabric within St Marys Railway Station is considered both rare and representative, particularly the Goods Shed, which is one of the few structures of its type dating from the late nineteenth century in the NSW railway network.

The grading of significant fabric, prepared by Artefact, is summarised in Table 34.

Table 34. Summary of significant fabric gradings at St Marys Railway Station

Element	Grading
Goods Shed (1880)	Exceptional
Platform 3/4 Building (1888)	Exceptional
Signal Box (1940s)	High
Jib Crane (1943, relocated c.1956)	High
Footbridge (1940s)	Little
Overhead Booking Office	Little
Modern platform canopies	Little
Platform 3/4 retaining wall	Moderate
Platform 1/2 retaining wall	Little

Great Western Highway Milestone (Penrith LEP 2010)

Location and physical description

The Great Western Highway Milestone is listed on the Penrith LEP 2010 as an item of local significance (LEP# 859).

The Great Western Highway milestone is located on the southern side of the Great Western Highway at Claremont Meadows, approximately 120m east of Gipps Street and 75m from the Caltex Service Station. The milestone is a sandstone obelisk-shaped milestone of 120cm in height, which tapers in at the top. The milestone is 40cm in width at the top, and 50cm in width at the base on the northeast face, and 45cm in width at the base of the northwest face. The milestone is hand-carved, demonstrated by the irregularity of measurements. The two southern faces of the milestone do not feature any text or other engraved or stylistic details. On the northeast face of the milestone, the engraving reads:

"BM 110 H PENRITH III"

On the northwest face of the milestone, the engraving reads:

"SYDNEY XXX"

The engraved text faces the Great Western Highway to increase legibility to passing travellers. The text on the north east face – "BM 110 H" appears to be a later addition to the milestone. The text and miles for Penrith and Sydney are engraved in the same style and methodology, while the BM 110 H is carved in a shallowed engraving and different typeface. Furthermore, the miles to Penrith and Sydney both utilise Roman numerals – showing 3 miles to Penrith and 30 miles to Sydney – while the text 'BM 110 H' uses numerals. The milestone is situated on the southern edge of the Great Western Highway footpath within a modern concrete footing and is located on the northern side of a small bush reserve with mature native vegetation.

Figure 49. Context of the Milestone adjacent to the Great Western Highway, northwest aspect

Figure 50. Context of Milestone (located at end of row of trees), western aspect

Figure 51: Engraved northern faces of the milestone, with bushland in background, southern aspect

Figure 52: Southern faces of milestone, northern aspect

Figure 53: Northeast face of milestone, southwestern aspect

Figure 54: Northwest face of milestone, southeast aspect

Historical background

In 1813, Gregory Blaxland, William Lawson and William Wentworth sought to cross the Blue Mountains, beginning their expedition in Emu Plains, immediately west of Penrith and the Nepean River.[192] The party reached Mount York (now Mount Blaxland) after 21 days, from which they saw an expanse of forest and grassland suitable for agriculture to the west. In 1814 the surveyor George Evans journeyed further west and surveyed a route that extended from Penrith to the eventual site of Bathurst. The following year a road was constructed along Evans route, which became the Great Western Highway, originally known as the Great Western Road.[193] The Great Western Highway travelled through South Creek towards Penrith, at the base of the parish of Rooty Hill, and increased the number of travellers and residents in the area. As a result, business began to grow in the area, with an accessible route linking South Creek to Sydney and Parramatta and resulting in the establishment of inns and public houses throughout South Creek and neighbouring towns. Sandstone milestones were established along the Highway at each mile, with inscriptions to provide guidance for travellers.

[192] State Library of New South Wales, 2017. 'Crossing the Blue Mountains, Sydney.' Accessed online 7/2/2019 at: https://www.sl.nsw.gov.au/blogs/crossing-blue-mountains-sydney
[193] National Museum of Australia, n.d. 'Blue Mountains Crossing.' Accessed online 7/2/2019 at: http://www.nma.gov.au/online_features/defining _moments/featured/blue_mountains

Statement of significance

The following statement of Significance has been extracted from the Penrith LEP listing for 'Milestone': [194]

> *The milestone is an interesting remnant of the early establishment of the Western Road as an important link between Sydney and the western districts and reflects the importance of Penrith along this route.*

Assessment of significance

The following assessment of significance for the Great Western Highway Milestone, included in Table 35 has been prepared by Artefact Heritage.

Table 35. Assessment of Significance for Great Western Highway Milestone

Criterion	Discussion
A) Historical Significance	The Great Western Highway Milestone is part of a significant and partially intact assemblage of stone milestones located between Sydney and the Blue Mountains, associated with the original establishment of the Great Western Road. The Great Western Road enabled and encouraged the expansion of Sydney in the early years of the NSW colony for agricultural and farming practice. **Great Western Highway Milestone reaches the threshold of local significance under this criterion.**
B) Associative Significance	The milestone is associated with the historic development of the Great Western Road and is associated with the nineteenth century surveyor William Cox. **Great Western Highway Milestone may reach the threshold of local significance under this criterion.**
C) Aesthetic Significance	Milestones of several variations have been a commonly utilised means of wayfinding for travellers for several thousands of years, however the Great Western Highway milestones may have been the first example of their use in Australia. The milestones do not demonstrate aesthetic or technical achievement, however. **The Great Western Highway milestone would not reach the threshold of local significance under this criterion.**
D) Social Significance	The Great Western Highway milestones is unlikely to be considered significant for any social group in the Penrith LGA. **The Great Western Highway would not reach the threshold of local significance under this criterion.**
E) Research Potential	The milestone is unlikely to have research potential historical records of the road are well-documented in historical sources. **The Great Western Highway would not reach the threshold of local significance under this criterion.**

[194] NSW Office of Environment and Heritage, 2008. 'Milestone.' *NSW Office of Environment & Heritage*.

Criterion	Discussion
F) Rarity	The Great Western Highway milestone is part of an uncommon assemblage of high integrity, which is well preserved and intact. A small number of additional milestones are still present along the Great Western Highway. **The Great Western Highway may reach t reach the threshold of local significance under this criterion.**
G) Representativeness	The Great Western Highway is an intact example that forms part of a well-preserved assemblage of milestones with high integrity. **The Great Western Highway may reach the threshold of local significance under this criterion.**

Heritage significant fabric

The Great Western Highway Milestone is a carved sandstone milestone situated within a modern concrete footpath on the southern side of the Great Western Highway. Significant fabric of the milestone consists of only the sandstone milestone itself, as the milestone has been remounted on a concrete footing and has been relocated to the current location from its original location.

Queen Street, St Marys, Post-War Commercial Building (potential item)

Location and description

The Queen Street, St Marys, Post-War Commercial Building is located at 1-7 Queen Street, St Marys and is not listed on any statutory or non-statutory registers. The Queen Street Post-War Commercial Building is a late 1940s-early 1950s group of post-war commercial buildings located at the northern end of Queen Street, adjacent to St Marys Railway Station and within the St Marys construction site. The buildings were constructed during the immediate post-Second World War development boom in St Marys in a simple Inter-War Art Deco style. The interior of the buildings and stores were not inspected due to access restraints however the building exterior suggests that the two buildings are divided internally, although were built contemporaneously as one structure. It is anticipated that nib walls were established internally to separate the stores. The location of the potential heritage item in relation to the project construction footprint is provided in Figure 17.

The building consists of two main structures, both of redbrick in stretcher bond, however the north building is rendered in a mid-toned grey. The pair are identical in their original design, both featuring parapet walls with a four-stepped façade design with small square tiling on the ground level and each building comprising three lower floor shop fronts. There are some small differences between the two facades however, as the south building includes upstairs access from the eastern façade and features narrower windows on the upper storey. The upper storey and parapet wall of the south building have not retained the ornate detail present on the north building, which features a painted brick band and protruding vertical brick on the upper parapet for decoration, also painted in a contrasting black.

The small square tiles on the façade of each building are well preserved, although some have been painted. The bricks and front façades are well preserved and are in relatively good condition. The awning on the southern building has been removed in late 2019 and the northern awning building has been modified with modern signage. The removal of the southern awning has resulted in localised damage to the façade of the southern building, however the remainder of the façade is in sound condition.

The south building also features well preserved 1950s-era advertising signage for the St Marys Coffee Bar in a post-war advertising style. The signage is a rare example within the St Marys streetscape and would hold historical significance as it reflects the early commercial development of St Marys and Queen Street in the post-war era. Two of the extant shopfronts currently feature aluminium roller doors and the awning on the northern building has been painted with store signage. The awning on the southern building has been removed. Wire cantilevered supports for existing awnings are extant on the northern building and have been removed on the south building, however the anchors are still extant on the upper level of the façade. Awnings are supported by new posts and the cantilevered wiring.

Internal access to the building was not available during site inspections for the project.

Figure 55. Commercial buildings from St Marys Railway Station entrance, 2019 site inspection. Note retained awning of south building.

Figure 56. Buildings from corner of Queen Street and Station Street

Figure 57. Detail of upper advertising on south building

Figure 58. Detail of lower advertisement, tiling and façade damage on south building

Figure 59. North building

Figure 60. South building, 2020 following awning removal.

Figure 61. View from St Marys Railway Station footbridge

Historical background

Throughout its history, Queen Street has previously been known as Dickson Lane, Mamre Road, Windsor Road, and Station Street. The name was changed to Queen Street in 1897, in celebration of Queen Victoria's Diamond Jubilee. In the late 1890s, the street was rural, with frequent newspaper reports of cows and other animals wandering in the streets after escaping from nearby farms. In 1906, tenders were put out by St Marys Council for graveling and kerbing 10 chains (200 metres) of footpath along Queen Street. In 1910, a small number of council lights were installed along the street, and in 1916 a car and pedestrian crossing were established at the western side of the railway station.

Queen Street was the original commercial centre of St Marys and led from the Great Western Highway to the Railway Station. Development was concentrated at the southern end of Queen Street until World War II, focused at St Marys Corner, which was the intersection of Queen Street and the Great Western Highway. At St Marys Corner was The Strangers Home Hotel and the Beecroft's Butchers on the eastern side. The Strangers Home had a long history that included several name changes including the First & Last Hotel (evident on subdivision plans), and ventures as a shoe store, a barber, and a medical practice. In 1953 the building was demolished.[195]

Other notable businesses on Queen Street included Bennett's Coach and Wagon Works on the corner of King Street and Queen Street. George Bennett purchased the site in 1888 and the works closed in 1920 when Bennett retired.[196] Queen Street originally extended north of the railway line, accessed by a level crossing for vehicles prior to the road closure in the mid-1900s. On the northern side of St Marys Station and east of Queen Street, the Inglis Cattle Sale Yards and the Shane's Park Hotel were present and faced the railway line. Further east there were several houses with yards facing the railway line.

1943 aerial imagery shows that the rail corridor was not crossed with a bridge, but rather with a boom barrier rail crossing. The same imagery shows that much of Queen Street was still undeveloped, with extensive areas of grass and several residential properties along the eastern side of the street. Several residential properties and associated yard structures are pictured along Phillip Street, and a large area of land to the east of East Lane is still uncleared bushland with several tracks or creeks evident. The Inglis Cattle Yards and Dunheved branch line rail are also evident in the imagery on the northern side of the railway.

[195] Penrith City Council, 2019. 'Queen Street – The Past', *Culture and Creativity*. Accessed online 18/6/2019 at: https://www.culturecreativity.com.au/updates/queen-street-the-past
[196] Thorp, W., 1987. *St Marys Industrial Study*, p. 74.

Throughout the 1950s several commercial enterprises opened on Queen Street, including the Crown Theatre,[197] Jim Mills Menswear (which closed in 2010),[198] Fleming's Corner Shop,[199] and the St Marys Fruit King store, which was located directly across Station Street from the Goods Shed and is still extant.[200] Upgrades to the street occurred at this time, including road surface upgrades,[201] and widening of the road to allow for street parking.[202] This development reflected the significant change of St Marys from a World War II industrial based community to a residential suburban community, as many workers in the World War II factories continued to live in St Marys during peace time. The commercial development boom along Queen Street, particularly at the north end around St Marys Station, reflects this change and the need for increased local services and stores.

The two-storey commercial building located at 1-7 Queen Street was constructed in the early 1950s as two connected commercial premises. This item is discussed in Section 5.3. It was developed as the northern-most of the Queen Street commercial buildings and in close proximity to the St Marys Railway Station. The building was used as commercial and business premises throughout its history, with minor external modifications to the building over time. The building appears to have originally been the premises of the St Marys Coffee Bar, as advertising still remnant on the building dated to the early 1950s by style corresponds with the approximate construction date of the building. The Coffee Bar was located in the upstairs shop of the southern building. The construction of the building corresponds with the commercial boom on Queen Street in the late 1940s and early 1950s following the rapid development in St Marys following the end of the Second World War.

For approximately 20 years, the northern commercial building was the office of the Western Districts Foundation for Aboriginal Affairs, an institution which provided charity support to Aboriginal communities in Western NSW. Yuin man, Syd 'Doc' Cunningham, ran the foundation during the 1970s and 1980s, and was known in Western NSW as 'Black Santa' for arriving in a helicopter 'sleigh' to provide donated toys to Aboriginal children in remote communities. Cunningham was awarded the Order of Australia Merit (OAM) in 1989 and died in 1999.[203] Cunningham has also served in the Australian armed forces in World War II and is also a significant figure in Newtown, where he also raised funds for children's toys on King Street.[204] This location is commemorated by a plaque on King Street today.

Historic street view images available on Google Maps show that the northern building has been occupied by the Warpaint Tattoo Parlour since the early 2000s, and the southern shops included the Queens Take Away store. Other stores in this time included Jerry's Tailoring. The awning of the southern building was extant between 2008 and 2013 however was demolished post-2013.

Photographs of Queen Street from the 1960s and 1970s show a range of plant nurseries, fashion stores, furniture stores, grocers, bakers, and delicatessens. In addition to showing the variety of

[197] Penrith City Library, 2019. 'Crown Theatre,' *Penrith Culture & Creativity*. Accessed online 18/6/2019 at: https://www.culturecreativity.com.au/updates/crown-theatre
[198] Penrith City Library, 2019. 'Jim Mills Menswear Store,' *Penrith Culture & Creativity*. Accessed online 18/6/2019 at: https://www.culturecreativity.com.au/updates/jim-mills-menswear-shop
[199] Penrith City Library, 2019. 'Fleming's Corner Shop,' *Penrith Culture & Creativity*. Accessed online 18/6/2019 at: https://www.culturecreativity.com.au/updates/fleming-s-corner-shop
[200] Penrith City Library, 2019. 'St Mary's Fruit King Shop,' *Penrith Culture & Creativity*. Accessed online 18/6/2019 at: https://www.culturecreativity.com.au/updates/st-marys-fruit-king-shop
[201] *Nepean Times*, 11 November 1954. 'Good Work in Queen Street'. Accessed online 18/6/2019 at: https://trove.nla.gov.au/newspaper/article/100987213?searchTerm=%22Queen%20Street%22%20%22St%20Mary%27s%22&searchLimits=sortby
[202] Nepean Times, 30 September 1954. 'Queen Street Set-Back.' Accessed online 18/6/2019 at: https://trove.nla.gov.au/newspaper/article/100986637?searchTerm=%22Queen%20Street%22%20%22St%20Mary%27s%22&searchLimits=sortby
[203] Sydney Morning Herald, 25 March 199, *Syd Cunningham OAM Obituary*. Archived online at: https://www.mail-archive.com/recoznet2@paradigm4.com.au/msg00426.html
[204] 'Cunningham, Syd 'Doc'. *Dictionary of Sydney*. Accessed online 11/6/2020 at: https://dictionaryofsydney.org/person/cunningham_syd_doc

stores, these photographs show that Queen Street had rapidly become a commercial centre with modern stores stretching along either side.

Several of the shopfronts along Queen Street that were constructed by the 1970s are still extant however they have been modernised, presumably several times, on the exterior and interior.

Statement of significance

A statement of significance for the Queen Street Post-War Commercial Building has been prepared:

> *The Queen Street Post-War Commercial Buildings are a historically significant and rare example of shopfronts within the town of St Marys. The building was constructed in the years immediately after the end of the Second World War and is closely linked to the rapid increase of permanent residential settlement as former munitions workers chose to remain in the town, which resulted in the development of Queen Street as a civic centre and commercial street. The rare architectural style rejects the austerity of the early Post-War era by including decorative details such as ornate tiling, stepped parapets, and façade detailing. Combined with the historical context of Post-War growth in St Marys and the attested commercial boom on Queen Street, the building fabric holds historical significance that reflects the hope and positivity of the Post-War period, and the desire of St Marys residents and builders to establish a flourishing town, perhaps with architecture similar to that of inner city suburbs, as the building does not adhere to the more common functional architectural styles of the post-war era. Rather, the building is of an Inter-War architectural style which is absent in the St Marys commercial area and relatively rare across the broader Penrith LGA.*

Assessment of significance

The assessment of significance in Table 36 for the Queen Street, St Marys, Post-War Commercial Building has been prepared by Artefact Heritage for this Environmental Impact Statement.

Table 36. Assessment of significance for Queen Street Post War Commercial Building

Criterion	Assessment against criteria
A) Historical	The Queen Street Post-War Commercial Buildings are associated with the significant development of the town of St Marys during the end of the Second World War. As large numbers of residents had moved to St Marys to work in munitions factories during the war period, many chose to stay in the town following the end of the war, which resulted in the Post-War development boom in the town, particularly along Queen Street, where a significant retail district flourished throughout the mid-century. The building architecture, which features Inter-War and few, subtle Art Deco elements – such as the stepped parapet and coloured tiling - despite being built in the Post-War period, reflects optimistic commercial development in St Marys during this time. Furthermore, the remnant signage for the St Marys Coffee Bar is intrinsic to the history of 1-7 Queen Street and represents the Post-War commercial and recreational development of St Marys. **Queen Street Post-War Commercial Building reaches the threshold of local significance under this criterion.**

Criterion	Assessment against criteria
B) Associative	The Queen Street Post-War Commercial Building is associated with Syd 'Doc' Cunningham, a Yuin Aboriginal activist and philanthropist who ran the Western District Foundation for Aboriginal Affairs from 1-7 Queen Street. Cunningham was also known as 'Black Santa' for his charity programs which delivered toys to disadvantaged Aboriginal children throughout Australia at Christmas time. Cunningham was awarded an OAM for his work, and was a prominent member in the Aboriginal community, as well as in the Newtown community where he is commemorated with a plaque on King Street. **The Queen Street Post-War Commercial Building is unlikely to reach the threshold of local significance under this criterion.**
C) Aesthetic/Technical	The Queen Street Post-War Commercial Building is an interesting example of the combination of Post-War architecture with stylistic elements adapted from the Inter-War and Art Deco styles. The architectural design largely rejects the Post-War austerity architecture commonly seen from this period, incorporating decorative elements order to create the sense of an established community during the rapid Post-War population growth and development boom. The buildings provide a period-appropriate streetscape in conjunction with St Marys Railway Station compared to the frequent modern infill of commercial frontages elsewhere along Queen Street in St Marys. **Queen Street Post-War Commercial Building reaches the threshold of local significance under this criterion.**
D) Social	While the building's prominent position adjacent to St Marys Railway Station has likely contributed to the sense of place and history felt by the local community, it is unlikely that a private commercial building would be considered socially significant. **Queen Street Post-War Commercial Building is unlikely to reach the threshold of local significance under this criterion.**
E) Research Potential	While the buildings have been constructed in an architectural style rare in St Marys, this commercial design is not considered uncommon elsewhere in Sydney and would not be of research interest. **Queen Street Post-War Commercial Building would not reach the threshold of local significance under this criterion.**
F) Rarity	The Queen Street Post-War Commercial Building is a rare intact example of the Inter-War and Post-War architectural styles in St Marys and the broader Penrith LGA. An inspection of the commercial premises on Queen Street has shown that the building is one of few remaining, largely unmodified examples of this architecture in the area and particularly in the St Marys commercial area itself. While other Post-War buildings are present in the Penrith LGA, the combination of the Post-War architecture with Art Deco elements is rare. Furthermore, this design eschews the typical austere Functionalist style of Post-War architecture. Review of the Penrith LEP 2010 shows that only one Post-War building (located within Penrith) is locally listed on the LEP. **Queen Street Post-War Commercial Building reaches the threshold of local significance under this criterion.**
G) Representativeness	The buildings are not considered a unique or representative example of their type. **Queen Street Post-War Commercial Building would not reach the threshold of local significance under this criterion.**

Heritage significant fabric

Heritage significant fabric associated with the Queen Street Post-War Commercial Buildings includes the building facades, parapets (including decoration), awnings, windows and remnant signage. These elements are well preserved original fabric which hold high integrity, while Post-War buildings in St Marys have been heavily modified. These elements are characteristic of Post-War and Art Deco architectural design. The signage holds significance as it is a well-preserved and retained example of historical 1950s era signage in St Marys and the broader Penrith LGA, which holds significance for its rarity and association with the early commercial development in St Marys. The interior of these buildings was not assessed during the site inspection and further investigation of original architectural features inside these structures is required.

St Marys Munitions Workers Housing (potential item)

The St Marys Munitions Workers Housing is not listed on any statutory or non-statutory heritage register and was identified as an potential item from historical research and during the site inspection for the project.

The St Marys Munitions Workers Housing is located on the southern side of the T1 Main Western Line at St Marys, south of Camira Street, north of Kungala Street, west of Carinya Avenue, and east of Kalang Avenue. The item is located within the St Marys construction site. The item's location with respect to project works is illustrated in Figure 17. The area consists of approximately one hundred fibre board houses concentrated around a central park (Jack Jewry Reserve), which were constructed in this location from 1942. Two hundred houses were originally constructed as 'duration houses' for munitions factory workers during the Second World War but only approximately 100 houses remain today. The majority of these houses have been extended and renovated since their original 'temporary' war time construction. Despite these modifications, most of these houses retain original fabric along their street frontage.

Housing in this area is predominantly from the 1940s, however there is significant replacement and infill in the southern portion of the potential item. The northern duration cottages, located within the Dunheved Precinct, are listed on the Penrith LEP 2010 as the North St Marys Staff Cottages Conservation Area (Item HCA4). With the exception of one new apartment development on the corner of Nariel Street and Carinya Avenue, the infill has so far been sympathetic to the grain and proportion of the original streetscape of the war-time housing development.

Figure 62. World War II era houses on Carinya Avenue

Figure 63. WWII housing on Carinya Avenue

Figure 64. WWII housing on Camira Street

Figure 65. WWII housing on Camira Street

Historical background

During the Second World War (1939-1945), St Marys became the location of several important factories for munitions production on the home front. These factories were located north of the study area in the Dunheved industrial area. During the first World War the Government had created the War Service Homes Commission, in which houses would be built at a generous rate for returned servicemen.[205] In World War II however, there was increased dependence and pressure on munitions and food production in Australia to supply troops in the Pacific. This resulted in large numbers of factories created throughout NSW, with fibro housing established nearby the new factories to house factory workers. This government supplied military housing was no longer limited to returned servicemen only, but to factory workers, including women. These houses were known as “Duration Cottages” – as they were intended to be demolished following the end of the war – and were created in close proximity to major factories so that workers would be available for shifts at all hours.[206] At the time, St Marys was a small town with limited residential development, particularly in the north. To support workers, a large number of houses were constructed by the Commonwealth War Workers Trust (discussed in Section 5.4).

The houses were typically two bedroom, although hostels were also constructed at the north St Marys workers cottages on Commonwealth Street. 200 two-bedroom houses were built by the Commonwealth War Workers Trust on the south of the St Marys Railway Station, located between Camira St, Carinya Avenue, Kalang Avenue and Kungala Street. These houses were all built around a central park, now Jack Jewry Reserve, and additional houses were built facing west on Carinya Avenue, but have since been demolished for the existing carparks. Similarly, additional houses were constructed south of Chris Hackett Drive, now in the location of Kokoda Park.

The houses were constructed of fibro cement and were built with standardised plans. The 200 cottages at St Marys was the largest group of wartime cottages constructed during the Second World War in NSW, followed in number by settlements at Bowenfels and Lithgow.[207] The first of the St Marys cottages was occupied in October 1942 and by April 1943 70 of the 200 had occupants.[208] By 1945 all were full and additional houses needed to be constructed and a community hall was constructed in Jack Jewry Reserve.

[205] Boyd, K., Kass, T., and Robertson, S., 2006. *Survey of World War I & 2 Buildings, Sites and Cultural Landscapes in NSW,* 169.
[206] Boyd, N., Kass, T., and Robertson, S., 2006. *Survey of World Wars I & 2 Buildings, Sites and Cultural Landscapes in NSW*, p. 169.
[207] Boyd, N., Kass, T., and Robertson, S., 2006. *Survey of World Wars I & 2 Buildings, Sites and Cultural Landscapes in NSW*, p. 178.
[208] Boyd, N., Kass, T., and Robertson, S., 2006. *Survey of World Wars I& 2 Buildings, Sites and Cultural Landscapes in NSW*, p. 178.

Statement of significance

The statement of significance for the Queen Street, St Marys, Post-War Commercial Building is as follows:

> *The St Marys Munitions Housing is a rare example of government provided Second World War duration housing. The group, located on the southern side of the T1 Main Western Line, originally comprised of 200 houses (now approximately 100) and is a rare example of war time housing which are intact and located within the original setting and town layout. Furthermore, the houses are historically significant due to their association with the Second World War munitions factories and military institutions at St Marys, which subsequently led to rapid settlement and growth of the town. The housing is expected to have social significance to the current residents of St Marys due to its association with World War II, the armed forces, and particularly female munitions workers and volunteers, who occupied much of the housing.*

Assessment of significance

The assessment of significance in Table 37 for the St Marys Munitions Workers Housing has been prepared by Artefact Heritage for this Environmental Impact Statement.

Table 37. Assessment of significance for St Marys Munitions Workers Housing

Criterion	Assessment against criteria
A) Historical	The St Marys Munitions Workers Housing is associated with the Second World War industrial development of St Marys. This program resulted in the development of the Munitions Workers Housing, under the Australian Government program to provide housing for workers in the Home Front war effort. This subsequently resulted in the population growth and modernisation of the town of St Marys. This group of housing originally comprised of 200 houses and was one of the largest program of armed forces housing provided during the Second World War in NSW. **The St Marys Munitions Workers Housing reaches the threshold of local significance under this criterion.**
B) Associative	The St Marys Munitions Workers Housing is associated with the Commonwealth War Workers Housing Trust who established the formal layout and built the housing. **The St Marys Munitions Workers Housing reaches the threshold of local significance under this criterion.**
C) Aesthetic/Technical	The layout of the war-time housing development surrounding the central Jack Jewry reserve park is of some aesthetic value for demonstrating the coordinated attempt at war-time community building and its resemblance to army institution dormitory planning and layout. **The St Marys Munitions Workers Housing reaches the threshold of local significance under this criterion.**

Criterion	Assessment against criteria
D) Social	The housing is associated with the armed forces, the working class, and particularly women, who received much of the Government supported housing to enable their work in factories and for the female armed forces branches, such as the WAAF. Further documentary and interview research would be required to confirm the significance of this item under this criterion. **The St Marys Munitions Workers Housing may reach the threshold of local significance under this criterion.**
E) Research Potential	The housing is not considered to respond to research questions which cannot be addressed in existing documentary or historical records. **The St Marys Munitions Workers Housing does not reach the threshold of local significance under this criterion.**
F) Rarity	The St Marys Munitions Workers Housing is rare within the Penrith LGA. While the northern group of workers housing in Dunheved is also listed, these are the only two examples of World War II government-provided housing in the LGA. Furthermore, the southern group (the potential item) was the largest group provided in the state, and forms part of a group of less than 900 houses provided during WWII in NSW, much less of which are still extant. The southern group is also associated with the working class factory workers and women, while the northern group is known as the Peace Officers housing, associated with a more military class of people. **The St Marys Munitions Workers Housing reaches the threshold of local significance under this criterion.**
G) Representativeness	The heritage item is in predominantly good condition and is a representative example of a type of housing development uncommon elsewhere in Sydney. **The St Marys Munitions Workers Housing reaches the threshold of local significance under this criterion.**

Heritage significant fabric

Heritage significant fabric associated with the St Marys Munitions Workers Housing includes the original fibre board housing (where present) as well as the street layout and central parkland. Late twentieth century infill and apartment block development are not considered significant fabric, although the original lot sizes for the war-time housing grants are considered significant.

Four Winds – Dwelling (Penrith LEP 2010 I321)

Location and physical description

Four Winds - Dwelling is listed on the Penrith LEP 2010 and the Department of Planning, Industry and Environment s170 heritage and conservation register

Four Winds is located on the southern side of the Great Western Highway near the Claremont Meadows services facility construction site. The location of the heritage item with respect to the project construction footprint is shown in Figure 3. The house is located close to the road reserve, with little front yard space. At present, a large property fence is located between the public area and the house. The house is an Inter-War era bungalow, single storey in design, with a brick verandah at the front façade of the house. The house features a gabled roof with timber detailing and incorporates

elements of the Arts and Crafts architectural style. The front façade features multi-paned double-hung windows and French entrance doors.

There are unobstructed views between Four Winds and the intersection of Reserve Road and the Great Western Highway, which would be utilised as an access road for the Claremont Meadows Stabling Facility. Views between the item and the Stabling Facility however are entirely obstructed by existing development, notably the McDonalds and Caltex service station.

Figure 66. Four Winds, southern aspect

Figure 67. View from Four Winds to access road and stabling facility

Historical background

Four Winds is located on part of the original land grant given to Mary Putland, the daughter of Governor William Bligh in 1810. For the next fifty years the land remained owned by Putland and her husband. During this time the land was cleared for agricultural purposes including crop growth and animal grazing.[209] In 1879 the property which now includes Four Winds was used for the operation of Martin Brell's tannery, one of the largest in New South Wales.[210] Brell's tannery was considerably upgraded in the 1880s and 1890s and new technologies for tanning became available.[211] In the 1900s and 1910s the changes in transportation technology and reduction of livestock coming from the west reduced the profitability of tanneries in Western Sydney. In 1914 however Brell purchased additional adjacent blocks of land and made great alterations to his tannery. In 1922, the existing Californian Bungalow – Four Winds – was constructed for Brell and became the family residence.[212] Additional tannery pits were excavated for the soaking of leathers. Following Brell's death the tannery was demolished and the property was surveyed for subdivision. The land was inherited by his daughter Elizabeth, and in 1970 was purchased by Four Winds Development Pty Ltd.[213] In the 1980s the land was purchased by the Department of Planning.

Assessment of significance

The significance assessment in Table 38 has been developed from the Penrith LEP 2008 listing for Four Winds Dwelling.[214]

[209] NSW Office of Environment and Heritage, 2007. 'Four Winds – Dwelling.'
[210] *Op. Cit.*
[211] *Op. Cit.*
[212] *Op. Cit.*
[213] *Op. Cit.*
[214] NSW Office of Environment and Heritage, 2007. 'Four Winds - Dwelling' https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2260321

Table 38. Heritage significance assessment for 'Four Winds' item

Criterion	Discussion
A) Historical Significance	The residence, its outbuildings and surrounding archaeological remains provide evidence of one of the important tanneries previously centred at St Marys. Tanning industry was the most significant element in the evolution of the town and this particular site provided constant employment for a substantial number of local men and boys. The industries utilized plentiful supplies of timber and water to establish secondary processing of rural produce within the grazing lands on the Cumberland Plain that were progressively cleared west of Sydney. The remaining structures record the success of Martin Brell a local tanner, whose construction of the Four Winds residence on the site in 1922 culminated a successful business career spanning 53 years. The tannery was one of the largest in the area and its products were exported to Europe. The residence with its American influenced architecture records a rare example of the use of this essentially suburban building style in a rural setting, despite the suitability of the style to rural Australia. The logical transition from Colonial Georgian farmhouse to Federation Bungalow and then Californian Bungalow did not eventuate, due to the conservatism of the rural sector and the emergence of an Inter-War rural style incorporating elements of each of these styles and notable for its minimal detailing. **Four Winds – Dwelling reaches the threshold of local significance under this criterion.**
B) Associative Significance	Four Winds has high local historical significance as the former home of Martin Brell, a successful local tanner. It has further significance for its association with the tanning industry, a key industry in the development of the local economy and is associated with influential names in the industry. **Four Winds – Dwelling reaches the threshold of local significance under this criterion.**
C) Aesthetic Significance	The residence its garage and outhouse are an accomplished example of the Inter-War California Bungalow Style prominently sited on a major road. The use of expansive roof forms, massive timber sections and extensive return veranda within the principle roof form and articulated windows provide architectural interest that is highly visible on the highway. The interior design of the residence reflects the transitional nature of early 20th Century architecture. Elements of Art Nouveau and English and American Arts and Crafts Styling are combined in a cohesive manner, utilizing the materials and technology of the times. The continuity of stylistic elements within the associated structures of garage and outhouse reinforces the visual impact and relationship of the group to the open site. **Four Winds – Dwelling reaches the threshold of local significance under this criterion.**
D) Social Significance	Four Winds has local social significance for its association with a successful local businessmen, Martin Brell, and for its contribution to the development of the local economy. Martin Brell and his family feature in local histories of the St Marys district. He is remembered as being a successful local businessman and council alderman. **Four Winds – Dwelling reaches the threshold of local significance under this criterion.**

Criterion	Discussion
E) Research Potential	The potential archaeological remains belonging to the tannery have a medium level of historic and archaeological significance and research potential at a local level. Remains of the nineteenth-century housing within the study area have a medium level of archaeological significance, on a local level. The archaeological investigation, analysis and interpretation of the remains associated with Brell's tannery could add to our knowledge about the mid to late nineteenth/ early twentieth-century technology and layout of a successful tannery. The archaeological investigation of the pre-tannery cottage or of the other house sites could add to knowledge of mid nineteenth-century residential life and household economies, and provide comparative evidence from other households in the same period in this part of western Sydney. Four Winds has high local technical/research significance for its demonstration of 1920s building techniques in relation to housing development at the time. It has further significance for the remnant structures on the site associated with tanning and for their demonstration of early twentieth century tanning practices. **Four Winds – Dwelling reaches the threshold of local significance under this criterion.**
F) Rarity	The bungalow is not a rare example of its type, although it is much less common in the St Marys district than it is in the inner metropolitan area of Sydney. The house is rare locally for its scale, and is one of the few surviving structures alongside the highway. The Tannery site is an area of local Archaeological Sensitivity (it is at present uncertain what the impact of the tannery options was on the earlier phase of development indicated by the c.1855 plan, and it is in turn uncertain what the scale of the impact was on the remains of the tannery itself through demolition. Another factor which disturbed the site was the widening of the Great Western Highway, which may have had some impact on the earlier cottages which were situated close to the Highway frontage. **Four Winds – Dwelling reaches the threshold of local significance under this criterion.**
G) Representativeness	Four Winds is a good example of the Californian Bungalow. It was once a popular form of house in the inner/middle areas of the Sydney Metropolitan region, it is much less common in Sydney's west. Brell's tannery is representative of the type of tannery, processes, layout and location of tanneries that operated in the surrounding area at the end of the nineteenth century. Nevertheless, it is likely to have individual characteristics because of the type of leathers produced, its size, and the ownership by the Brell family. **Four Winds – Dwelling reaches the threshold of local significance under this criterion.**

Heritage significant fabric

Four Winds is of local significance and is in a good condition and intactness. There are several elements of significant fabric within the Four Winds property. The bungalow, associated garage, outhouse, and in ground cistern are noted significant elements of the heritage item.[215]

[215] *Ibid*.'

Brick House, 565 Great Western Highway, Werrington (Penrith LEP 2010 I1810)

Location and physical description

The Brick House is listed on the Penrith LEP 2010 as an item of local heritage significance (I810).

The house is located on the Great Western Highway in Werrington, approximately 85 metres north-east of the proposed access road to the Claremont Meadows services facility construction site. The location of this heritage item with respect to the project construction footprint is illustrated in Figure 3. The heritage item consists of an inter-war California bungalow house on a half-acre block. The bungalow has a street-facing bay window with a multi-gabled tiled roof. The house is separated from the street with a low modern brick fence and is only partially visible from the publicly accessible footpath. There are direct views from the Brick House to the intersection of Reserve Road and the Great Western Highway, which would be utilised for an access road. There are no direct views towards the location of the Claremont Meadows services facility.

Figure 68. View of Brick House, north aspect

Figure 69. View to study area from Brick House

Historical background

The Brick House heritage item, located at 565 Great Western Highway Werrington, is located directly opposite from the Four Winds heritage item (discussed above). The two buildings are closely linked, as the Brick House was built for Frank Brell, the son of Martin Brell. As discussed above, Martin Brell was a leather tanner who had operated his business in Werrington since 1879. The Brick House item was constructed for Frank by his father at about the same time as Four Winds, c. 1922.[216] 1943 and 1955 aerial imagery shows that the house features a modest sealed fenced yard, accessed by a path/driveway along the east side of the house. Two outbuildings, potentially sheds are located at the eastern fence of the backyard, and an additional structure is present north of the back fence. The remainder of the area is cleared and undeveloped.

By the early 2000s the rear area (behind the backyard) of the Brick House was sealed, and surrounding development apparently associated with trucking began to occur at the rear and to the northeast of the house. On the west side, the existing service station was constructed. Through the mid- and late-1900s it is evident that part of the original front yard has been resumed for the widening of the Great Western Highway.

[216] NSW Office of Environment and Heritage, 2005. 'Brick House.'

Statement of significance

The following statement of significance is from the Penrith LEP 2010 listing for Brick House[217]:

> *Completed in the 1920s for a member of the Hackett family, the cottage is a good, substantial and well-built example of an inter-war brick cottage in the California Bungalow style which demonstrates suburban development in St Marys during the early decades of the twentieth century.*

Significance assessment

The significance assessment in Table 39 has been adapted from the Penrith LEP listing for Brick house.

Table 39. Assessment of Significance for the Brick House heritage item

Criterion	Assessment against criteria
A) Historical Significance	The house demonstrates suburban development in Werrington on the highway during the inter-war years. **Brick House reaches the threshold of local significance under this criterion.**
B) Associative Significance	The Brick House is believed to have been constructed for or by Frank Brell, the son of Martin Brell, an influential tanner in the St Marys and Werrington district in the early 20th century. The house was lived in by members of the Hackett family, however little information is known regarding either of these families and their influence on the area. **Brick House would not reach the threshold of local significance under this criterion.**
C) Aesthetic Significance	The house is a good, substantial and well-built example of an inter-war brick cottage in the California Bungalow style. **Brick House reaches the threshold of local significance under this criterion.**
D) Social Significance	The Brick House item is not known to have particular social significance within the St Marys and Werrington community, however as an historic property along the Great Western Highway, it is anticipated that the item may have contributed to the setting and place making of the suburb. **Brick House may reach the threshold of local significance under this criterion.**
E) Research Potential	Brick House is unlikely to demonstrate further research potential. **Brick House would not reach the threshold of local significance under this criterion.**

[217] *Ibid.*

Criterion	Assessment against criteria
F) Rarity	The cottage is one of a small number of residences on the highway at Werrington which collectively demonstrate suburban development. The building is a rare survivor of a once more extensive village settlement at the creek crossing. **Brick House reaches the threshold of local significance under this criterion.**
G) Representativeness	The Brick House is an excellent example of the inter-war California Bungalow architectural style and demonstrated high integrity regarding its façade and exterior. **Brick House reaches the threshold of local significance under this criterion.**

Heritage significant fabric

The Brick House is of local significance and is in good condition and intactness. The Brick House is constructed in 1930s California Bungalow architectural style, and is a significant element within the item curtilage. The house has been assessed within the SHI as having local significance under several criteria. The rear sheds and outbuildings are not considered significant fabric, as they are modern and intrusive elements within the heritage curtilage.

Luddenham Road Alignment (Penrith LEP 2010 (I843)

Location and physical description

The Luddenham Road Alignment is listed on the Penrith LEP 2010 as an item of local heritage significance (I843).

Luddenham Road is a single carriageway road which connects the suburbs of St Clair in the northeast and Luddenham in the southwest. The heritage item is located within the Luddenham Road construction site. The location of this heritage item with respect to the project construction footprint is shown in Figure 22.

The road is a sealed asphalt road on a predominantly northeast to southwest alignment. The easements on either side of the road are predominantly grassed with some areas of regrowth native vegetation. Residential fences run parallel to the road are comprised of posts and wire, or timber post and rail fences are located along either side of the Luddenham Road alignment. Within the study area, Luddenham Road crosses the Warragamba Dam to Prospect Reservoir Pipeline, which travels beneath the road (this item is discussed as an potential heritage item in Section 5.9). The road is generally flat through the study area, however, gently undulates in some areas. The landscape on either side of the road is predominantly rural cleared pastoral property.

At the northern end of Luddenham Road, near the intersection of Mamre Road, the former property of Gregory Blaxland is located on the eastern side of Luddenham Road. On the western side, there is a monument to commemorate the crossing of the Blue Mountains by Gregory Blaxland, William Lawson, and William Wentworth, who embarked for their journey from that location.

Figure 70. Luddenham Road alignment near Warragamba Supply Scheme, southern aspect

Figure 71. Luddenham Road near Science Park, northern aspect

Figure 72. Timber fences along Luddenham Road

Figure 73. Timber and wire fences along Luddenham Road

Figure 74. Blaxland monument at Luddenham Road

Figure 75. Detail of Blaxland monument at Luddenham Road

Historical background

Luddenham Road was first constructed in the 1800s to connect Luddenham and Lee Holme, the estates of brothers John and Gregory Blaxland respectively.[218] The road became an important route in the area, connecting Bringelly and St Marys. In 1887 the road was 'metalled' – covered with small crushed stones – reflecting the importance of the road and suggesting that it was heavily trafficked.

[218] NSW Office of Environment and Heritage, 2008. 'Luddenham Road Alignment.' Accessed online 24/7/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2260843

Statement of significance

The following statement of significance is from the Penrith LEP listing for the Luddenham Road Alignment:

> *Luddenham Road provides evidence of the early nineteenth century pastoral activities in the Penrith region, connecting the estates of Luddenham and Lee Holme owned by brothers John and Gregory Blaxland respectively. It continued to be an important link through the nineteenth century, connecting Bringelly with St Marys. The sparsely settled landscape around Luddenham Road and the long surviving post and rail fencing continue to provide evidence of the predominant pastoral activities in the district in the nineteenth century through to the present time (2008) and give the road a high level of aesthetic appeal.*[219]

Assessment of significance

The significance assessment in Table 40 has been extracted from the Penrith LEP listing for the Luddenham Road Alignment.[220]

Table 40. Assessment of significance for the Luddenham Road Alignment

Criterion	Assessment against criteria
A) Historical Significance	Luddenham Road provides evidence of the early nineteenth century agricultural development in the Penrith region, connecting the estates of Luddenham and Lee Holme owned by brothers John and Gregory Blaxland respectively. It continued to be an important link through the nineteenth century, connecting Bringelly with St Marys. The sparsely settled landscape around Luddenham Road and the surviving post and rail fencing continues to provide evidence of the predominant pastoral activities in the district in the nineteenth century through to the present time. **Luddenham Road Alignment reaches the threshold of local significance under this criterion.**
B) Associative Significance	Luddenham Road was established by John and Gregory Blaxland, two significant figures in Australian history who owned land in Luddenham and built Luddenham Road to connect their two properties. **Luddenham Road Alignment reaches the threshold of local significance under this criterion.**
C) Aesthetic Significance	The continuing rural character of Luddenham Road, characterised by the undulating traverse of the road, sparsely settled pastoral land and surviving timber post and rail fencing gives the road a high level of aesthetic appeal. **Luddenham Road Alignment reaches the threshold of local significance under this criterion.**

[219] NSW Office of Environment and Heritage, 2008. 'Luddenham Road Alignment.' *NSW Office of Environment & Heritage.*
[220] NSW Office of Environment and Heritage, 2008. 'Luddenham Road Alignment.' https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2260843

Criterion	Assessment against criteria
D) Social Significance	The Luddenham Road alignment is not associated with any significant social groups or communities. **Luddenham Road Alignment does not reach the threshold of local significance under this criterion.**
E) Research Potential	The former road surface for Luddenham Road consisted originally of a corduroy road followed by early metalled roads. However, these original road surfaces are likely entirely removed from road upgrades. **Luddenham Road Alignment does not reach the threshold of local significance under this criterion.**
F) Rarity	The Luddenham Road alignment is an uncommon example of an historic road dating to the early 1800s which has largely preserved its alignment since it was established. While there are several other historic roads in the Penrith region, including the Northern Road and the Great Western Highway, these roads have been heavily altered over time and do not share their original alignment to the extent of integrity of Luddenham Road. **Luddenham Road Alignment reaches the threshold of local significance under this criterion.**
G) Representativeness	Luddenham Road may hold some representative significance on account of the integrity of its alignment and setting, however as the physical remains of the original road are gone this item is not representative of a historic road of this type. **Luddenham Road Alignment does not reach the threshold of local significance under this criterion.**

Significant heritage fabric

Significant fabric of the Luddenham Road alignment listing includes the adjacent pastoral landscape, including surviving post and rail fences. The fabric of the road itself is modern and therefore is not significant. The alignment of the road is predominantly unaltered, and this alignment is of heritage significance. Significant views are not specified within the SHI entry for the item, however the visual relationship of Luddenham Road with the rural setting forms part of the significance of the item.

Warragamba Supply Scheme (WaterNSW s170 register)

Location and physical description

The Warragamba to Prospect Water Supply Pipeline is listed the WaterNSW s170 Heritage and Conservation Register as part of the Warragamba Supply Scheme. The Warragamba to Prospect Water Supply Pipeline has been assessed by Graham Brooks and Associates[221] as significant fabric of state significance as a part of the wider Warragamba Supply Scheme.

The pipelines are located between Warragamba Dam and Prospect Reservoir and includes 27 kilometres of steel water carrying supply pipes on an approximate west to east alignment. The study area includes approximately 2 kilometres of the pipeline and its surrounding easement on the western side of Luddenham Road, Luddenham, located within the off-airport corridor construction

[221] Graham Brooks and Associates, 2010. *Warragamba Supply Scheme Conservation Management Plan – Draft.*

site. The location of the heritage item with respect to the construction footprint of the project is shown in Figure 22.

The pipelines are fenced off from the publicly accessible areas of Luddenham Road by tall metal fencing and gates. The area includes two parallel pipelines, pipeline 1 in the south and pipeline 2 in the north, between which is a modern asphalt vehicle access road. There is approximately 2 metres of grass verge on either side of the access road. At the eastern extent of the study area there are several small pockets of semi-mature trees located on the southern side of the pipeline.

The pipelines are comprised of precast portions of steel, approximately 2 m in diameter. The steel portions are welded together, and at the eastern end of the study area the pipes are encased within a concrete framing which travels beneath Luddenham Road and provides protection for the pipeline. The pipeline is level throughout the study area, with the surrounding topography modified to accommodate the pipeline. In some portions the ground surface has been excavated with batters created. Through much of the study area the pipeline sits relatively flush with the natural ground level, however in some parts, the pipeline sits above the ground level and is supported by twin concrete pillars with thin steel crossbars.

Several maintenance and water testing access points are present along the length of the pipeline, with steel ramps and platforms present across the pipeline width. Octagonal cement frames are present around the diameter of the pipe in period locations.

At the western extent of the pipeline within the study area there is an access bridge, colloquially referred to as Kennett's Bridge or Kennett's Crossing, which connects the two parcels of land owned by the Kennett family on either side of the pipelines. The bridge, used to cross livestock and cars, is constructed of concrete over the Warragamba Pipeline, with galvanised steel road guards on either side. A small bridge passes over the north and south pipeline, leading off the access road. Each entrance to the Kennett property is accessed by a metal farm fence and the bridge slopes down to the south.

Figure 76. View to west along access road between pipelines

Figure 77. Vegetation along northern side of pipeline

Figure 78. Pipeline and maintenance points

Figure 79. Luddenham Road protective barriers

Figure 80. Pipe above natural ground level on concrete piers

Figure 81. Detail of concrete piers and crossbeams

Figure 82. Maintenance/access point along pipeline

Figure 83. Maintenance/access ramp along pipeline

Figure 84. Kennett's bridge over northern pipeline

Figure 85. View south from pipeline over Kennett's airstrip

Figure 86. Kennett's Crossing over northern Warragamba pipeline, northwest aspect

Figure 87. Northern bridge of Kennett's Crossing, north aspect

Figure 88. Northern bridge retaining wall, west aspect

Figure 89. Northern bridge of Kennett's Crossing, northeast aspect

Figure 90. Southern bridge of Kennett's Crossing over pipeline, east aspect

Figure 91. Southern gate of Kennett's Crossing, south aspect

Figure 92. Detail of galvanised steel road guards, west aspect

Figure 93. View from Kennett's Crossing over Warragamba Pipeline, east aspect

Historical background

Following the completion of the Warragamba Emergency Scheme in 1940, attention turned to the dam wall and gravity pipelines that were required to transport water from Warragamba to Prospect, and subsequently throughout Sydney.[222] The Warragamba Pipelines were first installed between 1937 and 1969. The first iteration, in 1937, comprised of a 48-inch diameter pipeline which was assisted by Pumping Station No. 9 at Warragamba Dam. This temporary pipeline was replaced with the larger, extant pipeline in 1946. The current pipelines were constructed between 1946 and 1955 and are from 84-106 inches in diameter, and overall, the Warragamba to Prospect Pipeline is approximately 27 kilometres in length. The duration taken to construct the pipeline represents the difficulty of major construction projects during World War II, in which manpower, resources (especially steel), and budgets were redirected to the war effort.[223] The Pipeline was constructed to coincide with the completion of the Warragamba Dam, a predicted 8-10 year construction timeline, which was finally completed following delay in 1960.[224]

Original plans for the pipeline included three 84-inch pipelines, however, to minimise costs, two pipelines – one larger than the original 84 inches – were constructed instead.[225] Until the pipeline was completed, water transport used a combination of the new (extant) pipeline where constructed, in conjunction with the former temporary pipeline where still present. At this time, water was still pumped. In February 1959 water no longer required pumping, as the almost completed dam was at a level sufficient to enable the gravitational delivery of water from Warragamba to Prospect at an average daily rate of over 80 million gallons.[226]

Kennett's Crossing is a galvanised steel and concrete livestock and vehicle bridge that forms part of the physical fabric of the Warragamba Pipeline. The Kennett Family owned the land within the study area through which the Warragamba Pipeline was constructed and 1955 aerial imagery of the area shows that the Kennett's Crossing bridge was constructed by this time, likely during the construction through the study area in the late 1940s-early 1950s. The Kennett's Crossing was established as part of land property arrangements negotiated between WaterNSW and the Kennett Family, to enable the continued movement of cattle and livestock between the two Kennett properties.

Statement of significance

Warragamba Supply Scheme

The Warragamba Dam Supply Scheme CMP provides the following description of the significance of the Warragamba Pipelines[227]:

> *The pipelines are associated with the initial construction phase and subsequent use and development of the overall Scheme. Significant components comprising of:*

[222] Graham Brooks and Associates, 2010. *Warragamba Supply Scheme Conservation Management Plan Draft*, p. 42.
[223] Graham Brooks and Associates, 2010. *Warragamba Supply Scheme Conservation Management Plan Draft*, p. 43.
[224] Graham Brooks and Associates, 2010. *Warragamba Supply Scheme Conservation Management Plan Draft*, p. 43.
[225] *Op. Cit.*
[226] Graham Brooks and Associates, 2010. *Warragamba Supply Scheme Conservation Management Plan Draft*, p. 43.
[227] Graham Brooks and Associates, 2010. *Warragamba Supply Scheme Conservation Management Plan – Draft,* 305.

- *remnants of the 48 inch Emergency Scheme pipeline evident at road crossings.*

- *2100/3000mm pipelines and associated elements and components including tunnels, concrete casings and cross connections and surrounding open space.*

The CMP provides the following statement of significance for the Warragamba Supply Scheme for elements within the study area for the project:

The Warragamba Supply Scheme, is the largest and most important of the water supply systems constructed between 1937 and 1960 to provide a secure water supply to satisfy the demands of industrial, commercial and residential development of metropolitan Sydney. The Warragamba Supply Scheme has supplied water since 1940 following the implementation of the Emergency Scheme, during the record drought, construction and on completion of the dam. The dam, associated infrastructure and pipelines is one of the largest (possibly largest) of any type of dam in the world constructed specifically for an urban water supply

The Kennett's Crossing is one of only two known examples of private crossings over the Warragamba Pipeline, and is a rare example of private residential access over major public works. The crossing demonstrates a creative use of land access in a rare visual setting. There is opportunity for further research into the history and significance of the Kennett's Crossing, including the relationship of the land and the Kennett family with WaterNSW.

Assessment of significance

The assessment of significance for the whole of the supply scheme by Graham Brooks and Associates is provided in full below for context in Table 41. Section 0 provides a summary of the significance for the specific elements of the scheme in the study area.

Table 41. Heritage significance assessment for the Warragamba Supply Scheme

Criterion	Discussion
A) Historical	The Warragamba Supply Scheme and pipeline has played a fundamental role in providing water to metropolitan Sydney from 1940, through the Emergency Scheme at a time of great need and during protracted record drought and since with the construction of Warragamba Dam in ensuring security of water supply. The dam, pipelines and associated infrastructure continue to predominate the supply to Sydney and is one of the largest of any type of dam in the world built specifically for an urban water supply. The Warragamba Supply Scheme (including the pipeline) was constructed over a period of over twenty years between 1937 and 1960, a protracted construction period which was directly affected by periods of government financial stringency as a result of the Second World War. The completion of the Scheme during this period was one of the major public works projects undertaken in the State. Kennett's Crossing is associated with the development of the Warragamba pipeline, however the crossing and airfield may not be significant in the historical development of the Penrith LGA. **The Warragamba Supply Scheme reaches the threshold of state significance under this criterion.**
B) Associative	The design and construction of Warragamba Supply Scheme, including the pipeline, was undertaken by the Construction Branch of the Water Board. The construction of the Dam drew upon the knowledge and experience of a number of the engineers including Stanley T Farnsworth (the first Engineer-in-Chief involved with the Scheme 1937-1948), (Sir) William Hudson (best known for his role in the Snowy Mountains Hydro Electricity Scheme, 1948-1949) and TB Nicol (1949-1961) who saw the project to completion. The construction of the Warragamba Supply Scheme, including pipeline, between the years 1937 and 1961, necessitated the employment of a large body of labourers and tradesmen who lived at the construction sites with their families. The number of employees at the Emergency Scheme was up to 2,000 and up to 1,7000 for Warragamba Dam, numbers which represents a major influx to the population of the local area. **Warragamba Supply Scheme reaches the threshold of State significance under this criterion.**
C) Aesthetic	The Warragamba Pipeline is a significant technical and engineering achievement that enabled the accurate transportation of water from Warragamba Dam to Prospect Reservoir, which is a significant engineering feat that reliably supplied water to Sydney. Kennett's Crossing is a creative example of agricultural infrastructure to maintain historic livestock access between privately owned land property following resumption for major public works. The aesthetic and technical design of the bridge however does not necessarily demonstrate achievement in architectural or engineering design. The setting of Kennett's Crossing however is rare and visually provides an interesting contrast between the agricultural structure and the industrial Warragamba Pipeline. The interplay of the elements with the adjacent pastoral landscape belonging to the Kennett family is visually appealing and unusual within the Liverpool area. **Warragamba Supply Scheme reaches the threshold of State significance under this criterion.**

Criterion	Discussion
D) Social	Several elements of the Warragamba Supply Scheme, notably the Dam, the Emergency Scheme, Megaritty's Bridge, Haviland Park and the picnic areas have been assessed by Graham Brooks and Associates as having social significance. The Warragamba Pipeline itself may have contributed to the sense of place of people within the Wollondilly, Penrith, and Blacktown LGAs, however the pipeline is unlikely to have social significance when in isolation from the broader Warragamba Supply Scheme. **Warragamba Supply Scheme reaches the threshold of local significance under this criterion. The Warragamba Pipeline is unlikely to reach the threshold of significance under this criterion.**
E) Research Potential	Parts of the Supply system, such as the 48 inch pipeline and Pumping Station tower and original access, cavern and pumps have been altered or removed, the physical fabric demonstrates the technology of the day that can provide insight into the workings of the system, supplemented by remaining documentary evidence. **Warragamba Supply Scheme reaches the threshold of local significance under this criterion.**
F) Rarity	The Warragamba Pipeline is rare within NSW, as an extensive example of an above ground water supply system that covers a tremendous distance. It is a rare feat of engineering. Kennett's Crossing is one of only two known examples of a bridge over the Warragamba Pipeline or other major infrastructure within Western Sydney and the Penrith LGA to enable continuous access between private property following the resumption of land. **Warragamba Supply Scheme reaches the threshold of State significance under this criterion.**
G) Representativeness	The construction technologies used at Warragamba represents a culmination of the technology and experience associated with dam constructed in New South Wales through to this period. The practice of ongoing maintenance of the dam wall and pipeline after completion through surveillance provided by staff is representative of procedures undertaken at other dams and weirs constructed in New South Wales. The upgrading of the equipment and ancillary monitoring and operating equipment is representative of modern day safe operating practice. **Warragamba Supply Scheme reaches the threshold of State significance under this criterion.**

Heritage significant fabric

The Warragamba Pipeline has been identified as an element of primary significance within the Warragamba Supply Scheme.[228] The pipeline, cuttings and embankments, alignment, and landscape of the pipeline have been identified as significant fabric and elements.

Heritage significant fabric associated with the Kennett's Crossing includes the concrete bridges over the pipeline, in addition to the galvanised steel guards and fences, which are all original fabric dated to the construction of the Warragamba Pipeline and the subsequent construction of the livestock

[228] Graham Brooks and Associates, 2010. *Warragamba Supply Scheme Conservation Management Plan – Draft*, 305.

crossing. The location of the crossing is also significant as it reflects the relationship between the two Kennett land parcels following resumption of their land for the Warragamba Pipeline.

Kennett's Airfield (potential heritage item)

Location and physical description

The Kennett's Airfield is not listed on any statutory or non-statutory heritage register. This item was identified as having heritage significance during historical research and site inspections from nearby properties.

This potential heritage item is located within the off-airport corridor construction site. The location of the Kennett's Airfield potential heritage item in relation to the project works is illustrated in Figure 22.

Historical background

Kennett's Airfield is named after the Kennett family, who have owned the land on the west side of Luddenham Road north and south of the Warragamba Pipeline alignment since at least c.1950. Following the construction of the Warragamba Pipeline and its completion in 1954, significant changes occurred to the Kennett property, which was bisected by the pipeline. 1955 aerial imagery shows that a track was established from the southern Kennett house to the crossing over the pipeline, however at this time the Airfield was not established. Documentation available at the National Archives of Australia from the former Department of Civil Aviation contains 'G C and H L Kennett Aviation – Charter and Aerial Work Licence', dating from 1953-1977.[229] While an airstrip is not evident within the 1955 aerial imagery, it appears that Kennett's Aviation predates the establishment of the airstrip itself, and that flights between Kennett's Airstrip and Sydney Kingsford Smith Airports were occurring prior to the establishment of the runway.

A photograph taken at Sydney Kingsford Smith Airport shows a Cessna 182-Skyline light aircraft owned by the Kennett's, labelled 'G.C. and H.L Kennett Dairy, *Unknown,* St Marys.' The image description states that the aircraft operated from a private airstrip at St Marys, placing the date of Kennett's Airfield from 1965-9. The Cessna 182 is a four-passenger aircraft, suggesting that from this date, the Kennett Family were flying private passengers between St Marys and Sydney, and/or running public flights as part of an aircraft business in addition to the Kennett's Dairy.[230] This aircraft was first registered on the 19th of January 1965, corresponding with the 1965-1969 time frame suggested for the establishment of the Kennett Aviation busines venture.[231]

Photographs from 1971 taken at Kennett's Airstrip do not show a gravelled or sealed runway present. These photographs are taken from a 'fly in' held at Kennett's – an event for aircraft enthusiasts and light aircraft pilots. Several planes and people are pictured at this event at the Kennett's property, suggesting that at least at this time.

The Kennett's later owned a Cessna 340 aircraft,[232] which was a cabin class plane with four passenger seats, a pressurised cabin, and stair doors.[233] This aircraft would have required a more substantial runway surface, perhaps encouraging the establishment of a sealed runway in the mid-1970s. The runway at Kennett's Airfield appears to be parallel to the Warragamba Pipeline – which

[229] National Archives of Australia, 1953-1977. B595, 51/1/233 Part 1 and Part 2. These files have been requested for access and digitisation, however requires examination and clearance approvals by Archives staff.
[230] Montgomery, MR & Gerald Foster, 1992. *A Field Guide to Airplanes, Second Edition*, p. 106.
[231] AustrAirData, 2020. 'VH-DGF 1'. *Austairdata.com.au.* Accessed online 17/6/2020 at: https://www.austairdata.com.au/component/rsdirectory/entry/view/15086-vh-dgf-1
[232] Carter, D., 2017. 'VGH-DGF.' *Air History.net.* Accessed online 16/6/2020 at: https://www.airhistory.net/photo/7037/VH-DGF
[233] Montgomery, MR & Gerald Foster, 1992. *A Field Guide to Airplanes, Second Edition*, p. 106.

may have assisted with navigation for landing at a small airport without large or coordinated local radio flight control. It is noted that airstrips are typically also aligned with the prevailing wind directions to ensure safe take off and landing,[234] and that other airfields in Western Sydney including Camden, The Oaks, Bankstown and Hoxton Park, are all aligned north-south or northeast to southwest for this reason. Kennett's airfield was likely laid on the east-west alignment to ensure ease of navigation against the adjacent Warragamba Pipeline.

The Cessna 340 (registration VH-TDU[235]) is recorded as conducting passenger flights between St Marys and Goulburn, and crashed after take-off from Goulburn in May 1979.[236] The aircraft was irrecoverably damaged and the pilot, GC Kennett,[237] was killed in the crash.[238]

Kennett's Aviation and the Airfield form part of the third-tier of commercial aviation, generally light aircraft that operated on an *ad hoc* basis and were often considered essential to providing additional services that major and regional airlines did not provide on a regular basis. Kennett's Airfield, or at least the Aviation company itself, represents this history and little-researched element of Australia's aviation history. Available documentation suggests that Kennett's was at its peak in the 1970s, however the runway appears to be in operation up until c.2004. In 2004 a white cross appears at the eastern end of the runway, implying that the airstrip is unserviceable,[239] however the cross is not present in 2002, suggesting decommissioning between 2002 and 2004. Kennett's however has been utilised as an emergency landing zone as recently as 2018.[240]

[234] Air Services Australia, n.d. 'Runway Selection.' *Air Services Australia.* Accessed online 17/6/2020 at: https://www.airservicesaustralia.com/wp-content/uploads/12-139FAC_NCIS-Runway-selection_P2.pdf
[235] AusAirData, 2020. 'VH-TDU 1'. *Austairdata.com.au.* Accessed online 17/6/2020 at: https://www.austairdata.com.au/component/rsdirectory/entry/view/33666-vh-tdu-1
[236] Carter, D., 2017. 'VH-TDU.' *Air History.net.* Accessed online 16/6/2020 at: https://www.airhistory.net/photo/29905/VH-TDU
[237] *The Canberra Times,* 17 May 1979. *Five Survivors: Fatal air crash victim named.'* Accessed online via Trove 17/6/2020 at: https://trove.nla.gov.au/newspaper/article/110946655?searchTerm=%22Cessna%20340%22%20goulburn&searchLimits=
[238] *Op. Cit.*
[239] Airways Museum, n.d. 'The Aerodrome Signal Area.' Accessed online 17/6/2020 at: http://www.airwaysmuseum.com/Signal%20Area.htm
[240] Flight Safety Australia, 2018. 'Australian Accidents: 11 July to 13 Aug 2018.' *Flight Safety Australia.* Accessed online 17/6/2020 at: https://www.flightsafetyaustralia.com/2018/09/australian-accidents-11-july-to-13-aug-2018/

Figure 94. Kennett's Property, 1965. Source: Department of Finance, Services & Innovation.

Figure 95. G.C. and H.L Kennett Dairies, Cessna 182 Skyline at Sydney Kingsford Smith International, 1969. Source: AirHistory.net

Figure 96: Home built replica 1960 Dart Kitten at a fly-in event at Kennett's Airfield, 1971. Source: AirHistory.net

Figure 97. Cessna 340, owned by Kennett Dairies, 1976, which crashed in 1979 killing GC Kennett. Source: AirHistory.net

Statement of significance

The statement of significance for Kennett's Airfield is as follows:

> *The Kennett's Airfield is a rare example of a privately owned and operated post-war airstrip and is the only known example of its type within the Penrith LGA. The airfield may be social significance for the history of private and amateur aviation events at the site, and to the local community. There is opportunity for further investigation of the site of Kennett's Airfield, including the relationship of the land and the Kennett family with the surrounding Penrith district.*

Assessment of significance.

The assessment of significance in Table 42 for the Kennett's Airfield has been prepared by Artefact Heritage for this Environmental Impact Statement.

Table 42. Assessment of significance for Kennett's Airfield

Criterion	Discussion
A) Historical	Kennett's Airfield is associated with the post-war private commercial aviation in Western Sydney. **Kennett's Airfield is unlikely to reach the threshold of local significance under this criterion.**
B) Associative	Although the Kennett family are a known farming family within the local area, their associated with the property would not be considered notable enough for significance under this criterion. **Kennett's Airfield would not reach the threshold of local significance under this criterion.**
C) Aesthetic/Technical	Kennett's Airfield may provide technical evidence of post-war private airfields. The site may contain remnant amateur aviation materials. **Kennett's Airfield may reach the threshold of local significance under this criterion.**
D) Social	Kennett's Airfield was the location of fly-in events with historic aircraft and may be of social significance to amateur aviation groups and the Luddenham local community who attended these events. **Kennett's Airfield may reach the threshold of local significance under this criterion.**
E) Research Potential	The heritage item in conjunction with community research may provide more about the history of the Kennett's Airfield and the role the airstrip may have played in supporting agricultural operations in the Luddenham and wider Western Sydney area throughout the later 20th century. **Kennett's Airfield may reach the threshold of local significance under this criterion.**
F) Rarity	Kennett's Airfield is the only remaining and historically known privately owned and operated pastoral airstrip in the Penrith LGA and the Western Sydney region. **Kennett's Airfield reaches the threshold of local significance under this criterion.**

Criterion	Discussion
G) Representativeness	Kennett's Airfield is a good and intact example of a private pastoral airstrip in the Penrith LGA. **Kennett's Airfield may reach the threshold of local significance under this criterion.**

Heritage significant fabric

Site inspections conducted from outside of the Kennett's Airfield property have identified that the runway, support buildings (hangars) and the wider pastoral setting of the airfield may be of heritage significance.

McGarvie-Smith Farm (Penrith LEP 2010 I857)

Location and physical description

The McGarvie-Smith Farm is listed on the Penrith LEP 2010 as an item of local significance (I857).

The McGarvie Smith Farm occupies land on the northern side of Elizabeth Drive directly to the west of Badgerys Creek, within the off-airport corridor construction site. The location of the McGarvie-Smith Farm in relation to the project construction footprint is shown in Figure 27.

The property consists of undulating rural land with several large and interconnected agricultural dams. A number of houses and farm buildings are scattered across the property, predominately located towards the northern boundary and on higher ground. Paddocks are separated by a mix of modern and early fencing and dirt and gravel access roads connect buildings within the property from Elizabeth Drive.

There are two building complexes – a building complex on the western side of the property of dilapidated 1930s-era veterinarian farm buildings, and a building complex in the centre of the property which consists of a mix of 1950s to 1990s animal pens, barns, silos and accommodation structures.

The western building complex is located on the western side of the main property driveway from Elizabeth Drive. The buildings consist of two\ 1930s? timber and compressed fibre cement sheet buildings. These structures are associated with the establishment of the farm as a research facility in 1936. The western skillion roofed building with an L shaped footprint was used for student accommodation, while the eastern building of Inter War Moderne style was utilised as an office building. The structures are in poor condition and early architectural detailing and fenestration have degraded over time. Earthworks of former animal pens are identifiable from aerial imagery but are overgrown on the ground; culverts and brick footings are present in isolated areas.

The central building complex consists of four structures, three of which are accommodation dwellings and one an animal pen related to the research facility. Two of the three dwellings are constructed of timber weatherboard and date from the mid-twentieth century operation of the farm. They are located approximately 150 metres apart, with the additional building sited in between these structures. A modern brick dwelling is located to east of these structures, while the former facility building is constructed of brick and is sited to the west. Additional sheds and a silo are located 100 metres north of the modern residential structure. The sheds are constructed of timber and metal sheeting, while the silo is constructed of concrete. The structures are all in varying stages of decay and vegetation has developed over additional ground features.

Five large pastoral dams of varying size are located throughout the property on the lower slopes away from the ridgelines where buildings are located. Several dams have intact electric pumping stations to control water flow between upper and lower dams on the interconnected dam network.

Figure 98. View northwest towards the early accommodation building.

Figure 99. View northeast towards the early office building

Figure 100. View facing west towards the research facility building.

Figure 101. View facing northeast towards three dwellings

Figure 102. View facing north towards the weatherboard dwelling. Note western buildings to the background of the frame.

Figure 103. View facing west towards the concrete silo.

Figure 104. View facing towards southern dams.

Figure 105. View facing towards the south-eastern dams and earth embankment

Figure 106. View towards the northern dams, facing northeast

Figure 107. View of the northern dams, facing northeast towards the pumping station

Historical background

The McGarvie-Smith Farm had been part of William Johnson's 500-acre land grant on the northern side of Elizabeth Drive, directly to the west of James Badgery's Exeter Farm. As discussed previously, little information about William Johnson or the use of his land grant is available.

The University of Sydney purchased the land in 1936 and it was established as a rural campus for veterinary research and to train students in animal husbandry.[241] Several dams, houses and farm buildings are located on the property, including two timber and compressed fibre cement sheet buildings which were established in 1936.[242] In addition to veterinary research and teaching, in the 1950s the property was used to develop new dam and irrigation techniques for pastural properties, from which time the several large dams of the property were developed. The university relocating their agriculture facility to Camden in 1955, where it is still extant. After the relocation of the university, dairying and cattle grazing continued at the site.

Statement of significance

The following statement of significance has been extracted from the Penrith LEP listing for the McGarvie-Smith Farm:

> *The McGarvie Smith Farm has interest as a veterinary research centre for Sydney University since 1936. These buildings are the only known example of rural research institution buildings in the Penrith City Council area.*
>
> *The c.1936 buildings are representative examples of Inter-War design applied to rural research buildings. The office buildings uses good proportions in a symmetrical design composed of primary and secondary roof forms and regular door and window openings. The scale, proportions and regular pattern of openings is continued in the less formal student accommodation building.*[243]

[241] NSW Office of Environment and Heritage, 2008. 'McGarvie-Smith Farm.' Accessed online 24/7/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?id=2260857
[242] NSW Office of Environment and Heritage, 2008. 'McGarvie-Smith Farm.'
[243] NSW Office of Environment and Heritage, 2008. 'McGarvie-Smith Farm.' *NSW Office of Environment & Heritage*.

Assessment of significance

The significance assessment in Table 43 has been developed from the Penrith LEP 2010 listing for the McGarvie-Smith Farm [244] with additional information developed from Jacobs 2019.[245]

Table 43. Assessment of Significance for the McGarvie-Smith Farm

Criterion	Discussion
A) Historical Significance	The McGarvie-Smith Farm is of interest as a veterinary research centre for Sydney University since 1936. The farm was the site of pastoral and veterinarian research in NSW. **McGarvie-Smith Farm reaches the threshold of local significance under this criterion.**
B) Associative Significance	McGarvie Smith Farm is associated with a number of leading researchers such as HJ Geddes who, as officer in charge to the farm, was responsible for pioneering water harvesting methods for Australian environments in the middle of the twentieth century. The farm is also associated with Sir John McGarvie, the developer of the first long living anthrax vaccine and the McGarvie Institute. The farm is associated with the University of Sydney. It is also associated with Sir Frederick Tout, who was a director of the McGarvie Institute and assisted in its running. **McGarvie-Smith Farm reaches the threshold of local significance under this criterion.**
C) Aesthetic Significance	The c.1936 buildings are representative examples of Inter-War design applied to rural research buildings. The office building uses good proportions in a symmetrical design composed of primary and secondary roof forms and regular door and window openings. The scale, proportions and regular pattern of openings is continued in the less formal student accommodation building. **The McGarvie-Smith Farm reaches the threshold of local significance under this criterion.**
D) Social Significance	The McGarvie Smith Farm is one of a number of farms associated with former Sydney University veterinary students who would have spent some time here, including staying in the student accommodation on site, during operation of the farm as a training facility. **The McGarvie-Smith Farm does not reach the threshold of local significance under this criterion.**
E) Research Potential	There may be research potential associated with the McGarvie-Smith Farm, particularly in relation to the dams and drainage channels around the site. The pioneering and experimental nature of McGarvie Smith Farm lends itself to technical and research significance on documenting the technological developments of veterinarian research in NSW. **The McGarvie-Smith Farm may reach the threshold of local significance under this criterion.**

[244] NSW Office of Environment and Heritage, 2008. 'McGarvie Smith Farm.' https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2260857
[245] Jacobs 2019, *M12 Motorway Environmental Impact Statement Non-Aboriginal Heritage Assessment Report*. pp.70 – 74.

Criterion	Discussion
F) Rarity	McGarvie Smith Farm is a relatively intact example of an experimental farm from the 1930s and into mid twentieth century, including its modified landscape in the form of innovative water harvesting practices constructed for its time. These buildings are the only known example of rural research institution buildings in the Penrith City Council area. **McGarvie-Smith Farm reaches the threshold of local significance under this criterion.**
G) Representativeness	The McGarvie-Smith Farm is an intact and authentic example of an agricultural research facility. The condition, integrity and setting is well preserved. **McGarvie-Smith Farm may reach the threshold of local significance under this criterion.**

Heritage significant fabric

The assessment of significance in Table 44 has been developed from the Environmental Impact Statement for the future M12 project, prepared by Jacobs.[246]

Table 44. Significant elements of McGarvie-Smith Farm

Element	Description	Significance
Building 1 (Western building complex)	*The structure identified as McGarvie-Smith Farm 1 appears to be a barracks or building utilised for accommodation and is in an L shape. Its roof style is skillion and is clad in what appears to be a corrugated fibro sheeting. The building, while still standing, is in poor condition with missing cladding, broken windows, overgrown with vegetation and animal infestation. The building is constructed for weatherboard on the lower section and cement sheeting on the upper sections. The building is built on a brick elevated base.*	High
Building 2 (Western building complex)	*McGarvie Smith Farm 2 appears to be a small residential cottage or office. Its roofing style is a combination of hip and gable, with a portico at the entrance to the structure. The building, while still standing, is in poor condition with missing cladding, broken windows, overgrown with vegetation and animal infestation. The building has been built on stumps, is timber framed, has double-sash windows, a timber verandah and timber doors. There is an entrance hall on the south side with double glass doors.*	High
Building 3 (Central building complex)	*A rectangular shaped corrugated iron clad shed with a steel girder frame set into a platform cut into the shape of the fill. The building is in poor condition with broken windows and is heavily corroded. The shed has an opening at one end with a large doorway. There are four paned metal window frames. The floor has two levels.*	Moderate
Building 6 (Central building complex)	*A medium sized weatherboard dwelling with corrugated iron hipped roof, has been fenced in with star picket and wire with chicken wire mesh around it. This house is in good condition as well as being occupied.*	Moderate

[246] Jacobs. *M12 Motorway – Non-Aboriginal Heritage Assessment*, p.69.

Element	Description	Significance
Building 7 (Central building complex)	*A small shed of fibro-cement sheeting and gabled corrugated fibro roof located behind McGarvie Smith Farm 6. There are introduced plants and a grove of eucalypts around the dwelling. These dwellings could date to post-second world war.*	Moderate
Building 8 (Central building complex)	*Further south are two brown brick dairy sheds with corrugated iron skillion roofs. They are associated with yards and fencing for livestock. These structures may date from 1960s to 1980s. The dairy has peeling paint and is overgrown with weeds and grass. There is a large round concrete holding yard with a moveable gate.*	Moderate
Building 10 (Central building complex)	*A small post-second world war weatherboard building with corrugated iron gabled roof, unoccupied. Building is in poor condition with asbestos, missing windows, rotting timber. Building has louvre windows, timber framed windows and sills, wooden floorboards.*	Moderate
Building 11 (Central building complex)	*Orange/brown brick building with a brown tiled gable roof. The style of this dwelling is 1980s-1990s and is in good condition. The building is occupied.*	Little
Building 12 (Central building complex)	*Small post-second world war weatherboard building with brown roof tiles. Louvre windows at rear of building. Recent addition of metal framed verandah roof. Unoccupied and in deteriorating condition.*	Moderate
Silo	Silo with timber and corrugated iron roof	High
Sheds	Timber sheds with cement lining	Moderate
Earthworks	Mounds and semi-circular embankments, dams, and canals/ditches across the property	Moderate

McMaster Farm (potential heritage item)

Location and physical description

The McMaster Farm is not listed on any statutory heritage register. It is identified as an potential heritage item as part of the Environmental Impact Statement for the future M12 Motorway on account of the historical, associative, and social significance values of the item.[247]

The site is located to the north of Elizabeth Drive in the suburb of Luddenham, within the off-airport corridor construction site. The location of the McMaster Farm potential item in relation to the project construction footprint is shown in Figure 28.

The property consists of undulating ridges with cleared grass paddocks. The property has a complex of farm buildings situated on the high ground on the ridgeline approximately 2 kilometres north of Elizabeth Drive. The farming structures consists of animal feeding pens and structures which are associated with the earlier research facility within the site. Structures in this complex consist of timber and corrugated iron animal barns with Besser block storage sheds, with a modern residential farmhouse at the east of the complex.

[247] Aurecon, 2016. *M12 Motorway – Non-Aboriginal Heritage Assessment*; Jacobs, 2019.

Approximately 500 metres north of the compound, a dirt road extends to the east and west, dividing the surrounding paddocks. To the north of the dirt road, a large dam is surrounded by an earth embankment. The general landscape is comprised of heavy vegetation, although there are small clusters of concrete troughs to the south east of the dam. Additionally, three former animal feeding troughs are present on the property in a northwest to southeast arrangement and approximately 40 metres apart.

Figure 108. View facing southeast towards building compound and former research facilities.

Figure 109. View facing east towards former research facility structures.

Figure 110. View facing west towards northern dam.

Figure 111. View facing west towards earth embankment of the northern dam

Figure 112. View facing north towards former animal feeding trough.

Figure 113. View facing southeast towards animal feeding troughs.

Historical background

The McMaster Field Station operated as an animal research centre for CSIRO between 1936 to c.1990.[248] The site is named after Frederick Duncan McMaster, who was a sheep breeder who was a founding member of the CSIR (Council for Scientific and Industrial Research, now CSIRO) in 1926.

[248] Roads and Maritime Services, 2016. *M12 Motorway – Non-Aboriginal Heritage Assessment*, p. 95.

McMaster donated £20,000 to the organisation to fund a new veterinary laboratory at the University of Sydney, which would be administered by CSIR and was named the FD McMaster Building. McMaster's donation enabled innovative veterinary and agricultural research, including the research of diseases and parasites which impacted livestock in Australia.[249] In 1936 the CSIR purchased land at Badgerys Creek, which is now the McMaster Field Station, and operated an experimental farm which featured extensive landscape modification and structures, including built dams, farm buildings, staff cottages, sheds and other outbuildings, livestock paddocks/yards, and sheep dips.[250] The natural environment was also modified, with land clearance and the selective retention of tree groves occurring. The McMaster Farm, operating through CSIRO with a close relationship to the University of Sydney, closely worked with the adjacent McGarvie Smith Farm.[251]

Statement of significance

The following statement of significance for the McMaster Farm has been extracted from the Environmental Impact Statement for the future M12 Motorway project, prepared by Aurecon:

> *The McMaster Farm, an experimental enterprise by CSIRO in the 1930s, is associated with the University of Sydney's FD McMaster Building (a State heritage listed building), both named in honour of Sir Frederick Duncan McMaster. His original gift to CSIRO in 1929, for the construction of the Division of Animal Health's first laboratory, located at Sydney University, marked the beginning of a new era of veterinary research in Australia that saw Australia forge an international reputation for excellence in veterinary research. The landscape has been culturally modified for the purposes of CSIRO research: cultivated fields, fence lines, dams and groves of trees. The potential archaeology and intactness of this landscape rates it as moderately significant. The McMaster Farm holds historical significance for the contribution it made to the development of farming in Australia, and in particular in NSW.*[252]

Assessment of significance

The assessment of significance in Table 45 has been developed based on the Environmental Impact Statement for the future M12 Motorway project, prepared by Aurecon.[253]

Table 45. Assessment of significance for the McMaster Farm

Criterion	Discussion
A) Historical Significance	The McMaster Farm holds historical significance for the contribution it made to the development of animal husbandry practices in western Sydney. **The McMaster Farm may reach the threshold of local significance under this criterion.**

[249] *Op. Cit.*
[250] *Op. Cit.*
[251] *Op. Cit.*
[252] Adapted from Aurecon, 2016. *M12 Motorway – Non-Aboriginal Heritage Assessment*, p. 101.
[253] Aurecon, 2016. *M12 Motorway – Non-Aboriginal Heritage Assessment*, p.101.

Criterion	Discussion
B) Associative Significance	The McMaster Farm is associated with a number of leading researchers such as the University of Sydney's Sir Frederick Duncan McMaster. His original gift to CSIRO in 1929, for the construction of the Division of Animal Health's first laboratory, located at Sydney University, marked the beginning of a new era of veterinary research. **The McMaster Farm reaches the threshold of local significance under this criterion.**
C) Aesthetic Significance	Buildings at the McMaster Farm are of technical interest in the organisation of the post-war structures for scientific development of animal husbandry practices. **The McMaster Farm does not reach the threshold of local significance under this criterion.**
D) Social Significance	The McMaster Farm may have some social significance amongst staff and students, in addition to the agricultural community within the Liverpool and Penrith district. However, it has not likely contributed to the sense of place held by the local community. **The McMaster Farm may reach the threshold of local significance under this criterion.**
E) Research Potential	There is potential technical/research significance for McMaster Farm, similar to that for McGarvie Smith Farm due to its pioneering methods and practices. **The McMaster Farm reaches the threshold of local significance under this criterion.**
F) Rarity	McMaster Farm is a relatively intact example of an experimental farm developed and managed by the Commonwealth from the 1930s and into mid twentieth century. It is facing potential endangerment to its archaeological heritage, including its modified landscape. **The McMaster Farm reaches the threshold of local significance under this criterion.**
G) Representativeness	McMaster Farm was a leading Commonwealth institution in pioneering experiments and education in agricultural and pastoral methods. The farm buildings at this property demonstrate the ways in which research farms were organised. **The McMaster Farm reaches the threshold of local significance under this criterion.**

Heritage significant fabric

The McMaster Farm has been assessed as locally significant and is in good condition and intact. There are several elements of significant fabric within the McMaster Farm. The individual elements of the McMaster Farm have been graded by Aurecon within the future M12 Motorway Environmental Impact Statement which are supported in this assessment.[254]

The grading of significant fabric is summarised in Table 46.

[254] Aurecon, 2016. *M12 Motorway – Non-Aboriginal Heritage Assessment*, p. 96.

Table 46. Grading of elements at the McMaster Farm

Element	Description	Significance
Building 1	*White modern Besser block building with gabled roof. Currently occupied. Good condition. Not present in 1947.*	Moderate
Building 2	*Shed with corrugated iron A-frame roof. Fair condition. Not present in 1947.*	Moderate
Building 3	*Small square timber and corrugated iron shed with sloping corrugated iron roof, large verandah at front, sliding door. Fair condition. Not present in 1947.*	Moderate
Building 4	*Timber and corrugated iron shed with A-farm roof. Sliding timber double doors on western side. Not present in 1947.*	Moderate
Building 5	*Timber and corrugated iron shed with hinged small timber shutters. Some small windows have glass. Also some timber doors. There was a crate of small glass bottles in a corner of the shed inside. Not present in 1947.*	Moderate
Building 6	*Timber and corrugated iron shed with gable roof. Not present in 1947.*	Moderate
Building 7	*Timber and corrugated iron shed, flat roof, open at one side, currently used as chicken shed. Unclear if present in 1947.*	Moderate
Building 8	*Modern Besser brick building, currently occupied. Good condition. Not present in 1947.*	Little
Building 9	*Timber and corrugated iron building. Large round timber posts, open on one side, gable roof, floorless, timber beams inside, large doorway on eastern side. Unclear in present in 1947.*	Moderate
Building 10	*Small rectangular timber and corrugated iron building with timber floor, timber door on north side, small timber framed windows. Unclear if present in 1947.*	Moderate
Building 11	*Large corrugated iron and timber building with metal roof trusses, open on west side, cement floor. Interior has remnants of animal pens. Building is in poor state. Large peppercorn tree at rear of building. Toilet and laundry attached to north side of building. Unclear if present in 1947.*	Moderate
Building 12	*Timber and corrugated iron building. Large timber round poles with a flat roof on timber beams on north side, metal poles on south side, concrete slab on floor. Building is open on east and west sides. One wall is of corrugated iron. Unclear if present in 1947.*	Moderate
Building 13	*Occupied modern house in good condition, cladding. Unclear if present in 1947.*	Moderate
Silo 1	*Located next to Building 4 and constructed of corrugated iron. This silo is quite large and horizontal metal bands on the outside. Not present in 1947.*	Moderate
Silo 2	*Silo 2 is smaller than Silo 1 and is constructed of corrugated iron. Silo 2 is located north of Building 9. Unclear if present in 1947.*	Moderate

Element	Description	Significance
Animal pens and stockyards	*Numerous small animal pens and stockyards located within the main buildings. One of the stockyards has a corrugated iron building built over the top labelled building 37. Unclear if present in 1947.*	Moderate
Grove of trees	*There is a grove of trees in the western section of the property. The grove measures about 700 m x 45 m although only the northern 260 m are located within the study area. Partly present in 1947.*	Moderate
Dams and ditches	*There are numerous dams across the property, some of which are large. There are also some man-made ditches within the property. Present in 1947.*	Moderate
Concrete pillar remnants	*In the eastern section of the property, located adjacent to the northern boundary of the McGarvie Smith Farm is an area with concrete pillar remnants, bricks, metal bolts and a wooden post. The size is the area is 25 m x 5m. A ditch in the neighbouring McGarvie Smith property appears to lead to this area. The concrete remnants are similar in appearance to those recorded on the nearby Fleurs Telescope site in Area RB 7, located at 2.1 kilometres east. It is possible that these remnants are related to the Fleurs Telescope site.*	Moderate
Concrete feeding troughs	*Present in northern paddocks, unclear if present in 1947.*	Moderate
Archaeological site in Paddock 1	*Paddock 1 Features – Sandstock bricks and three earthworks; sherds of blue and white transferware; "black" bottle glass identified on top of a ridge overlooking Badgerys Creek. It is located outside of the construction footprint.*	Moderate

Former OTC Site Group (Liverpool LEP 2008 I5)

Location and physical description

The Former OTC Site Group is listed on the Liverpool LEP 2008 as an item of local heritage significance (I5).

The site is located to the east of Badgerys Creek Road and approximately five kilometres south of the intersection of Badgerys Creek Road and Elizabeth Drive. The item is located near to the Aerotropolis Core construction site. The location of the former OTC site with respect to the construction footprint for the project is shown in Figure 29.

The landscape gently undulates to the east, with a gravel driveway leading towards the former site of the radio receiving station. The receiving station was demolished in 2008. The location of the former radio receiving station is now a large dump site.

To the southeast and south of the entrance drive, a small cement semicircular driveway remains which was used to access former staff housing facilities. These dwellings have also been demolished although the former locations of these houses were evident from the road and lot pattern on the site.

All elements listed on the heritage register have been demolished.

A small concrete drain runs to north to south from the east of the Badgerys Creek Road entrance. The drain dates from the period of occupation and allows water to funnel through the site in this location. The only remaining feature of the original use of the site is the entrance gate and retaining

walls, which are located at the Badgerys Creek Road entrance. The structure is constructed of brick and concrete with a modern metal gate and is built in a post war functionalist style, as was the original buildings within the site which have since been demolished.

Figure 114. View north towards current material dump site (location of former radio tower facility)

Figure 115. View south towards concrete tunnel near the entrance to the site.

Figure 116. View northeast towards former location of dwellings. Note driveway to the foreground of the image.

Figure 117. View northwest towards entrance gate.

Historical background

The Overseas Telecommunications Commission (OTC) Site, also known as the Bringelly Radio Receiving Station Complex, was formed after the resumption of parts of Laycock's Kelvin Estate in the 1950s and 1960s. In July 1955, radiotelegraph channels began transferring from La Perouse to Bringelly, and on October 10th the Bringelly radio receiving station opened. A newspaper article reporting the opening of the facility described it as "the main receiving centre in Australia for overseas radio telegrams and telephone calls."[255] All of the equipment used in the facility was developed in Australia.[256]

At the time the site comprised of a radio receiving station, fifteen staff housing dwellings, a water tank, a swimming pool, cricket pitch and tennis court.[257] Additional buildings included a storage building

[255] *The Farmer and Settler*, 14 October 1955. 'Radio Receiving Station Opened at Bringelly', p. 33. Accessed online 29/7/2019 at: https://trove.nla.gov.au/newspaper/article/123142921?searchTerm=bringelly%20radio%20receiving%20station&searchLimits=
[256] *The Farmer and Settler,* 14 October 1955. 'Radio Receiving Station Opened at Bringelly', p. 33.
[257] NSW Office of Environment and Heritage, 2017. 'OTC Site Group (former).' Accessed online 23/7/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=1970114

which housed a diesel generator and battery room.[258] Aerial imagery from 1955 shows that the staff housing buildings were planned in a semi-circular, U-shaped formation.

In 1957, Bringelly began to monitor the signals of the USSR satellite 'Sputnik', the first satellite successfully launched into space. The OTC station first recorded Sputnik as it passed over Honolulu on 7 October 1957.

By the 1970s, technology had enabled the OTC site to operate automatically. Staff were no longer required and therefore the housing complex became redundant, with many falling into disrepair. In 2008 the receiving station and a water tank were demolished.[259]

Statement of significance

The following statement of significance has been extracted from the Liverpool LEP listing for the OTC Site Group (former):

> *Former OTC Site Group, including radio receiving station and site of former staff housing.*
>
> *The Bringelly Radio Receiving Station Complex represented an important period in the development of the technology of the overseas telecommunications network. It was one of only three pairs of public stations in Australia of the period and the only receiving station in NSW. It was the last of the type built and the last receiving station in operation, which was an important aspect of the site's significance. The last technology in the station was second generation and did not relate to the building envelope which was representative of its period and of brick utility buildings. There was potential to gain more information on the site from further architectural, archaeological and documentary research.*[260]

Assessment of significance

The significance assessment in Table 47 has been developed from the Liverpool LEP listing for the OTC Site Group (former).[261]

Table 47. Assessment of significance for the OTC Site Group (former)

Criterion	Discussion
A) Historical Significance	The item demonstrates the history of a telecommunications facility and was one of three pairs of post-war radio receivers. **OTC Site Group (former) reaches the threshold of local significance under this criterion.**
B) Associative Significance	The OTC Site Group is not known to be associated with any historical figures, groups or events. **OTC Site Group (former) does not reach the threshold of local significance under this criterion.**

[258] NSW Office of Environment and Heritage, 2017 .'OTC Site Group (former).'
[259] NSW Office of Environment and Heritage, 2017. 'OTC Site Group (former).'
[260] *Ibid.*
[261] NSW Office of Environment and Heritage, 2071. 'OTC Site Group (former)' https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=1970114

Criterion	Discussion
C) Aesthetic Significance	The item reflects the evolution of telecommunication technologies, particularly relating to the overseas telecommunications network. The landscape setting and mature gardens are an important component of the aesthetic qualities of the complex. **OTC Site Group (former) reaches the threshold of local significance under this criterion.**
D) Social Significance	The OTC Site Group likely has some social significance to former workers, particularly those who lived in former staff residences on the site. **OTC Site Group (former) may reach the threshold of local significance under this criterion.**
E) Research Potential	There is the potential to gain more information on the site from further architectural, archaeological and documentary research. **OTC Site Group (former) does not reach the threshold of local significance under this criterion.**
F) Rarity	The item, together with Doonside, was one of the last three pairs of transmitting and receiving stations built in Australia and the only receiving station in NSW. **OTC Site Group (former) reaches the threshold of local significance under this criterion.**
G) Representativeness	The item is a representative example of an utilitarian building of simple design typical of its era. It provides evidence of the common use of traditional building material for small non-domestic structures. **OTC Site Group (former) reaches the threshold of local significance under this criterion.**

Heritage significant fabric

Heritage significant fabric associated with the OTC Site Group discussed within the LEP listing for the item includes former site housing for staff and the main receiving station building, receiving station, and a water tank. The water tank and receiving station were both demolished in 2008.[262] The staff housing was demolished between 1996 and 2002, however the semi-circular driveway that the staff housing was concentrated around is still present. As such, the driveway structure and remnant drainage culverts are anticipated to be the only significant remnant fabric on the site.

Two water tanks (RAAF receiving station site and former water supply to OTC staff) (Liverpool LEP 2008 I4)

Location and physical description

The Two water tanks item is listed on the Liverpool LEP 2008 as an item of local heritage significance (I4).

The location of the former water tanks is directly west of the former housing development of the OTC site, north of the Aerotropolis Core construction site. The location of this site with respect to the construction footprint for the project is shown in Figure 29.

[262] *Ibid.*

These structures have been demolished, however remnant evidence of the brick pillar foundations below the holding tank are evident. A former piping system is also evident. The surrounding landscape has retained the semi-rural landscape associated with the former OTC Site Group, including several mature trees groves which the water tank structures were constructed around.

Figure 118. View facing northwest towards former water tank system.

Figure 119. View of a remnant water system

Figure 120. View facing west towards the former location of the water tanks.

Figure 121. View of remnant brick pillars of the former tank storage system.

Historical background

The former Water Tanks history is closely linked to the history of the neighbouring OTC Site Group (north) and the Bringelly RAAF Base (south). The water tanks consist of two cast iron elevated water tanks, each of which are supported on 15m steel towers.[263] The tanks were established in the post-war period to supply water to staff working at the OTC Site, and it is anticipated that the tanks were constructed in 1950-1 simultaneously to the OTC Site. One water tower was demolished without consent from the Liverpool Council in 2008,[264] and the second tank was not identified during the site inspection and it is also likely it was demolished between 2008 and 2020.

Statement of significance

The following statement of significance has been extracted from the Liverpool LEP listing for the Former Water Tanks:

[263] NSW Office of Environment and Heritage, 2004. 'Two Water Tanks.' Accessed online https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=1970056
[264] *Ibid*

The two elevated tanks are water supply structures of unusual design. They are rare within the wider Liverpool area. There is the potential to gain more information on the site from further architectural, archaeological, and documentary research.[265]

Assessment of significance

The significance assessment in Table 48 has been extracted from the Liverpool LEP 2008 listing for the Two Water Tanks.

Table 48. Assessment of significance for Former Water Tanks[266]

Criterion	Discussion
A) Historical Significance	The site demonstrates the history of the provision of a water storage facility to a semi-rural settlement. **The Former Water Tanks reaches the threshold of local significance under this criterion.**
B) Associative Significance	The Former Water Tanks is not associated with any significant historical figures or groups. **The Former Water Tanks does not reach the threshold of local significance under this criterion.**
C) Aesthetic Significance	The sites indicate a level of technical achievement its design and construction. **The Former Water Tanks reaches the threshold of local significance under this criterion.**
D) Social Significance	The Former Water Tanks are not expected to have any social significance. **The Former Water Tanks does not reach the threshold of local significance under this criterion.**
E) Research Potential	There is the potential to gain more information on the site from further architectural, archaeological and documentary research. **The Former Water Tanks reaches the threshold of local significance under this criterion.**
F) Rarity	The site is rare within the wider Liverpool area and has an unusual design. **The Former Water Tanks reaches the threshold of local significance under this criterion.**
G) Representativeness	The Former Water Tanks are not a well preserved item and do not demonstrate a high level of integrity. **The Former Water Tanks does not reach the threshold of local significance under this criterion.**

[265] *Ibid.*
[266] *Ibid*

Heritage significant fabric

The former Water Tanks site consisted of two above ground water towers of rare technical design within the heritage curtilage for the item. The SHI listing for the item notes that one water tank was illegally demolished without council approval in 2008. The site inspection found that the second water tank had also been demolished. While the water tanks had been removed, the brick and concrete footings of the former water towers were identified in poor condition. Remnant footings are low integrity considered significant fabric.

Kelvin (SHR 00046) and Kelvin Park Group (Liverpool LEP 2008 I8)

Location and physical description

Kelvin Park Group is listed on the SHR and the Liverpool LEP 2008. A summary of these listings is provided Table 25.

The Kelvin Homestead is located on The Retreat, Bringelly. The boundary of the SHR curtilage for the item is situated 600 metres north-east of the Aerotropolis Core construction site, however the Liverpool LEP 2008 curtilage for the item includes land which constituted the former driveway to the property from Badgerys Creek Road which is above the tunnelling alignment of the project as well as directly adjacent to the Aerotropolis Core construction site. These curtilages with respect to the construction footprint for the project is shown in Figure 29.

The homestead is accessed by a driveway off The Retreat, which slopes up to the east to the Kelvin Homestead situated on the crest of a hill. The property is bordered by timber post and rail fencing either side of the main driveway, with adjacent paddocks to the south bordered with a wire farm fence. The Kelvin homestead group is visible from the street, although the main house is partially obscured by mature remnant plantings, including Bunya pines and eucalypts. The front portion of the garden is manicured lawns, with several garden beds present adjacent to the southern façade of the homestead. On the western side of the homestead there are several outbuildings with steel roofs. At the northwest corner of the homestead group, one building – potentially a barn – features a dormer window which is expected to provide views over the rural landscape to the west.

The northern cul-de-sac of The Retreat provides clear and uninterrupted views to the former Bringelly RAAF Base from a similar vantage point as the western structures located at Kelvin. This vantage includes views of the surrounding paddock, main receiving station, garages, sheds, and telecommunications towers with little obstruction.

Figure 122. Overview of Kelvin Park Group, northern aspect

Figure 123. Overview of Kelvin Park Group with paddock, northern aspect

Figure 124. Kelvin driveway and lawn, eastern aspect

Figure 125. View from Kelvin entrance to RAAF Base, southwestern aspect

Figure 126. View from Kelvin entrance to western rural landscape

Historical background

Thomas Laycock and Cottage Vale

Thomas Laycock arrived in New South Wales as a child and was commissioned as an ensign with the New South Wales Corps in 1795 at only nine years old.[267] In 1810 he left for England with his wife but returned to Sydney in 1817 after her death. He remarried and established himself in Sydney. In 1817, Laycock received a 600-acre grant in Bringelly, which he named Cottage Vale.[268] By January 1820, Laycock and his family were living at Cottage Vale.[269] Cottage Vale is located in the Aerotropolis Core site, at the southernmost portion of the study area.

He constructed a brick homestead including eight rooms which was surrounded by a verandah. The estate also included a dairy, cellar, coach house and other buildings.[270] At Cottage Vale various crops were grown and cattle was raised. Laycock was a large provider of meat to the colonial commissariat.[271] By 1821 70 acres of land had been cleared by Laycock, and he owned 200 cattle

[267] Australian Museum Consulting, 2014, p. 22. Cited in: RPS, 2016. *Western Sydney Airport EIS European and other heritage technical report*, p. 27.
[268] Australian Museum Consulting, 2014, p. 22. Cited in: RPS, 2016. *Western Sydney Airport EIS European and other heritage technical report*, p. 27.
[269] Form Architects, 2006. *Kelvin Park, Bringelly Conservation Management Plan*, p. 15.
[270] RPS, 2016. *Western Sydney Airport EIS European and other heritage technical report*, p. 27.
[271] Form Architects, 2006. *Kelvin Park Bringelly Conservation Management Plan*, p. 15.

and 45 pigs.[272] Major improvements were also undertaken from 1822, with twenty-two convicts – including carpenters and bricklayers - assigned to Laycock and led by William Mitchell.[273] The presence of carpenters and bricklayers indicates that work on the second, more substantial brick house was occurring in this period. It is possible that the original home on Laycock's land was adapted into a kitchen or convict accommodation after the completion of the new house.[274]

Extensive crops were farmed on Laycock's land, including 46 acres of wheat, 6 acres of maize, 3 acres of barley, ½ acre of oats, 1 acre of peas and beans, and 3 acres of potatoes. An additional 5 acres were established for gardens and orchards. He also owned 40 horses, 400 cattle, 1500 sheep and 40 hogs, and had acquired the adjoining land previously owned by Reid, bringing his land size up to 1200 acres.[275]

Laycock died suddenly in 1823 after a short illness and his estate was managed by Thomas Hart, a business partner. By mid-1824, Cottage Vale was owned by John Thomas Campbell, who owned the neighbouring property. Campbell renamed the estate 'The Retreat' and advertised it for lease. The advertisement, featured in *The Australian,* described the estate as including 1200 acres with a cleared lawn of 200 acres, several paddocks, and a "handsome and roomy residence, fit for the immediate reception of a gentleman's family."[276]

The Australian Agricultural Company

Between 1825 and 1833 The Retreat was the first Australian headquarters of the Australian Agricultural Company, which was established in 1824 with the purpose of breeding fine-woolled sheep.[277] It appears that extensive accommodation would have been required in this period, as over 70 employees lived and worked at the site, managing 600-800 sheep, in addition to seven horses and a dozen cattle. In order to house workers, several temporary huts were constructed around the farmhouse.[278] It is likely that multiple sheds, barns, shearing sheds, storehouses, stables, and possible dairies and coach-houses would have also been required.

Alfred Kennerly and subsequent owners

In 1833 The Australian Agricultural Company relocated to Port Macquarie. Thomas Campbell had passed away in 1830 and as such the property was sold to Alfred Kennerley, who renamed it Kelvin.[279] During Kennerley's ownership the property was most likely actively farmed and additional outbuildings were created.[280] When Kelvin was advertised for sale in 1853, rooms included a dining room and drawing room, and several outbuildings including a brick kitchen, laundry, servants room, dairy, pantry and stores. A new granary and stable for six horses, coach-house, loft, pig run, stockyards, and shingled cottages for farm servants were also constructed.

After Kennerley sold Kelvin, the property had several owners. By the mid-1860s a public pound, a blacksmith's shop and a store and dwelling which served as Bringelly Post Office had been opened at the south-western corner of the estate.[281] In 1896 parts of the southern boundary were resumed for

[272] Bonwick Transcripts/Bigge's Report Appendix CY1299, 1820. 'Settler's Residing upon property… Districts of Bringelly and Cooks,' p.5461; cited in Form Architects, 2006. *Kelvin Park Bringelly Conservation Management Plan*, p. 15.
[273] Form Architects, 2006. *Kelvin Park Bringelly Conservation Management Plan,* p. 15
[274] Form Architects, 2006. *Kelvin Park Bringelly Conservation Management Plan*, p. 16.
[275] Form Architects, 2006. *Kelvin Park Bringelly Conservation Management Plan*, p. 16.
[276] *The Australian*, 1824. p.2
[277] RPS, 2016. *Western Sydney Airport EIS European and other heritage*, p. 27.
[278] NSW Office of Environment and Heritage, 2006. 'Kelvin.' Accessed online 23/7/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5045191
[279] RPS, 2016. *Western Sydney Airport EIS European and other heritage*, p. 27.
[280] NSW Office of Environment and Heritage, 2006. 'Kelvin.'
[281] NSW Office of Environment and Heritage, 2006. 'Kelvin.'

the construction of Bringelly Road, the Northern Road (at the south-western corner) and a public school.[282]

Throughout the 20th century the property was utilised as for active farming, likely having a particular focus on cattle due to the proximity of several abbatoirs in the area. Sheep grazing was also common.[283]

Kelvin in the Twentieth Century

From 1942 to 1945, 370 acres of Kelvin were leased by the owner, Lorna MacDonald, to the Commonwealth Government. This area was converted into a 'Dispersal Aerodrome' for the Royal Australian Air Force (RAAF) use.[284] A flat strip of the property which ran along South Creek was suitable as an airstrip and was the primary interest point for the RAAF. Several alterations were made to existing buildings at this time, including the conversion of the stables and woolshed into sleeping quarters, the conversion of the stores into garages, the construction of new fences and of a dam.

The Dispersal area was never used and at the end of the Second World War in 1945 redundant items were removed, however several structures associated with the airstrip, including 'hideouts' were left in situ.[285] A rare photograph from this period shows a slab hut located on the property, although the location is unknown.

During the 1950s and 1960s large portions of Kelvin were resumed by the Commonwealth Government for use as the Overseas Telecommunications Commission. By 1960 Kelvin had been reduced to 970 acres, and by 1980 it had been further reduced to 250 acres. In 1985 further portions of the estate were subdivided to create 25 further lots, and Kelvin Park Drive was created in the same time period.[286]

Statement of significance

The following statement of significance has been developed from the SHR listing for Kelvin:

> *Kelvin Park, formerly known as Cottage-ville or Retreat Farm, is able to demonstrate the pastoral development of Bringelly from 1818. Although there is only a remnant (9.784 ha) of the original 1200 acre site (486ha), the homestead and farm buildings in their current setting with extensive views over rural land, is still able to demonstrate the principles of 19th century farm estate architecture, planning and design.*
>
> *Kelvin Park is significant for its association with a number of people and organisations of importance in NSW's cultural history, including Thomas Laycock Junior who established the farm at Bringelly, and later owners, John Thomas Campbell and Alfred Kennerley. The lease of the property by the Australian Agricultural Company, the country's oldest agricultural and pastoral development company established in 1824, is of particular significance.*
>
> *The homestead at Kelvin Park retains its colonial Georgian single-storey form and planning and is representative of a gentleman's rural residence of the 1820s. Despite some modifications its retains the architectural elements and character*

[282] NSW Office of Environment and Heritage, 2006. 'Kelvin.'; Form Architects, 2006. *Kelvin Park Bringelly Conservation Management Plan*, p. 19.
[283] NSW Office of Environment and Heritage, 2006. 'Kelvin.'
[284] NSW Office of Environment and Heritage, 2006. 'Kelvin.'
[285] NSW Office of Environment and Heritage, 2006. 'Kelvin.'
[286] NSW Office of Environment and Heritage, 2006. 'Kelvin.'

that make it a good example of its type. The kitchen wing and servant's quarters are modest examples of early colonial Georgian style architecture but similarly retain their original form and planning. All of these buildings are evidence of the establishment of a home and farm by Thomas Laycock.

The brick coach house at Kelvin Park retains its picturesque, early Victorian form, planning and much of its original detail. It is evidence of the development of the property in the 1850s by Alfred Kennerley, who later became Premier of Tasmania.

The two slab barns are evidence of Kelvin Park as a working farm from 1818 until, at least, the mid-20th century. The structures demonstrate 19th century building methods and farm practice.

The buildings at Kelvin Park belong to an important and rare group of colonial Georgian and early Victorian farm buildings that contribute to the historic rural landscape. They are evidence of continuity of land use for farming for 187 years (to 2005).

The form of, and elements within, the garden, courtyard areas and entry to the property are evidence of the planning of the homestead complex by Laycock and subsequent owners and express the status they hoped to convey.

The homestead of Kelvin Park retains important historic views to the east to Thompson's Creek and beyond to South Creek. The site also retains views of other historically related rural landscapes beyond the current boundaries such as the pasture and stands of trees to the north. Both views contribute to the site's significance and maintain the context of the homestead group.

Kelvin Park group, including the homestead complex and remnant of farmland is significant at local, regional, state and national levels. All areas of the site are considered equally significant.

The Kelvin Park site landscaping is a significant component of the Kelvin Park group. The early numerous tree plantings contribute to making the site a notable landmark in the area. The remaining details of driveways, fencing and entrances also contribute to the historic and social evidence provided by the site of its original patterns of occupation and use. The site is part of an intact early 19th century farm complex that is now rare within the wider urbanised environs of Liverpool. There is the potential to gain more information on the site from further archaeological and documentary research.

The setting of the house on a knoll above a creek, its remnant layout of early buildings and garden, and its fine, mature trees, particularly its variety of old pines, add greatly to the character and significance of the property. The garden and setting are considered to have regional significance.

Built by Thomas Laycock junior, 1820, having received the Bringelly grant in 1818. He returned to Australia in 1817 after fighting for England in the American War of 1812. An early house of quality and rich historical associations being one of the charming country houses of the 1820s. It is well sited above Thompson's Creek and is surrounded by a beautifully landscaped garden.

Assessment of significance

The significance assessment in Table 49 has been developed from the Liverpool LEP 2008 listing for Kelvin Park Group.

Table 49. Assessment of Significance for Kelvin Park Group

Criterion	Discussion
A) Historical Significance	The Kelvin Farm Group, being one of the earliest land grants, demonstrates the history of settlement within the region. Houses and outbuildings are present that date from the original settlement of the land grant in 1820. **Kelvin Park Group reaches the threshold of local significance under this criterion.**
B) Associative Significance	The site is associated with the Laycock family and Governor Macquarie's Secretary John Thomas Campbell. It is also associated with the early operations of the Australian Agricultural Company. **Kelvin Park Group reaches the threshold of State significance under this criterion.**
C) Aesthetic Significance	The complex shows evidence of an early-19th century vernacular design and construction indicating a level of technical achievement by the early settlers of the region. The site's setting and gardens adds to the authenticity and character of the site, it is aesthetically pleasing. **Kelvin Park Group reaches the threshold of State significance under this criterion.**
D) Social Significance	The heritage item is not associated with any social groups of communities of note. **Kelvin Park Group does not reach the threshold of local significance under this criterion.**
E) Research Potential	There is the potential to gain more information on the site from further architectural, archaeological and documentary research. The good condition of a number of the buildings and the known archaeological remains of former structures and operations at the property are of research value. **Kelvin Park Group reaches the threshold of local significance under this criterion.**
F) Rarity	The group is a significant intact early Colonial homestead complex that is now rare within the modern environment of Liverpool LGA. **Kelvin Park Group reaches the threshold of local significance under this criterion.**
G) Representativeness	The group is representative of the complex of sites associated with the early agricultural pioneering settlements of NSW. The various outbuildings represent the simple form, character and design of early vernacular architecture constructed in a rural setting for agricultural use. It also represents the evolution of homesteads away from functional structures to more permanent and ornate buildings, particularly by the more well-to-do settler farmers of that era. **Kelvin Park Group reaches the threshold of State significance under this criterion.**

Heritage significant fabric

Kelvin Park Group is of State significance and is in good condition and intactness. There are several elements of significant fabric within Kelvin. Much of the built environment and landscape within Kelvin Park has been assessed as having exceptional significance in the Conservation Management Plan.[287]

The grading of significant fabric is provided in Table 50.

Table 50. Summary of Significant Fabric Gradings at Kelvin Park Group

Element	Significance
Topography, setting and plantings	Exceptional
Western vista	Exceptional
Northern vista	Exceptional
South/southwest vista	Moderate
From northern end of Thompsons Creek	Exceptional
View from The Retreat	Exceptional
Structures (layout; relationship; character)	Exceptional
Homestead setting	Exceptional
Roofing	High
Kitchen	Exceptional
Former servants quarters	Exceptional
c.1800 former coachhouse	Exceptional
Slab shed 1	Exceptional
Slab shed 2	Exceptional
Late 20th century open sheds	Moderate
Driveway Remnants of early 19th century layout Original driveway and carriage loop on northern boundary Current driveway	 Exceptional Exceptional High
Plantings Within homestead fencing: Wild Olive; Tortured Willow; Hoop Pine; Camphor Laurel; Brown Pine; Stone Pine; Mahogany/Ironbark Gum; Creek side Casuarina; Plumbago; Campsis hedge; Ficus purnila	Exceptional
Plantings Within homestead fencing: Scotch Elm; Chinese pistachio; Common Ash; Lemon Scented Gum; Jacaranda; Chinese Elm	High
Plantings in grassed area: Silky oak; Wild Olive; Plum Pine	Exceptional

[287] Form Architects, 2006. *"Kelvin Park" The Retreat, Bringelly proposed subdivision proposed restoration and addition concept subdivision plan conservation management plan heritage impact assessment heritage agreement,* 64-73.

Element	Significance
Plantings in grassed area Chinese Elm	Moderate
Plantings in Lot 2711: Hoop Pine; Broad Leaved Ironbark; Stone Pine; Cluster Pine	Exceptional
Plantings in Lot 2711 Silky Oak	Moderate
Underground Brick Cistern	Moderate

Bringelly RAAF Base (potential heritage item)

Location and physical description

The Bringelly RAAF Base is not listed on any statutory or non-statutory heritage register, however previous heritage assessments prepared by ERM identified the item as having local heritage significance.[288] ERM also assessed that the Bringelly RAAF base does not meet the threshold for listing on the CHL.[289]

The Bringelly RAAF Base property is the location for the proposed Aerotropolis Core station, on the eastern side of Badgerys Creek Road within the suburb of Bringelly, NSW. It is situated to the north of Thompsons Creek and is bounded by semi-rural residential properties to the south, west and east. To the north of the RAAF base is the former Bringelly Overseas Telecommunications Company Receiving Station (Bringelly OTC Station). The location of the Bringelly RAAF Base with respect to the construction footprint for the project is shown in Figure 29.

The RAAF Base is accessed off Badgerys Creek Road via an access road which traverses through a former post-war housing complex for RAAF personnel before reaching the main receiving building. Housing has since been removed although ground-level infrastructure is present. These remains included several areas of concrete slab and foundations, metal, ceramic tiles, brick, and cobbled pathways. Immediately west of the former staff housing area is the former elevated water tank constructed of pressed cast iron, which was previously elevated ten metres above ground. The tower was removed from site in 2010. On approach to the main receiving building is a row of pine plantings on either side of the access road.

The main receiving station building of the RAAF base is located at the easternmost end of the access road and is enclosed in a metal and wire fence. The building is T-shaped, constructed of red brick with a galvanised metal roof. The surrounding landscaping includes a garden and lawn area with medium sized shrubbery and plantings. At the northern side of the main receiving building is a roller door which provides access to the interiors. The roller door opens into a large room including several items of remnant equipment, storage, and shelving. Off the large room is a hallway with several smaller rooms either side, including a kitchen, office spaces, and two equipment rooms at the southern end of the building.

The asphalted access road encircles the receiving station building, at the rear of which are several support buildings. These include a red brick storage building with roller door; a cladded colour bound garage; a fire hose shed; and dangerous goods store.

To the south-west of the main receiving station building is the main receiving telecommunications tower, which is a four-sided steel lattice tower. The tower is over 30 metres in height and is enclosed

[288] ERM, April 2011. p. 84
[289] *Ibid*, p. 79 – 80.

in fencing with a small brick building located within the enclosure. A small carpark is located at the western boundary of the main receiving building area, to the south of which is a pump house and secondary water tank.

Figure 127. Access road throughout RAAF Base, western aspect

Figure 128. Concrete foundations associated with former staff housing, northern aspect

Figure 129. Tall grasses and rural setting present throughout much of the site

Figure 130. RAAF base main building, western aspect

Figure 131. RAAF base and telecommunications tower, eastern aspect

Figure 132. Sheds at rear of main building, eastern aspect

Figure 133. Interior of main building, western aspect

Figure 134. Evidence of concrete foundations near area of former staff housing

Historical background

The RAAF Bringelly Base is located on the original land grants of Thomas Laycock and Charles Reid, both of which were granted in 1818. The area in which the RAAF Base was constructed was within the Kelvin Estate, however this area remained undeveloped, perhaps used for light agricultural purposes such as grazing.[290]

In 1949 the Commonwealth Government purchased the land to the north of Kelvin and the Bringelly RAAF Base for the establishment of the OTC Site, which was constructed between 1952 and 1955 as a high frequency radio transmission base.[291] From 1954 the Government began negotiating the purpose of the current site of the Bringelly RAAF Base, however the process was delayed until 1959.[292] Construction of the site commenced in the same year, with its main purpose to receive high radio frequency transmissions in coordination with RAAF bases at Glenbrook and Londonderry.[293]

By 1961 the main receiving station, several supporting buildings, three staff houses (at least), and several transmission masts were located across the site. Throughout the 1960s the site grew further, with six additional staff residences established.[294] By 1978 the structural layout of the site was at its largest, however new transmission masts continued to be established across the land until the 1980s. In 1990 the importance of the RAAF Bringelly was increased by the introduction of microwave technology, which enabled Glenbrook and Bringelly to connect directly without going through Londonderry, however the site also became increasingly automated by the new technology.[295] In the early 2000s residential development in Bringelly increased, making the possibility of high frequency transmissions unsafe through residential areas.[296] Simultaneously, RAAF transmissions were being increasingly transferred out of NSW to Queensland, the Northern Territory, and Western Australia.[297] The site was decommissioned in c.2002 and by 2005 some of the staff buildings had been removed. Footings and concrete slabs were still visible on the surface during the site inspection for the project. The site overall reflects the original layout and excepting the staff buildings, much of the site remains intact and extant.

Statement of significance

The following Statement of Significance is from the Bringelly RAAF Base report by ERM:[298]

> *RAAF Bringelly has historic heritage values arising from its historic importance and rarity in the local context. The current structures were built after 1959 but have undergone relatively little modification besides the removal of former staff housing and a water tank. RAAF Bringelly has historical significance for its association with the RAAF communications network and the development of communications*

[290] ERM, April 2011. *RAAF Bringelly Receiving Station NSW Heritage Assessment*, p. 16.
[291] ERM, April 2011. *RAAF Bringelly Receiving Station NSW Heritage Assessment*, p. 17.
[292] *Op. Cit.*
[293] *Op. Cit.*
[294] *Op. Cit.*
[295] ERM, April 2011. *RAAF Bringelly Receiving Station NSW Heritage Assessment*, p. 18.
[296] ERM, April 2011. *RAAF Bringelly Receiving Station NSW Heritage Assessment*, p. 18.
[297] *Op. Cit.*
[298] *Ibid.*

technology in the latter half of the 20th century. The entry drive landscaping has aesthetic qualities.

Comparative analysis has found several other examples of high frequency radio stations in Australia which are in better condition and are better representative examples; however RAAF Bringelly is an uncommon example in the Sydney region.

The majority of technical fabric connected with its past use as a transmission station has been removed and it is unlikely to ever return to its original use as a communications facility.

Assessment of significance

The Bringelly RAAF Base was then assessed against the Heritage Act criteria for local or State significance. This assessment is provided in Table 51.[299]

Table 51. Bringelly RAAF Base Significance Assessment

Criterion	Discussion
A) Historical	RAAF Bringelly was one of two high-frequency radio telecommunication sites in Sydney used by the Royal Australian Air Force and other defence services. RAAF Bringelly has been a component of the overall communications operations of the Australian Defence forces since the early 1960s. RAAF Bringelly is a relic of the technological developments in the middle of the twentieth century which made international radio communications possible. RAAF Bringelly has therefore been assessed as not being important in the course of pattern of NSW's cultural history. **The Bringelly RAAF Base reaches the threshold of local significance under this criterion.**
B) Associative	RAAF Bringelly is associated with the Royal Australian Air Force. RAAF Bringelly is associated with general Australian Defence Forces signal operations, as activity which grew in important during the period of operation of RAAF Bringelly. RAAF Bringelly has been assessed as having no strong or special association important in NSW's cultural history. **The Bringelly RAAF Base does not reach the threshold of local or State significance under this criterion.**
C) Aesthetic	While the remaining buildings at RAAF Bringelly are purely functional in nature and have no aesthetic value, landscaping, plantings and positioning of lamp posts along the main approach route to the building complex are indicative of attempts to beautify the area and provide an amenable living space. RAAF Bringelly has been assessed as not demonstrating aesthetic characteristics important in NSW. **The Bringelly RAAF Base reaches the threshold of local significance under this criterion.**
D) Social	The site is not known to have any particular strong or special association with a community or group in NSW for social, cultural or spiritual reasons. **The Bringelly RAAF Base does not reach the threshold of local or State significance under this criterion.**

[299] ERM, April 2011. *RAAF Bringelly Receiving Station NSW Heritage* Assessment, p. 84

Criterion	Discussion
E) Research Potential	The layout of the RAAF Bringelly station complex illustrates the spatial requirements associated with the original radio transmitting technology and the social requirements of its operating staff. The site has some historical archaeological potential within the former staff housing area. RAAF Bringelly has housed sophisticated state-of-the-art equipment at various times during its operational life. (None of this equipment remains in the Station now). The loss of equipment has diminished the place's potential to contribute to an understanding of NSW's cultural history. **The Bringelly RAAF Base reaches the threshold of local significance under this criterion.**
F) Rarity	RAAF Bringelly is one of a small number of similar high frequency radio transmitting and receiving stations in Australia. RAAF Bringelly is an incomplete relic of a specific period of telecommunications technology which was a significant stage in the development of telecommunications but one which has been superseded by later technologies. **The Bringelly RAAF Base reaches the threshold of local significance under this criterion.**
G) Representativeness	RAAF Bringelly is a representative example of a general-purpose military pattern-book building utilised and configured for a singular purpose. This quality is held in common with a large number of other buildings. The lands associated with the Station are representative of the requirements of radio telecommunications for large and isolated sites capable of housing a dispersed antenna network. **The Bringelly RAAF Base does not reach the threshold of local or State significance under this criterion.**

Significant heritage fabric

The Main Receiving Station building was constructed between 1959 and 1961 and has been subject to minor interior and exterior modifications. The building fabric is largely original and was the primary area of operations of the receiving station and RAAF base. The building is overall in good condition and has high integrity, despite the replacement of the roof and removal of some equipment. Individual elements within the building are unlikely to be significant in isolation, however the building as a whole has high contributory significance to the RAAF base.

The main receiving tower was likely installed in the 1950s and is comprised of mostly original material and is intact. Technical equipment such as wiring and aerials associated with the tower has been removed and it is no longer in operation, however overall the tower maintains integrity. The tower is an important element of the visual setting of the RAAF base and reflects the original function and purpose of the site.

The support buildings and structures located around the main station receiving building include a red brick dangerous goods storage building, a red brick garage, a Colourbond garage, pump house, cast iron water tank, fire hose shed, rain gauge and cast-iron incinerator. Each of these items are largely unmodified , except for the recent colour bond roofing. These buildings are not individually significant, however as a collection a, these items illustrate the day to day operations and function of the RAAF base.

Remnant surface materials associated with the former staff housing are unlikely to be significant. Housing was constructed after the Second World War and on concrete pads above ground as such buried remains associated with these former houses are not anticipated.

Five lamp posts are located on the access road in the area of the former staff housing. These lamp posts are Marley Design 37843 types made of concrete with aluminium shades and a glass lamp. One lamp post is a James Watt Group model constructed of galvanised steel, with a plastic lamp and no lamp shade. The lamp posts contribute to the setting of the RAAF base and are representative of the former staff housing in the area.

Landscaping throughout the RAAF base, including pine plantings on the access road and in the area of the former staff housing are significant elements within the setting of the RAAF base and reflect the aims of staff to beautify the area.

The layout of the heritage item overall is of significance, as it reflects several typical characteristics of Defence sites from the 20th century, notably 'grand avenues' which lead to the main complex and buildings, often landscaped to create a sense of formality and grandeur. The layout of Defence buildings, including the Bringelly RAAF Base, are often planned to be (relatively) symmetrical when viewed from the avenue. The layout is also well preserved, with the original alignment of the driveway avenue retained, and each building in its original location. With the exception of the former staff housing, each element remains extant and the original layout is intact and retains the authenticity of the site.

The setting of the Bringelly RAAF Base is also of significance, notably the visual relationship between each element, which continues to reflect the original site layout. The setting of the overall site, including the remnant vegetation west of the former staff housing, and the avenue throughout the site, is also intact and significant. The surrounding rural setting, to the north and east of the main building complex, is also significant as it reflects the history of the site as a receiving station constructed in greenfield former agricultural land, which previously included several smaller aerial tower throughout. The views to the OTC Site Group in the north, and Kelvin in the northeast would hold a low to moderate level of significance, as this visual relationship shows the historical and contextual relationship of the RAAF Base and OTC Site as Defence receiving centres established in the mid-20th Century. The views to Kelvin reflect the historical relationship of the two sites, as the Bringelly RAAF Base land was previously part of the Kelvin Estate.

Artefact has prepared a grading of the significance of elements of the former RAAF base in Table 52.

Table 52. Grading of elements at the former Bringelly RAAF base

Element	Discussion	Significance grading
Main Receiving Building	The Bringelly Main Receiving Station has been assessed as having high integrity with limited evidence of refurbishment or modification. This is the only example of this type of building amongst the remnant complex.	High
Main Receiving Tower	The Main Receiving Tower is one of few remnant RAAF Base towers within Australia, as towers present at other stations such as Belconnen have been removed.	High
Pump Shed	The Pump Shed is a mid-20th century shed which may be somewhat rare in the context of a RAAF Base now.	Moderate

Element	Discussion	Significance grading
Dangerous Goods Store	The Dangerous Goods Store is a rare example within the context of a RAAF Base and is an excellent example of this building type.	Moderate
Storage Shed	The Storage Shed is an excellent example of RAAF base storage facilities and is in excellent condition.	Moderate
Garage	The Garage is a late-20th century structure and would not be considered rare or of historical significance. It is however, a good example of this type of structure and reflects the continuous history of the RAAF Base.	Little
Fire Hose Shed	The Fire Hose Shed is an excellent example of RAAF base safety facilities and is in excellent condition.	Moderate
Water Tank	The Water Tank is an excellent example of RAAF base amenities and utilities, however, has been demolished.	Not present
Former staff housing	The Former staff housing is an excellent example of archaeological evidence relating to former military staff housing from the 20th century. The staff housing would contribute to the social significance and research potential of the site.	High
Landscaping	The landscaping is a significant element of the character and visual setting of the RAAF Base. The pastoral land to the east of the main building complex is an important element of the overall setting, and the planted avenue between the staff housing and the main building complex contributes to the formality of the site, enhanced by the symmetrical avenue and axial planning characteristic of 20th century military bases.	High
Lamp posts	The lamp posts are a rare example of the Marley Design lamp post style and are well preserved. They hold high integrity as many are unmodified and are located in their original setting, contributing to the formality and grand military setting of the site.	High

Leeholme Horse Stud Rotunda, 391-395 Mamre Road, Orchard Hills (Penrith LEP 2010 I180)

Location and physical description

The Leeholme Horse Stud Rotunda is listed on the Penrith LEP 2010 as an item of local heritage significance (I180).

The Leeholme Horse Stud Rotunda heritage item is located to the east of Luddenham Road, within the Bill Spilstead Complex for Canine Affairs (Lot 7 DP547057). The heritage item is located in proximity (less than 100 metres) to the proposed permanent power supply route for the project. The curtilage of the item includes several buildings and additional landscape elements that form part of the Bill Spilstead Complex for Canine Affairs, however these elements are not associated with the significance of the item. The horse rotunda is located at the northeast of the property boundary and there are clear, unobstructed views from Luddenham Road to the rotunda.

The rotunda is an octagonal structure built of timber and is clad with white horizontal weatherboards. The SHI listing for the item states that the rotunda is 23.4m in diameter and 11m in height. The roof of the item is corrugated-iron and octagonal, reflecting the overall shape of the building. There is a central clerestory, with an additional peaked roof, and pane-fixed glazing. At the northern side of the Rotunda there is a square extension which features a hipped gable roof and is constructed of half-height bricks, with weatherboard on the upper half. Each façade (excluding the north) features rollershutter doors which lead into the interior space. The interior of the rotunda was not accessed.

Views from the location of the power supply upgrade (in alignment with Patons Lane, Orchard Hills) to the Rotunda are obstructed by vegetation and the additional buildings that form the Bill Spilstead Complex for Canine Affairs. Existing power lines north of Patons Lane are visible from Luddenham Road in alignment with the rotunda. There are no clear views to Patons Lane, the approximate alignment of the proposed power supply upgrade trenching.

The setting of the item includes manicured grass lawn on the north, with mature native trees and wire fencing on the northern property boundary. At the western side of the rotunda a grove of mature trees is present, bordering on Luddenham Road. To the east of the rotunda is semi-pastoral, semi-landscaped grass areas, while the Bill Spilstead Complex for Canine Affairs buildings and grounds are located to the south.

Figure 135. View of rotunda from Luddenham Road, south-east aspect

Figure 136. View of heritage item from Luddenham Road, south-east aspect

Historical background

The Leeholme Horse Stud Rotunda is located on the Leeholme Estate, which comprised the original land grant of Gregory Blaxand. The horse stud rotunda was constructed on the property in the early 1920s by William Inglis & Sons and was originally built as a cattle exercising yard on the Flemington sale yards.[300] The rotunda was an open structure with a facetted corrugated iron roof and a timber auctioneer box at one side. Cattle were brought under the structure and would walk the perimeter of the rotunda in view of the auctioneers before being led out again.[301]

In the 1950s urban development reduced the viability of dairying in Sydney and the Inglis property was sold to developers and was converted into an industrial area.[302] The Leeholme estate was owned by Maurie Grogan at the time, who purchased the rotunda from the Inglis estate and transported it (in its dismantled state) to Leeholme, where it was reconstructed in its current location, although slightly modified with a shorter lantern on the roof.[303] Rather than a cattle yard however, the rotunda retained a similar purpose for horses. Several timber horse braces were constructed, encircling the perimeter of the rotunda, replaced by brick stalls in the 1960s.[304] In 1975 the rotunda was partially extended, with the northern brick wall extension added and the rotunda enclosed.[305]

Statement of significance

The following statement of significance has been extracted from the Penrith LEP 2010 listing for Leeholme Horse Stud Rotunda[306]:

> *The Rotunda is of historical significance for its association with early 20th century horse studs in the area and a rare surviving remnant of the operation of Sydney's livestock markets at Flemington in the early twentieth century. It is associated with Maurie Grogan and the Leeholme Horse Stud, one of the more prominent livestock trading firms of the era. Its design demonstrates an attempt to raise the public image of dairying at a time when milk quality was a major contemporary social issue and it is a relic of corporate image-making of the period.*
>
> *The Rotunda is significant as an extremely unusual building, of octagonal design and timber construction with corrugated iron cladding to the upper storey. The internal space appears to have been designed as an interior horse exercise yard, and is lit by a clerestory lantern and demonstrates intricate arrangements of posts, beams and trusses. Evidence of the relocation of the Rotunda during the 1950s and its use as a horse stud, as well as its present use by the Canine Council of NSW, is evident in the fabric of the building.*
>
> *The Rotundas landmark qualities, including its size, distinctive form and prominent location in relation to a major regional thoroughfare contributes to its high level of local recognition. The Rotunda is significant as an integral part of the local environment.*

[300] NSW Office of Environment and Heritage, 2004. 'Leeholme Horse Stud Rotunda.' Accessed online https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2260232
[301] *Ibid*
[302] *Ibid*
[303] *Ibid*
[304] *Ibid*
[305] *Ibid*
[306] *Ibid*

Assessment of significance

The significance assessment in Table 53 has been developed from the Penrith LEP 2010 listing for Leeholme Horse Stud Rotunda.[307]

Table 53. Assessment of significance for Leeholme Horse Stud Rotunda

Criterion	Discussion
A) Historical Significance	The Luddenham Rotunda has historical significance for its association with the development of horse and cattle studding in the Penrith district at the turn of the century. The Rotunda is an early-twentieth-century livestock sale-ring structure which played a significant role in the dairy and other livestock industries in the Sydney region from the 1920s till the 1950s. The Rotunda is a relic of the development of the Homebush abattoir and Flemington markets in the early twentieth century, leading to the development of the area for livestock trading. The Rotunda is a relic of the period when Sydney's development had an agricultural belt located between Sydney and Parramatta. Its early history also reflects the social and technological environment of the period, whereby the lack of refrigerated and motorised transport meant that foodstuffs and perishables such as milk needed to be produced within reasonable access to their market. The construction of the Rotunda occurred in the same year as a Select Committee report on the dairy industry and milk supply, reflecting a period of community attention to milk production and hygiene. Its design has an association with these contemporary concerns about milk quality and demonstrates an attempt to create an image of respectability in the suburban dairy industry of the period. The Rotunda is an example of the economic recycling, by dismantling and re-erection, of a timber building in the mid-twentieth century. **Leeholme Horse Stud Rotunda reaches the threshold of local significance under this criterion.**
B) Associative Significance	The Rotunda has a strong association with William Inglis & Son Ltd. Auctioneers who originally constructed the building. The Rotunda is associated with Maurie Grogan and the Leeholme Horse Stud, a notable Sydney horse-breeding establishment in its day. The Rotunda is associated with the Canine Council of NSW, one of the premier dog organisations in NSW. **Leeholme Horse Stud Rotunda reaches the threshold of local significance under this criterion.**
C) Aesthetic Significance	The Rotunda is an unusual structure of picturesque rustic design. The picturesque design is further enhanced by its setting within a rural environment. The internal spaces, clerestory and interplay of geometric forms and structural elements produce a distinctive aesthetic quality in the Rotunda. The Rotunda has landmark qualities due to its picturesque form and its prominent location on Luddenham Road, a major local thoroughfare.

[307] *Ibid*

Criterion	Discussion
	Leeholme Horse Stud Rotunda reaches the threshold of local significance under this criterion.
D) Social Significance	The Luddenham Rotunda has social significance for its association with development of local industry at the turn of the century. **Leeholme Horse Stud Rotunda reaches the threshold of local significance under this criterion.**
E) Research Potential	The Luddenham Rotunda has technical/research significance for its demonstration of turn of the century building techniques and in particular for its unusual design and construction. The form in particular is not usually associated with the equine industry and the use of a clerestory is also most unusual. The Rotunda is a one-off, purpose-built timber structure that, in its fabric and construction details, demonstrates accepted structural approaches and principles for its time, which are now rarely seen and almost never practiced. The Rotunda, in its use of structural timber roof framing, is a good example of the transitional phase in timber construction techniques that is characteristic of the late nineteenth and early twentieth century in NSW. Few similar examples display these techniques in such an obvious and accessible manner. Despite its generally rustic appearance and ad hoc detailing, the structure also boasts some sophisticated connections, such as the 'heel' connection of top and bottom truss chords, which are of interest to the study of the development and practice of structural engineering. **Leeholme Horse Stud Rotunda reaches the threshold of local significance under this criterion.**
F) Rarity	Given the buildings' unusual design, it is considered to be relatively rare. The Rotunda is a unique example of a purpose-built livestock sale ring from the early twentieth century which has been relocated, reconstructed and reused for the new but related purpose of stables, then refurbished for use as a canine training and show facility. The Rotunda demonstrates the unusual use, in its day, of a common but decorative building form associated with public recreation for the more mundane purpose of cattle-trading, with the intention of gaining publicity and respectability. The Rotunda is a rare surviving example of a sophisticated timber structure of the early twentieth century which demonstrates a mixture of traditional (nineteenth century) and developed (twentieth century) technologies in the arrangement of posts, beams, trusses and jointing. **Leeholme Horse Stud reaches the threshold of local significance under this criterion.**
G) Representativeness	The Rotunda is an unusual design for a stud building, and hence represents a different approach to this building type. The Rotunda is a representative example of an early twentieth century rotunda building, the style and design of which is more usually associated with park bandstands.

Criterion	Discussion
	The Rotunda contains representative examples within its timber structure of traditional (nineteenth century) and developed (twentieth century) timber structural technologies in its arrangements of posts, beams, trusses and joints. **Leeholme Horse Stud Rotunda reaches the threshold of local significance under this criterion.**

Heritage significant fabric

The Leeholme Horse Stud Rotunda is of local significance and is in good condition and intactness. The primary elements of significance include the rotunda, an octagonal timber structure which is visible from Luddenham Road; the rural setting within the land; the stallions stable; office and tack rooms; a concrete water tank; a galvanised metal silo; and a portable office building.[308]

[308] *Ibid*.'

APPENDIX B: OFF-AIRPORT ARCHAEOLOGICAL SITE POTENTIAL AND SIGNIFICANCE ASSESSMENTS

Introduction

The non-Aboriginal archaeological assessment in this Technical Paper has been prepared based on desktop (historical, archival and cartographic) research to identify areas of interest for potential non-Aboriginal archaeological remains. This has been combined with a comprehensive site survey of all accessible areas within the construction footprint for the project to confirm the presence of suspected remains as well as to locate possible unanticipated archaeological sites.

Due to the area which the construction footprint would traverse for the project, detailed discussions of land use history (to inform archaeological potential assessments) have only been provided for identified archaeological sites. As the construction footprint largely traverses rural pastoral properties there is limited evidence for archaeological remains located outside of known urban areas for the project.

Assessment of archaeological remains at St Marys station

Previous Archaeological Studies

St Marys Munitions Factory[309]

In 1994 Casey and Lowe prepared a historical archaeological survey report for the Australian Defence Industries. The study area was located approximately 1 kilometre north of the St Marys Station construction site and construction footprint. The report assessed sites into four categories based on significance: exceptional; considerable; some; and low. It was recommended that all sites of 'some significance' and higher would be retained in situ and further archaeological investigation should be undertaken prior to any development or additional works. It was recommended that sites of low significance are retained unless demolition is considered necessary.[310] An additional cultural landscape study was recommended.

St Marys Freight Hub[311]

In 2019 NGH Environmental prepared a Statement of Heritage Impact and Historic Archaeology Assessment for the St Marys Freight Hub precinct. The study area is located to the northwest the St Marys Station construction site. The findings of the report stated that archaeological potential in the area associated with the storage sidings and Ropes Creek branch line was low, and that significant archaeology was not likely to be impacted by the proposed works. The recommendations of the report included the continued maintenance and use of the Ropes Creek Branch line and the retention of mature trees which provide visual screening from the surrounding area.

St Marys Commuter Carpark[312]

In 2012 AMAC prepared an archaeological report for excavations at the site of the St Marys Commuter Carpark on Harris Street. The commuter carpark study area was located within the project

[309] Casey & Lowe, October 1994. *Historical Archaeological Survey St Marys Munitions Factory.* For Australian Defence Industries.
[310] Casey & Lowe, October 1994. *Historical Archaeological Survey St Marys Munitions Factory*, p. 31.
[311] NGH Environmental, April 2019. *Statement of Heritage Impact and Historic Archaeology Assessment St Marys Freight Hub.*
[312] AMAC, February 2012. *Final Archaeological Report St Marys Commuter Carpark Harris St St Marys NSW.* Report for Transport Projects Division of Transport for NSW.

study area but outside of the St Marys Station construction site and construction footprint. The archaeological excavations located the remains of two brick-lined wells, several postholes, an oven or fireplace, and several in situ building footings and wall foundations associated with the former Shane's Park Hotel, located within the study area. The footings were constructed of river pebbles with clay packing and lime mortar.[313] Artefacts found included a ceramic dolls arm, domestic ceramic fragments, and glass fragments. The well, approximately 2.5 metres in diameter, was not entered for safety reasons and was backfilled without demolition or further excavation. It was recommended that the well required additional future archaeological investigation on account of predicted relics within the well.[314]

Dunheved Precinct, St Marys*[315]*

In 2005 Casey and Lowe prepared a Heritage Assessment with archaeological impact assessment for the Dunheved Precinct in St Marys. The study area was located approximately 1 kilometre north of the St Marys Station construction site. The report found that there was limited potential for archaeological relics associated with the Dunheved Homestead, however that the built remains of the Dunheved Homestead reached the threshold of state significance. The report recommended the creation of a buffer zone around the Dunheved Homestead site to preserve existing significance rural vistas.

Land use summary

The historical development of the St Marys Station construction site has been divided into the following historical phases of activity for this assessment:

- **Phase 1** (1806-1862): Early land grants. The St Marys Station construction site was part of the land grants originally given to John Oxley, Philip Parker King, Maria Putland, and Maria King.
- **Phase 2** (1863- 1888): The Western Railway. The area was rural farming land until the development of the railway and the construction of St Marys Station, which included the construction of the railway line, St Marys Station, the Goods Shed and Goods Yard, and several twentieth century structures and modifications.
- **Phase 3** (1888- 1945): Subdivision and construction of surrounding buildings. Following the construction of the railway station, the King family sold much of the land surrounding the train line. This led to the construction of Shane's Park Hotel and Inglis cattle yards on the northern side of the station, commercial buildings and housing on the southern side of the train line.
- **Phase 4** (1945-present): Modern redevelopment of St Marys. Demolition of some buildings surrounding the train line, construction of new commercial buildings, carparks, and road upgrades.

Previous Impacts

The ongoing development of the existing St Marys Station within the construction site, including upgrades to railway infrastructure and the refurbishment of public areas such as the plaza on the

[313] AMAC, February 2012.*Final Archaeological Report St Marys Commuter Carpark Harris St St Marys,* p. 73.
[314] AMAC, February 2012. *Final Archaeological Report St Marys Commuter Carpark Harris St St Marys,* p. 147.
[315] Casey and Lowe, March 2005. *Heritage Assessment Dunheved Precincts St Marys Development St Marys, N.S.W.* Report for Jo McDonald Cultural Heritage Management on behalf of Maryland Development Company.

southern side of the railway line may have resulted in moderate ground disturbance during renovation works. Land within the railway corridor would be expected to be heavily ground disturbed, due to the scale of infrastructure upgrades within the corridor.

Localised ground disturbance has likely been caused by the installation of utility services within the St Marys Station construction site, as well as road and carpark construction and resurfacing during the twentieth century.

It is expected that moderate ground disturbance would have occurred in the location of the modern and post-war warehouses on Harris Street to the north of the railway line. The demolition of earlier buildings in the area, and any surface clearance for the construction of the extant warehousing may have resulted in minor to moderate ground disturbance. However, nearby archaeological excavations have uncovered evidence of former structures despite subsequent construction and demolition phases.[316] Severe ground disturbance may have occurred in localised areas north of the railway corridor for the installation of utility services for the extant warehousing. In circa 2012 the Harris Street commuter carpark was constructed, resulting in extensive bulk earthworks in the area.

Assessment of archaeological potential

Phase 1 (1806-1862): Early land grants

The St Marys Station construction footprint is located within four original land grants dating from 1806 to the early 1820s. These include the land grants of John Oxley (600 acres); Philip Parker King (650 acres); Maria King (280 acres); and Maria Putland (600 acres).

Within the construction footprint, it can be expected that land clearance may have occurred, in addition to the establishment of formal timber post and rail fences along the property boundaries. Historical sources state that Kirkham, located in Camden, was the primary estate of John Oxley's. There is no historical or cartographic documentation to suggest that Oxley ever built on his St Marys land grant or utilised it for any agricultural or pastoral endeavours.

There is no historical documentation to suggest that any homestead or estate was built on Phillip Parker King's land grant. The Dunheved homestead was constructed by Philip Parker King on Maria King's land grant. The location of the homestead is known to have been located to the north of the St Marys Station construction site, and associated outbuildings, including agricultural structures and accommodation for up to 100 staff would have been located in close proximity to the main homestead. Therefore, it is unlikely that any structures associated with Dunheved Estate would have been located within the St Marys Station ground disturbance footprint.

Written documentation, including a letter from Phillip Parker King to Governor Brisbane, dated to 1822, states that the property had large numbers of cattle, horses, sheep, and pigs, and that extensive land clearance had occurred. This attests that the property was a working farm from its origins, and that activity associated with land clearance and grazing would likely have occurred within the St Marys Station construction footprint. However, the previous industrial activity within the construction site associated with the development of the Western Railway Line, St Marys Station, and the Dunheved industrial branch line would have heavily disturbed archaeological evidence associated with land clearance or timber boundary fencing.

Due to the industrial development of St Marys during the late nineteenth and early twentieth centuries, the lack of any known structures associated with early land grands within the construction footprint, and the relatively ephemeral archaeological remains predicted (such as evidence of land

[316] AMAC, February 2012. *Final Archaeological Report St Marys Commuter Carpark Harris St St Marys NSW.* Report for Transport Projects Division of Transport for NSW.

clearing or intact buried soils), there is a **nil** potential for archaeological remains associated with Phase 1 to be present within the St Marys Station construction site.

Phase 2 (1863-1888): St Marys Railway Station

First St Marys Station

The construction of St Marys Railway Station commenced in 1862 and was originally named South Creek Station, with this station expanded for the duplication of the line in the 1880s. Prior to the duplication of the line, South Creek Station was not a major station and was instead a smaller train stop used for distributing goods to the northern portion of St Marys at a time when little urban development had occurred in this area.

Original station buildings from this would have included timber retaining wall platforms, timber or brick station buildings and signal sheds. It is likely that support and ancillary structures, including a water tanks, and/or lamp rooms may have been present. The precise location of former 1862 to 1885 structures are not known.

Duplication of the line in the 1880s, as well as the significant expansion and change to the station precinct during the Second World War involved widespread excavation and construction within the station precinct. Archaeological remains related to these remains would likely consist of remnant buried structural footings of brick, rail beam or timber. Remains from this period, if conserved, are likely to be heavily truncated or disturbed and unlikely to demonstrate a good degree of preservation. The potential for identifying archaeological material relating to the 1862 – 1885 South Creek Station are considered to be **nil to low**.

The Goods Yard

The Goods Shed and Goods Yard were constructed in 1880 at the southern side of the railway corridor. Potential archaeological remains in the area may include remnant railway tracks associated with the Goods Yard. Several support building structures are evident in 1943 aerial imagery of St Marys Railway Station, and appear to be sheds or storage locations, likely constructed of timber or brick. Potential remains may include stone, brick, or cement foundations. Artefact scatters may also be present. It is also highly likely that remnant railway beams and tracks are evident.

A 1956 plan of the Goods Yard and Goods Shed show several structures likely dating to the 1950s development of the station. A structure adjoined to the western end of the Goods Shed, featuring stairs abutting the south-western exterior Goods Shed wall appears to be a loading bank, associated with the Goods Yard railway tracks on the northern side of the Goods Shed and on the southern side of the main railway corridor. Historic photographs of the Goods Shed show the original ground surface at grade with the railway corridor, however it has now been raised for the construction of the plaza and bus interchange. A photograph from 1970 shows that the ground level was originally lower than current, and also shows that the loading bank was still extant at the time, accessible through the western door of the Goods Shed, and that it was constructed of timber. Furthermore, the 1943 foundations of the jib crane are located immediately to the west of the loading bank structure. The Goods Yard track continued west, to the south of the extant footbridge, where a buffer stop – likely constructed of timber sleepers – was located. At the southern side of the current jib crane location was a weighbridge, and a loading stage, measuring 12 feet (3.65 metres) by 8 feet (2.4 metres) was located at the northern side of the crane. These structures are not evident in the 1943 aerial imagery, suggesting they were constructed in the 1950s.

Archaeological remains related to the St Marys Goods Yard would consist of former concrete, brick and timber foundations, rail, ballast and sleepers, and isolated artefact deposits. Overall, there is **low to moderate** archaeological potential for remains associated with the St Marys Goods Yard to be present.

Figure 137. 1943 Aerial Imagery of St Marys Railway Station, with Goods Yard structures highlighted in red. Source: SixMaps

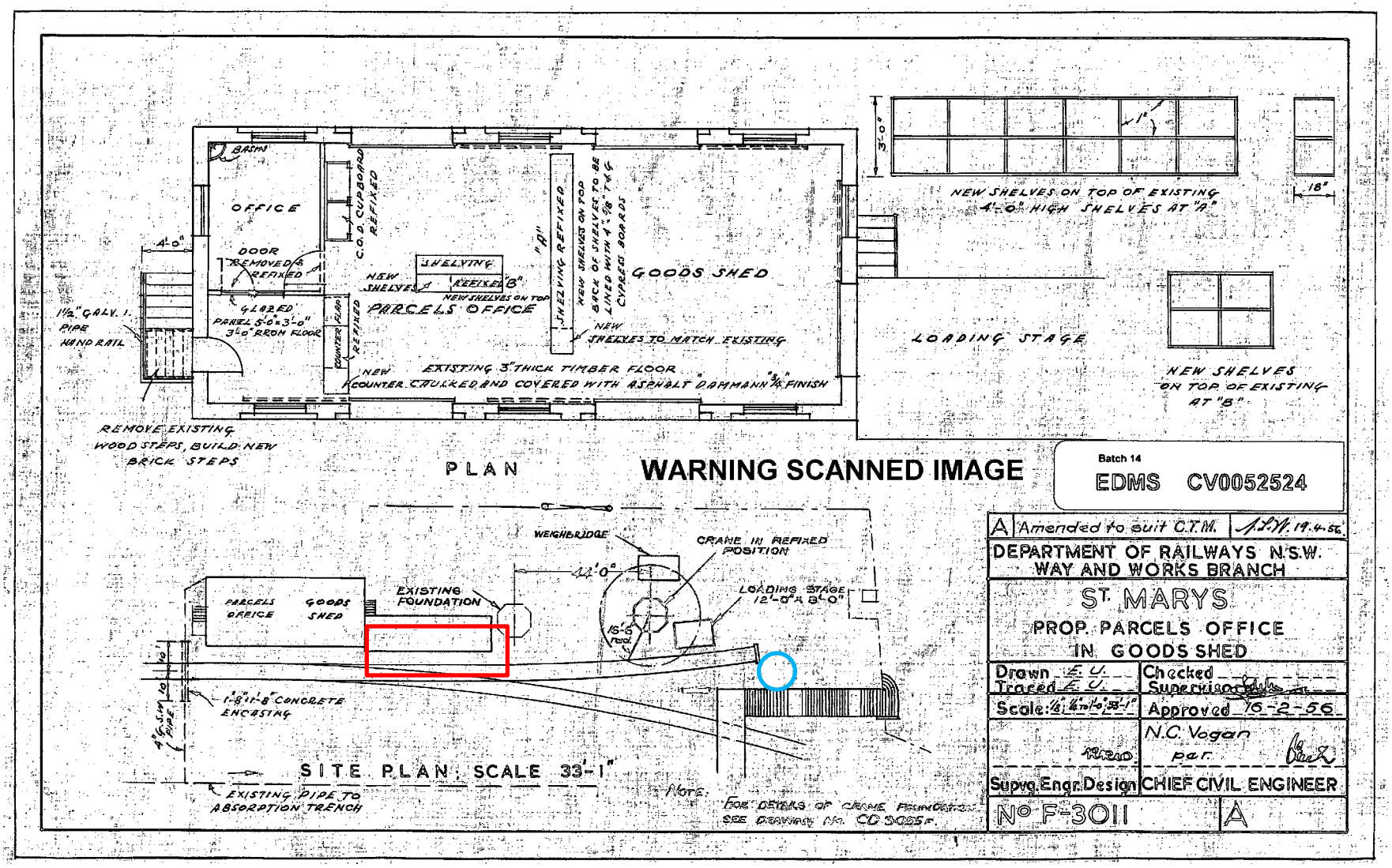

Figure 138. Sydney Trains Plan of St Marys Goods Yard/Shed precinct, 1956. Buffer stop circled in blue and loading bank highlighted in red. Source: Sydney Trains Plan Room

Figure 139. The Goods Shed at St Marys Station (looking east), 1970. Source: Penrith City Library[317]

Former 1888 Platform Structures

The current St Marys Railway Station previously featured a platform building on Platform 1/2 which dated to 1942. The State Heritage Listing for the St Marys Railway Station Group states that there is no evidence of the 1942 brick station building and that there is therefore low archaeological potential for remains of the building.

The 1943 aerial imagery shows an out-of-shed towards the eastern end of platform 3/4, which would most likely date to the 1880s when the platform 3/4 building was constructed. The out-of-shed may have been constructed of weatherboard timber with a corrugated metal roof, as seen at Katoomba Railway Station[318] on the Main Western Railway Line, or from brick, as seen at Hazelbrook[319] and Glenbrook[320] Stations, also on the Main Western Line. Platform regrading works may have resulted in the partial or complete truncation of any remains associated with the structure, likely limited to footings or foundations.

There is **low** archaeological potential for early to mid-twentieth century platform structures.

Phase 3 (1888-1945): Subdivision, Industrial and Residential Development

The Inglis Cattle Yards were established by William Inglis in 1901, and were located on Harris Street, in the location of the extent multi-storey commuter carpark. The Shane's Park Hotel, located immediately east of the cattle yards on Harris Street, was established by 1977, and was excavated by

[317] Penrith City Library, 1970. 'St Marys Railway Station.' *Penrith In Pictures.* Accessed online 24/7/2019 at: http://www.photosau.com.au/penrith/scripts/ExtSearch.asp?SearchTerm=003029
[318] NSW Office of Environment and Heritage, 2009. 'Katoomba Railway Station Group and Yard.' *NSW Office of Environment and Heritage.* Accessed online 4/11/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=4801008
[319] NSW Office of Environment and Heritage, 2009. 'Hazelbrook Railway Station Group.' *NSW Office of Environment & Heritage.* Accessed online 4/11/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=4801914
[320] NSW Office of Environment and Heritage, 2005. 'Glenbrook Railway Station Group.' *NSW Office of Environment & Heritage.* Accessed online 4/11/2019 at: https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=4801053

AMAC in 2011-2012.[321] Any remains associated with the Inglis Cattle Yards and the Shane's Park Hotel have been removed from their original location during the construction of the multi-storey commuter carpark on Harris Street following excavation and recording by AMAC, including deposits of a well or cistern located during AMAC's excavations. The second well is located on Forrester Road at the base of the roundabout and was not removed or excavated further during works, however this is located outside of the study area. There is **nil** archaeological potential for archaeological evidence within the area of the commuter carpark associated with the Inglis Cattle Yards or earlier buildings, including the Shane's Park Hotel.

Subdivision plans of the area dating to the early 1920s show five built structures on Station Street, located between Queen Street and Lethbridge Street, however these are unlabelled, and it is uncertain if they are residential or commercial structures. The 1943 aerial imagery shows approximately 12 separate residential lots with housing facing Station Street, and four residences on Phillip Street facing south. As with the housing on Phillip Street, these residences include several outbuildings of various sizes, which may include outhouse, sheds, or agricultural structures. At the corner of Phillip Street and Queen Street is a park or reserve, with dirt tracks connecting the two streets. In addition, aerial images from 1943 for the northern portion of Queen Street in 1943 show the presence of two commercial / light industrial buildings; these buildings were likely cattle yards or storage warehouses.

Archaeological remains relating to late nineteenth and early twentieth century commercial and residential structures could include brick and concrete footings, evidence of former services or drainage, industrial and yard deposits as well as isolated domestic artefact deposits. Tongue-and-groove timber flooring was used in this period and the presence of artefact-bearing underfloor deposits is considered unlikely. Excavations at the Shanes Park Hotel to the north of the construction footprint identified former privies, wells and cesspits. [322] While archaeological remains related to these items are often deeper than other artefactual remains, widespread ground disturbance along Phillip Street for the construction of the current St Marys shopping mall, including basement carparks, is considered to have entirely removed remains of this type.

Overall, the potential for the recovery of archaeological remains relating to this phase is considered **low**.

[321] AMAC, February 2012. *Final Archaeological Report St Marys Commuter Carpark Harris St St Marys NSW.* Report for Transport Projects Division of Transport for NSW.
[322] AMAC, February 2012. *Final Archaeological Report St Marys Commuter Carpark Harris St St Marys NSW.* Report for Transport Projects Division of Transport for NSW.

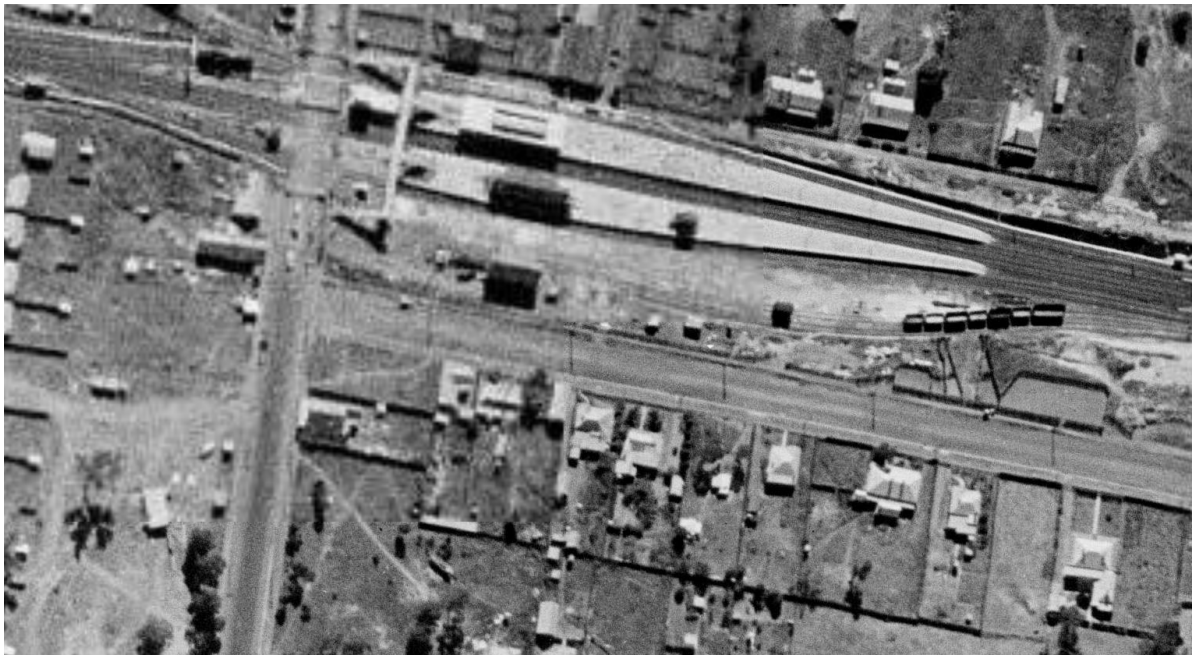

Figure 140. Residential properties on Station Street (north), Queen Street and Phillip Street (south) in 1943. Source: SixMaps

Phase 4 (1945-present) Modern Development

Archaeological remains from the post-war period would consist of brick or concrete footings, utility services and former road and kerbing remains. The potential for archaeological remains associated with this phase to be present in the study area is considered to be **moderate**. Remains dating from this phase would not be considered archaeologically significant, however.

Assessment of archaeological significance

The following assessment of significance for archaeological remains is provided for remains predicted to be present within the construction footprint only. Land use phases for which archaeological remains have not been predicted are not included in this discussion of archaeological significance.

Phase 2 (1863 - 1888): St Marys Railway Station

First St Marys Station

Archaeological remains relating to the first St Marys Station (South Creek Station) are likely to be heavily truncated or disturbed within the context of extensive ground disturbance at the site since it was removed in the 1880s. While these remains could be related to the earliest public NSW railway network, truncated or *ex situ* remains are not likely to provide detailed information which could respond to research questions about the former railway station, nor be demonstrative of the technical and historical aspects of the use of the rail network in St Marys from this time. In addition, renovations within the railway corridor would likely have intermixed stratigraphic relationships with later development, and material remains may not be archaeologically distinguishable between phases.

Due to the high degree of disturbance within the rail corridor, remains associated with the first St Marys station may reach the threshold for local significance.

St Marys Goods Yard

Archaeological remains associated with the former St Marys Goods Yard could consist of former concrete, brick and timber foundations, as well as buried rail, ballast and sleepers. There is a moderate potential for these remains to be present. Archaeological materials related to these remains may have some demonstrative value if they are identified intact and *in situ*, however as structural remains they may not respond to research questions associated with interrogating the past use of the rail yard or the goods distribution network that operated in St Marys during this time. Isolated artefact deposits may be identified within the rail corridor; however, these would be likely to be remnant rubbish deposits and may not be able to be associated with any specific domestic, commercial, or industrial use. Rail beams, sleepers and ballast are also considered ubiquitous from the rail network and would not be considered significant remains.

Substantial intact remains related to the former footings of Goods Yard structures, and isolated artefact deposits, may reach the threshold for local significance.

Former 1888 platform structures

Former footings to the original 1888 platform structure which was demolished in the 1990s to install new canopies would likely be brick remains sub-platform. Excavation works to install the canopies would have likely removed all but the deepest building foundations in this location. Remains relating to the former platform building would be demonstrative of the original construction of the building and may be used as a comparative example for analysing the platform 3/4 building.

Archaeological remains relating to the former platform 1/2 building may reach the threshold for local significance.

Phase 3 (1888-1945): Subdivision, Industrial and Residential Development

Archaeological remains relating to late nineteenth and early twentieth century industrial and residential development at St Marys Station has been assessed as low potential. Remains associated with late nineteenth century cattle industries or goods storage facilities may provide information on commercial and industrial practices in this period in what was a largely rural area. Archaeological remains relating to these industries are unlikely to respond to research questions associated with the understanding the development of St Marys and the relationship of the place with developing commercial networks within Sydney.

Archaeological remains associated with this phase would not reach the threshold for local significance.

Phase 4 (1945-present): Modern Development

Archaeological remains related to post-Second World War development would be considered to be materially ubiquitous and unlikely to respond to historic or archaeological research questions. Buried remains from this period would not reach the threshold for local significance.

Summary of archaeological potential and significance at St Marys station

A summary of archaeological potential and significance at St Marys Station is provided in Table 54 below. The location of areas of significance archaeological potential at St Marys Station is provided in Figure 141.

Table 54. Summary of archaeological potential and significance at St Marys station

Phase	Activity and remains	Potential	Significance
Phase 1 (1806 – 1862)	Evidence of early land grants, agricultural remains	Nil	Nil
Phase 2 (1863 - 1888)	First Railway Station – timber or brick footings, isolated artefact deposits	Nil to low	Possible local
	St Marys Goods Yard – brick, timber and concrete footings, isolated industrial or domestic artefact deposits	Low to Moderate	Possible local
	Platform 1/2 building – brick footings	Low	Possible local
Phase 3 (1888 – 1945)	Commercial, industrial and residential remains – brick, timber or concrete footings, former yard surfaces, isolated artefact deposits	Low	Nil
Phase 4 (1945 – present)	Modern concrete footings, kerbs, road surfaces, utility services	Moderate	Nil

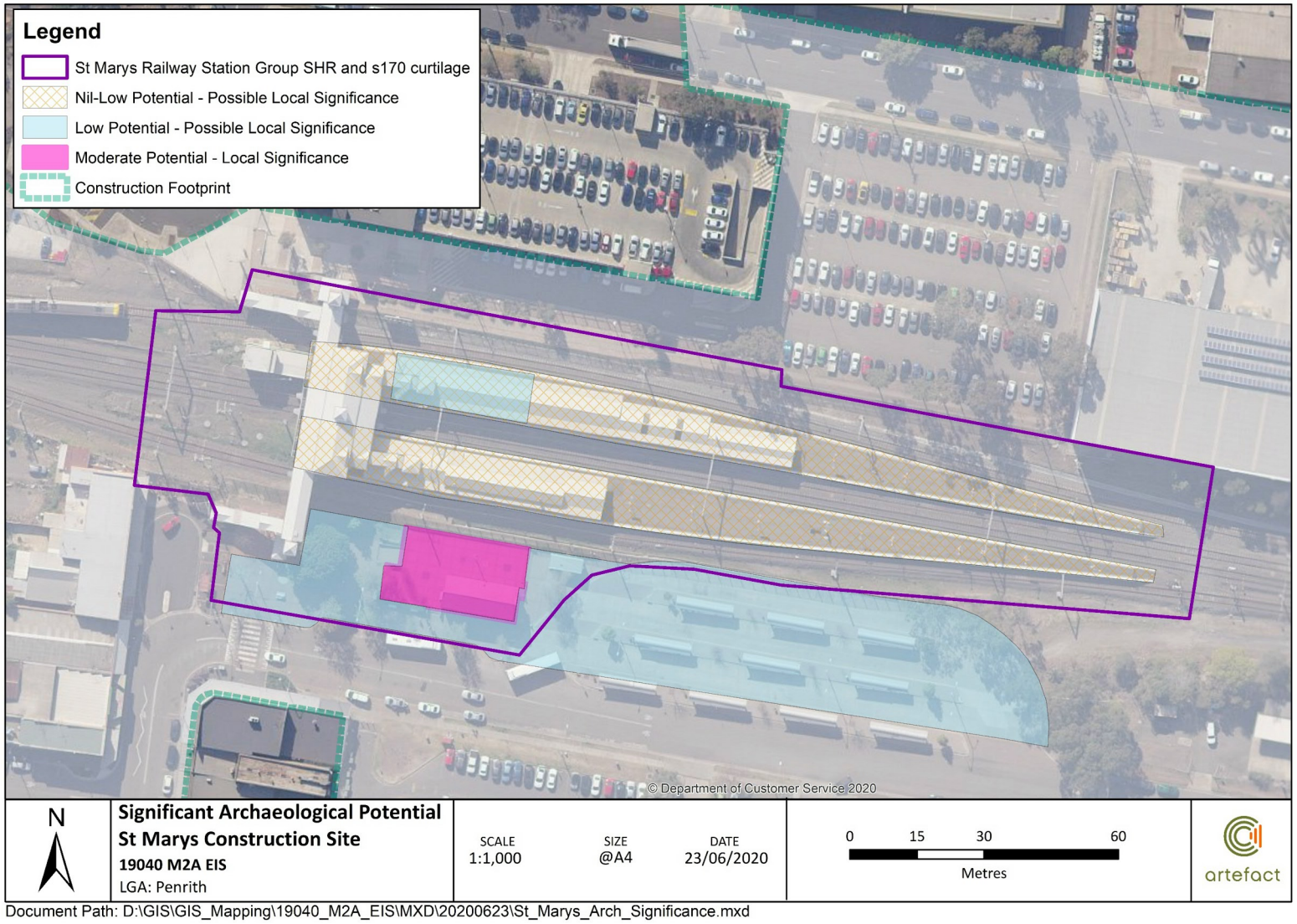

Figure 141: Significant archaeological potential at St Marys Station

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