Figure 53. Assessed levels of archaeological potential and significance for PAS 3. Source: Near Map, Extent, Sydney Water

7. PAS 4—McMaster Field Station

7.1 Overview

The former McMaster Field Station is located at 1853-2109 Elizabeth Drive, Badgerys Creek, Lot 101 DP 848215 within the Penrith City Council LGA. As part of the project, the study area is limited to the southern portion of the site along the Elizabeth Drive frontage (Figure 54).

Figure 54. Location and extent of PAS 4. Source: LPI, Extent

7.2 Historical development

The site of McMaster Field Station formed part of a 500-acre land grant made in 1819 to William Johnson, a free settler who had first obtained land in Emu Plains in 1807 under military administration after the coup on Governor Bligh (Figure 55). This first land grant was cancelled by Governor Macquarie, with the land including the study area offered as compensation (Paul Davies Pty Ltd, 2007:14; CRM, 2019:27). There is no indication of whether a homestead was constructed during Johnson's ownership of the property.

The site changed hands several times through the nineteenth century, with historical names including 'Morrison's Paddock' and 'Bangaroo'. It generally served as a secondary property for

running sheep or cattle, with most of the owners having primary residences elsewhere (CRM 2019:27-29).

The Primary Application (64895) for the site provides insight into the ownership history of the land that eventually became McMaster Field Station. The property was purchased in 1923 by the Commonwealth Government as land reserved for pastoral and agricultural research undertaken by CSIRO. The Primary Application for the property indicates that ownership of the property transferred to the CSIRO on 27 May 1937 and 1 January 1949 (Primary Application 64895).

The field station is associated with 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 marked the beginning of a new era of veterinary research in Australia and the development of an international reputation for excellence in veterinary research. Several hundred head of stock were present on the site at any one time (Figure 56). The farm at McMaster Field Station operated collaboratively with McGarvie Smith Farm and contained cultivated fields, two principal and fourteen smaller dams, livestock yards, dwellings, farm buildings, and other infrastructure such as sheep dips (Figure 57) (Aurecon 2016:65). No development had occurred within the study area by 1947, with an aerial photograph (Figure 58) depicting paddocks and two vehicle tracks fronting Elizabeth Street.

The field station was divided into two sections – the Division of Animal Health (DAH) in the west and the Division of Animal Production (DAP) in the east, and each section contained a cluster of principal buildings surrounded by paddocks and yards. The project extends through the southern part of DAH along the Elizabeth Street frontage, away from the primary buildings complex (Figure 59). Buildings in the DAH section dated from the late 1930s to the 1980s, with Buildings 11 (Superintendent's House) and 23 (Water Storage/Pump House) having been built within the study area. These all represent mid-to-late additions to the experimental farm, with the brick veneer Superintendent's House constructed in 1966 and the Water Storage/Pump House constructed of steel in 1980 (Figure 60). Both of these structures remain extant within PAS 4.

As the facility was downgraded in the late 1980s and early 1990s a number of buildings were demolished and contamination removal was undertaken. The core of the site contains few standing structures, though evidence of landscape modifications remains, including cultivated fields, fence lines, dams, and groves of trees (Aurecon 2016:65).

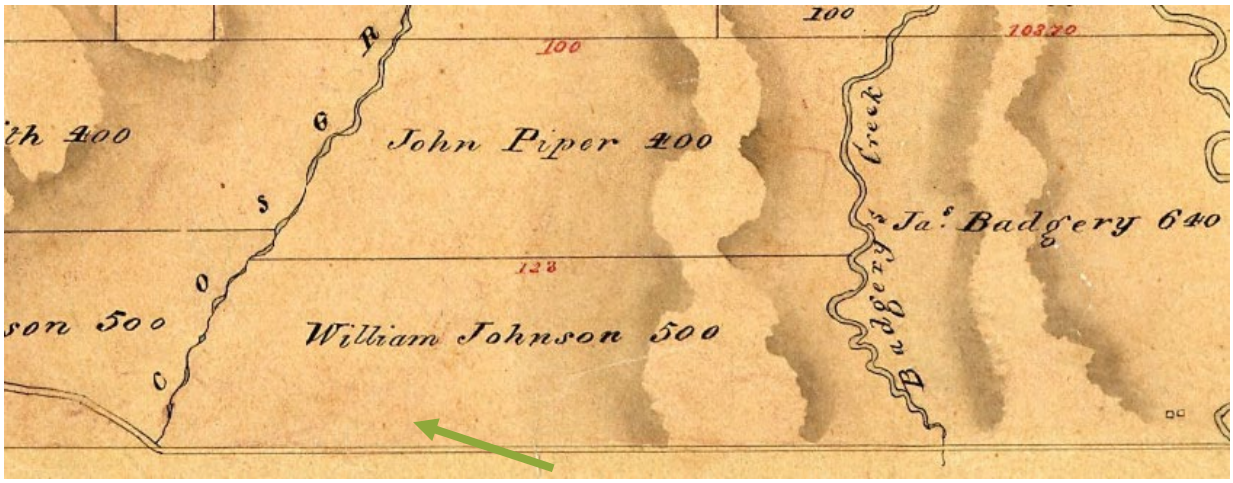

Figure 55. Undated parish map showing the original land grant associated with PAS 4, approximate study area location marked with a green arrow. Source: HLRV

Figure 56. Animal Health/McMaster Field Station, experimental sheep yards 1923-1932. Source: NAA B5626, 427

Figure 57. Animal Health/McMaster Field Station, general view of property, 1923–1932. Source: NAA B5626, 426

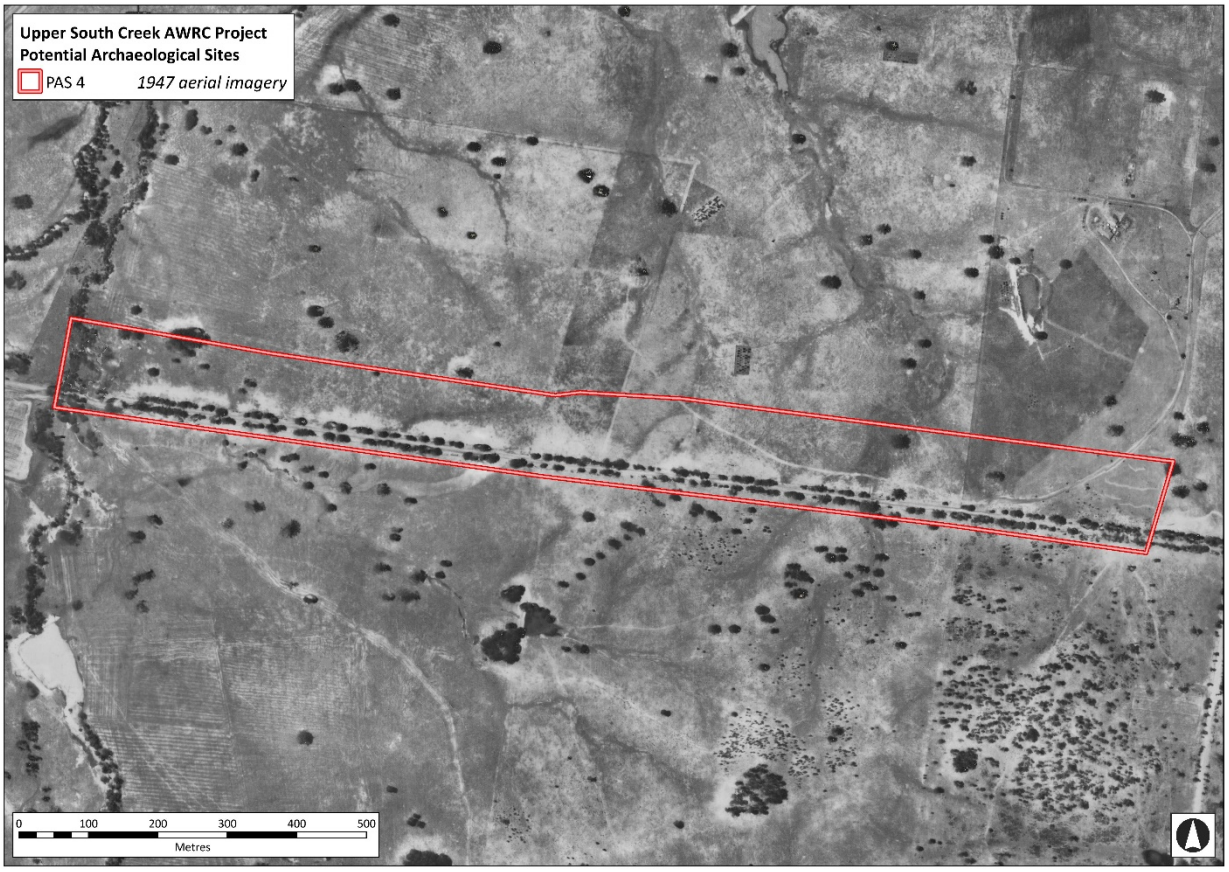

Figure 58. Aerial photograph from 1947 showing the absence of development within the study area. Source: LPI

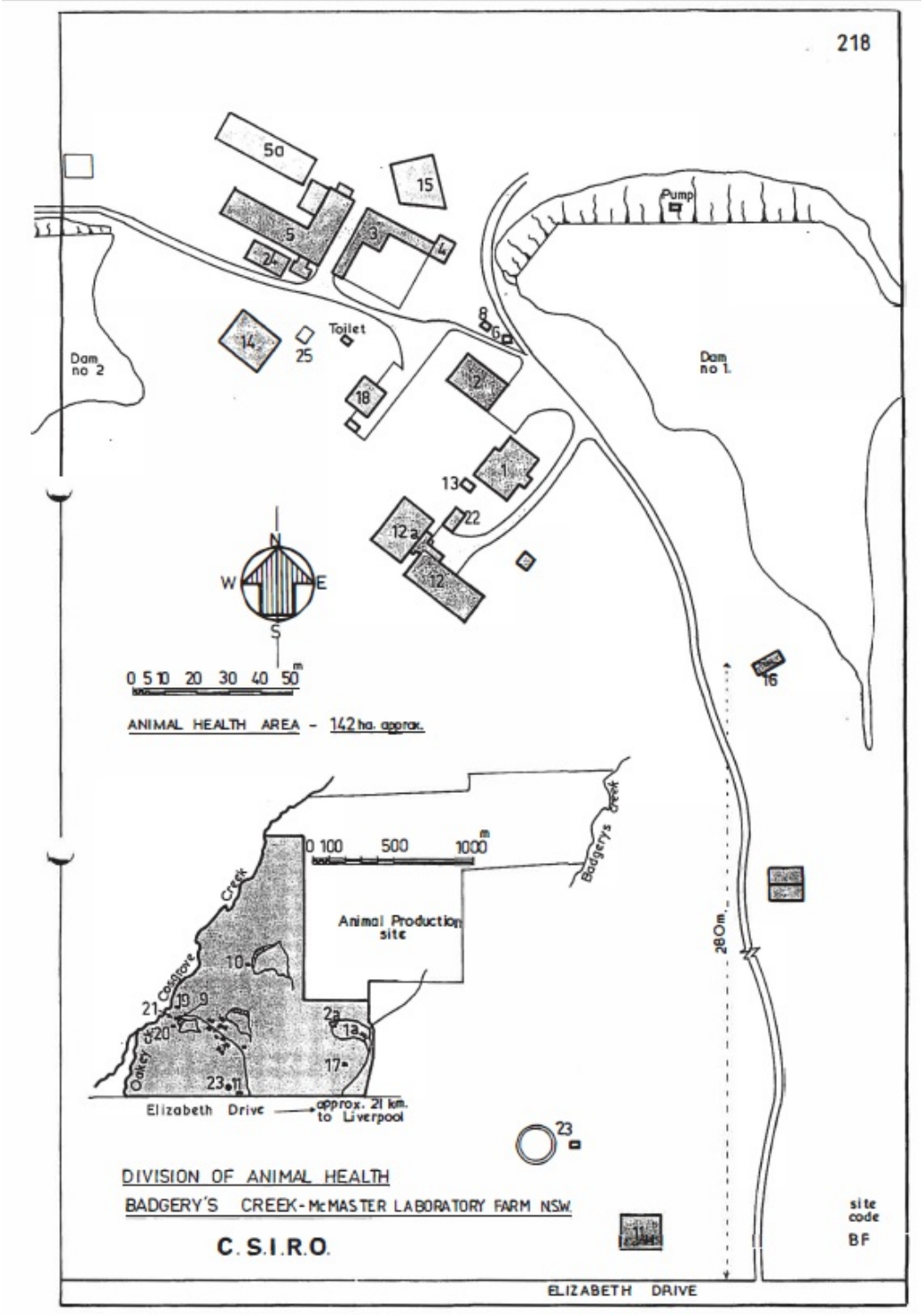

Figure 59. CSIRO Badgerys Creek McMaster Laboratory – building layout Division of Animal Health, 1995 (Source: CSIRO (2020): Document part 17)

Site No: 218
Site Code: BF

BADGERY'S CREEK, NSW

McMaster Laboratory Farm

ANIMAL HEALTH (IAPP)

Tenure: CSIRO Title
Assets Equity: CSIRO
Area of Site: 142Ha
Staff Numbers: 3
No. of Buildings 24

Bld No	Building	Gross Area in sq m	Construction	Levels	Year Built
1	Laboratory	238.00	Brick	1	1966
1A	Buffier Memorial Laboratory	150.00	Weatherboard	1	1938
2	Implement Shed/Workshop	100.00	Corr GI	1	1961
2A	4BR Residence	186.00	Weatherboard	1	1939
3	Sheep Yards	180.00	Corr GI	1	1957
4	Sheep Shed	27.87	AC Sheet	1	1960
5	Sheep/Shearing Shed	420.00	Corr GI	1	1963
5A	Sheep Shed	270.00	Corr GI	1	1980
6	Flammable Liquid Store	6.00	Brick	1	1961
8	Pump House	5.95	Corr GI	1	
9	Pump House	5.95	Corr GI	1	
10	Pump House	5.95	Corr GI	1	
11 *w*	House (Superintendant)	136.00	Brick Veneer	1	1966
12/12A	Small Animal Building	479.00	Brick	1	1975
13	Cold Room	6.00	Aluminium	1	1971
14	Hayshed	200.00	Corr GI	1	1971
15	Sheep Shed	90.00	Corr GI	1	1975
16	Glasshouse	85.00	Steel/Glass	1	1975
17	Covered Sale Yards	250.00	Corr GI	1	1969
18	Incinerator	60.00	Brick Veneer	1	1979
19	Sheep Shelter	90.00	Corr GI	1	1972
20	Sheep Shelter	90.00	Corr GI	1	1972
21	Farm Machinery Shed	110.00	Corr GI	1	1977
22	Storage Shed	110.00	Corr GI	1	1976
23	Water Storage/Pump House	18.00	Steel	1	1980
24	Chaff Cutting Building	72.00	Corr GI	1	1982
25	Flammable Liquids Store	30.00	Brick	1	

Total Area of Buildings: 3,661.72 sq m

Figure 60. CSIRO Badgerys Creek McMaster Laboratory – building schedule Division of Animal Health, 1995. Source: CSIRO (2020): Document part 17

7.3 Potential archaeological resource

7.3.1 Phases of development

The following phases of development were identified with regard to PAS 4:

- Phase 1: c.1810-1923 (Peripheral Agricultural Use)
- Phase 2: 1923-c.1990 (McMaster Field Station)

- 1990-Present (Abandonment).

Phase 1: c.1810-1923 (Peripheral Agricultural Use)

No development was identified in the study area during this phase, and it likely remained an open paddock. Potential archaeological evidence is likely limited to remains of land clearing (burnt tree boles, wash deposits), pastoral activities and grazing (fence lines, earthen tracks, ephemeral structures), and may potentially include isolated artefacts resulting from loss or discard.

Phase 2: 1923-c.1990 (McMaster Field Station)

The Superintendent's House (1966) was constructed within PAS 4 and remains extant today, as does the Water Storage/Pump House (1980).

The study area, fronting Elizabeth Drive, was located south of the core of the DAH complex. Development in these areas, as part of McMaster Field Station, appears to have been limited to establishment of fence lines, access tracks (gravel and/or paved), and dams.

Continued use of the site for agricultural pursuits may have impacted on or removed archaeological evidence from Phase 1.

Phase 3: c.1990-Present (Abandonment)

Several structures within the core of the DAH complex, outside the study area, were demolished. No further development was identified within the study area.

7.3.2 Historical archaeological potential

PAS 4 has low potential for historical archaeological evidence associated with land clearing in Phase 1 (burnt tree boles, wash deposits) and ephemeral evidence of pastoral activities in Phases 1 and 2 (ephemeral structures, and potentially isolated artefacts).

PAS 4 has low-moderate potential for landscaping evidence resulting from use in Phases 1 and 2, including access tracks (gravel and/or paved), dams, and fence lines.

7.4 Assessment of significance

Previous studies (Aurecon 2016:65) have identified that the McMaster Field Station may be of significance at a state or national level for the contribution made to the development of farming in Australia, and the site remains part of a significant cultural landscape.

7.4.1 NSW Heritage Criteria

Table 9 below considers the significance of the site's historical archaeological resources in response to the NSW Heritage Criteria.

Table 9. Assessment of potential archaeological remains against the NSW Heritage Criteria.

Criterion	Assessment
Criterion (a) *An item is important to the course, or pattern, of NSW's cultural or natural history (or the local area).*	The DAH marked the beginning of a new era of veterinary research in Australia and led to the development of Australia's international reputation for excellence in veterinary research. The anticipated archaeological resource is unlikely to substantively demonstrate this significant phase of veterinary research. The archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (b) *An item has strong or special association with the life or works of a person, or group of persons, of importance to NSW's cultural or natural history (or the local area).*	The McMaster Field Station was named in honour of Sir Frederick Duncan McMaster, who originally made a gift to the CSIRO for construction of the DAH's first laboratory. The anticipated archaeological resource is unlikely to demonstrate this significant association. As no further associations were identified, the archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (c) *An item is important in demonstrating aesthetic characteristics and/or a high degree of technical achievement in NSW (or the local area).*	McMaster Field Station is associated with several significant technical developments in the field of veterinary medicine and animal husbandry. The study area is outside of the core DAH complex where these developments would have occurred, and the archaeological resource is unlikely to demonstrate these technical achievements. The archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (d) *An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the local area).*	No potential cultural or social associations were identified during this assessment. The archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (e) *An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the local area).*	The anticipated archaeological resource may provide insight into landscape use and modification in Phases 1 and 2, though similar evidence would be available through research documentation from the CSIRO and historical aerials. Most of the study area appears to have remained enclosed paddock since the nineteenth century. Any potential archaeological resource has limited research potential, as a relatively recent and well-documented site owned by a government agency. The archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (f) *An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the local area).*	Evidence of experimental veterinary medicine and animal husbandry is rare within the state of NSW, and Australia more broadly. The anticipated archaeological resource, generally limited to ephemeral evidence of agricultural activities on the periphery of the McMaster Field Station, is not rare in the context of the local area or NSW more broadly.

Criterion	Assessment
	The archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (g) *An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or the local area).*	The archaeological resource is not substantive enough to be considered a representative example of any class of cultural place in NSW or the local area. The archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.

7.4.2 Bickford and Sullivan's questions

Can the site contribute knowledge that no other resource can?

The site was part of a government agency and a research facility. The activities that occurred on the McMaster Field Station are likely very well documented, with those documents being relatively accessible. The site is unlikely to contribute knowledge no other resource can.

Can the site contribute knowledge that no other site can?

The anticipated archaeological resource is limited to ephemeral evidence of pastoral activities and landscape modifications. The site is unlikely to contribute knowledge that no other site can, and this resource type is not rare in the context of western Sydney or NSW more broadly.

Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?

Evidence from the core of the DAH complex may answer substantive questions relating to the development of Australian veterinary medicine, but the anticipated resource within PAS 4 is limited to ephemeral evidence of agricultural activities and landscape modifications. This resource is unlikely to provide useful input into substantive questions relating to Australian history of other major research questions.

7.4.3 Summary statement of archaeological significance

While the McMaster Field Station site has been previously assessed as being of state or national significance for its historical, associative, and research values, as well as its rarity, any potential archaeological resource within PAS 4 is limited to ephemeral evidence of agricultural activities (likely limited to grazing) and landscape modifications (including access tracks, fence lines, and dams). The anticipated archaeological resource within PAS 4 is unlikely to demonstrate significant historical developments in veterinary medicine or the lives of the students and university staff who worked there. The anticipated archaeological resource is unlikely to meet the threshold for local significance.

7.5 Conclusion

PAS 4 has low to low-moderate potential for disturbed and limited, ephemeral evidence associated with animal grazing (Figure 61. This archaeological resource has been assessed as being of low heritage significance, unlikely to meet the threshold for local significance.

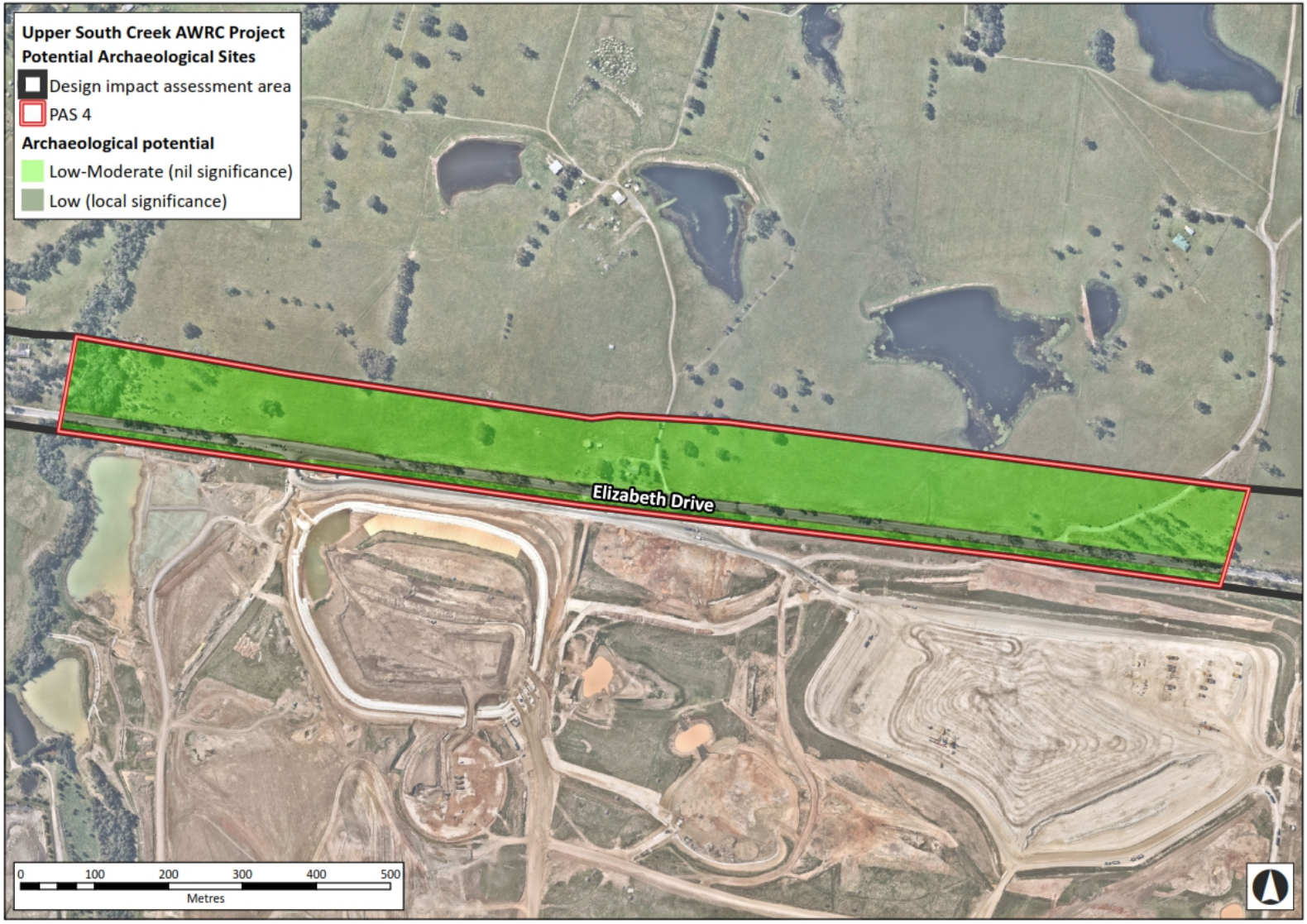

Figure 61. Assessed levels of historical archaeological potential and significance for PAS 4. Source: Near Map, Sydney Water, Extent

8. PAS 5—McGarvie Smith Farm

8.1 Overview

The former McGarvie Smith Farm is located at 1793-1951 Elizabeth Drive, Badgerys Creek, Lot 63 DP 1087838 (Figure 62) within the Penrith City Council LGA. As part of the project, the study area is limited to the southern portion of the site along the Elizabeth Drive frontage. McGarvie Smith Farm is listed on Schedule 5 of the *Penrith LEP 2014* (Item 857) and Schedule 2 of *SEPP (Western Sydney Aerotropolis) 2020* (I1).

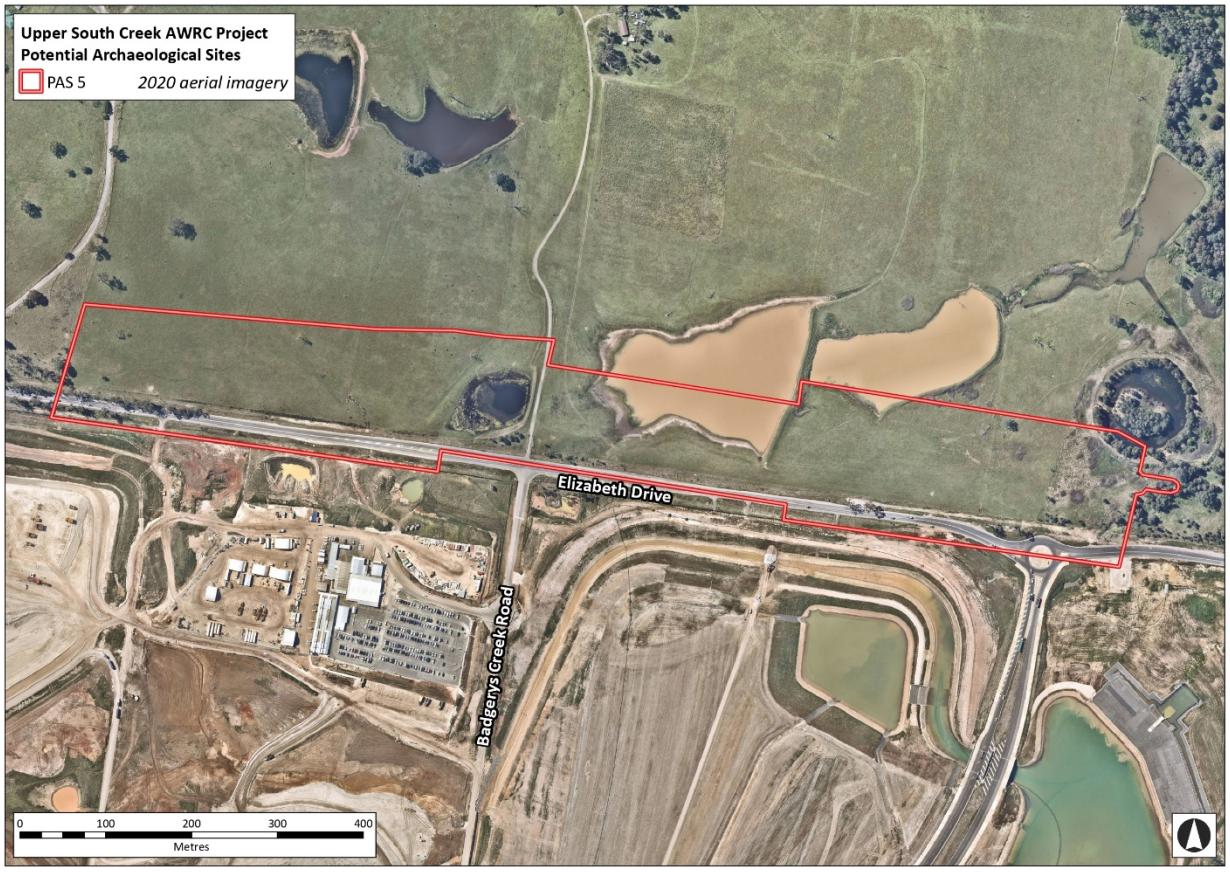

Figure 62. Location and extent of PAS 5. Source: LPI, Extent

8.2 Historical development

Date	Event
31 August 1819	The study area comprised part of a 500-acre land grant issued to William Johnson (Figure 63) (Paul Davies Pty Ltd 2007:14). Johnson was a free settler who had first acquired land at Emu Plains in 1807. This land, however, had been granted by the military administration following the coup on Governor Bligh. It was cancelled by Governor Macquarie, and he was granted the land at South Creek as compensation (CRM 2019:27).

Date	Event
1822	In the muster return of 1822, it appears that Johnson's grant of 1819 was described as covering 310 acres with an area of 10 acres under crop and the remainder used to run ninety-six head of cattle (Paul Davies Pty Ltd 2007:14). It is unknown whether or not Johnson lived at the site, as advertisements for various activities associated with him indicate that he was based at Windsor. The property at Badgerys Creek may have been leased to tenants. It is unknown whether any further improvements were made to the property at this time.
1825	Elizabeth Drive, which forms the southern boundary of the study area, was evident on historical maps and plans drafted by 1825. It was initially constructed as a corduroy road using logs as a base. The road was initially named Orphan School Road and later Mulgoa Road. In 1952 the name changed to Elizabeth Drive in honour of the visit of Queen Elizabeth II (CRM 2019:27).
April 1831	Johnson's land was sold to John Piper, who had purchased the land immediately to the north. The sale may have been brought about by Johnson's death (CRM 2019:28). Piper was a well known figure in Australian society, and Point Piper in Sydney was named for him. He was an officer in the NSW Corps and arrived in Sydney in 1792. He was a close friend of Governor Macquarie, who made Piper a magistrate. Piper owned Vaucluse House and land at what is now Point Piper where he built the luxurious Henrietta Villa. He owned substantial properties throughout the colony and the properties at Badgerys Creek are unlikely to have received much attention from Piper, other than as assets (CRM 2019:29).
1831	The land comprising the study area is sold to Edward Cox, who may have been the eldest son of Edward Cox of Fernhill, Mulgoa and grandson of William Cox, an early colonial road builder. Edward Cox was a renowned stock breeder of merino sheep, horses and cattle. His primary residence, however, was at Fernhill Mulgoa, so the study area was possibly used to run stock (CRM 2019:29).
25 November 1873	The land comprising the study area was sold to James Morrison. The property was popularly known as 'Morrison's Paddock', which may indicate the use of the site.
1914	The land comprising the study area was purchased by Norman Buffier, son of local dairyman and cattle dealer Daniel Buffier. The Buffier family was involved in the dairy business at Luddenham and St Marys over three generations. By the early decades of the twentieth century the family had amassed 4,000 acres of land, including the study area. The estate was named 'Bangaroo' and ran between 600 and 800 head of dairy cattle.
1915	The remaining timber within the study area was likely cleared by Buffier at this time. Buffier advertised for tenders for the purchase of standing and felled timber at his property on Badgerys Creek, including a large quantity of felled and seasoned timber cut to lengths. He advertised again in 1917 for removal of timber standing on the property, which included stringybark, ironbark and box trees (CRM 2019:30).

Date	Event
1936	A certain amount of the Bangaroo Estate was sold to the CSIRO in partnership with the University of Sydney. Eight-hundred acres of Bangaroo Estate were acquired, with 400 acres to be used by the university. Sale or transfer of Lots 62 and 63 DP 1087838 from the Commonwealth of Australia to the University of Sydney was formalised in a contract dated 5 February 1937 (CRMO 2019:32). Much of the funding for the development of the new farm was supplied by a generous benefactor, the McGarvie Smith Institute, named for the developer of the first long-life anthrax vaccine (John McGarvie Smith). Site preparation works began before the land was formally transferred to the University, including erecting fences, constructing dams and building the student barracks (CRM 2019:35).
1937	A dairy stable and milking shed were constructed, as was a large concrete silo of 85 tons capacity. A hay shed (with stables and machine shed), calf shed and piggery were also constructed in this phase (CRM 2019:38). Power was supplied to the property by Penrith Council in September.
1938	New additions to the farm included a shed, stable, bails, manure dump, dairy, cover to pump motors, bull shed, and lavatory. By September the farm had been cleared, subdivided into paddocks and approximately 200 acres had been cultivated, with crops conserved as hay, silage or grains and stored in tubs or pit silos. Approximately 30 acres was laid down as permanent pasture (CRM 2019:41). The farm formally opened on 8 September.
1940	The Director's Cottage was constructed, and the first director appointed was Mr Geddes. The cottage was a weatherboard house with tanks, a hot water system, electric light septic tank, and rubble drain.
1941	Funding was sought to fund livestock, a farm piggery, stock shelters, poultry sheds, equipment, water supply including dams, windmill, tank and stand, stallion shelter, stock yards, grain silo, dairy yards, crush, dairy renovations, planting and clearing (CRM 2019:41).
1947	Funding was granted for construction of a temporary animal hospital. An aerial photograph of the McGarvie Smith Farm shows a complex of buildings to the north of the study area and a large dam within PAS 5 (Figure 64).The dam was likely constructed in either 1936 or 1941.
1949	Expanded student accommodation was required and a new steel Amco shed with a thirty-foot span was purchased. Plans for a new staff cottage were developed, described as having a corrugated asbestos sheet roof, galvanised iron damp proofing, timber walls, asbestos cement partitions and concrete foundations. A kitchen and laundry were to be constructed in a separate building (CRM 2019:42-43). A permanent animal hospital was constructed on the site and consisted of seven rooms, horse boxes, a garage and animal wards. The hospital featured an iron roof, timber internal partitions and concrete foundations.
1950	A tennis court was constructed at the farm.

Date	Event
1951	Three new pre-fabricated cottages were purchased and erected as accommodation for staff, including the senior lecturer in veterinary medicine, the clinical officer and a temporary lecturer in animal husbandry (CRM 2019:44).
1955	Floods inundated the farm and the opportunity was taken to convert a wash out into a dam, construct a causeway, a new pumping channel and a new dam. At the end of 1955 funding was requested for the construction of garages at the farm clinic.
1960	The 'herringbone dairy' was constructed at McGarvie Smith Farm and included a tank stand and water supply, feeding stalls, lining, an extra stall, herringbone bails, manure tanks and a wash trough. It also required a cooler, can rack, shelter wall, connection to a manure sump, river water supply and electricity. An aerial photograph of the farm in 1961 shows the additions made to the farm complex north of the study area since 1947. Within PAS 5, additional development was limited to a vehicle access track from Elizabeth Drive and a range of dams constructed across study area (Figure 65). The land at the west end of PAS 5 appears to be under cultivation.
1970	The University owned a substantial number of properties in the region. With additional resources available the McGarvie Smith Farm as progressively less used (CRM 2019:48-49). An aerial photograph of the site in 1971 shows that additional dams were constructed in the 1960s at the north end of McGarvie Smith Farm, with large parts of the site under cultivation. No new development occurred in PAS 5.
1983	The farm was divided between a few uses. Veterinary Physiology used 178 acres while the remained was used for a water harvesting project which also entailed the running of a commercial dairy herd. A large number of agronomy projects were undertaken on the farm but non required more than one year's commitment and did not take up more than a few acres. The farm was declared surplus to the University's needs and considered for sale.

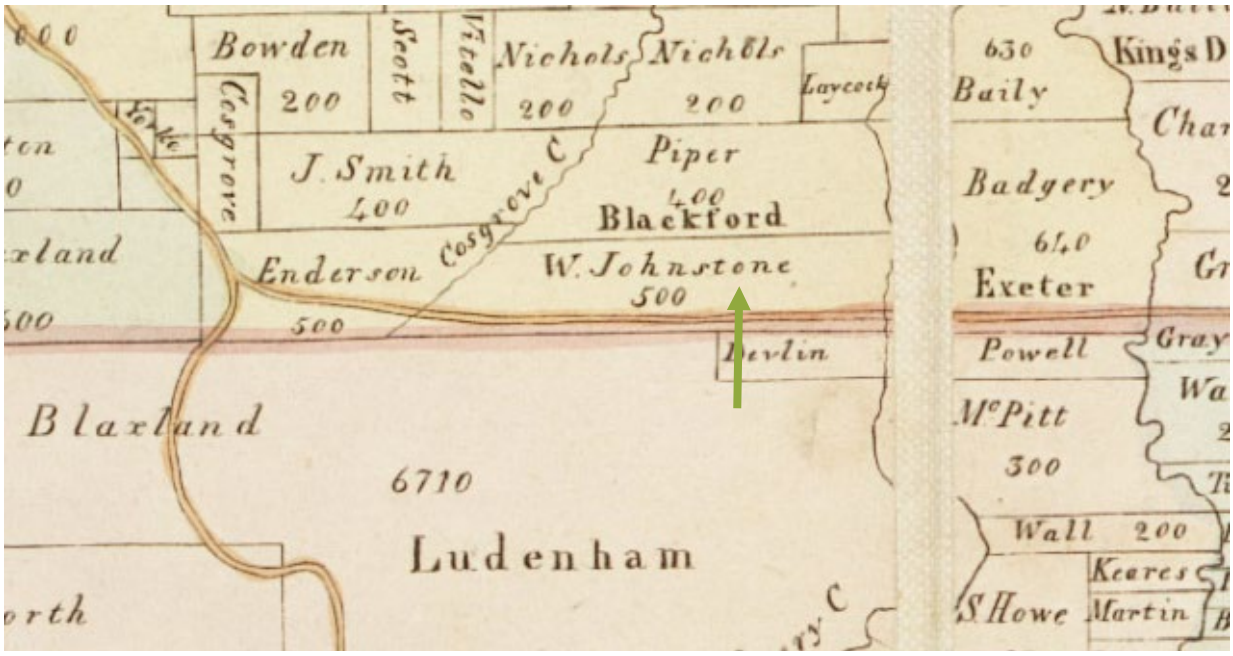

Figure 63. Parish map from 1840 showing the land grant that comprises the study area, with the approximate location of PAS 5 marked with a green arrow. Source: HLRV, Extent Heritage

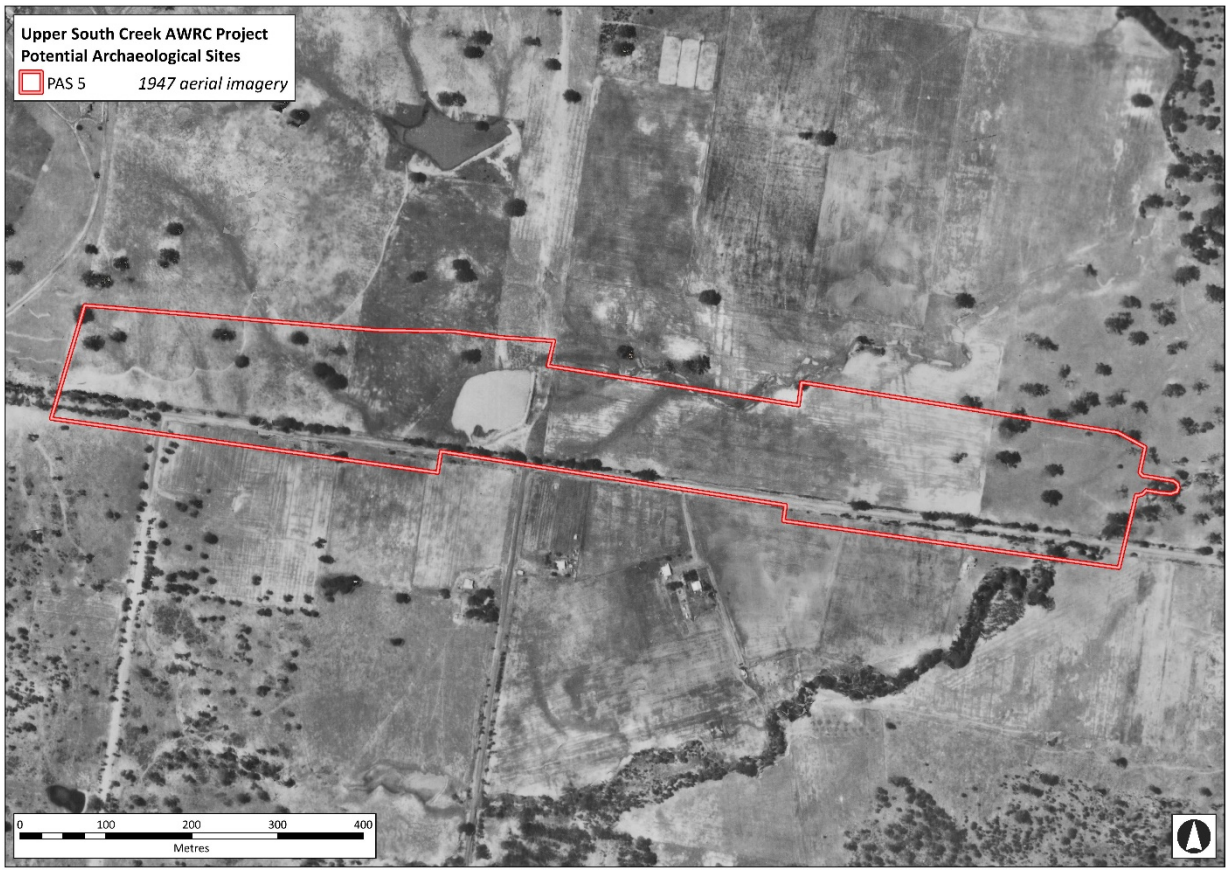

Figure 64. Aerial photograph of the McGarvie Smith Farm in 1947, with PAS 5 outlined in green. Source: LPI, Extent

Figure 65. Aerial photograph of the McGarvie Smith Farm in 1961 showing increased development of the farm complex to the north of PAS 5, approximate extent outlined white. Source: CRM 2019:77

8.3 Potential archaeological resource

8.3.1 Previous reports and investigations

One previous heritage assessment relevant to assessment of the study area's potential to contain historical archaeological relics was identified during research for the current report.

Heritage Assessment, Historic Period Resources – University of Sydney Western Sydney Lands, Cultural Resources Management (CRM) 2019

The study area is situated on land designated as 'Area 3' in the 2019 assessment by CRM. This part of the site was identified as having had no identifiable structures or other elements built upon it, with the exception of dams added in the 1950s. A site survey and historical research for that study identified the core of the McGarvie Smith Farm as being located to the

north of the PAS 5. It identified no potential archaeological sites associated with the McGarvie Smith Farm occupation phase, or earlier phases of land use, within the study area.[2]

8.3.2 Phases of development

The following phases of development were identified with regard to PAS 5:

- Phase 1: William Johnson's land grant (1819-1831)
- Phase 2: Edward Cox's estate (1831-1873)
- Phase 3: Morrison's Paddock (1873-1914)
- Phase 4: Bangaroo Estate (1914-1936)
- Phase 5: McGarvie Smith Farm (1935-1985).

No development was identified within the study area for Phases 1 through 4. PAS 5 was generally used as an ancillary grazing property or paddock to the estate owner's main landholdings. The potential historical archaeological resource for Phases 1 through 4 might consist of ephemeral evidence of pastoral and agricultural activities, including palynological materials within the soil profile, tree boles and wash deposits resulting from land clearing, fence lines evidenced through post holes, and may potentially include isolated artefacts resulting from loss or discard.

The core of the McGarvie Smith Farm was situated to the north of the study area. In Phase 5, a dam was constructed within the study area in 1936 or 1941, with further dams constructed between 1947 and 1961. Excavation and earthworks to facilitate dam construction would have been a major impact to any archaeological evidence associated with use in Phases 1 through 4 within the study area. Construction of the vehicle track within the study area in Phase 5, and any upgrades or repairs made to it, are likely to have further impacted archaeological evidence resulting from earlier phases of use.

Evidence associated with drainage and irrigation systems established in conjunction with the dams and water harvesting system may extend into the study area. Extensive and intensive agricultural activities are likely to have impacted on any ephemeral evidence associated with earlier land use phases (some of which are described above).

8.3.3 Historical archaeological potential

Taking into consideration historical information presented above and analysis of visible, past land use, PAS 5 is assessed as having low potential to contain intact historical archaeological deposits and remains associated with any past use and occupation, with the exception of a vehicle track constructed between 1947 and 1961 and irrigation or drainage systems

[2] Cultural Resources Management, 'Heritage Assessment, Historic Period Resources – University of Sydney Western Sydney Lands, Badgerys Creek Farm Centre, Elizabeth Drive, Badgerys Creek', report prepared for University of Sydney in April 2019, p 82.

established in Phase 5 following construction of dams. As a result of disturbance in Phase 5, there is low potential for archaeological evidence associated with initial land clearing and subsequent agricultural or pastoral uses in Phases 1 through 4.

8.4 Assessment of significance

8.4.1 NSW Heritage Criteria

Table 10 below considers the significance of the site's historical archaeological resources in response to the NSW Heritage Criteria.

Table 10. Assessment of potential archaeological remains against the NSW Heritage Criteria.

Criterion	Assessment
Criterion (a) *An item is important to the course, or pattern, of NSW's cultural or natural history (or the local area).*	Ephemeral evidence of agricultural use and irrigation lines would not be important in the course of pattern of cultural history in the region. The anticipated archaeological resource is **unlikely to meet the threshold for significance** under this criterion.
Criterion (b) *An item has strong or special association with the life or works of a person, or group of persons, of importance to NSW's cultural or natural history (or the local area).*	The anticipated historical archaeological resource within the study area is unlikely to demonstrate any significant historical associations with the site, such as with William Johnson or John Piper. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (c) *An item is important in demonstrating aesthetic characteristics and/or a high degree of technical achievement in NSW (or the local area).*	The McGarvie Smith Farm was the site of many technological advances in the fields of animal husbandry and horticultural practices. These technical achievements are unlikely to be demonstrated by the anticipated archaeological resource in the study area, and is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (d) *An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the local area).*	No associations with community or cultural groups have been identified. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (e) *An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the local area).*	Disturbed ephemeral evidence of agricultural activities and modern irrigation lines have low research potential and would not contribute to an understanding of the cultural history of the region. Any potential archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (f)	Evidence of agricultural activities would not be considered rare within the area. The anticipated archaeological resource is

Criterion	Assessment
An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the local area).	**unlikely to meet the threshold for local significance** under this criterion.
Criterion (g) *An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or the local area).*	The potential archaeological resource, limited to evidence of a modern irrigation system and disturbed ephemeral evidence of agricultural activities, would not be important in demonstrating the principal characteristics of a cultural place or environment. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.

8.4.2 Bickford and Sullivan's questions

Can the site contribute knowledge that no other resource can?

The site was a research facility associated with both a university and government agency. The activities that occurred on the McGarvie Smith Farm are likely very well documented, with those documents being relatively accessible. The site is unlikely to contribute knowledge no other resource can.

Can the site contribute knowledge that no other site can?

The anticipated archaeological resource is limited to disturbed evidence of agricultural activities and landscape modifications. The site is unlikely to contribute knowledge that no other site can, and this resource type is not rare in the context of western Sydney or NSW more broadly.

Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?

Evidence from the core of the McGarvie Smith Farm complex may answer substantive questions relating to the development of cutting-edge agricultural and pastoral practices in NSW and Australia. The anticipated resource within PAS 5 is limited to disturbed, ephemeral evidence of agricultural activities and landscape modifications. This resource is unlikely to provide useful input into substantive questions relating to Australian history of other major research questions.

8.4.3 Summary statement of archaeological significance

The anticipated archaeological resource along the southern boundary of the McGarvie Smith Farm site has little or no research potential as a result of extensive and intensive agricultural activities that would have impacted on or removed any ephemeral evidence associated with earlier phases of land use. The historical archaeological resource is unlikely to meet the threshold for local significance under any of the Heritage Council criteria.

8.5 Conclusion

PAS 5 has low potential for disturbed and truncated historical archaeological evidence associated with agricultural activities on the periphery of both the McGarvie Smith Farm and estate of William Johnson. The anticipated archaeological resource has been assessed as having low heritage significance, being unlikely to meet the threshold for local significance (Figure 66).

Figure 66. Assessed levels of historical archaeological potential and significance for PAS 5. Source: Near Map, Sydney Water, Extent

9. PAS 6—Exeter House and Farm

9.1 Overview

The former Exeter Farm site is located at 1669-1723 Elizabeth Drive, Badgerys Creek, Lot 5 DP 860456 (Figure 67) within the Penrith City Council LGA. As part of the project, the study area extends across the southern site boundary for the western half of the property, then extends to the northeast along South Creek.

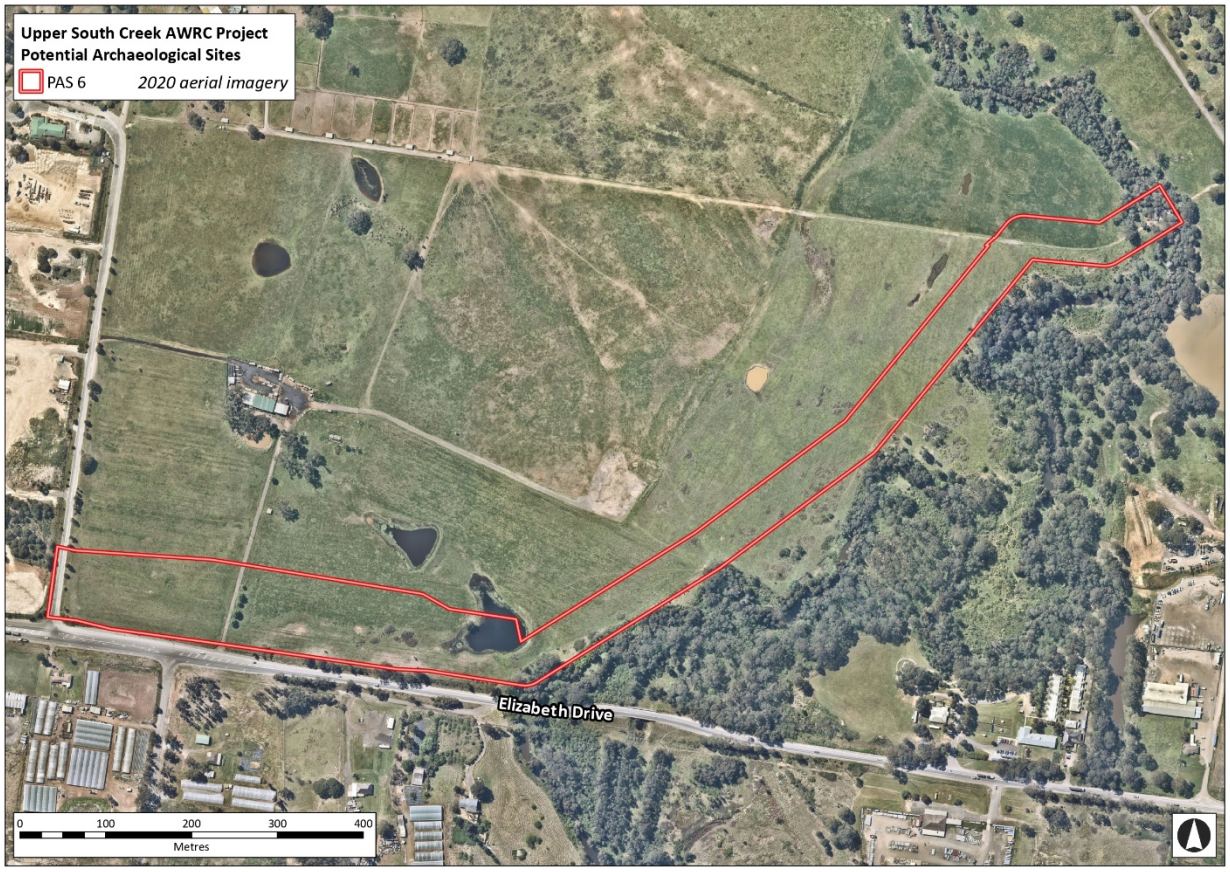

Figure 67. Location and extent of PAS 6. Source: LPI, Extent

9.2 Historical development

Date	Event
25 August 1812	James Badgery, after whom Badgerys Creek is named, received a grant of 640 acres (Primary Application 24574). Badgery had arrived in the colony in 1799 in the employ of William Paterson of the NSW Corps. Badgery named the grant Exeter Farm after his English birthplace, and used this large grant to establish a farming enterprise that evolved over the nineteenth century into agricultural company Pitt Son & Badgery (Paul Davies Pty Ltd 2007:13).

Date	Event
	Badgery was a racing enthusiast and stud-master of some skill. Badgery, along with William Emmett and Nicholas Bayly, played a notable role in the development of the racing industry in NSW (Paul Davies Pty Ltd 2007). PAS 6 includes part of the lands associated with Exeter House, which was James Badgery's primary residence constructed c.1810.
c1820	A large number of convicts are listed as being in the employ of James Badgery at South Creek from 1822, predominantly men (or boys) (*Convict Assignments*, State Archives NSW).
22 October 1823	James Badgery's land passes to Henry Badgery and Mary Ann Badgery.
1 January 1854	The title of the land comprising PAS 6 was acquired from the Badgerys by James Boyd McKaughan (Primary Application 24574).
5 November 1855	The property was conveyed to Joseph McMullen (Roads and Maritime Service 2019:137).
18 September 1860	The property was transferred from Joseph McMullen to William Sharpe (Roads and Maritime Service 2019:137).
12 July 1913	The property was transferred to Donald Bruce MacIntyre (Roads and Maritime Service 2019:137).
February 1916	Exeter Farm is shown as being subdivided into three parcels of land, with one parcel at the north end of the site and two parcels fronting Elizabeth Drive.
24 December 1920	The two parcels of land which formerly comprised the southern part of Exeter Farm were purchased by H. C. Bowden.
1923	The parcel of land north of PAS 6, containing Exeter House, was purchased by William Gibb.
1972	A Parish of Claremont map shows the study area in the ownership of M. J. Nobbs.
1974	The main residence at Exeter House was demolished, at which time it was partially excavated in a search for relics.
2010	An ancillary residence associated with Exeter House was demolished.

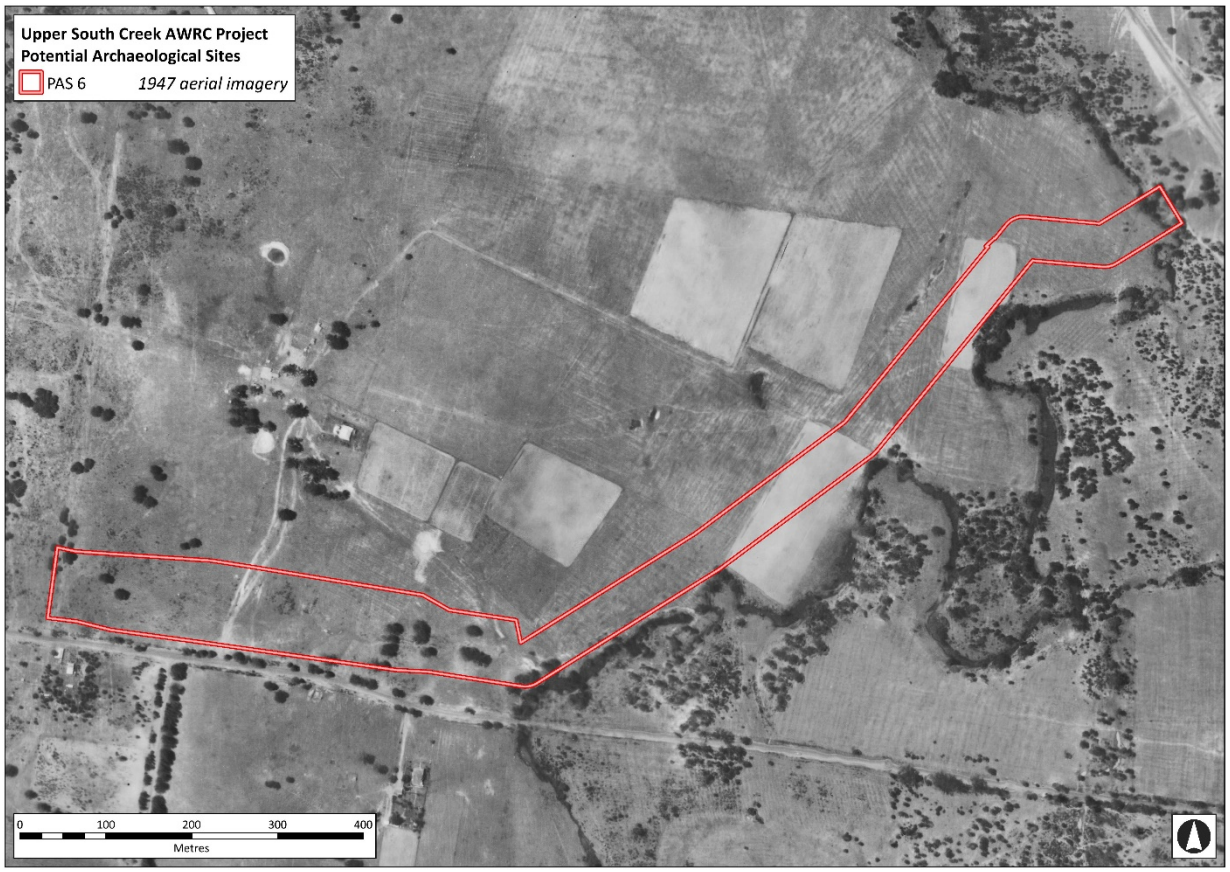

Figure 68. Aerial photograph of PAS 6 in 1947. Source: LPI, Extent

9.3 Potential archaeological resource

9.3.1 Phases of development

The following phases of development were identified with regard to PAS 6:

- Phase 1: 1812-1854 (Exeter Farm)
- Phase 2: 1854-1913 (Agricultural and pastoral use)
- Phase 3: 1913-Present (Subdivided with continued pastoral use).

Exeter House and the Exeter Farm complex were established north and west of PAS 6 in Phase 1. The only historical development identified within the study area is the establishment of the access track to Exeter Farm. Following initial land clearing, the study area's use through all phases of development has been limited to agricultural or pastoral use.

9.3.2 Historical archaeological potential

PAS 6 formed part Badgery's Exeter farm, but no development or establishment of specialised cultivation areas or gardens in the early colonial phase were identified within the study area. The archaeological resource is likely sparse and widely dispersed across the greater

landscape of Exeter Farm, with the core of the homestead and associated features being located to the north and west of the study area. PAS 6 has low potential for historical archaeological evidence of land clearing (burnt tree boles, wash deposits), may potentially include isolated artefacts lost or discarded during agricultural or pastoral use of the site, and ephemeral structures used to support crop cultivation or grazing activities. There is also low potential for evidence of landscaping and cultivation (field drains, fence lines, access tracks) from all phases of use.

9.4 Assessment of significance

9.4.1 NSW Heritage Criteria

Table 11 below considers the significance of the site's historical archaeological resources in response to the NSW Heritage Criteria.

Table 11. Assessment of potential archaeological remains against the NSW Heritage Criteria.

Criterion	Assessment
Criterion (a) *An item is important to the course, or pattern, of NSW's cultural or natural history (or the local area).*	Exeter Farm was an early colonial homestead and estate in the region and holds significance in the context of regional development and cultural history. Intact evidence of historical cultivation and land management would demonstrate the transition to longstanding use as agricultural land after European invasion. Archaeological remains would be of **local significance** under this criterion.
Criterion (b) *An item has strong or special association with the life or works of a person, or group of persons, of importance to NSW's cultural or natural history (or the local area).*	Exeter Farm is associated with James Badgery and his family. This association is unlikely to be demonstrated by the site's anticipated archaeological resource, and it is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (c) *An item is important in demonstrating aesthetic characteristics and/or a high degree of technical achievement in NSW (or the local area).*	No technical achievements were identified within the study area, and ephemeral evidence of agricultural and pastoral use is unlikely to demonstrate significant aesthetic characteristics. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (d) *An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the local area).*	No associations with community or cultural groups have been identified. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (e) *An item has potential to yield information that will contribute to*	Ephemeral evidence of agricultural activities may provide insight into land management activities, crops cultivated and the

Criterion	Assessment
an understanding of NSW's cultural or natural history (or the local area).	management of livestock. Any potential archaeological resource would be of **local significance** under this criterion.
Criterion (f) *An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the local area).*	Evidence of agricultural activities would not be considered rare within the area. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (g) *An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or the local area).*	Ephemeral evidence of agricultural activities would not be important in demonstrating the principal characteristics of a cultural place or environment. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.

9.4.2 Bickford and Sullivan's questions

Can the site contribute knowledge that no other resource can?

Evidence of land clearing, crops grown (ethnobotanical and palynological evidence) and management of animals would provide insight into activities at the site not readily available through other resources.

Can the site contribute knowledge that no other site can?

Evidence of colonial landscape modifications, grazing and land in cultivation is not rare in the greater Sydney region, and the knowledge this site might contribute could be gained at a range of other sites.

Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?

The anticipated resource within PAS 6 is limited to ephemeral evidence of agricultural activities and landscape modifications. This resource is unlikely to provide useful input into substantive questions relating to Australian history or other major research questions.

9.4.3 Summary statement of archaeological significance

Exeter Farm comprises part of an early colonial landscape and estate, first granted to James Badgery in 1812. Ephemeral evidence of historical land clearing, cultivation of crops and management of grazing animals at Exeter Farm would be of local significance for its historical and research values.

9.5 Conclusion

PAS 6 has low potential for historical archaeological evidence of local significance associated with James Badgery's c.1812 Exeter Farm (Figure 69).

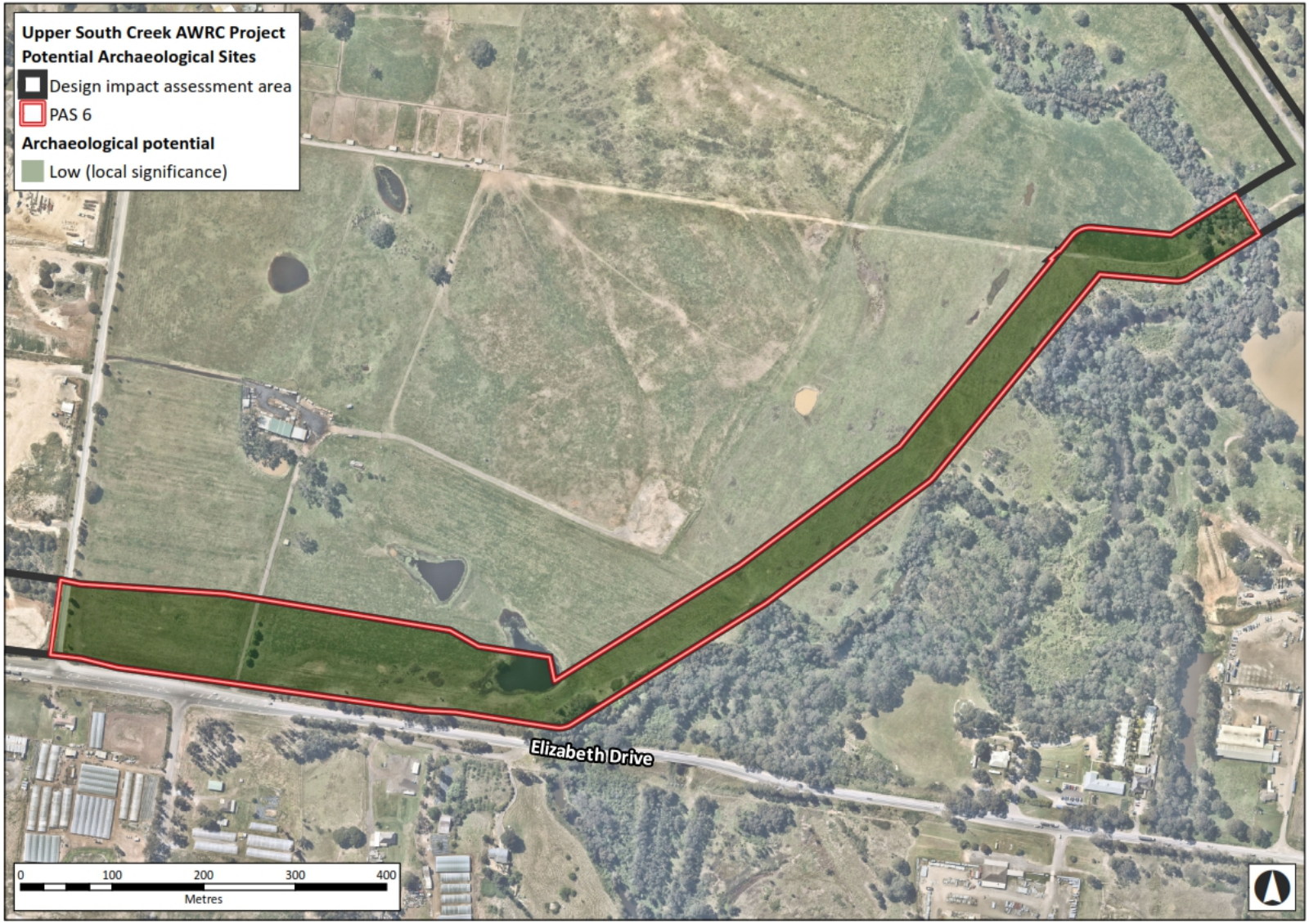

Figure 69. Assessed levels of historical archaeological potential and significance for PAS 6. Source: Near Map, Sydney Water, Extent

10. PAS 7—Fleurs Radio Telescope Site

10.1 Overview

The former Fleurs Radio Telescope Site is located at 885A Mamre Road, Kemps Creek, Lot 21 DP 258414 (Figure 70) in the Penrith City Council LGA. The study area for the project is limited to the eastern half of the property. The site is listed on Schedule 5 of the *Penrith LEP 2014* (Item 832) and Schedule 2 of *SEPP (Western Sydney Aerotropolis) 2020* (I1).

Figure 70. Location and extent of PAS 7. Source: LPI, Extent

10.2 Historical development

Date	Event
1805	The land comprising PAS 7 was first granted to Nicholas Bayly. Bayly had arrived in NSW in 1798 as a member of the NSW Corps, though he resigned in 1803. He also played a central role in the coup against Governor Bligh and was barred from public office by Governor Macquarie. Bayly accumulated over 2,500 acres of land in the Kemps Creek area, with the name 'Bayly Estate' applied to the entire combined estate (CRM 2019, 51).

Date	Event
1814	The house associated with Bayly's estate was built in 1814 and still exists in greatly modified form at 919-929 Mamre Road, Kemps Creek, to the east of the study area (CRM 2019, 51). There is no evidence for what improvements Bayly made within PAS 7, other than he may have cleared it (CRM 2019:51).
1826	The property comprising PAS 7 is purchased by Richard Jones, who is credited with naming it 'Fleurs'.
1852	A detailed catalogue of the property in 1852 offers some insight into the activities occurring on the estate, and the 'improvements' to the site included the following: ▪ stone dwelling house; ▪ stone outbuildings, including a sunken dairy, store, butcher's shop, harness room, still room and wine room with cellar; ▪ equine-associated outbuildings, including a large coach house, large and small stables, extensive cart sheds, and loose boxes for horses; ▪ tool room; ▪ brick-built smith's shop; ▪ staff accommodation, including four brick rooms for labourers, brick gardener's cottage, and four huts for men; ▪ two large barns, including one Dutch barn; ▪ further agricultural outbuildings, including calf pens, pig sties, fowl houses, milking yards and stock yards (CRM 2019, 53). Nearly all these outbuildings were situated within a 15-acre area centred on the house, outside PAS 7 and the study area on the opposite (east) side of Kemps Creek.
1882	The land comprising Fleurs Estate was first subdivided, with 200 acres of the estate divided into 20-acre rural allotments. Further subdivision occurred in 1888, 1894, 1895, and 1906, though not all allotments were taken up.
1890s	Much of the homestead and surrounding buildings, to the east of the study area, were modified to enable their use as a commercial dairy and the Fleurs Butter Factory.
1942	Construction of the Fleurs Aerodrome began to the southeast of PAS 7 during World War II on behalf of the Royal Australian Air Force (RAAF). 'Parent' aerodromes were major bases or had many satellite aerodromes or landing grounds. The Fleurs Aerodrome formed part of a proposal to establish a base of the United States Navy Fleet Air Wing in Sydney, should the need arise (Roads and Maritime Service 2019:104). Activities associated with construction and use of the aerodrome are evident within PAS 7 in an aerial photograph, with evidence of potential land clearing to establish a second landing strip along the northeast site boundary. There is no evidence of structures associated with the aerodrome within PAS 7 (Figure 71).

Date	Event
1945	The property was purchased by butchers Joseph Bawn and Richard Stone, with the study area presumably used to run cattle (CRM 2019, 54-59).
1954	Work by Bernard Mills with the CSIRO identified that the Kemps Creek area was the most suitable location in Sydney to establish a cross-antenna for use in radio astronomy research. Land for construction of the Mill Cross Telescope was leased from Bawn and the telescope was operational from 1956.
1956-1958	A second (Shain Cross) and third (Chris Cross) telescope were constructed on the Fleurs property.
1959	Further property was leased from Bawn to increase the size of the field station (CRM 2019, 61-65).
1963	The University of Sydney leased the land from Bawn and was gifted the existing radiophysics field station by the CSIRO.
1991	Several cross installations were removed and the Fleurs Radio Telescope Site was effectively closed.
1998	The station was assessed as being surplus to the requirements of the university.

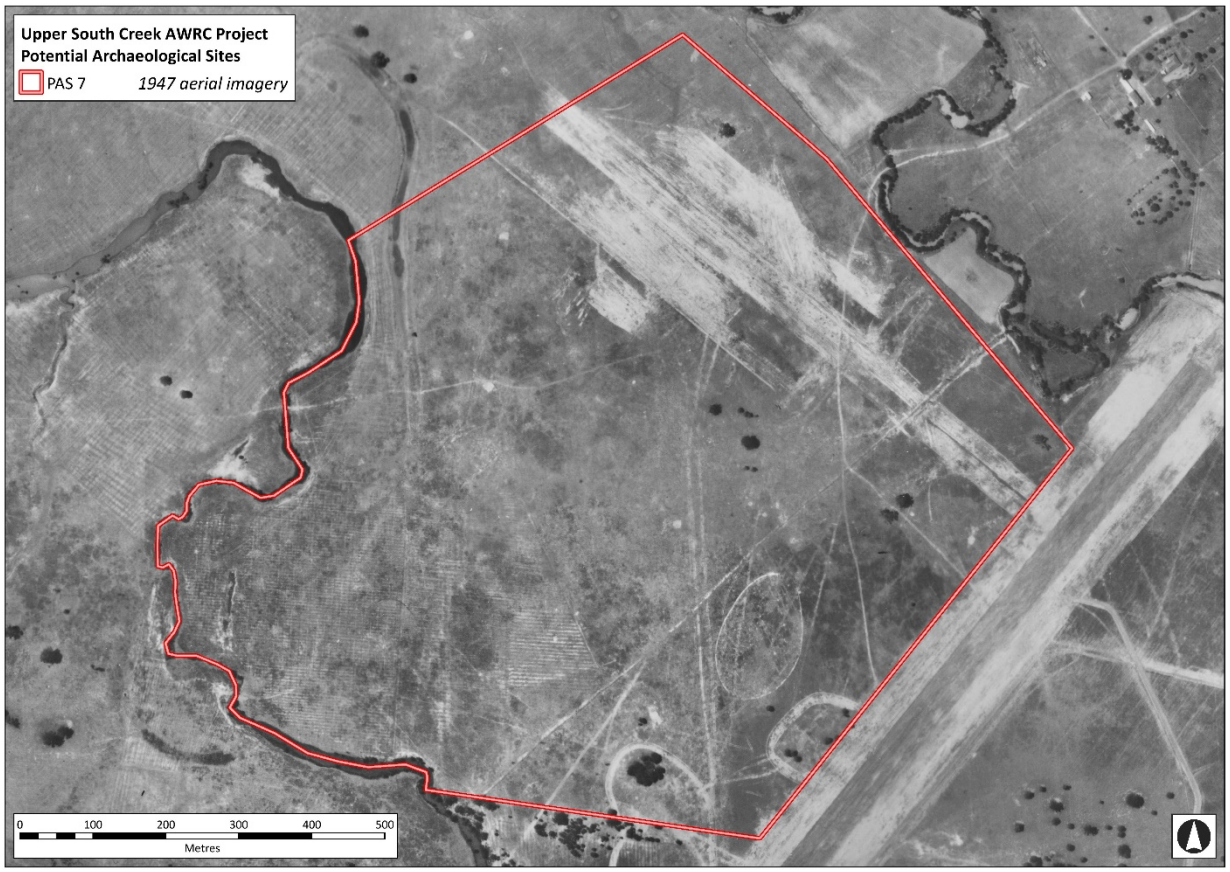

Figure 71. Aerial photograph of PAS 7 in 1947 showing land clearing and levelling in association with the Fleurs Aerodrome.

10.3 Potential archaeological resource

10.3.1 Previous reports and investigations

One previous heritage assessment relevant to assessment of the study area's potential to contain historical archaeological relics was identified during research for the current report.

Heritage Assessment, Historic Period Resources – University of Sydney Western Sydney Lands, Cultural Resources Management (CRM) 2019

PAS 7 falls within survey Areas 9 through 13 in CRM's heritage assessment of the Fleurs Radio Telescope Site. The archaeological resources associated with each area is drawn from CRM's 2019 report and presented in Table 12 below.

Table 12. Summary of survey findings at Fleurs Radio Telescope Site (CRM 2019:90-91)

Area	Description
09	*This area…encompassed substantial areas of brambles some in association with evidence from the radio physics improvements. The latter includes what may have been two signal boxes connected to an antenna, one of the parabolic antenna now fallen, some unidentified foundations near the creek, services and cables that emerge from underground trenching and a timber pole that may have brought electricity to the*

Area	Description
	array. There is also evidence of two timber bridges that crossed South Creek at different places; now collapsed it is impossible to accurately date them.
10	*This area only produced evidence of isolated bramble patches.*
11	*This area contained evidence of telescope arrays including unidentifiable foundations, power poles, two and possibly three foundations that may have been the site of parabolic antennae, a building complex encompassing two sheds, foundations for other buildings, landscape, drainage and other service works, foundations for machinery related to the arrays. There was a second building group that encompassed two sheds, the smaller having some remnant equipment as well as services. A third large building group included a large derelict cottage, out-buildings, landscape works, services and drainage as well as evidence of machinery and other works related to the array. In another part of the area was a single collapsed shed with the foundations of what appeared to be a second shed close to it with remnant equipment. There were isolated finds in the fields of foundation bases, conduits and service pits. There were numerous areas of brambles and evidence of the 2005 programme of demolition and clearance. There was also evidence of a small building that might have predated the telescope arrays.*
12	*This area had isolated bramble patches, one timber power pole, a cattle grid and an unidentified foundation.*
13	*This area contained the single upright parabolic antenna as well as unidentified foundations around it, a number of timber electricity poles, a large shed and clear evidence of the 2005 demolition programme as well as isolated brambles.*

CRM (2019) identified that PAS 7 likely contains extensive works associated with the radiophysics field station, including cables, services and hydraulics that enabled the above-ground arrays to operate. These materials have limited potential to provide new insight into the operations of the telescope installations, particularly as they are highly truncated and fragmentary. Written documents and plans would provide a better understanding of how these operated (CRM 2019: 116). They would also be considered 'works', as defined by the Heritage Act, and not afforded protection under the 'relics provision' of the Heritage Act. Construction of these subsurface elements is also likely to have resulted in localised removal of archaeological evidence associated with the Fleurs Estate.

Potential archaeological sites associated with historical occupation in the first half of the nineteenth century were identified to the western side of the former Fleurs Radio Telescope Site, outside of PAS 7 (CRM 2019:102).

10.3.2 Phases of development

The following phases of development were identified with regard to PAS 7:

- Phase 1: 1805-1826 (Bayly's Estate)
- Phase 2: 1826-1846 (Fleurs Estate)
- Phase 3: 1846-1954 (Ephemeral agricultural use)

- Phase 4: 1954-1991 (Fleurs Radio Telescope Site).

Phases 1-3 (1805-1954)

Limited development was identified within PAS 7 in Phases 1 through 3, though the land was cleared of trees and used for animal grazing. Anticipated archaeological evidence would be limited to evidence of land clearing (burnt tree boles and wash deposits), landscape modifications to enable grazing (dams, tracks, fence lines), and may potentially include isolated artefacts resulting from loss or discard.

Partial land clearing and levelling to construct a second airstrip associated with the Fleurs Aerodrome appears to have occurred during World War II, though construction appears never to have been completed. No further development associated with the Fleurs Aerodrome was identified within PAS 7 and clearing of the land for the airstrip is likely to have removed any archaeological remains within its footprint.

Two timber bridges spanning South Creek found by CRM during survey were likely constructed during these phases, though it was not possible to phase them accurately as both bridges have since collapsed (CRM 2019:90).

Phase 4 (1954-1991)

Survey of the site, as well as analysis of historical aerials, indicates a large suite of above and below surface remnants of the telescope installations and associated research infrastructure, including staff accommodation, sheds, and an extensive range of services installed to enable operation of the telescopic arrays.

Installation of subsurface cables, service pits, hydraulics and machinery to operate the arrays is likely to have impacted on historical archaeological evidence resulting from pastoral use of the site in Phases 1 through 3.

10.3.3 Historical archaeological potential

The study area remained on the periphery of the former Fleurs Estate. PAS 7 has generally low potential for historical archaeological evidence associated with land clearing (burnt tree boles and wash deposits), landscaping (fence lines, dams, tracks), and pastoral activities (isolated artefacts) from the early nineteenth century through to the middle of the twentieth century. There is high potential for evidence of two timber bridges constructed crossing South Creek, likely in Phase 1 to 3, including headwalls, spans, approaches, piers, struts, bolsters, and shoring in two localised areas along South Creek.

There is high potential for archaeological evidence of the Fleurs Radio Telescope Site, including subsurface cables, machinery foundations, service pits, remnants of staff accommodation, and structural evidence of the former telescopic arrays. This evidence is, however, likely highly fragmentary, truncated and of generally poor intactness and integrity as a result of site clearing and remediation in the early twenty-first century.

10.4 Assessment of significance

10.4.1 NSW Heritage Criteria

Table 13 below considers the significance of the site's historical archaeological resources in response to the NSW Heritage Criteria.

Table 13. Assessment of potential archaeological remains against the NSW Heritage Criteria.

Criterion	Assessment
Criterion (a) *An item is important to the course, or pattern, of NSW's cultural or natural history (or the local area).*	Fleurs Estate one of the earliest and most significant properties in the region, renowned for its agriculture, pastoral works and viticulture, as well as dairying at the end of the nineteenth century. However, ephemeral evidence of land clearing and pastoral use would not be important in the course of pattern of cultural history in the region. The anticipated archaeological resource associated with Fleurs Estate **would not meet the threshold for significance** under this criterion. If the timber bridges in South Creek were associated with the earlier stages of Fleurs Estate (Phases 1 and 2) they would be significant as elements connecting a large and dispersed early estate. If the bridge were constructed in Phase 1 or 2 they would be of **state significance** under this criterion, while if they were constructed in Phase 3 they would be of **local significance** under this criterion. The Fleurs Field Station is of pre-eminent importance for its role in the development and innovation of radio astronomy in Australia. This significance is not, however, likely reflected in the anticipated truncated and disturbed archaeological remains associated with this use of the site. The archaeological resource associated with the Fleurs Field Station is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (b) *An item has strong or special association with the life or works of a person, or group of persons, of importance to NSW's cultural or natural history (or the local area).*	Fleurs Estate was established by Nicholas Bayly, who was a member of the NSW Corps in the early days of the colony and played a central role in the coup against Governor Bligh. The Fleurs Field Station has associations with Mills, Christiansen and Shain, pioneers in radio astronomy, as well as the CSIRO division of radio astronomy and University of Sydney more broadly. As the site's archaeological resources are likely disturbed or truncated, the anticipated archaeological resource is unlikely to demonstrate these significant associations. The archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (c) *An item is important in demonstrating aesthetic characteristics and/or a high degree of technical achievement in NSW (or the local area).*	CRM (2019) indicate that more than 99% of the site elements have been removed. The remnant service cables and structural footings of the telescope arrays are unlikely to demonstrate the high level of technical achievement accomplished at the Fleurs Field Station.

Criterion	Assessment
	Ephemeral evidence of grazing and pastoral land use in Phases 1 and 2 would not demonstrate aesthetic characteristics or technical achievement. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (d) *An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the local area).*	No broader social or cultural group associations were identified with regard to the potential historical archaeological resource. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (e) *An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the local area).*	Disturbed ephemeral evidence of pastoral use and land clearing at Fleurs Estate is unlikely to yield new information to contribute to our understanding of cultural history in NSW or the local area. This resource is **unlikely to meet the threshold for local significance** under this criterion. If evidence of the timber bridges were associated with Fleurs Estate in Phases 1 or 2 they would provide insight into the construction techniques, materials and architectural design of early timber bridges in the colony. Evidence of timber bridges from Phases 1 or 2 would be of **state significance** under this criterion, while evidence of bridges from Phase 3 would be of **local significance**. Given the truncated and disturbed nature of the archaeological resource (as a result of extensive clearing and removal programs) sub-surface evidence of radio telescope function is unlikely to be legible enough to answer well considered specialist research questions. As well, the site (as part of both the CSIRO and University of Sydney) would be extensively documented, with the findings of archaeological investigations unlikely to add substantive new information. Any potential archaeological resource associated with Fleurs Field Station is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (f) *An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the local area).*	Evidence of land clearing and pastoral activities would not be considered rare within the area. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion. Intact evidence of early timber bridges is rare in NSW. If the bridges were constructed in Phases 1 or 2, they would be of **state significance** under this criterion. The Fleurs Field Station is a rare site in the context of NSW. The anticipated archaeological resource—disturbed evidence of services, mechanical mounts, service pits and concrete footings—would not be considered rare in the context of twentieth-century industrial sites. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.

Criterion	Assessment
Criterion (g) *An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or the local area).*	The remaining anticipated archaeological resource is of poor intactness and integrity and unlikely to demonstrate the principal characteristics of any type of cultural place. This resource would be **unlikely to meet the threshold for local significance** under this criterion.

10.4.2 Bickford and Sullivan's questions

Can the site contribute knowledge that no other resource can?

The site was a research facility associated with both a university and government agency. The activities that occurred at the Fleurs Radio Telescope Site are likely very well documented, with those documents being relatively accessible. The site is unlikely to contribute knowledge no other resource can.

Early timber bridges on private estates were not thoroughly documented, and archaeological remains of timber bridges and their construction has the potential to contribute knowledge no other resource can.

Can the site contribute knowledge that no other site can?

The anticipated archaeological resource from Phases 1 through 3 is limited to disturbed evidence of agricultural activities and landscape modifications. The site is unlikely to contribute knowledge that no other site can, and this resource type is not rare in the context of western Sydney or NSW more broadly.

Evidence of early timber bridges in NSW is a rare resource in NSW, and there was likely a certain amount of variability in design and construction across colonial estates and towns. Intact evidence of bridge construction could contribute knowledge that no other site can.

Archaeological evidence associated with the Fleurs Radio Telescope Site does comprise a rare resource, however the disturbed nature of the resource has rendered it unlikely to contribute new knowledge of the operations of the site, or the life of its occupants. The site is unlikely to contribute knowledge that no other site can.

Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?

Evidence of disturbed, ephemeral evidence of pastoral activities and landscape modifications in Phases 1-3 is unlikely to provide useful input into substantive questions relating to Australian history or other major research questions.

Similarly, highly disturbed and truncated evidence of the Fleurs Radio Telescope Site is unlikely to contribute to major research questions.

Remains of the timber bridges, particularly if constructed in the early nineteenth century, would contribute to substantive research questions relating to transport and the management of large colonial estates.

10.4.3 Summary statement of archaeological significance

Disturbed ephemeral evidence of pastoral activities and landscape modifications associated with Fleurs Estate is unlikely to demonstrate any significant associations or provide new information relating to historical activities at the site. Most of the anticipated archaeological resource for Fleurs Estate is not likely to meet the threshold for local significance.

Evidence of the collapsed timber bridges on South Creek have the potential to demonstrate historical construction techniques, selection of building materials, and more broadly the management of the landscape on large colonial estates. If constructed in Phases 1 or 2, archaeological evidence of the timber bridges would be of state significance for their historical and research values, as well as their rarity. If the timber bridges were constructed in Phase 3, they would be of local significance for their historical and research values.

The Fleurs Radio Telescope Site has been previously assessed as being a cultural landscape of national significance (CRM 2019:116). The landscape and former radio telescope installations have strong historical and associative values, as well as rarity. The resulting archaeological resource is, however, highly disturbed and truncated as a result of previous clearing activities and remediation. The associated archaeological resource does not sufficiently demonstrate historical significance or significant associations, nor is it likely to resolve any useful or insightful research questions. The archaeological resource associated with Fleurs Radio Telescope Site is unlikely to meet the threshold for local significance.

10.5 Conclusion

PAS 7 has low potential for disturbed ephemeral archaeological evidence associated with Fleurs Estate unlikely to meet the threshold for local significance. It has high potential for evidence of Fleurs Radio Telescope Site which is similarly unlikely to meet the threshold for local significance on the basis of extensive disturbance and removal of key elements.

PAS 7 has high potential for the remains of two timber bridges on South Creek which would be of local or state significance, depending on the phase during which they were constructed. Figure 72 presents the assessed levels of historical archaeological potential and significance within the study area, depicting the potential for archaeological remains of at least local significance.

Figure 72. Assessed levels of historical archaeological potential and significance for PAS 7, with two areas of high potential for archaeological remains of local or state significance. Source: Near Map, Sydney Water, Extent

11. PAS 8—Upper Canal

11.1 Overview

The portion of the Upper Canal system comprising PAS 8 is located at Elizabeth Drive, Cecil Hills, and includes parts of Lots 11 and 12 DP 1055232 (Figure 73) within the Liverpool City Council LGA. The Upper Canal is listed on the NSW SHR (SHR No. 01373), Schedule 5 of the *Liverpool LEP 2008* (Item 15), and Schedule 1 of the *SEPP (Western Sydney Parklands) 2009* (Item 7), which also includes the Liverpool Offtake Reservoir (Item 12).

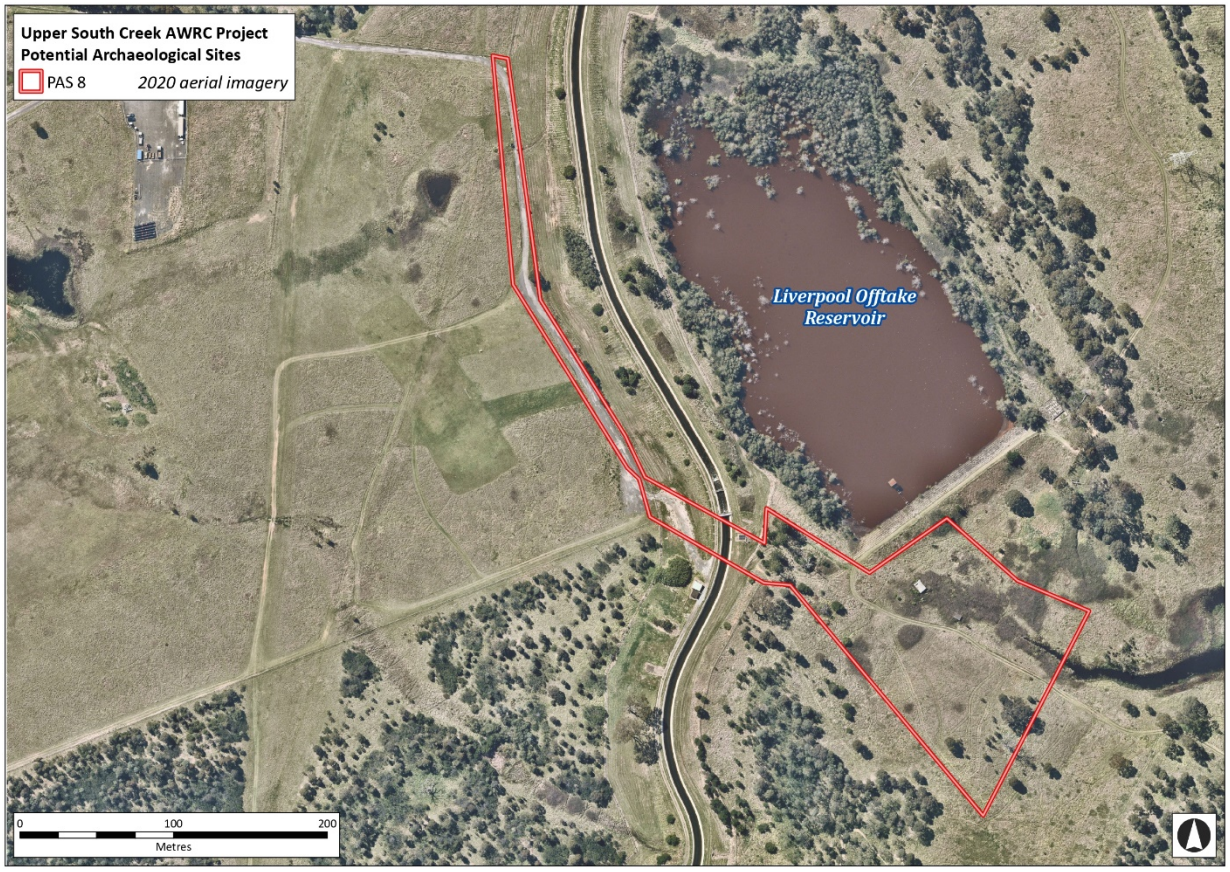

Figure 73. Location and extent of PAS 8. Source: LPI, Extent

11.2 Historical development

Date	Event
1816	The site comprised part of a 2,000 acre land grant made to John Wylde. Wylde's 'Cecil Hills Farm' was one of the earliest farms in the Liverpool district. He was also granted 50 acres of land on Pott's Point, Sydney, where he built a palatial home which he kept for many years (McKay 1967). Sir John Wylde was born in London in 1781 and developed a successful legal career after studying at Trinity College, Cambridge. He accepted a

Date	Event
	position as deputy judge advocate of New South Wales in 1815 and was appointed Vice-Admiralty Court there (McKay 1967). He and his family arrived in Sydney on 5 October.
1818-1824	The Cecil Hill homestead was constructed with a range of ancillary outbuildings. The house and many of the outbuildings remain extant, including a kitchen block, stables, cow bails, shearing shed, privies and farm sheds (Neustein and Associates 1992:4.9; OCP Architects 2013:12) The site was generally used as a cattle farm, with much of the 2,000 acre grant used for grazing (OCP Architects 2013:13). The farm itself was operational by 1818, as Wylde was contracted that year to supply 6,000 pounds of meat to the government stores (OCP Architects 2013:31).
1822	Wylde applied to clear further land on his estate and was employing convict clearing gangs to undertake this work by February (OCP Architects 2013:32).
1825	Wylde departed the colony for England, but the estate remained highly successful with a substantial number of staff (OCP Architects 2013:32).
1827	Wylde was knighted and appointed chief justice of the new court of the Cape of Good Hope, South Africa (McKay 1967).
1859	Ownership of Cecil Hills Farm passes to Wylde's ex-wife Elizabeth following his death (OCP Architects 2013:29).
1864	Following Elizabeth Wylde's death, Cecil Hills Farm became badly run down. At the time of her death there were very few staff and the stock comprised only a heifer, a mare and her foal (OCP Architects 2013).
1880-1881	Land resumed for construction of the Upper Canal system.
7 April 1891	Ten acres of land and site of the Liverpool Dam resumed for the Liverpool Water Supply, with the dam in operation that year (County of Cumberland LTO Charting Map, 1894).
1892-1900	Gradual subdivision of the land comprising Cecil Hills Farm north of Mulgoa Road (OCP Architects 2013:1).
11 July 1893	Eighteen acres of land surrounding Liverpool Dam resumed for the Liverpool Water Supply.
1930	An aerial photograph of PAS 8 in 1930 shows the dam following construction, as well as the site of a maintenance worker's cottage to the south.
July 1932	Unemployed relief workers were employed to raise the earth bank of the dam by 10 feet, at which time it was also faced with concrete slabs on upstream face (Government Architects Office 2016:126).
1947	An aerial photograph of PAS 8 in 1947 shows two small structures within the study area (Figure 74).

Figure 74. Aerial photograph of PAS 8 in 1947 showing two small structures built within the study area (marked with white arrows), as well as the site of a maintenance workers' cottage to the south of the study area (circled in white). Source: LPI, Extent

11.3 Potential archaeological resource

11.3.1 Previous reports and investigations

The site is located in Section 10, which includes the 'Liverpool Dam Precinct' of the Upper Canal system, as identified in the CMP prepared for the site (Government Architects Office 2016). The site of a former maintenance cottage (Item 10.12) is located to the southeast of the study area and would not be impacted by the project (Government Architects Office 2016:185). The site of the cottage is marked by fencing, a tank stand and possible skid hut, while concrete footings, paths and a septic tank associated with the cottage remain extant (Government Architects Office 2016:206).

A historical archaeological assessment of the Upper Canal completed by Higginbotham, Kass, Murphy, Collocott, Fianer and Lavelle (2002) similarly only identified the former cottage site as the only potential archaeological item in proximity to PAS 8. Broadly, across the Upper Canal system, identified archaeological sites relate to worker accommodation, either as construction camps or residences established to enable the ongoing maintenance and operation of the canal (Government Architects Office 2016:204).

11.3.2 Site inspection

A site inspection of Section 10 of Upper Canal and Liverpool Offtake Reservoir was carried out on 4 November 2020. The following observations were made:

- The area is partially within and bounded by Western Sydney Parklands to the north, south and east, and by Sydney International Shooting Centre to the west.
- Section 10 of Upper Canal comprises a raised ridgeline of ground that the canal sits within. The canal is concrete lined and the ground either side of the canal system is grassed. On the western side of the canal is a concrete and gravel roadway. A roadway cuts down the western side of the area towards the fence line separating Upper Canal and the Sydney International Shooting Centre.
- To the east of the Upper Canal within the area of interest is a winch and grate system to allow filtration of the Upper Canal waters. The grates cover deep sumps which connect the Upper Canal to Liverpool Offtake Reservoir to the east.
- To the south of the area of the interest, and to the east of the Upper Canal, is a water tank stand, concrete footings for a house and a brick and concrete pad for a garage, being features associated with the former maintenance cottage (Item 10.12).
- The Liverpool Offtake Reservoir is to the east of Upper Canal. The area of interest is around the south-western and southern sides of the Reservoir. This area was observed to be heavily vegetated with thick grass cover. Roadways leading into the area from Upper Canal and to the south were mown grass.
- A concrete pad was observed to the south of reservoir and to the north of two extant structures.
- The two extant structures consisted of a small white fibro building and a small red brick building to the south. The small brick building was likely one of the structures constructed between 1930 and 1947. These structures were associated with management and chlorination of the reservoir. A large drain cover was observed to the south of the red brick structure.
- On the western side of the study area, to the south-west of the reservoir, a tank stand was observed up the hill. Thick vegetation made visibility low but no other structural features were observed near the tank stand.
- A drainage or overflow channel was observed on the reservoir wall. This channel appeared to run south from the reservoir to a swampy area at the southern extent of the study area. Vegetation was too thick to observe how far the channel continued south or if it was lined.

Figure 75. View north along Upper Canal. Upper Canal is visible as the raised line of ground curving around from the right.

Figure 76. View south along Upper Canal.

Figure 77. View south-east of a winch and grate system on the eastern side of the canal, connecting Upper Canal to Liverpool Offtake Reservoir.

Figure 78. Concrete footings to the west of the canal and south of the study area.

Figure 79. View west of concrete pad, part of a brick and concrete construction for a garage south of the study area.

Figure 80. View north east of Liverpool Offtake Reservoir.

Figure 81. Concrete pad observed to the south of Liverpool Offtake Reservoir, north of the extant structures

Figure 82. View to the south along mown grass roadway and two extant structures on the left.

Figure 83. View north east of extant fibro structure surrounded by thick vegetation.

Figure 84. View north east of red brick structure.

Figure 85. View west of tank stand to the south-west and up the slope from the reservoir.

Figure 86. View south of brick lined sump forming part of an overflow channel on the reservoir wall, southern side of reservoir.

11.3.3 Phases of development

The following phases of historical development were identified with regard to PAS 8:

- Phase 1: 1816-1881 (Cecil Hills Farm); and
- Phase 2: 1881-Present (Upper Canal).

Phase 1 (1816-1881)

No development was identified within PAS 8 during Phase 1. The study area comprised part of a vast estate used for grazing cattle, with the homestead and core of the farming buildings located 2.4km east of PAS 8. Anticipated historical archaeological evidence would be limited to evidence of land clearing (burnt tree boles, wash deposits), landscaping to accommodate grazing (fence lines, dams), and isolated artefacts resulting from loss or discard.

Phase 2 (1881-Present)

The land for the Upper Canal was resumed in 1880, with construction completed by 1888. Land for the Liverpool Dam (extant within the site) was resumed in 1891 and 1893 to assist with securing Liverpool's water supply, with the dam constructed in the 1890s. Work was completed in the 1930s to raise the level of the dam by 10 feet, and small structures of unidentified use were constructed within PAS 8 between 1930 and 1947.

Earthmoving to construct the Upper Canal and Liverpool Dam is likely to have impacted or removed archaeological evidence from Phase 1.

The anticipated archaeological resource from this phase includes evidence of large-scale cutting and filling episodes, remains of access tracks, and evidence of ancillary structures associated with operation of the upper canal.

11.3.4 Historical archaeological potential

The site has low to no potential for historical archaeological evidence associated with Cecil Hills Farm in Phase 1, with the anticipated resource limited to evidence of land clearing, landscaping to accommodate grazing, and isolated artefacts resulting from loss or discard.

The areas within the immediate vicinity of the Upper Canal have low-moderate potential for historical archaeological evidence associated with operation and maintenance of the Upper Canal, including flumes, culverts, trash racks, control installations, and offtakes diverting to the Liverpool Dam. To the south and east of the Upper Canal, the site has low-moderate potential for evidence of cutting and filling to construct the Liverpool Dam, surfaces associated with former tracks, and high potential for remains of a c.1940 shed or maintenance structure.

11.4 Assessment of significance

11.4.1 NSW Heritage Criteria

Table 14 below considers the significance of the site's historical archaeological resources in response to the NSW Heritage Criteria.

Table 14. Assessment of potential archaeological remains against the NSW Heritage Criteria.

Criterion	Assessment
Criterion (a) *An item is important to the course, or pattern, of NSW's cultural or natural history (or the local area).*	Archaeological evidence associated with the Upper Canal would demonstrate a significant development in the provision of fresh drinking water to the greater Sydney region. Provision of potable water is a central concern to any settlement, and this system operated for over 125 years without substantial alteration through to the twenty-first century. Archaeological evidence associated with the Upper Canal would be of **state significance** under this criterion.
Criterion (b) *An item has strong or special association with the life or works of a person, or group of persons, of importance to NSW's cultural or natural history (or the local area).*	Construction of the Upper Canal is strongly associated with Edward Orpen Moriarty, head of the Harbours and Rivers Branch of the NSW Public Works Department, who was a key figure in the development of plans for Sydney's water supply in the 1870s and 1880s. Operation of the Upper Canal is strongly associated with the Board of Water Supply and Sewerage (later Metropolitan Sewerage and Drainage Board), a powerful and influential government body (Government Architects Office 2016:14). Archaeological evidence of key original components of the Upper Canal would be of **state significance** under this criterion.
Criterion (c) *An item is important in demonstrating aesthetic characteristics and/or a high degree of technical achievement in NSW (or the local area).*	The Upper Canal represents a major advance in the management of water sources, with detailed and varied engineering construction techniques established prior to the introduction of reinforced concrete. It demonstrates ingenious nineteenth-century hydraulic engineering, in particular for its design as a gravity-fed water supply system spanning difficult terrain (Government Architects Office 2016:14). Archaeological evidence associated with the Upper Canal would be of **state significance** under this criterion.
Criterion (d) *An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the local area).*	No community or cultural groups with significant associations have been identified. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (e) *An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the local area).*	Elements directly associated with the original construction and operation of the Upper Canal could provide new insight into the functioning of the canal and its associations with the adjacent landscape. Evidence of the original construction of the Upper Canal would be of **state significance** under this criterion. Archaeological remains of two structures built in association with the Liverpool dam may provide some insight into their function

Criterion	Assessment
	and operations of the dam in the context of the Upper Canal. Evidence of changing elements within the Upper Canal would provide some insight into changing water management practices. These elements would be of **local significance** under this criterion.
Criterion (f) *An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the local area).*	A gravity-fed water system such as the Upper Canal is rare in the context of NSW and Australia more broadly. Archaeological evidence associated with the Upper Canal would be of **state significance** under this criterion.
Criterion (g) *An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or the local area).*	As part of a rare or uncommon resource, the anticipated archaeological resource would not be considered representative, and as such would be **unlikely to meet the threshold for local significance** under this criterion.

11.4.2 Bickford and Sullivan's questions

Can the site contribute knowledge that no other resource can?

As part of a major public infrastructure project, the Upper Canal system is likely very thoroughly documented in historical plans and project specifications, though infrastructure projects are not always constructed exactly to specification. Archaeological remains are likely to provide limited evidence of deviation from the final designs.

Can the site contribute knowledge that no other site can?

The Upper Canal is a rare resource and has the potential to contribute knowledge that no other site in NSW can regarding large-scale, gravity-fed water management systems from the nineteenth century. It has the potential to contribute knowledge that no other site can.

Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?

Access to fresh water is a key aspect of human life and human history, and the anticipated archaeological resource could provide knowledge relevant to major research questions relating to water management.

11.4.3 Summary statement of archaeological significance

The Upper Canal system was a feat of engineering and provided a consistent supply to the greater Sydney region utilising gravity-fed technology for over 125 years. Archaeological evidence associated with the early stages of construction and operation of the Upper Canal system would be of state significance for their historical, associative, technical and research values, as well as their rarity.

Archaeological evidence of progressive changes to the Upper Canal to enable its ongoing maintenance and use through the twentieth century is of local significance for its historical and research values.

11.5 Conclusion

PAS 8 has low-moderate potential for archaeological evidence of state significance associated with the establishment and early operations of the Upper Canal. It also has low-moderate potential for archaeological evidence of local significance associated with upgrades to the Upper Canal and Liverpool Dam, with one localised area of high potential for evidence of a structure associated with operation of the Upper Canal (Figure 87).

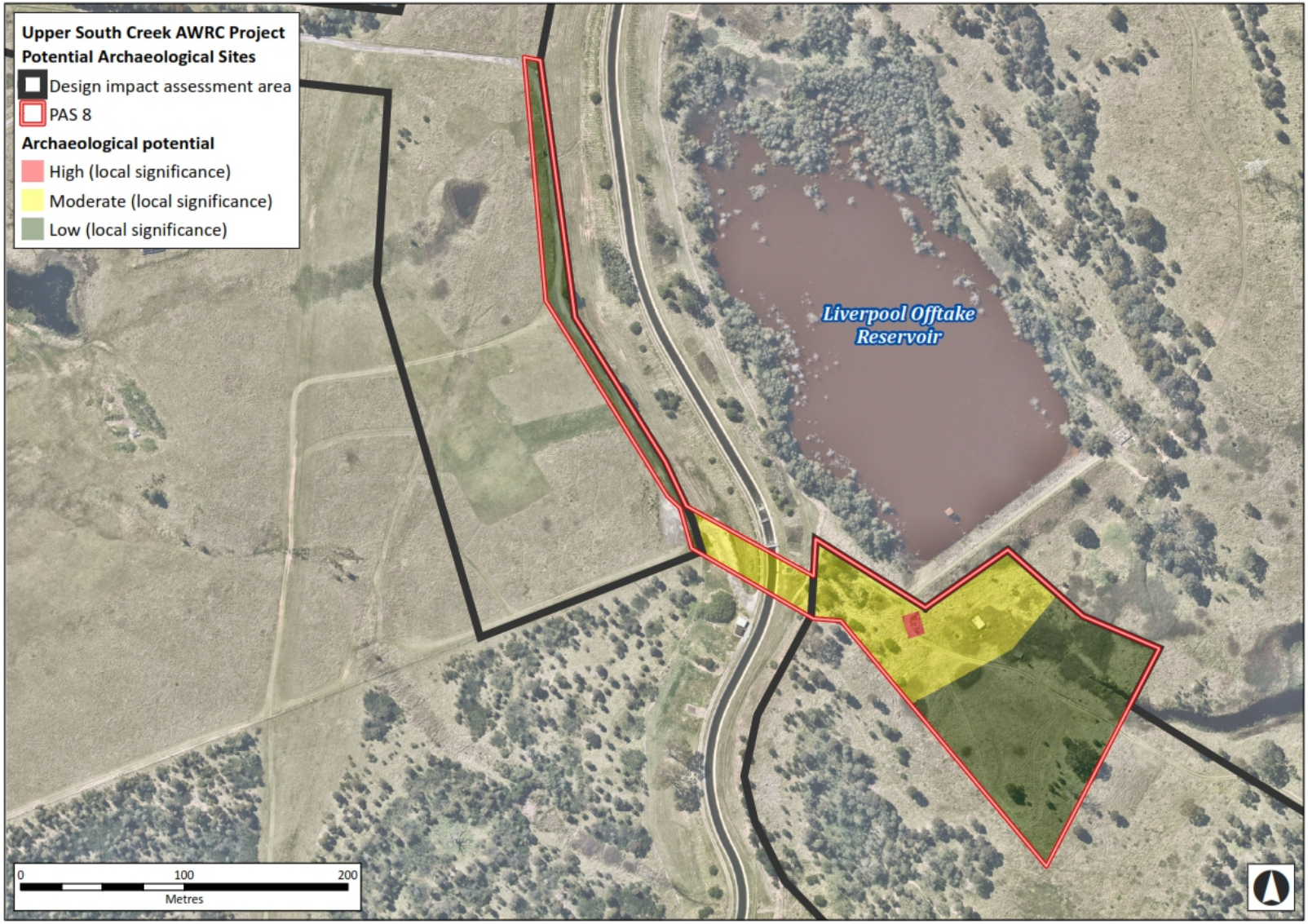

Figure 87. Assessed levels of historical archaeological potential and significance for PAS 8. Source: Near Map, Sydney Water, Extent

12. PAS 9—Lennox Reserve

12.1 Overview

PAS 9 is located within Lennox Reserve on the Hume Highway, Canley Vale, within the Fairfield City Council LGA (Lot A DP33027). Lennox Reserve is associated with construction of the Lansdowne Bridge, which spans Prospect Creek to the east of PAS 9. Lansdowne Bridge was constructed using convict labour between 1834 and 1836 (RTA 2002:9).

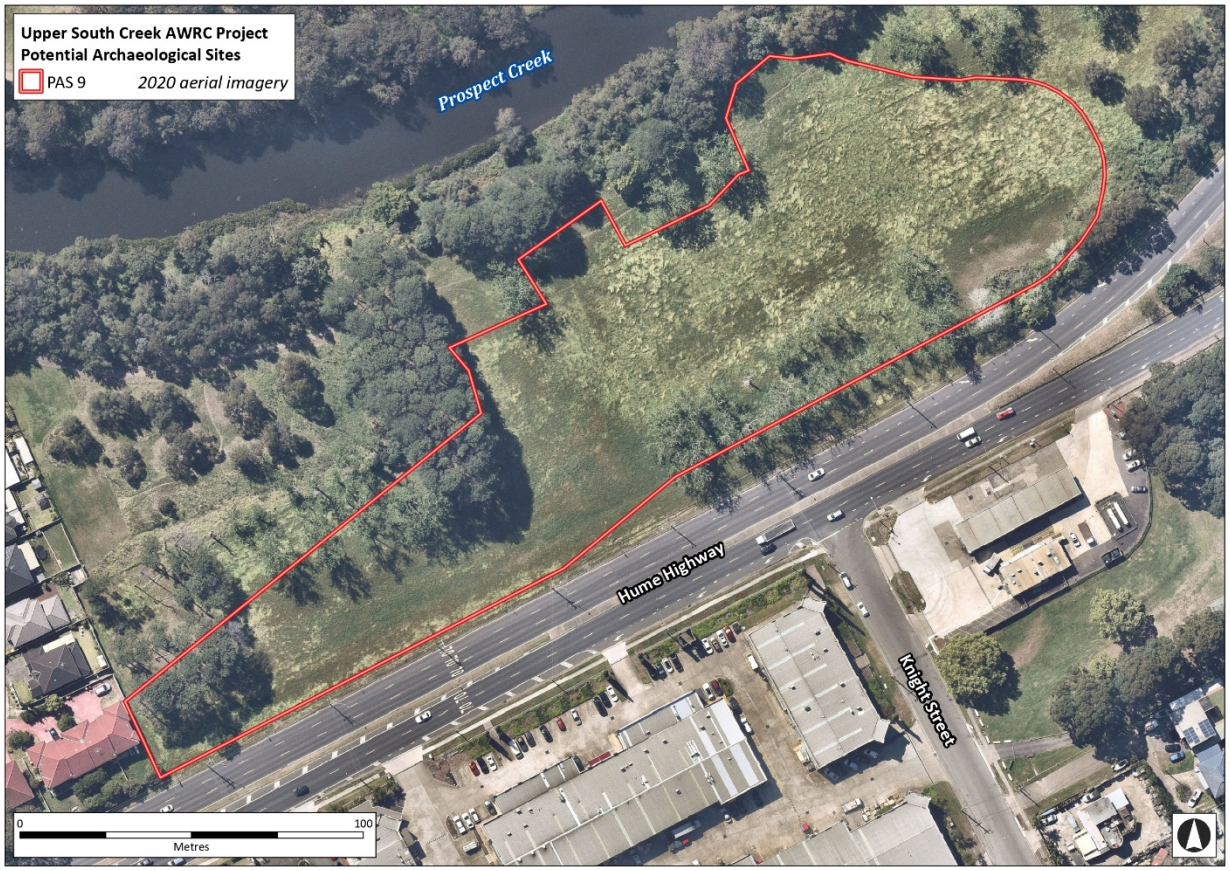

Figure 88. Location and extent of PAS 9. Source: LPI, Extent

12.2 Historical development

Date	Event
1806	The Great Southern Road, now Hume Highway, was partly formed in 1806, and a low-level timber bridge known as 'Bowler's Bridge' was erected ('Historic Lansdowne Bridge', *The Biz,* 10 July 1957:23).
1807	James Bowler arrived in the colony of NSW as a convict on the *Duke of Portland* and was granted a Ticket of Leave (*Convicts Index 1791-1873*, INX-65-88495).

Date	Event
1811	James Bowler was emancipated or offered a pardon (*Tickets of leave, emancipation and pardon records 1810-1819*, INX-37-150).
1830	James' son Samuel Bowler is listed as the Publican's license holder for The Greyhound (*Publicans' Licenses Index* 1830-1861, INX-69-365). Publican licenses are only available from this date, and the pub could have been established significantly earlier.
Prior to 1832	The Bowler family conducted the Greyhound Inn on the southwest side of Bowlers Bridge, which crossed Prospect Creek (Kass 1993:6). The inn was located west of the study area within what is now residential development. This was the first inn established in the Fairfield district, and it stood near the rough timber bridge which carried the Southern Road across Prospect Creek. It was the ideal location for an inn, as all travellers headed to Sydney had to cross the bridge, while it was also near Dog Trap Road (now Woodbridge Road), which led to Parramatta (Vance 1991).
1832	David Lennox, who was born in Scotland in 1788 and trained as a stonemason, emigrated to Australia. He immediately found employment with the government (RTA 2002:9). The timber bridge at Southern Road and Prospect Creek was frequently flooded and damaged, and a decision was made to construct a stone bridge and a sum of £1,083 was allocated for its construction. Lennox was appointed as overseer because of his success on other works projects (RTA 2002:10). Lennox asked to retain the convicts who had worked well on the Lapstone Bridge and asked the Governor to permit removal of their irons for the remainder of their sentences (RTA 2002:10).
June 1833	Lennox was appointed 'Superintendent of Bridges' by Governor Bourke (RTA 2002:9).
August 1833	The Bowlers had been running the Greyhound Inn for several years when they received the first in a series of land grants that amounted to 120 acres on the Southern Road, adjacent to the bridge on the southern side (including PAS 9) (Primary Application 13788). The land grant of 40 acres including PAS 9, and site of the Greyhound Inn, was made to emancipated convict James Bowler (Figure 89).
1 January 1834	The foundation stone for the new bridge was laid by Governor Bourke, and construction of the bridge commenced.
26 January 1836	The bridge was nearing completion, and Governor Bourke established a date for an opening ceremony. The bridge actually opened several months later following completion of the toll house, also designed by Lennox, and constructed on the north side of the bridge (RTA 2002:10). The complex also included milestones associated with Turnpike Road (Higginbotham 1993:9). Recollections of the bridge opening indicate a committee of 'country gentlemen and other important settlers' was appointed to make arrangements for a ceremony, including a luncheon, agricultural display and procession across the bridge. An improvised banquet hall of tree boughs was created for the elite, and the 'Guvment men' were given extra rations. The Greyhound Inn ran out of rum (Cramp 1934:123).
c1840	Samuel Bowler remained the licensed publican, but the inn was renamed 'The Queen Victoria' (*Publicans' Licenses Index* 1830-1861, INX-69-377).

Date	Event
20 July 1866	The land including PAS 9 was purchased from Samuel Bowler by John Higgerson (Primary Application 13788). There is no indication of development within PAS 9 during the mid to late nineteenth century (Figure 90).
1 June 1871	The 40-acre parcel of land (including PAS 9) was purchased by William R. Piddington (Primary Application 13788).
12 February 1875	The land including PAS 9 was purchased by Thomas L. Peate (Primary Application 13788)
1890	A subdivision plan shows PAS 9 marked as being in cultivation (Figure 91).
December 1921	Two photographs were taken of the former Greyhound Inn, one showing the front of the structure (Figure 92), the other showing it in the distance relative to Lansdowne Bridge (Figure 93). Orientation of these photographs and matching key features has confirmed that the Greyhound Inn was the structure west of the study area.
1930	A historical aerial of the site shows that much of PAS 9 was under cultivation. One structure is shown along the northern study area boundary, at the end of a long access drive (Figure 94).
1943	An aerial photograph shows all structures within PAS 9 cleared and the fields no longer under cultivation (Figure 95). The study area appears to be an open paddock.
16 September 1954	Land granted to Wilfred Edgar Thompson, Norman Ewan Archibald Thompson and Lachlan Ian Scott Thompson as joint tenants under the *Closer Settlements Act* (Vol. 6843 Folio 236). No further development was identified within PAS 9, and the area was eventually declared the Lennox Reserve.

Figure 89. Undated nineteenth century parish map showing the land grant made to James Bowler on the west side of Prospect Creek. Source: HLRV

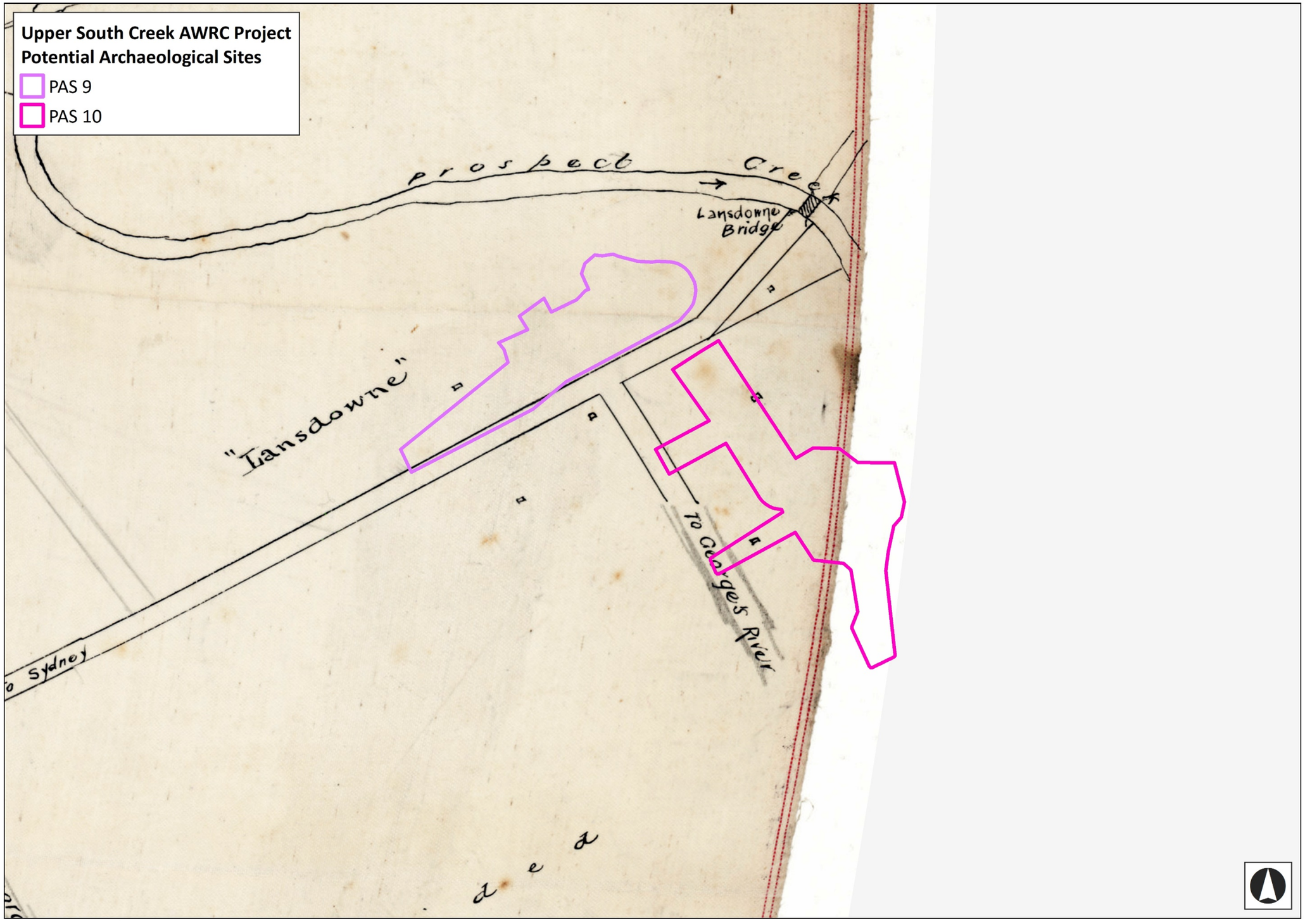

Figure 90. Sketch plan from the 1880s, showing the absence of development within PAS 9 and two structures within PAS 10. Source: LPI, Extent

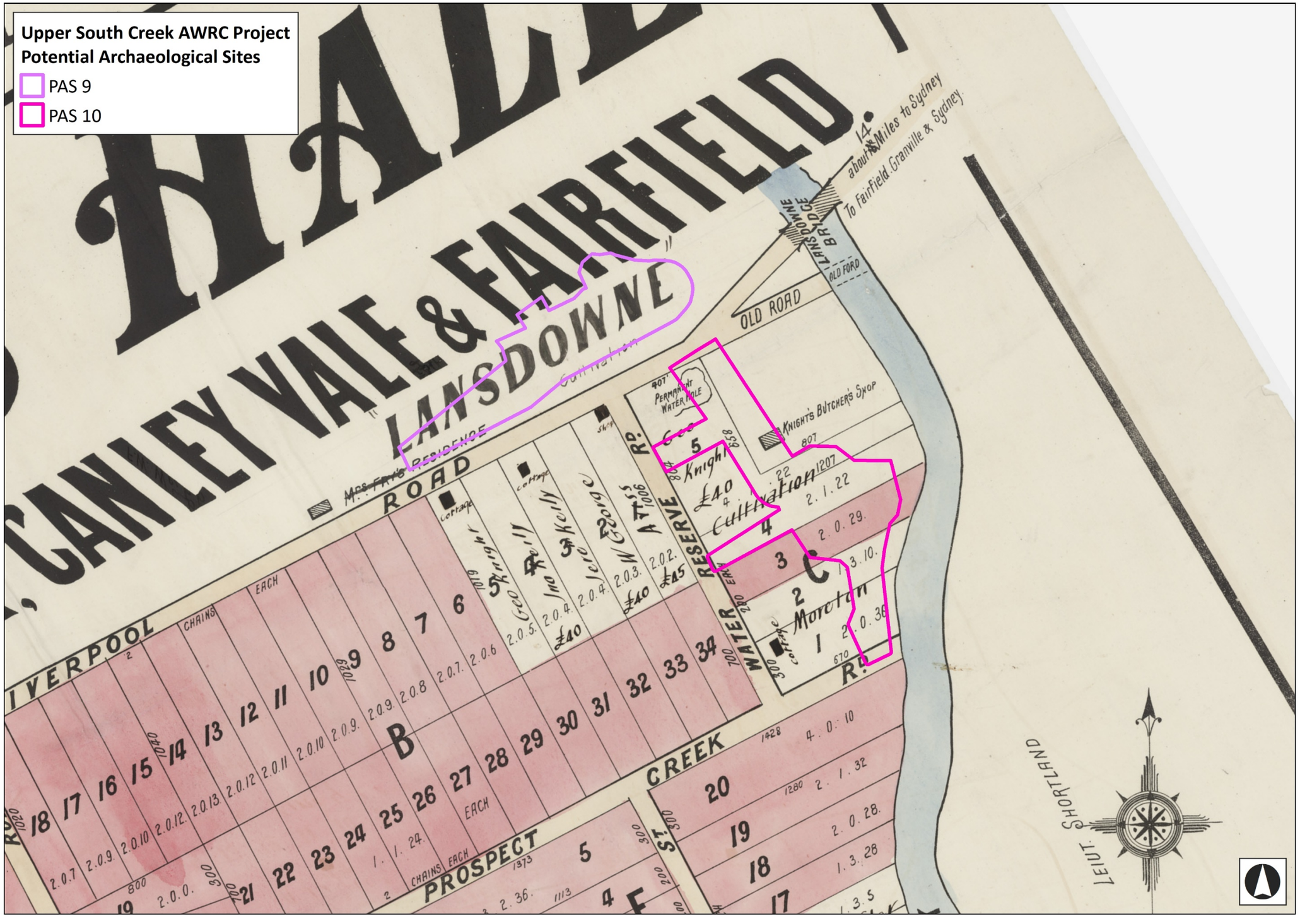

Figure 91. Subdivision plan from the 1890s showing PAS 9 marked as being under cultivation and PAS 10 as part of George Knight's landholdings with an associated butcher shop. Source: SLNSW

Figure 92. 'The Greyhound Inn, kept by Samuel Bowler', December 1921. Source: SLNSW

Figure 93. 'Lansdowne Bridge, Liverpool Rd: Greyhound Inn in distance', December 1921. Site of Greyhound Inn marked with a white arrow, structure within PAS 9 marked with a green arrow. Source: SLNSW

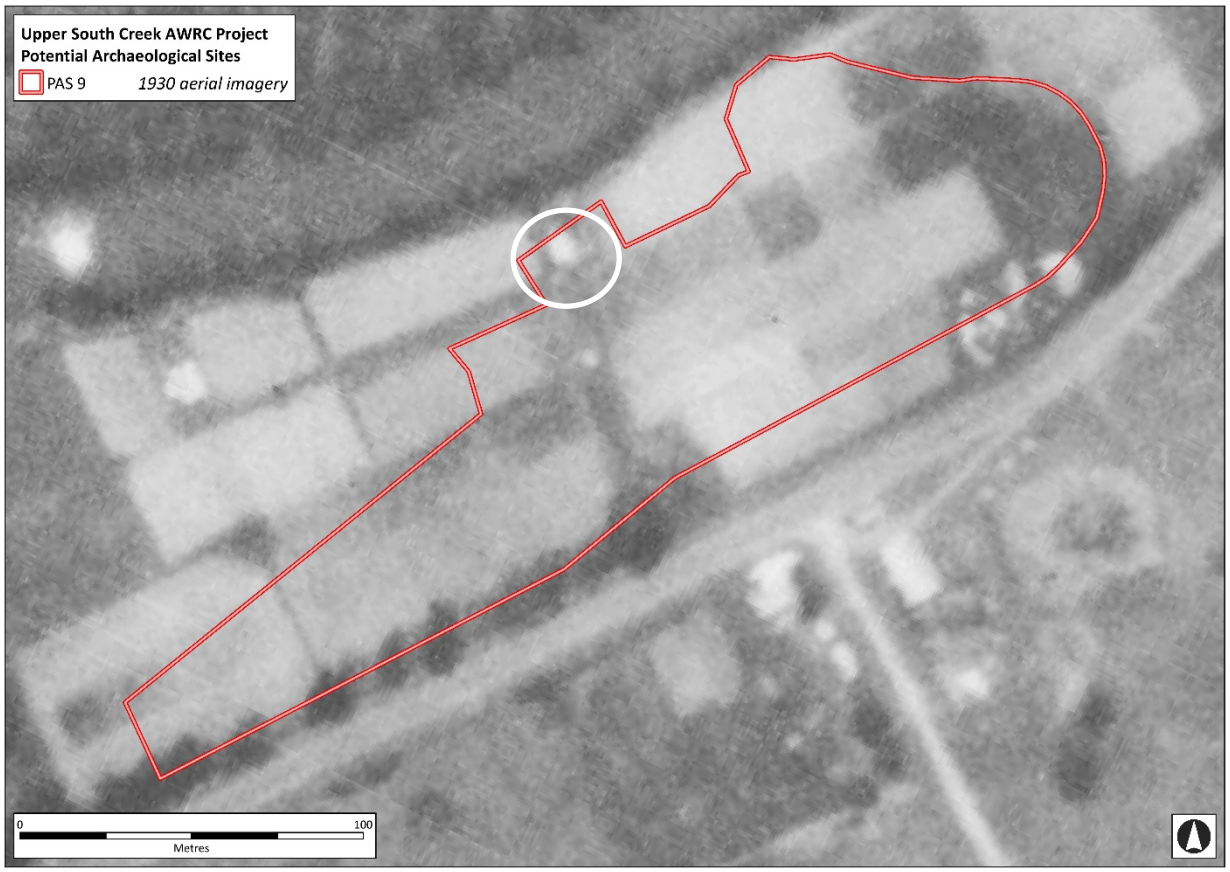

Figure 94. Aerial photograph of PAS 9 in 1930, potential cottage or farm shed circled in white. Source: LPI, Extent

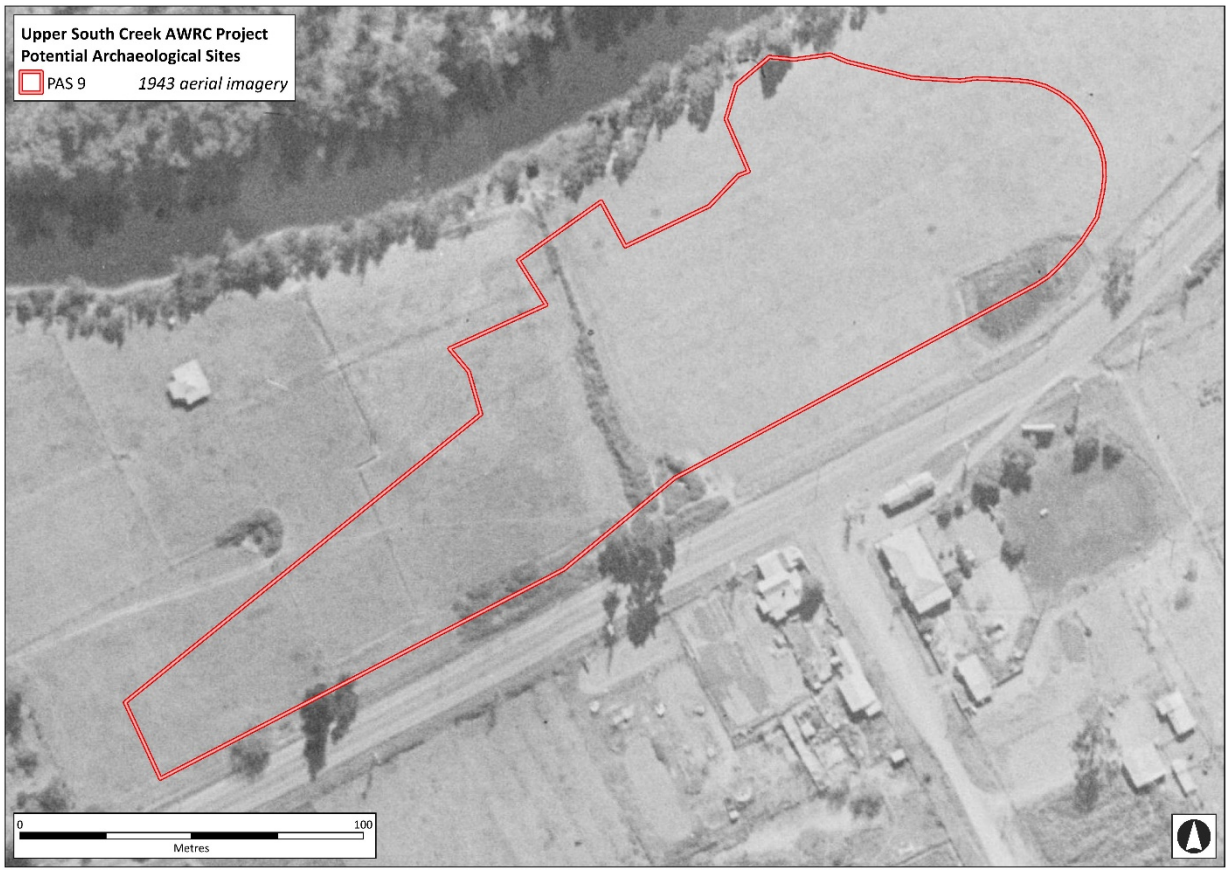

Figure 95. Aerial photograph of PAS 9 in 1943, showing PAS 9 cleared of structures and the fields no longer under cultivation.

12.3 Potential archaeological resource

12.3.1 Site inspection

A site inspection of the area was carried out on 16 October 2020. The following observations were made:

- Lennox Reserve is bounded by Hume Highway to the south and east, Prospect Creek to the north and residential structures to the west.
- The area is moderately vegetated with thick grass covering the area and stands of mature trees on the eastern, western and southern sides. Strips of thick vegetation line the riverbank along the northern and eastern boundaries of the area.
- The strip of vegetation observed along the top of the riverbank measured between 4 to 6 metres in width. Beyond this area, within the reserve, the ground was relatively flat and thickly grassed with low visibility.
- Two parallel rows of trees observed along the south-eastern side of the area. A plaque at the western end of these rows states the trees to be part of a Remembrance Driveway in memory of employees of Tooheys Limited who served their country in times of war.

- East to west running drainage channel observed running parallel to Hume Highway on the southern side of the study area.
- A stand of mature pine and other trees at the southern edge of the area.
- No archaeological remains, footings or artefact deposits were noted during the site inspection.

Figure 96. View north of thick vegetation along the top of the riverbank.

Figure 97. View east of thick grass, recently slashed, mature trees and thick vegetation along riverbank to the left.

Figure 98. View south of park, looking towards Hume Highway.

Figure 99. View west from eastern end of park.

Figure 100. View east along Hume Highway showing drainage ditch and Driveway of Remembrance to the left.

Figure 101. Plaque at western end of Driveway of Remembrance, southern side of area.

Figure 102. View to the south of stand of mature pine trees at western end of area.

Figure 103. View to the northeast of other mature plantings at southern end of area.

12.3.2 Phases of development

The following phases of development were identified with regard to PAS 9:

- Phase 1: 1806-1840 (Bowler's Greyhound Inn)
- Phase 2: 1840-1866 (Bowler's Queen Victoria Inn)
- Phase 3: 1866-c.1940 (Queen Victoria Inn and Residence)
- Phase 4: c.1940-Present (Lennox Reserve).

Phase 1: 1811-c.1840 (Bowler's Greyhound Inn)

The Greyhound Inn was established on the west side of Prospect Creek where the Great Southern Road (now Hume Highway) crossed it. The assessment of historical aerials and maps indicates it was likely constructed west of the study area fronting the Great Southern Road. The Lansdowne Bridge was constructed by convict labourers under the direction of David Lennox to the east of the study area. There is no indication that construction camps or working areas were established in PAS 9.

The land comprising PAS 9 was officially granted to Bowler in 1830, though no development was identified within the study area, and the land surrounding the Greyhound was likely being grazed or under cultivation. Anticipated archaeological remains might include evidence of land clearing (burnt tree boles, wash deposits), remains of ephemeral structures associated with agricultural or pastoral activities, isolated artefacts, and landscape evidence associated with cultivation (plough marks, palynological evidence, field drains) and grazing (fence lines).

Phase 2: c.1840-1866 (Bowler's Queen Victoria Inn)

The Greyhound Inn became the Queen Victoria Inn but continued under the establishment of the Bowler family.

No further development was identified in PAS 9, and the site presumably continued under cultivation. The anticipated archaeological resource is consistent with Phase 1.

Phase 3: 1866-c.1940 (Queen Victoria Inn and Residence)

During Phase 3, the Queen Victoria Inn continued in operation for a period of time before being partially demolished and adapted for use as a residence.

The areas surrounding the Queen Victoria Inn included in PAS 9 were under cultivation in 1930, with archaeological remains across most of the site limited to evidence of pastoral or agricultural use (isolated artefacts, garden soils, evidence of fence lines and ephemeral structures). Extensive cultivation activities evident in aerial photographs are likely to have disturbed evidence of nineteenth century cultivation in Phases 1 and 2.

One sizeable structure, a cottage or agricultural outbuilding, was constructed along the north edge of PAS 9, likely within Phase 3 (Figure 94), with associated archaeological remains including evidence of footings, floor surfaces, underfloor deposits, and construction trenches.

Phase 4: c.1940-Present (Lennox Reserve)

The building on the north edge of PAS 9 was demolished by 1943, and most of PAS 9 remained an open paddock.

The site has remained an undeveloped parcel of land since, with no further development occurring before the site was declared the Lennox Reserve.

12.3.3 Historical archaeological potential

PAS 9 has low potential for ephemeral evidence of agricultural and pastoral activities in Phases 1 and 2, as a result of more intensive agricultural practices evident in Phase 3. The anticipated archaeological resource might include evidence of land clearing of land clearing (burnt tree boles, wash deposits), remains of ephemeral structures associated with agricultural or pastoral activities, isolated artefacts, and landscape evidence associated with cultivation (plough marks, palynological evidence, field drains) and grazing (fence lines).

There is high potential for evidence of a late-nineteenth or early-twentieth century cottage or agricultural outbuilding constructed along the northern edge of PAS 9. Anticipated archaeological remains may include structural evidence of the building (brick or sandstone footings, timber posts and beams, floor surfaces), and artefact deposits (rubbish pits, underfloor deposits, accumulated in gardens and yard surfaces).

While PAS 9 formed part of the property associated with the Greyhound Inn, all development associated with the inn (and associated artefact deposits) was focused west of PAS 9 and the study area has low potential for archaeological evidence associated with the Greyhound Inn. Similarly, there is low potential for evidence of construction of the Lansdowne Bridge, as the bridge was located to the northeast a considerable distance from the study area.

12.4 Assessment of significance

12.4.1 NSW Heritage criteria

Table 15 below considers the significance of the site's historical archaeological resources in response to the NSW Heritage Criteria.

Table 15. Assessment of potential archaeological remains against the NSW Heritage Criteria

Criterion	Assessment
Criterion (a) *An item is important to the course, or pattern, of NSW's cultural or natural history (or the local area).*	Archaeological remains of a mid-to-late nineteenth century cottage or substantial agricultural outbuilding would demonstrate the process of historical development and life in the region. Archaeological remains would be significant at a **local level**. Ephemeral evidence of agricultural and pastoral use would not be important in the course of pattern of cultural history in the region. The anticipated archaeological resource is **unlikely to meet the threshold for significance** under this criterion.
Criterion (b) *An item has strong or special association with the life or works of a person, or group of persons, of importance to NSW's cultural or natural history (or the local area).*	The anticipated historical archaeological resource within the study area is unlikely to demonstrate any significant historical associations. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (c)	No technical achievements were identified within the study area, and ephemeral evidence of agricultural and pastoral use is unlikely to demonstrate significant aesthetic characteristics. The

Criterion	Assessment
An item is important in demonstrating aesthetic characteristics and/or a high degree of technical achievement in NSW (or the local area).	anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (d) *An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the local area).*	No associations with community or cultural groups have been identified. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (e) *An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the local area).*	Archaeological evidence of a mid to late-nineteenth century cottage or substantial agricultural outbuilding has the potential to provide insight into its construction, function, activities that occurred within and around the structure, as well as insight into the lives of the people living and/or working there, including class, gender, ethnicity, age and occupation. Archaeological evidence of a cottage or outbuilding would be of **local significance** under this criterion. Disturbed ephemeral evidence of agricultural activities has low research potential and would not contribute to an understanding of the cultural history of the region. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (f) *An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the local area).*	Evidence of agricultural activities and mid to late-nineteenth century cottages or outbuildings would not be considered rare within the area. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (g) *An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or the local area).*	The function and age of the mid to late-nineteenth century structure within PAS 9 has not yet been identified, so unclear as to what it would be representative of. The site has been subject to little or no disturbance since it was demolished, so it is likely highly intact and of good integrity and would meet the threshold for **local significance** under this criterion. Disturbed ephemeral evidence of agricultural activities, would not be important in demonstrating the principal characteristics of a cultural place or environment. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.

12.4.2 Bickford and Sullivan's questions

Can the site contribute knowledge that no other resource can?

Archaeological remains of the mid to late-nineteenth century cottage or outbuilding can provide insight into the function of the structure, as well as the lives of the people living and/or working there. The review of historical documents for the site has identified that this information is currently limited from other resources.

Can the site contribute knowledge that no other site can?

The site is likely to contribute knowledge useful to the local area with regards to historical lifeways, construction techniques and activities occurring in the area, but would not be considered rare. There are likely other sites that would provide similar insight into mid to late-nineteenth century life in the region.

Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?

Archaeological remains from PAS 9 are likely to provide knowledge relating to general questions about human history and historical lifeways in Fairfield. As the nature of the archaeological resource (age and function of the structure) is not yet known, it is difficult to ascertain whether or not it would contribute to other major research questions.

12.4.3 Summary statement of archaeological significance

PAS 9 was associated with the family of emancipated convict James Bowler and predominantly used for grazing and cultivation from the 1830s onwards. Historical archaeological evidence of a mid to late-nineteenth century cottage or substantial agricultural outbuilding identified within the study area would be of local significance for its historical and research values, as well as potentially its representativeness, given its likely high levels of intactness and integrity. Disturbed ephemeral evidence of agricultural activities in Phases 1 and 2 would be unlikely to meet the threshold for local significance.

12.5 Conclusion

Most of PAS 9 has low potential for archaeological evidence of local significance associated with ephemeral agricultural use. A localised area within PAS 9 has high potential for archaeological evidence of local significance associated with a mid to late-nineteenth cottage or substantial outbuilding (Figure 104).

Figure 104. Assessed levels of historical archaeological potential and significance for PAS 9, with a localised area of high potential for locally significant remains associated with a mid to late-nineteenth century cottage or outbuilding. Source: Near Map, Sydney Water, Extent

13. PAS 10—Lansvale Park

13.1 Overview

The extension of the study area within Lansvale Park extends through parts of several properties within the Fairfield City Council LGA, including:

- 2-20 Hume Highway, Lansvale (Lot 1 DP 653719);
- 22-36 Hume Highway, Lansvale (Lot 10 DP 774392;
- Knight Street, Lansvale (Lots 1 and 2 DP 556916);
- 14 and 14A Knight Street, Lansvale (Lots 2 and 3 DP 561588); and
- 1B Day Street, Lansvale (Lots 1 and 2 DP 121121; Lot 5 DP 238490) (Figure 105).

Figure 105. Location and extent of PAS 10. Source: LPI, Extent

13.2 Historical development

Date	Event
1793	PAS 10 forms part of a 170-acre parcel of land granted to Colonel George Johnston, who received his first grant of land on this date (Primary Application 4904). Johnston was a soldier and farmer born in Annandale, Scotland, in 1764, son of Captain George Johnston, aide-de-camp to Lord Percy, later Duke of Northumberland. Johnston had an extensive military career and sailed in the *Lady Penrhyn* with the marine detachment in the First Fleet, reportedly the first man on shore in January 1788. Johnston held several positions with high levels of responsibility in the military administration, though he regularly quarrelled with both Governors King and Bligh. He led the suppression of the armed rising of Irish Convicts at Castle Hill in 1804, and in 1808 he assumed the lieutenant-governorship and arrested Governor Bligh as part of the Rum Rebellion (Yarwood 1967). Johnston received his first land grant of 100 acres and established Annandale Farm at Petersham. By 1802 Jonhston had 602 acres at Annandale and Bankstown, with 160 acres sown in wheat and maize, seven horses, 27 horned cattle, 136 sheep, 85 goats, and 29 hogs. He was also granted 2,000 acres at Cabramatta for his part in quelling the 1804 insurrection. Over the course of his life Johnston received grants amounting to 4,162 acres, including the study area (Yarwood 1967) (Figure 106).
8 February 1821	George Johnston's landholdings passed to his son, David Johnston (Primary Application 4904). David was formally granted the land comprising PAS 10 in 1842 (Vol. 736 Fol. 136, Vol. 1053 Fol. 11).
5 January 1823	George Johnston died and was buried in the Greenway-designed family vault at Annandale Farm, where years earlier he had planted the colony's first Norfolk Island pines (Yarwood 1967). The property remained in the possession of the Johnston family.
28 April 1886	Ownership of the property transferred to Ebenezer Vickery from George Robert Johnston and Arthur Alfred Johnston (Vol. 786 Fol. 136) (Figure 107).
Late 1880s	A plan of the site prepared in the 1880s shows two structures in PAS 10, with one at the northeast corner of the study area and the other at the southwest corner fronting Knight Street (Figure 90). As this is a sketch plan, however, the locations of structures depicted are not reliable. The presence of Knight Street suggests that this plan post-dates subdivision of the property.
1890s	The northwest portion of the site is shown as belonging to George Knight, with most of the land under cultivation with a structure marked 'Knight's Butcher Shop' delineated. Subdivision of properties across PAS 10 occurred after the transfer of the Johnston family estate to Ebenezer Vickery. The land at the southeast end of PAS 10 is marked 'Moreton Vineyard', with no structures marked within the study area but a cottage situated to the southwest. The land was transferred to Charles William Henry Morton from Ebenezer Vickery on 13 April 1892 (Vol. 1053 Fol. 11).

Date	Event
	Several vineyards were established in Canley Vale in the mid to late nineteenth century due to the rich volcanic soils in the region (Kass 1993:7-8), and Moreton's vineyard continued that trend.
1930	An aerial photograph of PAS 10 in 1930 shows the structures associated with Knight's Butcher Shop, as well as possibly the structure shown in the post-1836 plan (Figure 108). Access to the butcher shop appears to be via the Hume Highway. There appear to be no structures associated with Moreton's landholdings along the southern half of the site, with an associated cottage fronting Knight Street located just outside the study area (likely the structure shown as being within PAS 10 in the post-1836 plan).
1943	An aerial photograph from 1943 illustrates the continued presence of the Knight's Butcher Shop building, with expanded outbuildings to the rear, as well as demolition of the structure potentially depicted in the post-1836 plan (Figure 109). The southern half of the study area contains no development and appears to be partly under cultivation, though the former vineyards appear to have been cleared away.
1955	An aerial photograph from 1955 shows no substantial changes to PAS 10, with the Knight's Butcher Shop complex remaining intact. The formerly cultivated fields at the south end of the site appear to have been converted to open paddock.

Figure 106. Undated parish map showing the 170-acre land grant made to George Johnson, which includes PAS 10. Source: HLRV

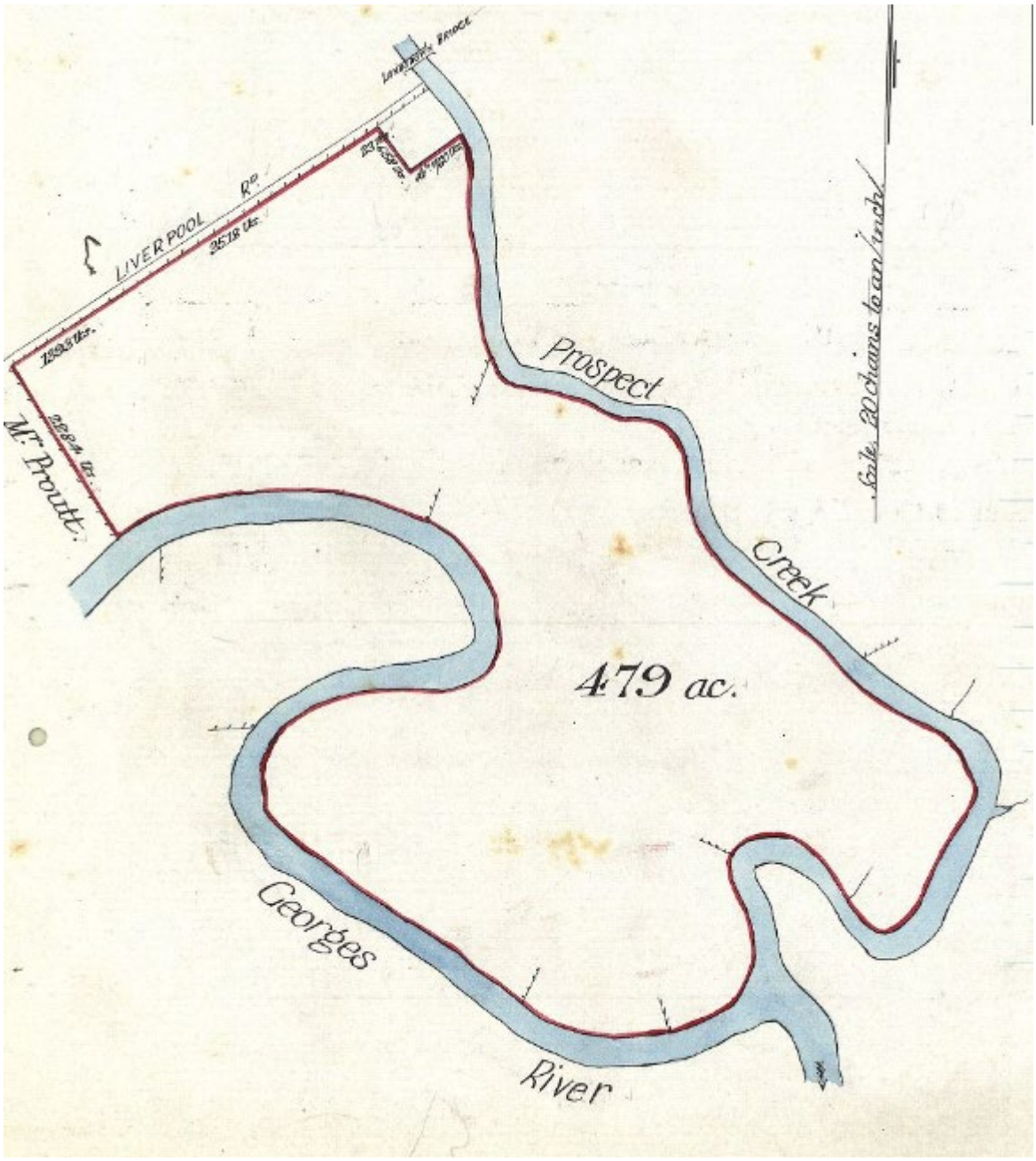

Figure 107. Detail of property being transferred from George Robert Johnston and Arthur Alfred Johnston to Ebenezer Vickery in 1886. Source: Vol. 786 Fol. 136, HLRV

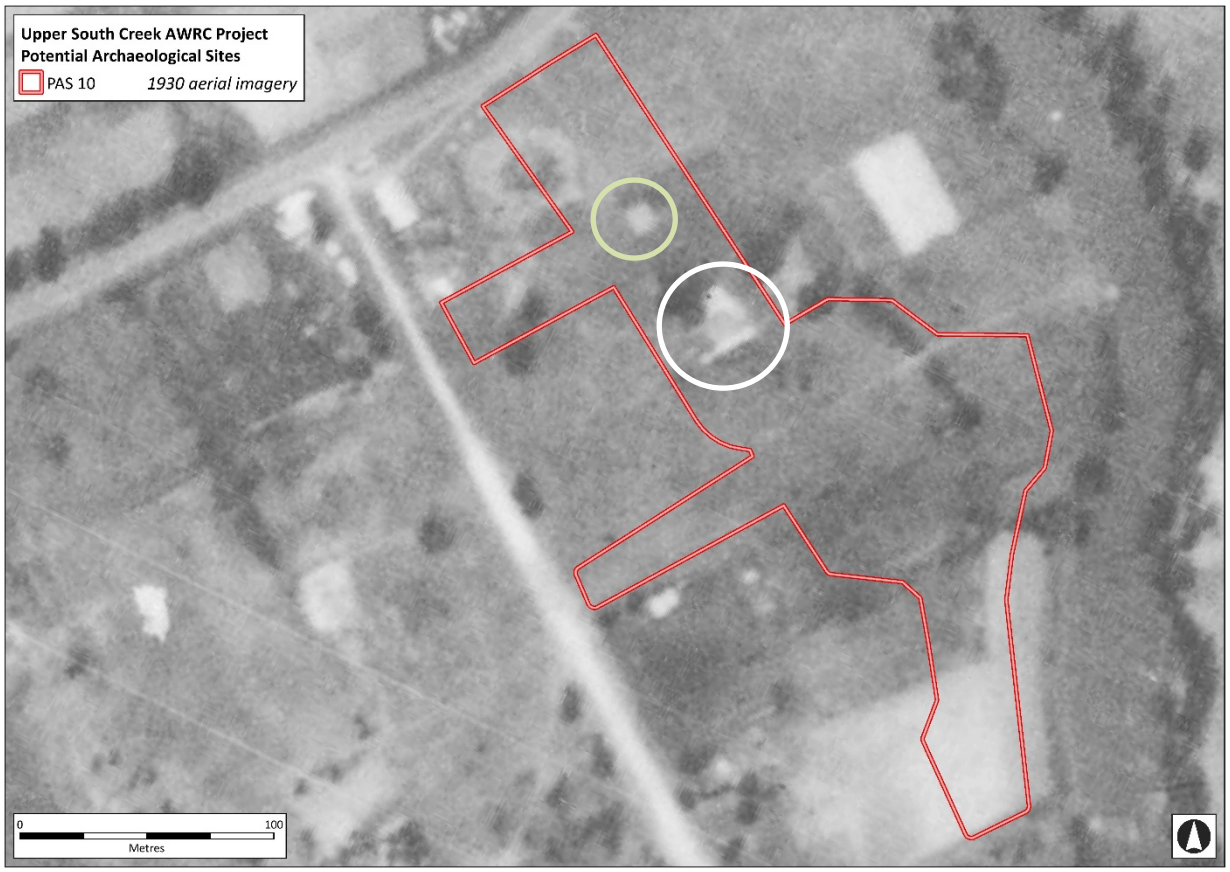

Figure 108. Aerial photograph of PAS 10 in 1930 showing Knight's Butcher Shop (circled white) and the structure potentially shown on the 1880s plan (circled green). Source: LPI, Extent

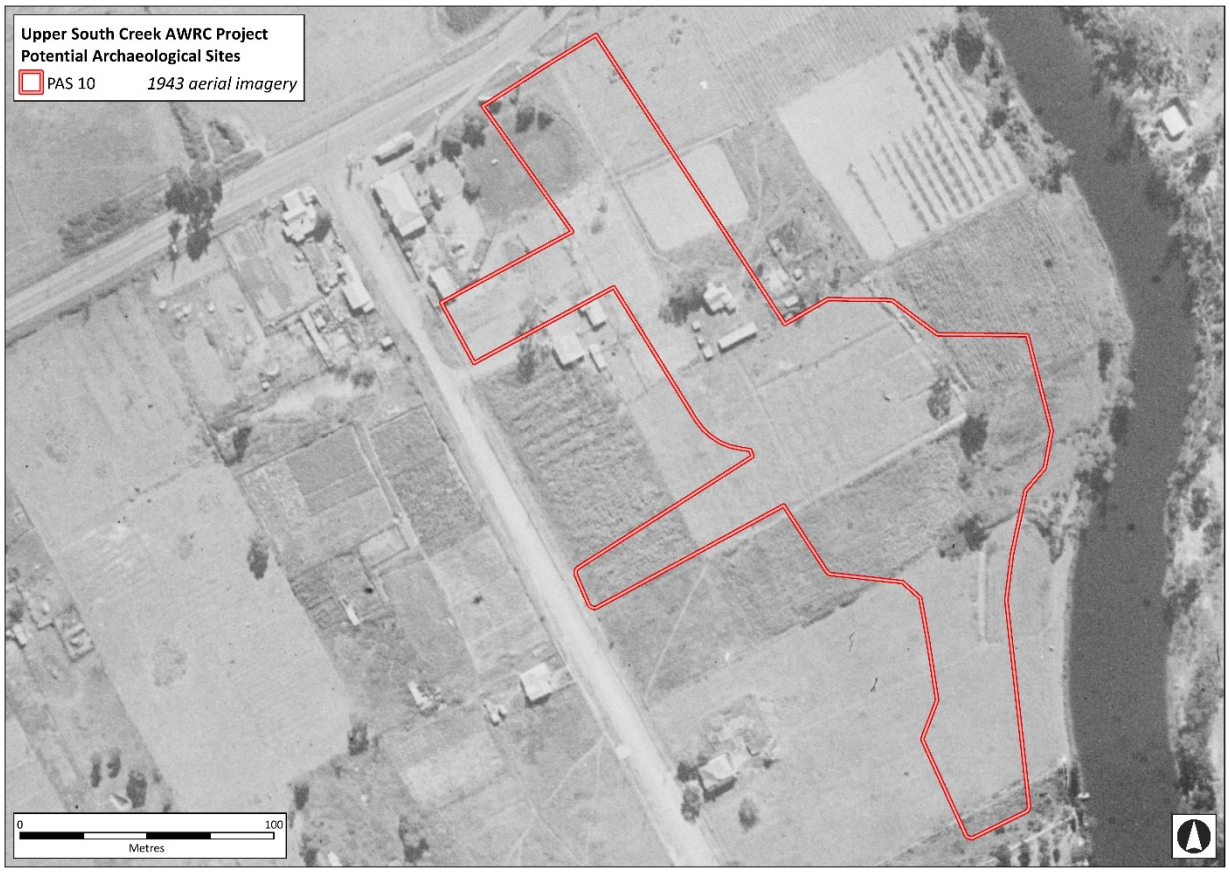

Figure 109. Aerial photograph of PAS 10 in 1943 showing the continued presence of the Knight's Butcher Shop building, with expanded outbuildings to the rear, as well as demolition of the structure potentially depicted in the post-1836 plan. Source: LPI, Extent

13.3 Potential archaeological resource

13.3.1 Site inspection

A site inspection of the area was carried out on 16 October 2020. The following observations were made:

- The area is bounded by the Hume Highway to the north, Prospect Creek to the east, Day Street to the south and Knight Street and residential blocks to the west.
- The area is moderately vegetated with low grass covering most of the area and mature trees throughout. Along the riverbank, on the eastern side of the area, is a strip of thicker vegetation with low shrubs, mature trees and tall grass.
- The area is principally level, gently sloping towards the river to the east. There is an area of raised ground on the southern side, it is unclear what purpose it may have served.
- On the western side, in proximity to Knight Street and to the south of a petrol station on Hume Highway, is a raised platform of ground. Fragments of cement and asphalt could be

observed within the fill. Area appears to be and extension of raised ground for the petrol station.

- Also on the western side of the study area, south of the petrol station, is a small ablutions block and asphalt carpark.
- In the centre of the area is a playground, bike park and picnic area.
- At the southern extent of the area some exposure was visible where the grass was thin and had died off. Fill with tile, cement and some asphalt observed as well as a potential asphalt surface.
- Besides the fragments of building material described above, no archaeological remains, footings or artefact deposits were noted during the site inspection.

Figure 110. View north of northern end of area.

Figure 111. View north of western side of park.

Figure 112. View north of thick vegetation along top of riverbank.

Figure 113. View north of area of raised ground on southern side of area.

Figure 114. View east of raised ground to south of petrol station, north-western corner of area.

Figure 115. View east of asphalt car park on western side of area.

Figure 116. View east of bike park and playground in the centre of the area.

Figure 117. View north of area of dead grass at southern end of study area.

Figure 118. Detail of exposure at southern end of study area showing fill and potential asphalt surface.

13.3.2 Phases of development

The following phases of development were identified with regard to PAS 10:

- Phase 1: 1812-1886 (Ephemeral use);
- Phase 2: 1886-c.1960 (Subdivision and Knight's Butcher Shop); and
- Phase 3: c.1960-Present (Lansvale Park).

Phase 1: 1812-1886 (Ephemeral use)

The study area formed part of several extensive plots of land granted to the Johnston family in the early nineteenth century, though their primary estate was at Annandale. PAS 10 likely comprised pastoral land used exclusively for grazing. Anticipated archaeological remains include evidence of land clearing (burnt tree boles, wash deposits), isolated artefacts resulting from loss or discard, ephemeral structures associated with management of animals, and landscaping evidence (fence lines, dams).

Phase 2: 1886-c.1960 (Subdivision and Knight's Butcher Shop)

Knight's butcher shop was established in the north half of PAS 10 prior to the 1890s (Figure 91) or possibly the 1880s (Figure 90), most likely following subdivision of the property by Ebenezer Vickery in 1886. Anticipated archaeological evidence includes structural remains of the butcher shop, associated outbuildings (slaughterhouse, sheds, stores), and possibly residential quarters. A cistern, well and cesspit may have serviced the property, with artefact deposits potentially disposed of in these features or in rubbish pits cut into the adjoining yard spaces. The surrounding area was identified as being in cultivation in the 1890s.

A structure was also constructed to the northwest of Knight's Butcher Shop and is possibly the building depicted in the 1880s site plan (Figure 90). It is unclear at this stage whether the building marked on the 1880s plan represents the butcher shop or this alternate structure (a cottage or large outbuilding). Structural remains of the building (brick, sandstone or concrete footings, timber posts, beams, paved surfaces) might be anticipated, as well as ancillary features and sealed artefact deposits in surrounding yard spaces or as fill within wells, cisterns, cesspits or drains.

Construction of these structures, as well as extensive cultivation at both properties, is likely to have removed any ephemeral evidence associated with grazing in Phase 1.

Phase 3: c.1960-Present (Lansvale Park)

All structures formerly located within PAS 10 were demolished prior to or during the construction of Lansvale Park in the late twentieth century. These demolition events are likely represented by the fill deposits observed in localised areas during the site inspection. Construction of the park is also likely to have involved the introduction of levelling fills and localised excavation to accommodate construction of ablution blocks, a playground and bike paths.

13.3.3 Historical archaeological potential

PAS 10 has generally low historical archaeological potential for evidence of pastoral activities in Phase 1, including evidence of land clearing (burnt tree boles, wash deposits), isolated artefacts resulting from loss or discard, and landscape modifications (fence lines, dams). There is also low potential for evidence of cultivation activities in Phase 2 as part of Moreton's vineyard.

The site has moderate to high potential for historical archaeological evidence of Knight's Butcher Shop, associated outbuildings and features (slaughterhouses, cools rooms, sheds, stores, cesspit, well, cistern), a residence (likely as part of the shop), and sealed artefact deposits in underfloor spaces, rubbish pits, or as fill within cesspits, wells, cisterns and drains.

There is also moderate to high potential for a second structure constructed to the northwest of Knight's Butcher Shop, likely in Phase 2, though the function of this structure has not yet been identified (likely a cottage or large outbuilding). Structural remains of the building (brick, sandstone or concrete footings, timber posts, beams, paved surfaces) might be anticipated, as well as ancillary features and sealed artefact deposits in surrounding yard spaces or as fill within wells, cisterns, cesspits or drains.

13.4 Assessment of significance

13.4.1 NSW Heritage criteria

Table 16 below considers the significance of the site's historical archaeological resources in response to the NSW Heritage Criteria.

Table 16. Assessment of potential archaeological remains against the NSW Heritage Criteria

Criterion	Assessment
Criterion (a) *An item is important to the course, or pattern, of NSW's cultural or natural history (or the local area).*	Archaeological remains of Knight's Butcher Shop would demonstrate the important role meat has played in Australian diet and the importance of local butcher's shops to regional towns. Archaeological evidence of Knight's Butcher Shop would be of local significance under this criterion. Archaeological remains of a mid-to-late nineteenth century cottage or substantial agricultural outbuilding would demonstrate the process of historical development and life in the region. Archaeological remains would be of **local significance** under this criterion.
Criterion (b) *An item has strong or special association with the life or works of a person, or group of persons, of importance to NSW's cultural or natural history (or the local area).*	The anticipated historical archaeological resource within the study area is unlikely to demonstrate any significant historical associations with the site, such as with Captain George Johnston. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (c)	No technical achievements were identified within the study area, and ephemeral evidence of agricultural and pastoral use is

Criterion	Assessment
An item is important in demonstrating aesthetic characteristics and/or a high degree of technical achievement in NSW (or the local area).	unlikely to demonstrate significant aesthetic characteristics. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (d) *An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the local area).*	No associations with community or cultural groups have been identified. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (e) *An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the local area).*	Historical archaeological evidence of Knight's Butcher Shop would provide insight into the functioning of a late nineteenth century butchery, as well as insight into the daily lives of the people who worked (and likely also lived) there. Evidence of Knight's Butcher Shop would be of **local significance** under this criterion. Archaeological evidence of a mid to late-nineteenth century cottage or substantial agricultural outbuilding has the potential to provide insight into its construction, function, activities that occurred within and around the structure, as well as insight into the lives of the people living and/or working there, including class, gender, ethnicity, age and occupation. Archaeological evidence of a cottage or outbuilding would be of **local significance** under this criterion.
Criterion (f) *An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the local area).*	Archaeological evidence of a nineteenth-century butchery would be uncommon in the context of the Fairfield region. Archaeological evidence of Knight's Butcher Shop would be of **local significance** under this criterion. Evidence of a late-nineteenth century cottage or outbuilding would not be considered rare within the area. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.
Criterion (g) *An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or the local area).*	As a relatively uncommon example of specialist nineteenth century commerce, archaeological evidence of Knight's Butcher Shop would not serve as a good representative example. The function and age of the late-nineteenth century structure within PAS 10 has not yet been identified, so unclear as to what it would be representative of. The anticipated archaeological resource is **unlikely to meet the threshold for local significance** under this criterion.

13.4.2 Bickford and Sullivan's questions

Can the site contribute knowledge that no other resource can?

Limited information regarding Knight's Butcher Shop was available through a source of historical documents. Archaeological remains and deposits associated with the shop have the potential to provide unique insight into the operations of the shop, as well as the daily lives of the people who lived and worked there.

Archaeological remains of the late-nineteenth century cottage or outbuilding can provide insight into the function of the structure, as well as the lives of the people living and/or working there. The review of historical documents for the site has identified that this information is currently limited from other resources.

Can the site contribute knowledge that no other site can?

There are not a large number of nineteenth century butcher shops in the region, particularly with the level of intactness anticipated within PAS 10 (given that the site was demolished and converted to a park). The site could contribute knowledge few other sites in the region could.

Remains of the cottage or outbuilding are likely to contribute knowledge useful to the local area with regards to historical lifeways, construction techniques and activities occurring in the area, but would not be considered rare. There are likely other sites that would provide similar insight into late nineteenth-century life in the region.

Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?

Archaeological remains from PAS 10 are likely to provide knowledge relating to general questions about diet, commerce, human history and historical lifeways in Fairfield.

13.4.3 Summary statement of archaeological significance

Historical archaeological evidence associated with Knight's Butcher Shop, likely established within PAS 10 in the 1880s or 1890s, would provide insight into a local commercial enterprise and source of an important dietary component for nineteenth-century Australians. Archaeological evidence of Knight's Butcher Shop would be of local significance for its historical and research values, as well as its rarity.

Historical archaeological evidence of a late-nineteenth century cottage or substantial agricultural outbuilding identified within PAS 10 would be of local significance for its historical and research values.

13.5 Conclusion

PAS 10 has moderate to high potential for archaeological evidence of local significance associated with Knight's Butcher Shop and a small cottage or large outbuilding constructed in the late nineteenth century (Figure 119). The remaining areas have low potential for ephemeral archaeological evidence associated with agricultural activities.

Figure 119. Assessed levels of historical archaeological potential and significance for PAS 10. Source: Near Map, Sydney Water, Extent

14. Impact assessment

14.1 Overview

This section considers the works being completed in association with the project that may impact on the study area's identified historical archaeological resources. It impacts arising from different components of the project are outlined in separate subsections. Each includes a summary of archaeological potential and significance of the archaeological resources that would be impacted, as well as recommended mitigation measures.

14.2 The Centre

Construction activities associated with building the centre would consist of:

- Site establishment including the installation of environmental controls, ancillary construction such as roads and fences, grubbing and removal of surface vegetation, demolition of existing buildings and contamination management.
- Earthworks including cut and fill, temporary drainage and soil management controls and excavation of detention basins and underground infrastructure.
- Civil works and structural construction including the construction of roads and stormwater infrastructure and landscaping.

Impact assessment

Construction of the Centre is occurring within PAS 7 (Fleurs Radio Telescope Site). Earthworks, excavation of detention basins and underground infrastructure likely to result in the removal of any historical archaeological remains within the study area.

Most of PAS 7 has been assessed as having low potential for disturbed archaeological evidence of little significance associated with Fleurs Estate. There are two localised areas on South Creek with high potential for locally significant evidence of timber bridges.

The construction footprint of the Centre has the potential to impact on areas of high potential for archaeological remains of local or state significance (Figure 120).

Recommended mitigation

Work in areas of low archaeological potential could proceed under an 'unexpected finds protocol'.

Avoidance of areas of high archaeological potential should be enacted during detailed design if possible. If impacts to areas of high archaeological potential cannot be avoided, archaeological salvage excavation will be required.

Figure 120. Plan of PAS 7 showing indicative impact areas with relation to assessed levels of historical archaeological potential and significance. Source: Near Map, Sydney Water, Extent

14.3 Treated water and brine pipelines

The main construction technique for pipelines will be trenching, with trenches ranging from about 1.5 metres to 7 metres deep. Where trenching is required, the construction corridor will typically measure 15 metres to 30 metres, though it may be wider in some areas. Trenchless pipelines may be deeper depending on ground conditions and topography. Launch/receive pits for trenchless pipelines would be approximately 10 metres long and 5 metres wide.

Construction activities associated with pipeline construction would include:

- Ancillary construction works including roads site compounds and fencing;
- Trench excavation, including stockpiling of spoil material; and
- Landscaping.

Impact assessment—treated water pipelines

Trenching to accommodate treated water pipelines will result in complete removal of the archaeological resource within the impact area footprint.

The extent of the impact area resulting from trenching for each PAS, as well as the proposed placement of the pipeline relative to assessed levels of archaeological potential, are presented in Figure 121 through Figure 127. Table 17 presents an overview of impacts anticipated within each PAS and provides recommendations to mitigate these impacts.

Table 17. Assessment of impacts arising from installation of treated water pipelines.

PAS	Archaeological potential	Archaeological significance	Impact discussion	Recommended mitigation
1 (Blaxland's Farm)	Moderate to moderate-high	State	The initially proposed placement of the treated water pipelines at the north end of PAS 1, as well as an associated discharge structure 15m by 5m in size, extended through the core of the brewery and mill complex established by Blaxland c.1830 (Figure 121). This would have resulted in a major adverse impact and	Archaeological testing to inform detailed design and further works. Archaeological salvage excavation of remains of

PAS	Archaeological potential	Archaeological significance	Impact discussion	Recommended mitigation
			near complete destruction of a highly significant archaeological site. Following additional historical research and site survey, the placement of the pipelines and discharge structure was modified to avoid the core of the site, with the updated placement following the edge of the recorded extent of the site (Figure 122). This represents a significant improvement to anticipated impacts. The pipelines and discharge structure still extend through areas with moderate to moderate-high archaeological potential, though archaeological evidence is likely more dispersed in these area (being outside the core of the site), and they are more likely to have been impacted by twentieth century agricultural activities. This impact can be further reduced by archaeological testing in advance of construction to refine final placement of treated water pipelines to avoid significant structures or deposits. The project will still, however, result in an adverse impact to the site's historical archaeological, and these impacts must be mitigated.	local or state significance within the impact area.
	Low	State or local	Installation of the treated water pipeline in these areas would result in little to no archaeological impact.	Works to proceed under an 'unexpected finds protocol'.
2 (Blaxland's Gardens)	Moderate	State or local	Within the impact area, installation of the treated water pipeline would result in complete removal of archaeological remains of local or state significance associated with Blaxland's gardens at Luddenham Estate (Figure 123). This would result in partial loss of the Blaxland's gardens site. This would result in an adverse impact to the study area's archaeological resources, and these impacts must be mitigated.	Archaeological testing to confirm assessed levels of potential and significance. Archaeological salvage excavation of remains of local or state significance within the impact area.
	Low	State or local	Installation of the treated water pipeline in these areas would result in little to no archaeological impact.	Works to proceed under an 'unexpected finds protocol'.

PAS	Archaeological potential	Archaeological significance	Impact discussion	Recommended mitigation
3 (Blaxland's Crossing)	Moderate	Local	Installation of the treated water pipeline is likely to result in the localised removal of historical archaeological evidence of local significance associated with an early colonial roadway, as well as potentially a causeway and timber bridge (Figure 124). This would result in a partial loss of these sites, as they would be anticipated to extend further to the west to the edge of (as well as partly within) the Nepean River.	Archaeological monitoring of ground disturbance in areas of moderate potential.
	Low	Unlikely to meet the threshold for local significance	Installation of the treated water pipeline in these areas would result in little to no archaeological impact (Figure 125).	Works to proceed under an 'unexpected finds protocol'.
4 (McMaster Field Station)	Low to low-moderate	Unlikely to meet the threshold for local significance	Installation of the treated water pipeline in these areas would result in little to no archaeological impact (Figure 125).	Works to proceed under an 'unexpected finds protocol'.
5 (McGarvie Smith Farm)	Low	Unlikely to meet the threshold for local significance	Installation of the treated water pipeline in these areas would result in little to no archaeological impact (Figure 126).	Works to proceed under an 'unexpected finds protocol'.
6 (Exeter House and Farm)	Low	Local	Installation of the treated water pipeline in these areas would result in little to no archaeological impact (Figure 127).	Works to proceed under an 'unexpected finds protocol'.