Archaeological Assessment & Impact Statement
Stage 1 DA – Concept Application

Blackfriars Research Facility Stage 1, UTS

Colonial Sugar Co., Chippendale, 1868, watercolour by Samuel Elyard. SLNSW, Dixson Galleries, digital order no. a1528154

Report to

University of Technology Sydney

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4.0 Archaeological Potential

4.1 Overview

Archaeological Potential is the degree to which archaeological remains are considered likely to survive within the study area in light of modern impacts. The archaeological potential of an area depends on the historic uses of the site (Section 2.0), its archaeological context (Section 3.0) and other factors including previous impacts. This section will present additional material relating to the archaeological remains on the study area, before assessing the archaeological potential of the study area. Section 5.0 will assess the Heritage Significance of the potential archaeological remains. Sections 6.0, 7.0 and 8.0 will assess the potential impact of the proposed works within the study area and provide recommendations for dealing with any impacts.

4.2 Principles for assessing archaeological potential

A series of assumptions and general principles underlay the analysis of archaeological potential for historical remains. These have been based on the experience of archaeologists working in New South Wales over the last 30 plus years.

Typical archaeological remains found at domestic sites in New South Wales take a number of forms:

- Structural remains associated with buildings shown on a historic plan are likely to survive but will be impacted by later phases of building. These remains include:
  - building footings
  - underfloor deposits associated with the occupation of a house
  - other types of deposits
- Certain types of remains are typically not shown on historic plans, although they occasionally feature on later plans. These include:
  - wells
  - underground water storage systems, including cisterns and reservoirs
  - cesspits
  - site drainage
  - rubbish pits
  - evidence for gardens, layout and use of the yard areas
  - fencelines, assisting with clarification of lot boundaries and internal use of lots
  - pollen and soil evidence
  - land clearing and modification of the landform, including major filling events, i.e., backfilling of ponds or the creek line
  - rubbish dumps
  - other types of archaeological deposits
- The kinds of undocumented features found on a site will depend upon the sites uses. Industrial, domestic and institutional sites are all examples of site categories which have quite different sets of expected remains.

There are also several other common processes which determine the archaeological resource:

- Disused underground features such as wells, cisterns, reservoirs and cesspits tend to be backfilled with rubbish when they cease being used.
- Underfloor deposits typically form where the original flooring was butt-boarded timber floorboards.
  - These can survive in both demolished and standing structures, although the installation of later services and the replacement of flooring can impact on the integrity of underfloor deposits.

  - Underfloor deposits can include both small items which fell between floorboards, and also material which must have been deliberately deposited beneath loose floorboards.
  - Floor coverings such as oil-cloths and carpets can minimise the accumulation of items underneath a butt-boarded timber floor. Floor coverings like these would be more common in wealthier households.
  - Subsequent replacement with tongue and groove floorboards or even capping the underfloor void with imported material (a strategy popular for dealing with rats),[82] often will only have a limited impact on any archaeological deposit.
  - Rooms where the floors are used heavily, washed often and not covered by oil cloth or carpet provide the best circumstances for the formation of underfloor deposits. In a domestic context, these rooms most commonly are kitchens.[83]
- Later building phases will impact on the remains of early phases.
- The greater the number of phases the more complicated the nature of the archaeological the remains.

Other issues arise from the nature of impacts from later 20th-century activities such as demolition, clearing and construction. Generally the following principles apply:

- The later the date a building was demolished, then the greater the impact on the archaeological resource from larger modern machinery.
- Footing systems of single-storey buildings have less impact on the archaeology of earlier phases than those of multi-storey buildings.
- Demolishers and builders typically do as little as they have to because of the need to control costs.
- Higher areas get cut down and levelled, while lower damp areas get filled.
- Roadways usually have impacts from modern services.

4.3 2015 Site Visit

On 24 July 2015, Nick Pitt of Casey & Lowe visited the Blackfriars site. The site inspection was limited to publically accessible areas. No photographs of the Childcare Centre were taken, as it was in operation at the time. The overall site was raised above the height of Buckland Street level. The Girls & Infant School Building was particularly raised above street level (Figure 4.2). The distance from the base of the underfloor vents of this building and the present street level was 820mm. Large trees were growing at various places across the site. The ground was noticeably raised around these, possibly indicating some disturbance from roots.

The Childcare Centre is a single-storey structure. A fenced off play area is located to its south, between it and the Girls & Infant School Building, and was built in 1994. Buckland Street sloped slightly downwards towards Broadway (towards the north) (Figure 4.5). Blackfriars Avenue sloped down from Abercrombie Street towards Buckland Street. The Blackfriars Avenue entrance to the Blackfriars site was roughly level with the road (Figure 4.7).

Some unidentified sandstone blocks were visible beneath the demountable building in the northwest corner of the site (Figure 4.6). The purpose of these was unclear. Some outlines of earlier school-related buildings were visible on the east boundary wall, between the site and Blackfriars Lane.

[82] This practice was observed at workers' housing excavated as part of the Darling Quarter redevelopment (Casey & Lowe 2013:412-413).
[83] Casey 2004:34.

Figure 4.1: Blackfriars Site, showing timber building, corner of Blackfriars Avenue and Buckland Street. Looking northeast.

Figure 4.2: Detail of Girls and Infants School Building, showing height above Buckland Street. Looking east.

Figure 4.3: View into courtyard towards Childcare Centre. Looking north.

Figure 4.4: View of carpark/courtyard from near Blackfriars Avenue entrance, looking towards 'The Residence'. Looking east.

Figure 4.5: View along Buckland Street from intersection with Broadway, looking south. Blackfriars site located on the left, beyond the grey building, but obscured by trees.

Figure 4.6: Detail showing sandstone blocks beneath timber building in southwest corner of site. Looking northeast.

Figure 4.7: Blackfriars Avenue entrance to the site with the Childcare building on the left. Looking northwest.

4.4 Impacts from 1994 works

The present Childcare Centre building at the north end of the Blackfriars site was constructed in 1994. The construction works associated with it were subject to archaeological monitoring by Casey & Lowe. The building was constructed on a foundation supported by piles, thought to be Franki-piles, which are a proprietary form of driven pile.[84] The piles were driven to depths ranging between 5.5 and 7.4m (Figure 4.8).

These piles are likely to have had a minor to moderate impact on the archaeological resource where they were laid. The best alignment of historic plans suggests that most of the piling was located in yard areas, outside the main buildings associated with the Brisbane Distillery and Pemell's Mill. Archaeological investigations at other sites have found that a considerable amount of archaeology can survive in areas which have been subject to piling. For instance, in 2008 at the Darling Quarter site at Darling Harbour, Casey & Lowe recorded a substantial archaeological site within an area which had been subject to two sets of piles for 20th-century buildings (Figure 4.9).[85]

The 1994 works also included the installation of a number of service trenches. The excavation for these was subject to archaeological monitoring. Again the impact of these trenches is expected to be minor overall, with most of the area unaffected by them. A small number of the services were quite deep, particularly those dug for the gas mains ('trench 1' of the 1994 monitoring).[86] These will have had a localised impact on any archaeological remains in their vicinity.

[84] Casey & Lowe 1994:1; Franki Grundbau n.d.
[85] Casey & Lowe 2013.
[86] Casey & Lowe 1994:3.

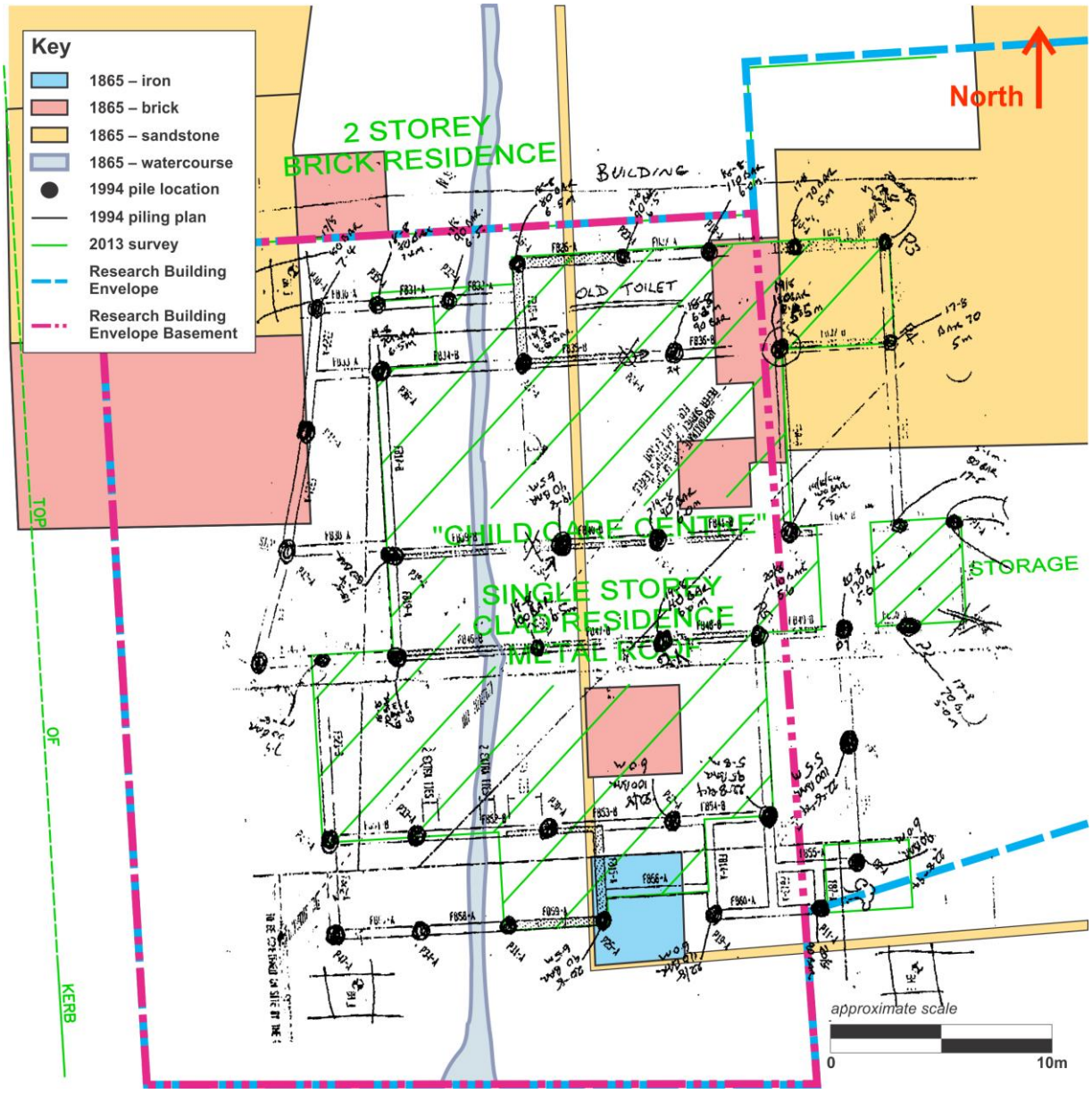


Figure 4.8: 1994 Piling Plan with overlays showing 1865 and 2013 features and proposed Research Building envelope. Each pile is annotated with the depth at which it met resistance. Pile plan from Casey & Lowe 1994, figure 16. Supplied by Group One to Casey & Lowe in 1994.

Figure 4.9: Piles in the area of Barker's Jetty (c.1826) and the early timber slip (1810s), Darling Quarter. This area was a focus of many piles. If there had been many more then the archaeology in this area would have been seriously compromised or destroyed. Looking west. Casey & Lowe 2009.

4.5 1994 Archaeological monitoring

In 1994 Casey & Lowe undertook archaeological monitoring on the Blackfriars site.[87] The archaeological monitoring was undertaken in two stages. Stage I monitored the excavation of service trenches and recorded their profiles. It went ahead in February 1994. Stage II monitored piling and some limited demolition associated with the construction of the present Childcare Centre. It proceeded following a permit granted in August 1994.

In total the 1994 monitoring recorded five trenches, as well as works associated with the construction of the Childcare Centre. The results of the 1994 monitoring are reproduced below unchanged. However, each section of results is followed by a revised discussion which provided the best interpretation, given the developments in historical and archaeological knowledge over the past 21 years, and the further information from geotechnical and environmental testing boreholes drilled across the site in 2009.

Note that where possible original photographs or negatives have been scanned and used in this summary. In some cases, however, the original photographs could not be located in time for this report, and scanned copies of colour photocopies of the site photographs have been used.

[87] Casey & Lowe 1994.

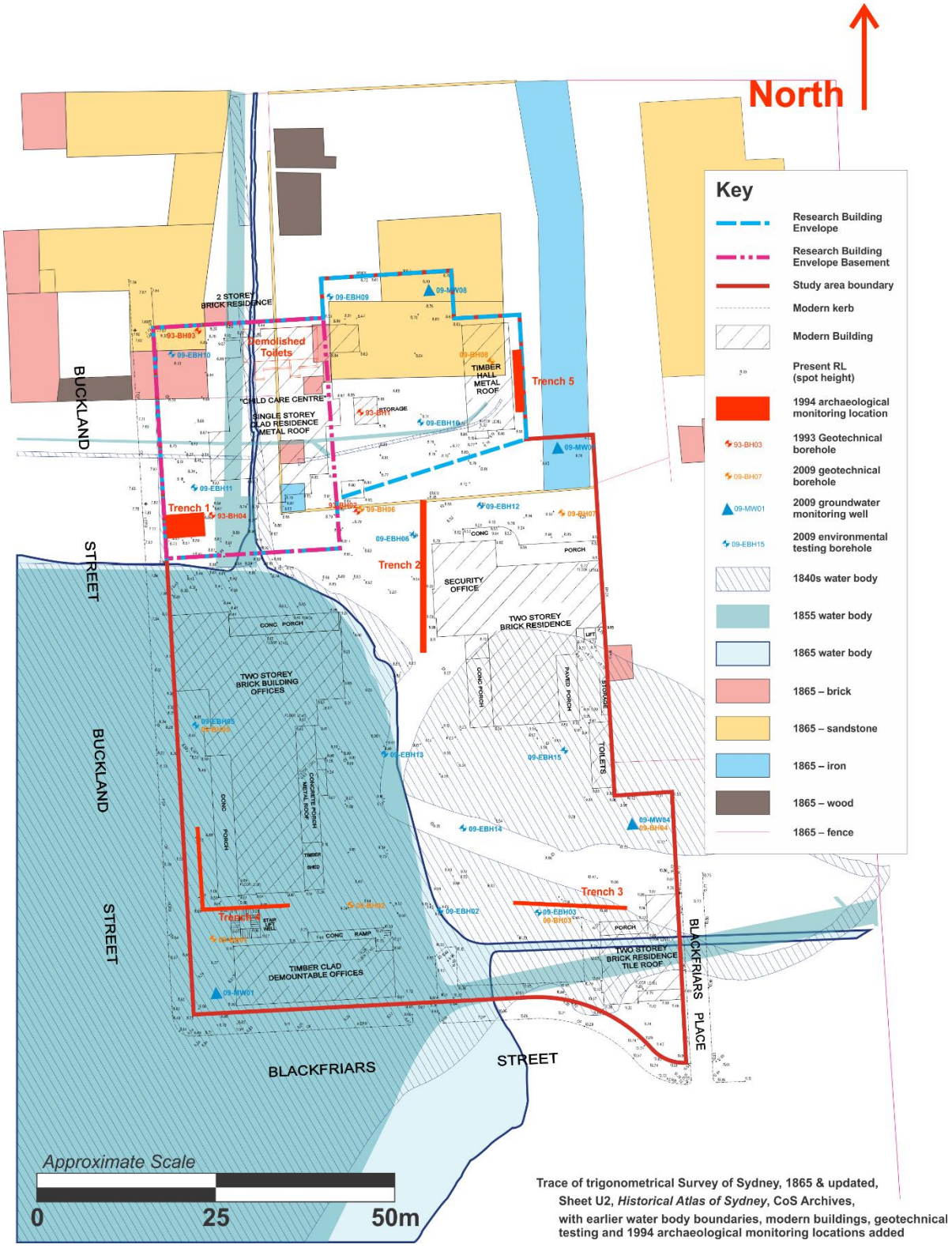


Figure 4.10: Plan showing location of 1994 monitoring locations and geotechnical testing locations with historical and present features for reference.

4.5.1 Gas Main Trench - Trench 1

4.5.1.1 1994 Results

A large gas main trench was excavated east-west in the northern part of the site, in the sandpit area (Figure 4.10). The area opened at the western end of this trench was extensive. The western section was:

Western End: Western Section - Stratigraphy (Figure 4.11, Figure 4.13)

1	0 - 150 mm	Sand pit deposit
2	150 - 350 mm	Black landscape fill (200 mm)
3	350 - 360 mm	Deposit of sandy material (100 to 200 mm)
4	360 - 870 mm	Grey sandy deposit
5	870 - 1170 mm	Mix of black grey soil and small rubble
6	1170 - 3670 mm	Light grey clay (2.5 m)
7	3670 mm	Black organic material (old creek line)

These deposits contained some artefacts: sandstock brick fragments, glass and ceramics sherds but nothing of a substantial nature. They did not contain footings or occupation deposits associated with the occupation of the distillery in this area. They were probably deposited during the demolition and levelling of the site prior to and during the construction of the School buildings. This tends to support the results of the overlaying of the historic plans which indicates the main distillery complex was further to the north.

Figure 4.11: Western end of gas main trench, Trench 1, in northern playground area. Photo taken looking west, BLKF 2:4.

Figure 4.12: South-facing section of gas main trench, Trench 1. Photo taken looking north, BLKF 2.5, Scale 1m.

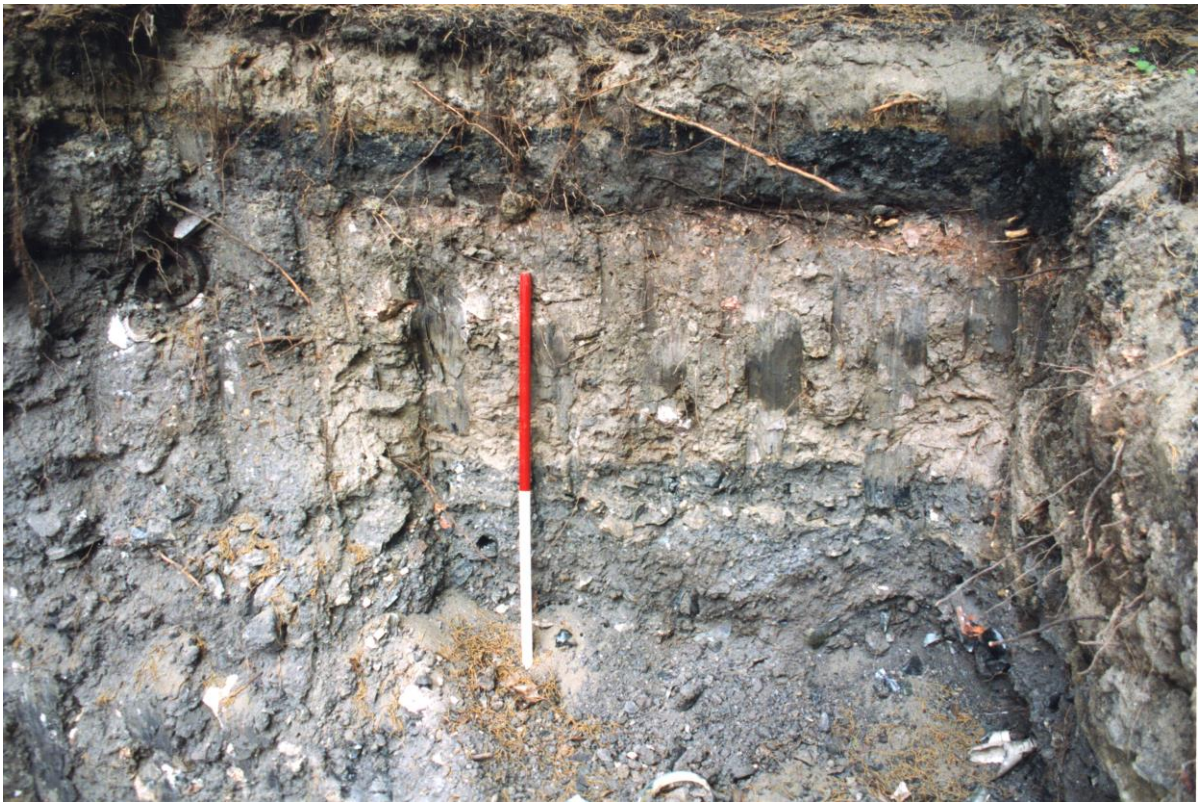


Figure 4.13: East-facing section of gas main trench, Trench 1. Note brick, glass and ceramic fragments in the black grey soil at the bottom of this section (deposit 5). Photo taken looking west, BLKF 2.3, Scale 1m

Figure 4.14: Southwest corner of gas main trench, Trench 1, in northern playground area. Photo taken looking southwest, BLKF 2:6.

4.5.1.2 2015 Discussion

The upper 1170mm of deposit in this area are likely to be associated with the c.1878 levelling of the site and later works. The sand pit deposit and the black landscape fill (deposits 1 and 2) are likely to be associated with the 20th-century occupation of the school grounds. The thin deposit of sandy material (deposit 3) may be associated with an earlier yard level, probably around when the school was built. The grey sandy deposit and the mix of black grey soil and rubble (deposits 4 and 5) are likely to be associated with the c.1878 reclamation. The sandstock brick fragments and sherds from broken glass and ceramics found in these deposits (Figure 4.13) are consistent with mid to late 19th-century practices, which could include domestic rubbish in imported fill.

A light grey clay (deposit 6) extends for 2.5m from 1170mm to 3670mm. This deposit is most likely part of the dam embankment which needed to be constructed in the 1820s to create the large dam. Archaeological testing for a similar dam wall associated with John Dickson's Steam Engine at Haymarket, Sydney (built c.1815) found that Dickson's dam wall was constructed using a series of sand and clay fills to a depth of 940mm.[88] Although the clay deposit observed during the 1994 archaeological monitoring was a different colour and more uniform throughout, it still is consistent with an embankment made with clay.

[88] Casey & Lowe 2014:16, 24.

4.5.2 Central Area - Trench 2

4.5.2.1 1994 Results

The area between the Boys and Girls schools required the laying of a number of services (Figure 4.10). None of these services were especially deep. The northern section of this central area contained bitumen layers above various deposits. Figure 4.15 shows the bitumen sitting on a layer of red clay which was probably a fill deposit for levelling the playground. Below this was a white sandy construction layer sitting on a natural grey sandy soil layer.

The stratigraphy changed further to the south (Figure 4.16). Underneath the bitumen surfacing was a shallow pale yellow sandy construction layer with some artefacts sitting on top of a black organic sandy clay layer (natural).

Figure 4.15: Northern end of central trench, Trench 2, to the west of the Boys school. Photo taken looking northeast, BLKF 2.7, scale 1m.

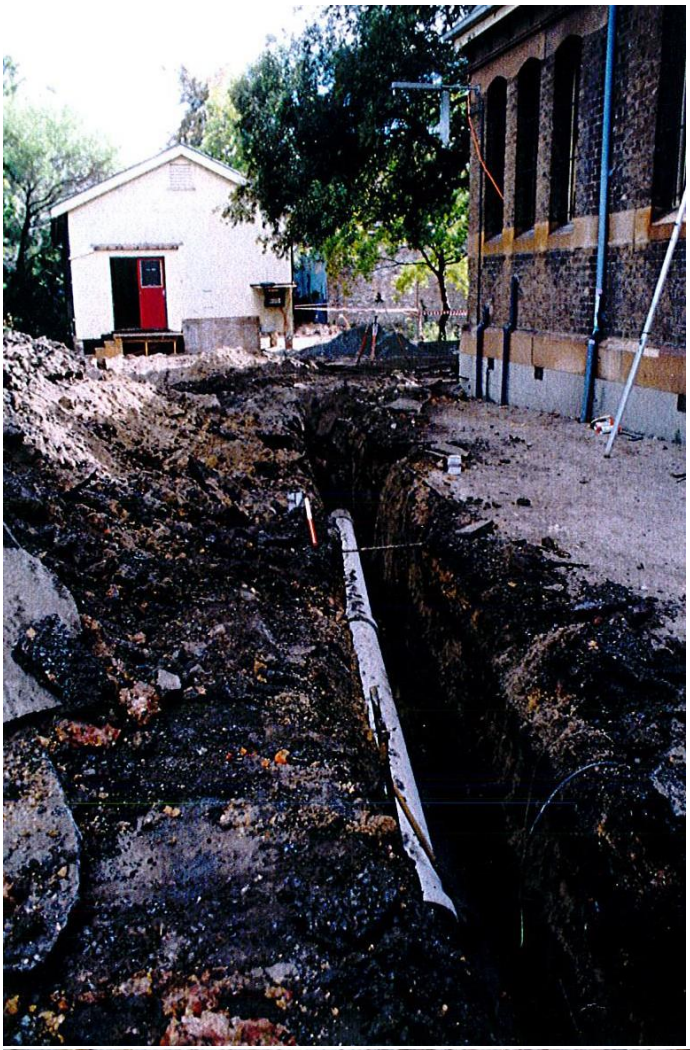


Figure 4.16: Trench 2 running down the centre of the site to the west of the Boys school. Photo taken looking north, BLKF 2.13, scale 1m.

Figure 4.17: West-facing section, Trench 2, between the Boys School and Girls/Infants School buildings. Photo taken looking east, BLKF 2.12, scale 1m

4.5.2.2 2015 Discussion

The bitumen layers are very likely to have been associated with use of the area as open space within the school. The red clay layer is probably imported fill, possibly onto the site when it was levelled c.1878.

The best account for the pale white or yellow sand found underneath the red clay or bitumen has changed since 1994. It is now much clearer that the natural soil in this area (much of Chippendale, extending to Central Station) at the time of British colonisation was white sand. Available photographs of archaeological investigations at the nearby site of Central Park, Chippendale (formerly Carlton United Brewery) by GML Heritage Pty Ltd appear to provide evidence of the natural subsoil being sand.[89] Archaeological investigations by Casey & Lowe at Kensington Street, Chippendale in April 2014 also found that the natural subsoil on that site was sand. Further evidence for sandy soil is found in the 1823 Bigge report, which describes the soil of the Military Garden as 'loose sand'.[90] The garden was later the location of the Carlton United Brewery, St Benedict's church and school, and part of the Blackfriars site. The sand layer observed in Trench 2 is likely to be the early to mid 19th-century topsoil in this area.

Below the pale yellow sand, there was a darker sandy clay layer. This is probably a natural soil strata. The organic material in it may be associated with the Blackwattle Swamp which was in the area prior to Robert Cooper's development of the site in the 1820s.

4.5.3 Southeastern Area - Trench 3

4.5.3.1 1994 Results

Work in the southern area was extensive but again the trenches were not very deep, not much more than a metre. The deposit in the southern area contained footings of the demountable buildings and associated school surfaces and beneath them the deposit was mostly sand with some landscape soil for plantings (Figure 4.18). No artefacts were found in this area.

Southern Section: Eastern end - Stratigraphy

1	1 - 150 mm	Bitumen layer (100 to 150 mm)
2	150 - 550 mm	Landscape Fill: grey/brown layer (400 mm)
3	550 - 700 mm	White construction layer: probably construction of Blackfriars School (100-200 mm)
4	700 - 1400 mm	Grey sandy soil - original strata, c.700 mm

[89] GML Heritage n.d.
[90] Bigge 1823:65.

Figure 4.18: Trench 3 running easterly toward the eastern boundary wall. Photo taken looking east, BLKF 2.11.

4.5.3.2 2015 Discussion

The bitumen layer in Trench 3 (deposit 1) observed in 1994 is almost certainly associated with the 20th-century yard surfaces in the school. The grey/brown 'landscape fill' (deposit 2) is likely to be either fill deposited during the 20th-century use of the school, or levelling fills deposited during the c.1878 levelling of the site.

Like Trench 2, Trench 3 also showed evidence for sandy deposits (deposits 3 and 4). It is unclear when these were deposited. Overlays of historic maps indicate that Trench 3 is likely to have been initially part of the dam up to the 1840s (Figure 4.10). For this reason, deposits 3 and 4 are unlikely to be natural soil, unlike the sand layer observed in Trench 2. Instead, they are likely to be sand redeposited from nearby and used to level the area at some point during the 19th century. This may have occurred as early as before 1855, by which time the area was no longer part of the dam. Alternately it may have occurred as late as the general levelling of the site in 1878.

4.5.4 Southwestern Area - Trench 4

4.5.4.1 1994 Results

In the corner to the west of the Girls school the service trenches cut through a sandy deposit (Figure 4.19). In one part the trench was up to 1.5m deep into the sand without any change in stratigraphy. There was no evidence for artefacts in this area.

Figure 4.19: Trench 4, southwest corner behind Girls school showing sandy deposits. Photo taken looking west, BLKF 5.11.

4.5.4.2 2015 Discussion

This trench was located in part of the site occupied by the large dam prior to 1878 (Figure 4.10). As such the sandy deposit found in this trench is unlikely to be natural soil, as it was found too close to the modern surface. The modern yard area of the former Blackfriars School is about 400mm above the level of Buckland Street, based on levels shown on a 2013 survey of the site. The photograph of Trench 4 from the 1994 monitoring report (Figure 4.19) indicates that this sandy deposit started above the level of Buckland Street. As it is unlikely that the present (and 1994) level of Buckland Street is lower than the base of the dam when it was drained c.1878, it then follows that the sandy deposit observed in 1994 had to be imported after the site was cleared and levelled in 1878. This may have been in 1878, or when the school was built in the 1880s.

4.5.5 Eastern Wall Trench - Trench 5

4.5.5.1 1994 Results

The eastern boundary wall was collapsing due to undermining by the roots of a large palm tree (Figure 4.20). This required the rebuilding of this wall and the excavation of a trench to the base of the existing footings (Figure 4.21). This trench was 5m by 2m wide and 1.5m deep. The base of the trench consisted of a concrete aggregate footing (700 mm wide) and a crushed yellow and white sandstone deposit (Figure 4.21). There were some small rubble stones and bricks along the western side of the trench sitting in the crushed sandstone layer but these had no real meaning. A small test hole showed that the crushed sandstone layer was a thin lense sitting on a black ashy deposit. There was no need to disturb this next layer. The western section of the trench showed a series of fill layers with the occasional brick fragment (Figure 4.22). Tip lines were evident in this deposit but they indicate little more than the deposition of various fill layers to raise ground levels during the late nineteenth and early twentieth-century occupation of the site. The black ashy layer beneath the yellow and white crushed sandstone deposit may be the beginning of archaeological deposits associated with the early and mid-nineteenth century occupation of the distillery buildings.

Figure 4.20: Eastern boundary wall showing severe cracking near palm tree. Photo taken looking east, BLKF 3.29.

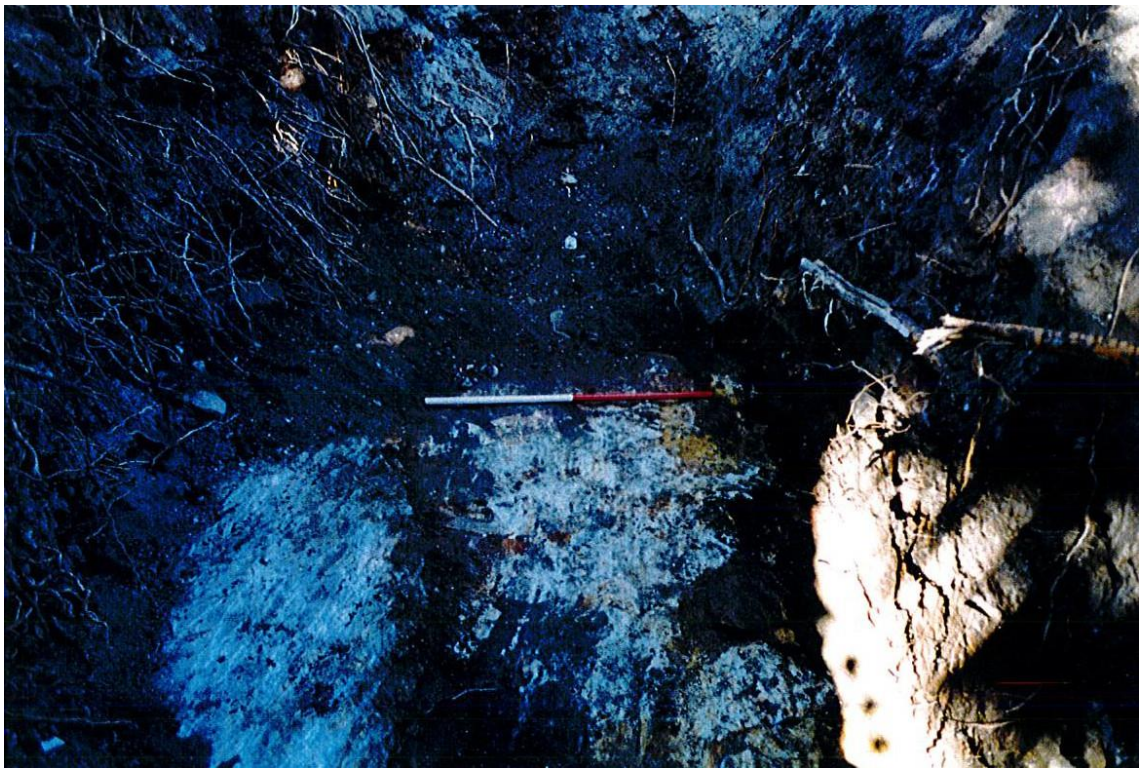


Figure 4.21: View to south showing the floor of Trench 5 and the concrete footings of the eastern boundary wall on the left. Photo BLKF 4.5, scale 1m.

Figure 4.22: East-facing section of Trench 5 showing various fill layers containing some brick rubble. Photo taken looking west, BLKF 4.7, scale 1m.

4.5.5.2 2015 Discussion

Trench 5 was located against the east boundary wall with St Benedict's Church, now part of the Notre Dame University precinct. This boundary only dates to the 1880s, when representatives of the Catholic Church bought the adjoining lot as part of the Blackfriars subdivision. Prior to then, the boundary between the Brisbane Distillery and St Benedict's Church lay further to the east (Figure 4.10).

The material recorded in this trench in 1994 is likely to be associated with the c.1878 levelling of the site and the construction of a boundary wall, probably in the 1880s. The rubble in the deposit is likely to come from structures demolished around that time.

A black ashy layer was observed at the base of the trench at a depth of about 1.5m. As noted in the 1994 monitoring report, this may be the start of material associated with the distillery and the adjoining yard.

4.5.6 Childcare Centre

4.5.6.1 1994 Results

Prior to the commencement of construction of the Childcare centre a brick toilet block was demolished. The demolition of this toilet block required the removal of substantial concrete and brick footings (Figure 4.23, Figure 4.24). These concrete slabs provided a solid foundation beneath the brick footings. The nature of the boggy ground appears to have required substantial footings for even small scale structures.

The fill associated with the removal of the toilet footings contained a number of broken bottles. These included: 3 champagne bottles (1860-1900), 1 skittle bottle (1870-1880), neck/shoulder (1860-1900), a base embossed with C(?)HG & Co (1840-1900), 1 bottle neck and rim (1840-1900), and two other bases (1840-1900).[91] The date range for these items was rather wide. They were probably associated with the operation of the Distillery.

The injection of the franki-piles met no resistance until depths of 5.5 to 7.4m (Figure 4.8). The depths at which the piles met bedrock show a rising slope away from the creek line on the western side to the east. The depths indicate that no sandstone walls associated with the distillery building and perimeter wall were hit.

The removal of the toilet block buildings and its footings indicated that the upper layers of the northern area of the site were more disturbed than predicted during the archaeological assessment. This is to some extent supported by the results of the franki-pile piering which appears not to have hit any solid footings associated with the distillery. This suggests that the demolition of the Distillery may have been more invasive than initially thought.

[91] Jean Smith examined these glass bottles and provided a general date range.

Figure 4.23: Extensive brick footings below the toilet block in the area of the new Childcare Centre. Photo taken looking north, BLKF 3.35.

Figure 4.24: Mounds of dirt containing brick and concrete slabs that formed the footings of the toilet block. Photo taken looking northwest, BLKF 3.36.

4.5.6.2 2015 Discussion

The major item of archaeological recording during the construction of the Childcare Centre were observations made during the removal of a toilet block with concrete foundations (Figure 4.10, Figure 4.23). The foundations were quite deep and probably required excavations of at least one metre. The fill associated with the foundations included glass bottles with date ranges in the mid to late 19th century.

The 1994 monitoring report interpreted these results to suggest that the demolition of the Brisbane Distillery was more invasive than initially thought. This interpretation should be revised in light of better information.

Based on the revised overlays of historic maps produced for this report, the toilet block removed in 1994 is likely to have been situated outside the main sandstone distillery building. The brick structures which may have been situated beneath the east end of the toilet block, are likely to have been smaller, less substantial additions to the main building. For this reason, the 1994 monitoring results also are unlikely to provide substantial evidence regarding the extent of the demolition of the Brisbane Distillery.

Furthermore, based on the best information now available, the level of the pre-1878 ground level and the distillery buildings is likely to be lower than the level reached by the 1994 excavations to remove the toilet block. One historic watercolour of the site (Figure 2.7), not used in the 1993 assessment, shows that the level of the industrial buildings, including Pemell's Mills and the Brisbane Distillery, was noticeably lower than the top of the dam, immediately to their south. Although the difference in levels is hard to estimate from the watercolour painting, it is likely that it was between 0.5 and 1.0m. Archaeological evidence from Trench 1 suggests that the top of the dam was about 1.2m below the 1994 ground level. Given this information, it seems likely that the pre-1878 level of the Brisbane Distillery yard was about 1.5m to 2.0m below the 1994 ground level. This is probably deeper than the excavations to remove the toilet block.

Therefore it seems likely that the material recorded during the removal of the toilet block was associated with the c.1878 levelling of the site. The date ranges of the glass bottles recorded are consistent with this interpretation.

4.6 Geotechnical testing

Geotechnical testing has been undertaken on the Blackfriars site on two previous occasions; once in 1993 by Coffey Partners International Pty Ltd, and once in 2009 by Douglas Partners.[92] Douglas Partners also undertook a separate sequence of boreholes for environmental testing and monitoring wells, also in 2009.[93] Although not their primary aim, geotechnical and environmental boreholes do provide information regarding the level of fills and deposits, which is useful for assessing the archaeological potential of an area.

Overall these results are consistent with what was observed during the 1994 archaeological monitoring. Boreholes within the presumed footprint of the Brisbane Distillery found material possibly associated with the distillery between 1.6m and 2.1m below the surface. This was material described as 'grey brown, clay filling with some gravel, moist' (09_BH08) and 'brown, clayey sand filling with bricks and concrete' (09_EBH08). Although concrete was observed in borehole 09_EBH08 at depths below 2.5m, this material probably was associated with the Brisbane Distillery. Concrete became increasingly common as the 19th-century progressed, but experimental uses of cement and concrete for foundations and mortar are known in Britain from the early 19th

[92] Coffey Partners 1993; Douglas Partners 2009a.
[93] Douglas Partners 2009b.

century.[94] An 1833 description of Robert Cooper's industrial buildings stated that the large store building, to the west of the Blackfriars site, had a 'Roman Cement' floor.[95] Roman Cement was an early form of artificial cement, patented in 1796 by James Frost.[96] Several small shipments of Roman Cement were advertised for sale by auction in Sydney during the 1820s, including some sold by Robert Cooper.[97] It seems quite possible that Robert Cooper may have used cement in the construction of the Brisbane Distillery, either as mortar or render. Alternately the observed concrete may have been from later repairs and additions to the distillery structure.

The geotechnical and environmental borehole results also indicate that deposits associated with the yard to the south of the Brisbane Distillery is likely to between 1.6m (93_BH02) and 2.2m (93_BH01) below the surface. The observed material at this level was generally sand with some historic artefacts, which is consistent with modified historic topsoil, similar to that observed in Trench 2 of the 1994 monitoring (Section 4.5.2.2).

In the south part of the Blackfriars site, where the dam was located, borehole data suggest that there is between 0.7 and 2.0m of material which is likely to be c.1878 fill. Under this is sandy material which may be material which washed into the dam while it was in use. Beneath the sandy fill was clay, which has been interpreted as the base of the dam.

It must be noted that this interpretation of borehole data is tentative. An interpretive discussion of each borehole log used for this report is included in Appendix 2.

4.7 Summary

The historical analysis of the Blackfriars site has shown that since the British colonisation of Sydney in 1788 the site has been the location of the following:

- A military garden (c.1814-1824)
- An industrial complex including the Brisbane Distillery, a flour mill and a dam (1824-1878)
- The Blackfriars school buildings (1883-1994)
- Uses by UTS (1994-present)

It is unlikely that there are any archaeological remains associated with the military garden on the site. Although Blackwattle Creek formed its legal western boundary, the military garden appears to have been focused on the area east of its boundary fence. This appears to have corresponded to the east boundary of Robert Cooper's later land grant, which was located east of the Blackfriars site.

There is moderate to high potential on the site for substantial archaeological remains associated with the Brisbane Distillery and other industrial features. Both archaeological monitoring in 1994 and boreholes dug for geotechnical and environmental testing have indicated that these remains are likely to be found under later imported fill, brought onto the site when it was cleared and levelled c.1878. At the north of the site, where the main industrial structures are expected, the fill is expected to be between 1m to 2m deep. Based on elevations given on the 2013 site survey, this would correspond to approximately RL 7.7 and RL6.7. At the south of the site, where no historic structures are expected, the c.1878 fill may be only 0.5m deep. The c.1878 fill is deep enough for most of the later works on the site not to have impacted on the earlier archaeological remains.

Very deep services, such as the gas mains trench dug and archaeologically monitored in 1994 (trench 1) will have had localised impacts on the archaeological remains. The piles from the 1994

[94] Hurst 2001.
[95] *Sydney Herald* 18 March 1833, p 3b.
[96] Hurst 2001:46.
[97] *Sydney Gazette* 3 July 1823, p 4b, 30 September 1824, p 1e, 13 October 1825, p 1d, 25 March 1826, p 1e.

Childcare Centre will have had a minor to moderate impact on the archaeology in the area. Experience on other sites around Sydney has shown that archaeological remains can remain readily interpretable in an area subject to piled foundations.

The potential archaeological features associated with the industrial phase of the site include:

- Footings associated with the Brisbane Distillery building and related deposits and features within the building.
- Footings associated with later brick additions to the Brisbane Distillery. These include a brick industrial smokestack/chimney.
- Surfaces and other material associated with the rear (south) yards of the Brisbane Distillery.
- Footings associated with the pre-1855 Engine and Boiler house attached to Pemell's Mill.
- The drainage channel/mill race along the line of Blackwattle Creek.
- Water channels and pipes used to supply water from the dam to Pemell's Mill and the Brisbane Distillery.
- Evidence for the embankment used to create the dam.
- Fills and silts associated with the life of the dam.

There is only low potential for the site to contain substantial archaeological remains associated with the site's use as an educational facility since 1883. The potential for artefact deposits within the standing buildings is low. Typically, tongue and groove flooring in common use by the 1880s, significantly reduced the chance for material to be lost or deliberately deposited in underfloor cavities. Furthermore, any deliberately hidden material is likely to have been found and removed during later renovations, particularly the extensive works in the mid-1990s. The potential for rubbish dumps of material associated with the school on the site is low to nil. Regular rubbish collection services make it unlikely that the school was ever forced to dispose of material on site. All the major 1880s buildings built in 1883 remain standing on the site. Some later additions, smaller outbuildings and relocatable timber buildings have been removed from the site. The later additions, if built from timber or fibre-cement, and the relocatable are unlikely to have had substantial foundations, and are unlikely to have associated archaeological remains. The outbuildings may have had more substantial foundations, as shown by the toilet block footings observed during the 1994 archaeological monitoring (Section 4.5.6). There may also be earlier garden walls associated with the school buried on the site, such as those seen during the site visit (Figure 4.6).

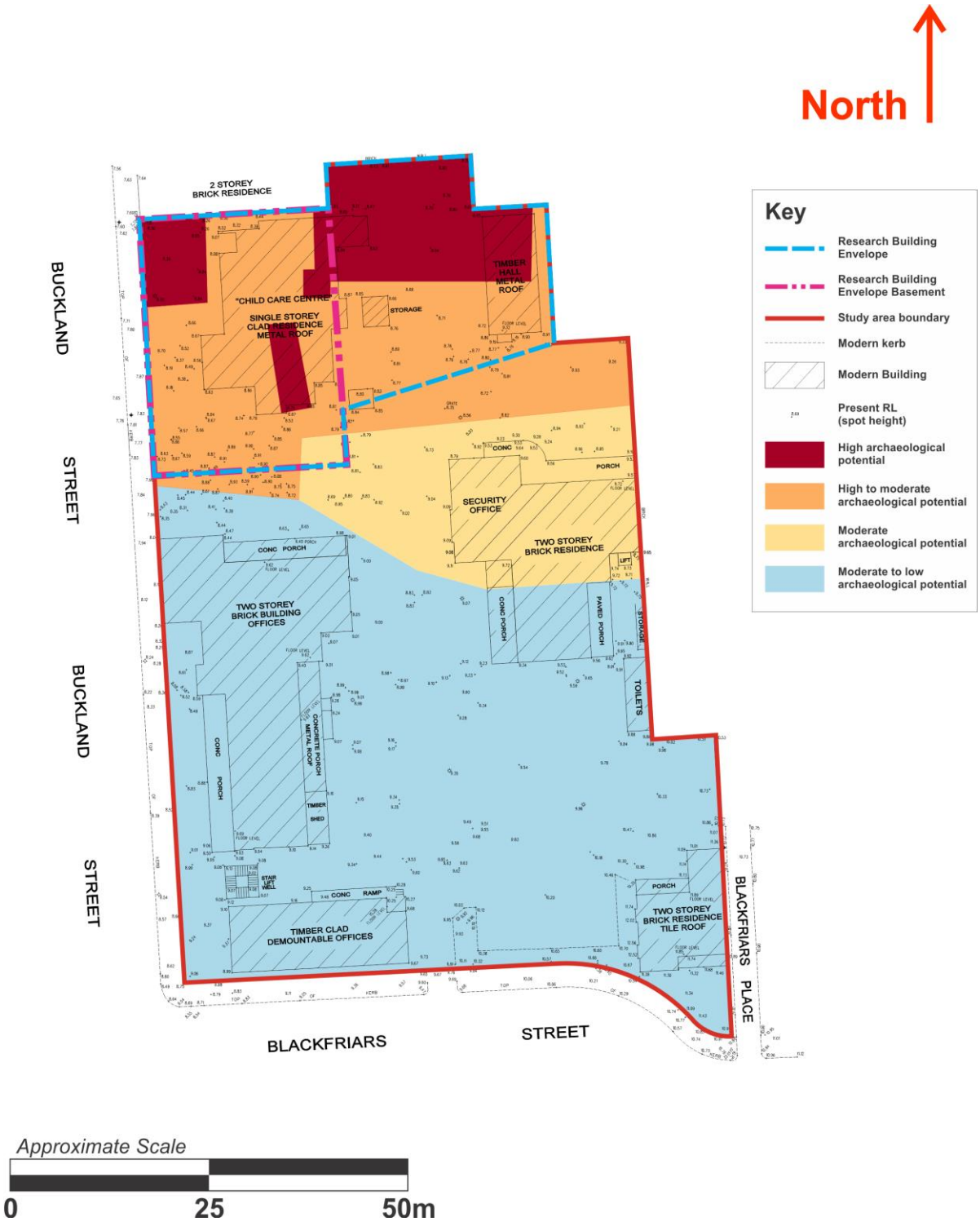


Figure 4.25: Schematic map showing the assessed archaeological potential within the study area and the proposed envelope of the new building envelope for which UTS is seeking concept approval.

5.0 Heritage Significance

5.1 Heritage Significance

Heritage significance is distinct from archaeological potential. Assessment of archaeological potential considers the probability of physical evidence from previous human activity to still exist on a site. Assessment of heritage significance for archaeological features considers the cultural values associated with those remains.[98] This section will outline the basis of assessing the heritage significance of archaeological remains, before then assessing the significance of the potential features within study area. This assessment is a revision of that contained in the 1993 archaeological assessment of the site. This section will also present existing heritage statements of significance for the Blackfriars site for reference.

5.2 Heritage significance and archaeology

A number of guidelines are relevant to the heritage assessment of historical archaeological remains. In NSW the most relevant of these are those developed by the Heritage Branch (now the Heritage Division) in 2009: *Assessing Significance for Historical Archaeological Sites and 'Relics'*. The heritage criteria, adopted by the NSW Heritage Council and the associated guidelines issued in 2001 (*NSW Heritage Manual - Assessing heritage significance*) are also foundational.

The 2001 heritage criteria are used assess the heritage significance of archaeological items. To be assessed as having heritage significance an item must:

- meet at least one of the one of the seven significance criteria
- retain the integrity of its key attributes[99]

Relics must also be ranked according to their heritage significance as having:

- Local Significance
- State Significance

If a potential relic is not considered to reach the local or State significance threshold then it is not a relic under the NSW *Heritage Act* 1977.

Section 4A of the NSW *Heritage Act* 1977 defines these two levels of heritage significance as follows:

> *'State heritage significance',* in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.
>
> *'local heritage significance',* in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.[100]

Although 'research significance' (criterion e of the Heritage Council criteria) has traditionally been seen as the primary heritage value of archaeological remains,[101] if an item is to be considered to be of State significance it should meet more than one criterion.[102] As the 2009 guidelines state:

[98] This distinction has long been recognised by historical archaeologists working in heritage management, but has recently been restated in *Practice Note – The Burra Charter and Archaeological Practice* (Australia ICOMOS 2013a:7).
[99] NSW Heritage Office 1996:26.
[100] NSW Heritage Act 1977 (current January 2014), section 4A; NSW Heritage Branch 2009:6.
[101] Bickford & Sullivan 1982; NSW Heritage Office 1996:26.

> Archaeological Significance may be linked to other significance categories especially where sites were created as a result of a specific historic event or decision, or when sites have been the actual location of particular incidents, events or occupancies.
>
> Other relevant factors may be comparative values related to the intactness and rarity of individual items. The rarity of individual site types is an important factor, which should inform management decisions.[103]

Similar sentiments are also contained in the 2013 Australia ICOMOS Practice Note: *The Burra Charter and Archaeological Practice*.[104]

As a result of the need to assess sites using multiple criteria, the 2009 guidelines include the following categories and associated questions relevant to historical archaeological sites:

- Archaeological Research Potential (current NSW Heritage Criterion E).
- Associations with individuals, events or groups of historical importance (NSW Heritage Criteria A, B & D).
- Aesthetic or technical significance (NSW Heritage Criterion C).
- Ability to demonstrate the past through archaeological remains (NSW Heritage Criteria A, C, F & G).[105]

The 2009 significance guidelines included examples which were in part intended to help demonstrate how an assessment may distinguish between local and State significant archaeological sites. The examples provided, however, were fairly obvious ones, and do not help us to work out how a less obvious site has State rather than local significance. This means that it remains down to the skill and expertise of the archaeologist assessing the site to make the distinction between local and State significance.

5.3 Previous Statements of Heritage Significance

5.3.1 Archaeological heritage

Casey & Lowe 1993

> The Brisbane House Distillery and the CSR industrial complex has historical, archaeological, social, scientific, and architectural significance. It was the second distillery built in the colony when it was erected in 1825. While notable during the first half of the century for the size of its buildings after 1855 it became the base of CSR's operations as this company gained a monopoly over sugar production and became one of the largest companies in Australia. The study area is likely to contain remains of these industrial buildings that were erected on the site from 1825. Robert Cooper was associated with the establishment of the industrial landscape of Chippendale, which continues today. The structures, deposits and artefacts contained within the site are likely to illustrate the nature of an industrial site of this type and date. This is a rare archaeological site, which has significance for future, past and present generations.

[102] NSW Heritage Branch 2009:9, cf NSW Heritage Act 1977, section 33 (3) (a) which requires an item to meet more than one of the heritage criteria for an item to be listed on the State Heritage Register.
[103] NSW Heritage Branch 2009:9;.
[104] Australia ICOMOS 2013a:3.
[105] NSW Heritage Branch 2009:11-13.

5.3.2 Built heritage

McPhee Architects 2012

The Former Blackfriars School is of State Significance for its association with the development of educational reforms in the late 19th century both within Chippendale and on a Statewide basis.

The School is of State significance for its role as host to a number of educational initiatives including the development of the State's first kindergarten, its adoption of the Montessori Method of education and the development of the Blackfriars Correspondence School.

The School buildings and Headmaster's Residence are of State Significance as examples of late 19th century architecture in the Gothick Picturesque Style and as the work of a prominent Victorian architect, G.A. Mansfield.

The School buildings and Headmaster's Residence are of high visual and aesthetic value as a surviving late Victorian school complex in the Gothic style, atypical of the majority of NSW public schools at the time, although typical of Mansfield's later work.

The School buildings and Headmaster's Residence are of visual, aesthetic and social value as remnants of the expansion period experienced by the Department of Education in the late 19th and early 20th centuries. The demountable timber structures are contributory elements.

The School is of State significance as a 'modern' 19th century public school and as a symbol of the State's attempt to monopolise primary education during this period.

The School buildings and Headmaster's Residence have high visual and aesthetic value as a remnant of an earlier cultural landscape now largely lost to the pressure of urban and industrial development.

The site of the Blackfriars school is of State significance as part of the former site of Cooper's Distillery and later the Colonial Sugar Refinery, both important colonial industries linked to prominent colonial businessmen.

The site is of State significance for its archaeological potential associated with former industries on the site and for the archaeological potential associated with its possible occupation and use by the Eora people, prior to and immediately after European settlement.

5.4 Discussion of Heritage Significance

The assessment of archaeological potential above indicates that the Blackfriars site has high to moderate potential to contain archaeological remains from the industrial use of the site by the Brisbane Distillery, Pemell's Mills and an associated dam. Although the site was previously part of a military garden, the potential for remains associated with this phase is low to nil, as it formed part of the edge of the property and is outside the current study area. The site has been occupied by the Blackfriars School buildings since 1883. Due to the introduction of rubbish collection services by the 1880s, and later renovations of the standing buildings, there is also low to nil potential for archaeological remains associated with this phase. For this reason, this discussion of heritage significance has focused on the industrial period of the site.

Criterion (a): Historic Significance - (evolution)

an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).

The site of the Brisbane Distillery and the associated buildings formed one of the largest industrial complexes in Sydney during the 1820s and 1830s. The distillery was only the second legal distillery in the colony, and it had a much longer life than the first distillery on Old South Head Road. Although other industrial buildings were built in Sydney during the 1820s, Robert Cooper's facilities were notable for how they consisted of multiple buildings including the distillery, mill and stores (outside the study area). The total area occupied by the industrial buildings roughly measured 240 x 25m (0.6Ha), along Parramatta Street (now Broadway). As such, the potential archaeological

remains of the Brisbane Distillery and associated features such as the dam have the potential to provide information regarding the beginning of industrial practices in NSW.

The site remained in use as an industrial complex until the 1870s. Later additions within the study area include the engine and boiler house attached to Pemell's Mills. These later additions illustrate the development of industrial processes over the period the site remained in use.

Criterion (b): Associative Significance – (association)

an item has strong or special association with the life or works of a person, or group of persons, or importance in NSW's cultural or natural history (or the cultural or natural history of the local area).

The potential archaeological remains of the Brisbane Distillery are associated with individuals and organisations of importance to the cultural and industrial development of New South Wales.

Robert Cooper, who constructed the entire industrial complex including the distillery, flour mill, dam, was prominent as a merchant in Sydney from the 1820s to the 1840s. His interests were diverse, but the industrial complex at Chippendale represented a major investment by him. He appears to have taken personal interest in the running of the facilities. His personal association with the distillery and gin was reinforced by his decision to name his house at Paddington, *Juniper Hall*, after the juniper berries used to flavour gin.

The Australasian Sugar Company and its successor company the Colonial Sugar Refinery Company (CSR), was closely associated with the site between 1852 and 1878. This was a period of significant growth for the company, which ended up being the dominant sugar company in Australia. The Brisbane Distillery was an important part of the company's operations while it was establishing itself, as it could use excess molasses produced by the refining process to produce rum and other spirits.

Pemell's Mills were closely associated with the miller James Pemell and his family. Although he was not as prominent as either Robert Cooper or CSR, James Pemell was actively involved in politics as well as business. He was a member of the NSW Legislative Assembly between 1859 and 1860 and again between 1865 and 1869. He also was an alderman on the City of Sydney Council from 1851 to 1852. The Pemell family appear to have been active in managing their flour mill.

Criterion (c): Aesthetic Significance - (scenic qualities / creative accomplishments)

An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the cultural or natural history of the local area).

The potential archaeological remains of the Brisbane Distillery are thought to be part of the second legal distillery in NSW, and part of one of the largest industrial complexes in Sydney during the 1820s and 1830s. As such they are likely to demonstrate a high degree of technical achievement, as early representatives of large-scale industrial enterprises in NSW. There is also some evidence that Robert Cooper used 'Roman Cement', an early form of cement used for mortar and rendering. The potential remains of the Brisbane Distillery may include some of the earliest uses of cement on an industrial site in NSW.

Other aesthetic values of the potential remains are harder to determine. While archaeological remains may have aesthetic value, evoking emotions in some, mostly through their novelty and age, these values are usually more by accident than design.

The potential archaeological remains of the Brisbane Distillery have 'aesthetic significance' not in the sense of being attractive, but in the broader sense of demonstrating an important technical

achievement. This broader sense is used in various guidelines including the 2009 Heritage Division Guidelines and the 2013 practice notes to the Burra Charter.[106]

Criterion (d): Social Significance - (contemporary community esteem)

an item has a strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the cultural or natural history of the local area).

No public consultation has been undertaken relevant to the potential archaeology of the study area. Anecdotally there does appear to be fairly strong public interest in the archaeology of Sydney, with public open days usually attracting good attendance. Also there may be some particular interest in the archaeology of the site from former students and staff of the school and university, even though the potential archaeological remains are not associated with this phase of use. Past and present residents of Chippendale may also be interested in an early industrial site within a suburb which remained dominated by industry until relatively recently.

Criterion (e): Technical/Research Significance - (archaeological, educational, research potential and scientific values)

an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).

The potential remains of the Brisbane Distillery, Pemell's Mill and their associated buildings are expected to provide information regarding the construction and operation of an early industrial complex in NSW. The site was in use from 1824 to 1878, over which time the main distillery building remained standing, although other additions and outbuildings changed. While not the earliest steam mill in the colony it was a substantial industrial complex and a number of steam engines probably operated here.

A small number of 1820s industrial sites in Sydney have been excavated previously. Most notably, Barker's Mill (completed 1825) has been investigated previously.[107] However, no other distilleries from this period are known to have been investigated in NSW.

Although some records do exist, the early history of the site is not particularly well documented. Some detailed plans of the site do exist, but the earliest of these is thought to date from the early 1840s. Only one photograph of the site has been identified. Archaeological investigation could greatly enhance the knowledge regarding the site and the industrial practices carried on there.

The potential archaeological remains have the potential to address a wide range of research questions including:

- How were these large buildings constructed? Did Robert Cooper use any of the innovative materials such as 'Roman Cement' which he also was selling at this time?
- What evidence is there for the distilling process on the site? How does that compare to what is known about general 19th-century large-scale distillation?
- How were the industrial buildings modified to adapt to changing technologies?
- How did the addition of the engine and boiler house relate to Pemell's Mills?
- How was water managed on the site?
- Is there any evidence from the workers on the site? What evidence does this provide regarding work practices?
- What evidence is there for the environment of the site prior to its industrial development?

[106] Heritage Branch 2009:12; Australia ICOMOS 2013b:3.

[107] The mill building: Wilson 1985; Casey & Lowe 2006; the remainder of the industrial complex: Casey & Lowe 2013.

Other relevant research questions may arise depending on the results of the archaeological program.

Other areas of research interest relate to the changing natural and cultural landscape since British settlement in 1788 until the building of the school in 1883. This should allow for using the archaeological evidence to address a range of questions in relation to the evolving landscape and the impact of British settlement on this area, from furthering an understanding of the area of Blackwattle Creek, the industrial landscape and dam of the Brisbane Distillery and complex and the modification of this part of Chippendale for subdivision.

Criterion (f): Rarity

an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).

The site is part of the second legal distillery in NSW. It also formed one of the largest industrial complexes in Sydney during the 1820s and 1830s. The mid 1820s, when the Brisbane Distillery was built, marks a time when a few large industrial buildings started to be constructed in NSW, including Barker's Mill and the Darling Mills (at North Parramatta). Prior to that the only moderately sized industrial building was Dickson's Steam Engine, in the area now known as Haymarket.

Therefore the potential archaeological remains associated with the Brisbane Distillery and related features are rare, being part of the largest of only a handful of similar sites.

Criterion (g): Representativeness

an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places of cultural or natural environments (or the cultural or natural history of the local area).

Although the site does represent a particularly large and early industrial site, the potential archaeological remains are expected to be broadly representative of early to mid 19th-century industrial sites and technology in NSW. Many sites, producing different goods, would have had similar requirements regarding the need to manage steam engines and water supplies. The large sandstone building for the Brisbane Distillery would also be representative of not only industrial buildings, but also may have some similarities to mercantile warehouses and stores.

The archaeological investigation of the potential remains would enhance what is already known regarding early to mid 19th-century industrial sites and is likely to provide results which would be representative of other, smaller sites.

Integrity

Overall the potential remains associated with the industrial use of the site are expected to retain a fair degree of integrity. The demolition of the distillery and associated buildings in 1878 would have only removed the material which could be readily sold. Other material would have been buried under levelling fill, which would have been brought onto the site to raise the levels of what was generally a swampy area. Archaeological monitoring and geotechnical and environmental testing boreholes suggest that the depth of the fill over pre-1878 deposits ranges from roughly 0.5m at the southwest of the site to 2m in the north.

The potential remains associated with the brick and sandstone structures are expected to be relatively easy to interpret. The remains of iron-clad sheds, the dam embankment and water channels are likely to be harder to interpret, but still fairly straightforward for an archaeologist experienced in excavating these categories of feature.

5.5 Statement of Heritage Significance

The archaeology within the Blackfriars site has high to moderate potential to contain archaeological remains associated with the Brisbane Distillery and other associated features dating from c.1825 to 1878. The Brisbane Distillery and the CSR industrial complex has historical, archaeological, social, scientific, and architectural significance. The Brisbane Distillery was the second legal distillery in NSW and formed part of one of the largest industrial complexes in Sydney during the 1820s and 1830s. The site is closely associated with several prominent people or groups. These include Robert Cooper, a prominent merchant in NSW between the 1820s and 1840s, James Pemell, a locally important miller and politician, and with the Colonial Sugar Refining Company, which came to dominate the Australian sugar market while operating from the site. The potential archaeological remains have the ability to address a wide range of research questions regarding early industrial building and steam technology, industrial practices and how these changed over time, the management of water resources, work practices on an early industrial site and the nature of the original landscape and its modification between 1788-1883. This kind of archaeological site is relatively rare in NSW. The potential remains are anticipated to be relatively intact and readily interpretable with appropriate experience. The potential archaeological remains are of State heritage significance.

6.0 Concept Proposal and Impacts

6.1 Proposed Impacts

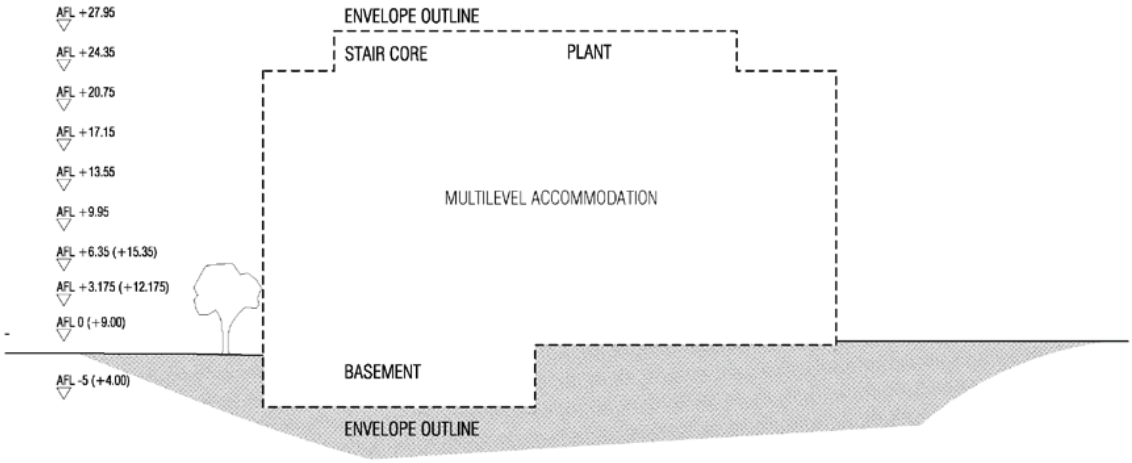
The proposed works involve a new Research Building located in the north of the Blackfriars site. The schematic design of this building has yet to be established, but the broad design envelope has been prepared for the Stage 1 DA (Figure 6.1). The design envelope provides for a six-storey building, with a possible basement level in the west half of the site.

There are two areas in which the proposed building may have impacts on the potential archaeological resource on the site (Figure 4.25). The proposed building envelope includes a possible basement in the western half excavated to a depth of 5.0m (RL 4.0). This basement would remove all archaeological remains within in its footprint. This would include the corner of the Pemell Flour Mill and the yard area of the Brisbane Distillery.

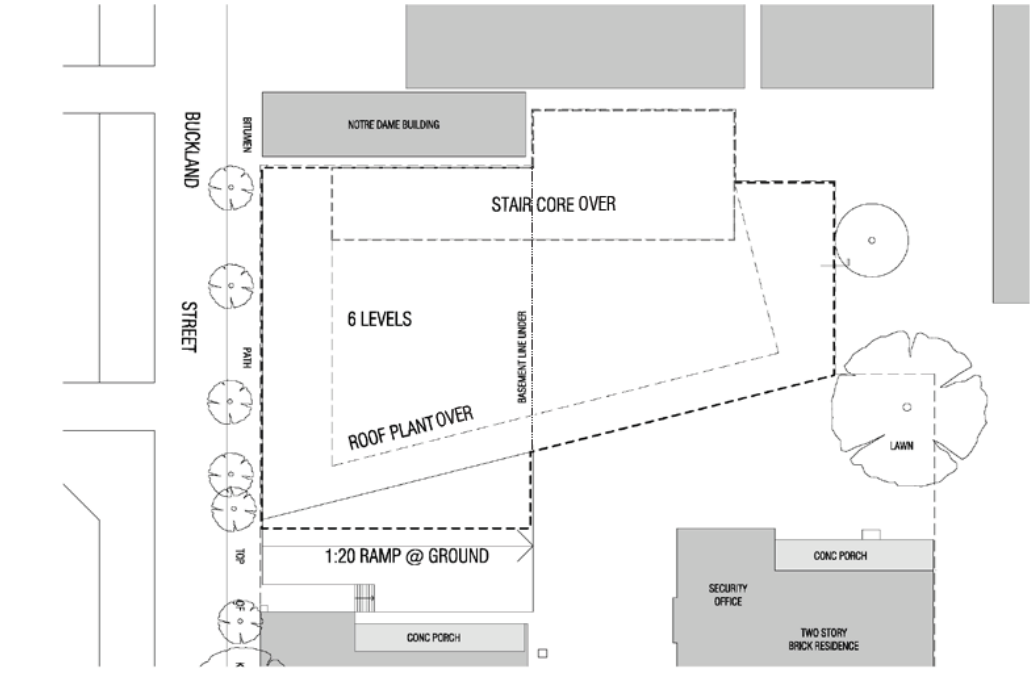
The design envelope does not indicate any other large-scale excavations across the remainder of the building envelope. However, the proposed building in this area will require some kind of foundations. At present no information is available regarding the likely foundations. If a system of piles is chosen, experience has shown that these can be used with only minor to moderate impacts on the archaeological resource. With further information on both the location of the archaeological resource and the structural requirements of the building, it should be possible to design piled foundations in such a way as to minimise the impact to areas of high archaeological potential.

The proposed building is also likely to require a lift core to accommodate elevators. Lift shafts typically extend to a depth of at least 1m to 2m below finished floor levels. Depending on the final design of the proposed building, this may result in a further impact on the archaeological resource on the site.

It is likely that the proposed building will also require the excavation of further trenches for services, although details regarding these will be determined at a later design stage. Again with better information regarding the level of the archaeology, it should be possible to design these service trenches to minimise impacts to areas of high potential and significance. In some cases it may be possible to restrict the services to post-1878 fill, which is not considered to be archaeologically significant.



ENVELOPE SECTION
1:500



ENVELOPE PLAN
1:500

Figure 6.1: Proposed design envelope plan for the UTS Blackfriars Research Building. H2O Architects, 13/8/2015.

6.2 Impact on Significance

A clear understanding of the potential impact on significance cannot be determined prior to the provision further building design details in the Stage 2 DA. Nevertheless, key outcomes of the concept design are:

- That there would be no substantial impact on the main structures of the Brisbane Distillery from the basement except along the western edge (Figure 4.25).
- Main impacts from the basement are on the yard are of the distillery and one of the outbuildings and part of Pemell's Flour Mill. There may also be impacts on possible evidence of early water mill operations within Blackwattle Creek to the east of the flour mill.
- Single piles are not considered to have a substantial or significant impact on potential archaeological remains.
- The fill covering substantial areas of the archaeological remains offers an opportunity to still erect a building and minimise impacts from its construction and services on potential archaeological features.
- Services corridors should be designed to limit impacts to specific areas.

7.0 Mitigation

7.1 Mitigation Strategies

- Archaeological testing should be undertaken as part of developing the Stage 2 DA design to confirm the survival of the potential archaeology in key areas of the site and to inform the design process and issues associated with the location of basements and lift cores.
- Establish service corridors to limit impacts from services.
- Minimise impacts from lift cores on substantial and significant archaeology.
- Interpretation of the archaeological site within the new development. This would be set out in an Interpretation Plan and would need to include the results of any archaeological testing and possible excavations and identify opportunities for the location of interpretation.
- All archaeological work, either testing or salvage, would require the writing of an Archaeological Research Design to establish the approach and methodology to any archaeological excavation.
- All approved archaeological excavation directors for this project would need to be in accordance with the Heritage Council's Excavation Director Criteria for State significant sites.

8.0 Results and Recommendations

8.1 Results

- This Archaeological Assessment and Impact Statement for a Stage 1DA – Concept Application identified that the subject site contains archaeology of potential State significance.
- This State significant archaeology is associated with the Brisbane Distillery and the Colonial Sugar Refinery, which were active on the site between 1824 and 1878.
- The archaeology of the site is buried beneath fills introduced in c.1878 to backfill the dam and to raise the levels of the site. It is noted that the site is above the level of Buckland Street. Likely depth of fill above the archaeology is:
    - At the north of the site, where the main industrial structures are expected, the fill is expected to be between 1m to 2m deep.
    - At the south of the site, where no historic structures are expected, the c.1878 fill may be only 0.5m deep.
- While the design is at Concept stage it is considered that the design envelop is located above the area of the State significant archaeology. It therefore may have a number of impacts on this potential archaeology. The presence of fill should mitigate against many of these impacts in terms of ground slab and services.
- Construction of a new building will have impacts from individual piles, concentrations of piles and deeper excavation such as lift pits, stairwells and beams, as well as the basement. These have varying levels of impact on the potential:
    - Individual piles are not considered to have a major impact on significance but this depends up locations.
    - Concentrations of piles are considered to have a major impact in an isolated location. The individual piles would remove archaeology but in addition the concentrations of piles may make it impossible for an archaeologist in the future to record or understand the archaeology in such a location. Such impacts are typically associated with lift pits which may be of depth and remove archaeology within their footprint remove the archaeology.
- A basement of -5m will remove all archaeology within its footprint. This would require an archaeological salvage program to be undertaken to mitigate this impact prior to development.

8.2 Recommendations

1. Undertake archaeological testing to inform the Stage 2 design and to determine where the archaeology may survive within the site and the degree to which is survives. The results of this testing will need to be written up in a report outlining opportunities for conservation *in situ*, development and interpretation.
2. Avoid impacts as much as possible on the State significant archaeology of the site.
3. The need for an approval for testing will depend upon the stage of the approval process. It is possible that archaeological testing may be able to be completed under a SSD approval through Planning or it may require a S140/S139(4) application to the NSW Heritage Division to be approved. In either case it will require an Archaeological Research Design to be written outlining which areas will be tested and the purpose of the testing.
4. Conservation of State significant archaeology should be a key outcome for this development.
5. Opportunities for interpretation should be undertaken within the proposed new building and in the landscaping.
6. An Interpretation Strategy should be undertaken to achieve the best heritage and interpretation outcome.

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Appendices

Appendix 1 – extracts from *Sands Directory*

Listings partly in study area shaded in blue.

Date	Number	Occupier/Owner	Name of Business
1858-59	*Abercrombie St*		
			St Benedict's Church
	106	Frederick Poolman, licensed distiller	Brisbane Distillery
	124	Pemell, James	Steam Flour Mills
	138	Colonial Sugar Refining Company's Stores and Works	
	186	Wright, Alexander	boot and shoe maker
1865	*Abercrombie St*		
			Saint Benedict's Church
			Brisbane Distillery
		Pemell. James	miller and corn dealer
		Turner, Mrs Hannah	
		COLONIAL SUGAR REFINING COMPANY	
1867	*Abercrombie St*		
			Saint Benedict's Church
	108	Brisbane Distillery	
		Pemell, James	flour mill
	140		Brisbane Stores
	172		CSR Co
1870	*Abercrombie St*		
			Saint Benedict's Church
	108		Brisbane Distillery
	132, 134, 136	Pemell, James	steam flour mill
		Ross, Joseph Grafton, manager	Brisbane Sugar Refinery
	186	Whitbred. Walter	general dealer
1871			St. Benedict's R.C. Chapel
			Brisbane Distillery
		Pemell & Co.,	millers & flour merchants
			Brisbane Sugar & Spirit Store
		Ross, J. Grafton, general manager	Colonial Sugar Refining Co
1873			St Benedict's Church (R.C)
			Brisbane Distillery
			Colonial Sugar Company's Refinery and Warehouses
1875	*Abercrombie St*		
			Saint Benedict's Church
		Perigo Thomas	treacle store
		Colonial Sugar Company	bonded store
		Colonial Sugar Company	Brisbane store
		Colonial Sugar Refining Company	
	188	Newton, Henry	bootmaker
1876	*Abercrombie St*		
			Saint Benedict's Church
		Perigo. Thomas	treacle store
		Colonial Sugar Co.'s bonded store, etc	
		Colonial Sugar Co.'s refining works	
1877	*Abercrombie St*		
			Saint Benedict's Church
		Perigo, Thomas	treacle merchant
		Colonial Sugar Co.	Refinery Works
1879	*Abercrombie St*		
			Saint Benedict's Church
		Perigo, Thomas	treacle store
		Vacant Land	

Date	Number	Occupier/Owner	Name of Business
	186	General dealer	
1880	*Abercrombie St*		
			Saint Benedict's Church
		Vacant Land	
		[Buckland and Shepherd Streets identified as cross streets]	
	186	Vacant Land	
1882	*Abercrombie St*		
			Saint Benedict's Church
	104	O'Brien, Rev. Edward	
		Unfinished houses	
	116	Fuller T.	Tinsmith
	118	Vacant	
	120	Brett W.J.	*Victoria Hotel*
	Buckland St		
		Unfinished houses	
	Shepherd Street		
1885	*Abercrombie St*		
			Saint Benedict's Church
	104	O'Brien Rev. Dean	
	106	Fuller, Catherine	Tinsmith
		Willgross, AJ.	Stationer
	108	Feathers, Thomas	sewing-machine depot
	110	Engert, Kasper	tobacconist
	112	Marsh, C.	picture frame maker
	114	Hobson Bros.	music warehouse
	116	Young Australia Club	
	118	Jarvis, C. & Co.	general dealer
	120	Taylor, J.B.	carpenter
		Taylor, Madam Lemaire	Catholic-repository
	122	Duval, George	shoemaker
	124	Jefferys, Robert	Sawmaker
	126	Green T.C.	*Macquarie Hotel*
	Buckland Street		

Appendix 2 – summaries of geotechnical and environmental boreholes with archaeological interpretation

The following tables summaries the geotechnical and environmental borehole logs from the following reports:

93_BH Coffey Partners International Pty Ltd *UTS Blackfriars Site, Geotechnical Investigation*, report no. S9979/1-AB, for Taylor Thomas & Whitting Pty Ltd, August 1993.

09_BH Douglas Partners *Report on Geotechnical Investigation Student Accommodation University of Technology, Blackfriars Campus, Blackfriars Street, Chippendale*, for J. Hutchinson Pty Ltd, Project 45996, March 2009.

09_EBH Douglas Partners *Report on Phase 2 Contamination Assessment, UTS Blackfriars Campus, , Chippendale*, for Hutchinson Builders, Project 45996.1, March 2009.

A tentative archaeological interpretation has been proposed for each fill. These interpretations are in part informed by what is known about the site history and historic overlay maps produced for this report. A question mark following a particular interpretation denotes that it is particularly uncertain.

The borehole logs were not transcribed for strata below the first sandstone layer.

93_BH01

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.1	TOPSOIL: fine to medium grained sand, brown		1994 topsoil
0.1 – 0.6	FILL: Sand, sandstone rubble, clay, roadbase, grey		Fill, possibly assoc. with 1878 levelling and school yard
0.6 – 2.2	FILL: Sandy Clay, some sandstone fragments, low to medium plasticity, brown, bricks, black @ 2.0m.	Soil sample at 1.1m detected 1.1ppm Hg and 960ppm Zn.	Fill, probably assoc. with 1878 levelling
2.2 – 2.9	FILL: Sand, fine to medium grained, clayey in part, black, grey, glass, bricks		Mid 19th-century working surfaces assoc. with distillery yard?
2.9 – 3.4	SAND: fine to medium grained, grey, white.	Water table at 3.0m (24/08/93)	Early 19th-century topsoil? Possibly blown in or deposited.
3.4 – 4.8	CLAY: medium plasticity, grey, slightly sandy		Associated with Blackwattle Swamp?
4.8 – 5.2	CLAY: high plasticity, grey, brown, red.		Associated with Blackwattle Swamp?
5.2 – 5.4	GRAVEL: high plasticity, grey brown, red		Associated with Blackwattle Swamp?
5.4+	SANDSTONE: medium grained, red, brown		Bedrock

93_BH02

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.3	TOPSOIL: fine to medium grained sand, brown		1994 topsoil
0.3 – 1.6	FILL: Clay, low to medium plasticity, sand in parts, some ripped sandstone, brown.		Fill, probably assoc. with 1878 levelling
1.6 – 2.6	FILL: Sand, fine to medium grained, slightly clayey, grey, black		Fill, possibly assoc. with 1878 levelling or possibly material associated with the mid 19th-century yard.
2.6 – 3.6	SAND: fine grained, black, grey, some rootlets, organic matter, slightly clayey	Water table at 2.7m (24/08/93)	Early 19th-century topsoil? Possibly blown in or deposited.
3.6 – 5.2	CLAY: medium plasticity, grey, black, slightly sandy @ top, organic matter, peaty		Associated with Blackwattle Swamp?
5.2 – 5.9	GRAVEL: coarse grained, red, orange		Associated with Blackwattle Swamp?
5.9 – 6.8	CLAY: medium to high plasticity, grey, red, fine to medium grained, sand		Associated with Blackwattle Swamp?
6.8+	SANDSTONE: medium grained, red, orange, white, extremely weathered sandstone, ironstone lenses		Bedrock

93_BH03

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.1	ASPHALT		1994 surface
0.1 – 0.9	FILL: coal waste/chitter sand, black		Fill, possibly assoc. with 1878 levelling and school yard
0.9 – 2.0	FILL: Clayey Sand, brown		Fill, probably assoc. with 1878 levelling
2.0 – 3.9	FILL: Clay low to medium plasticity, sandy, some small pebbles, bricks, becoming sandier with depth	Water table at 3.0m (24/08/93)	Fills probably associated with either the flour mill or the adaption of Blackwattle Creek for industrial purposes in the early to mid 19th century
3.9 – 4.5	CLAY: low plasticity, grey, slightly sandy		Deposits possibly associated with Blackwattle Creek
4.5 – 7.3	SAND: grey, clayey in parts		Deposits possibly associated with Blackwattle Creek
7.3 – 8.3	CLAY: high plasticity, grey, red, some ironstone pebbles, sandy		Deposits possibly associated with Blackwattle Creek
8.3 – 9.85+	SAND: fine to medium grained, red, brown, probably residual sandstone		Probably weathered bedrock
	Borehole BH3 Terminated at 9.85m		

93_BH04

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.5	FILL: Sand, medium grained, clayey in parts grey		Fill, probably assoc. with 20th-century modifications to school yard
0.5 – 0.8	FILL: Coal waste/chitter, sand, clay black		Fill, possibly assoc. with 1878 levelling or later school yard modifications
0.8 – 1.0	FILL: Sand, some coal fragments, grey		Fill, probably assoc. with 1878 levelling
1.0 – 2.3	FILL: Clay, slightly sandy, some small pebbles, medium plasticity, grey, brown		Deposits possibly associated with 19th-century works around the creek, including the dam embankment
2.3 – 3.6	CLAY: medium plasticity, grey, brown, some charcoal, organic matter becoming sandy @ 3.5m	Water table at 3.0m (24/08/93)	Deposits possibly associated with Blackwattle Creek
3.6 – 5.2	CLAY: low to medium plasticity, grey, fine to medium grained sand, some very soft clayey lenses		Deposits possibly associated with Blackwattle Creek
5.2 – 5.7	SAND: fine to medium grained, grey,		Deposits possibly associated with Blackwattle Creek
5.7 – 7.19	CLAY: medium to high plasticity, grey, firm from 6.4m, sandy	Continued as a cored borehole from 7.19m	Deposits possibly associated with Blackwattle Creek
7.19+	SANDSTONE: fine to medium grained, red, brown, yellow, indistinct bedding, iron cemented sandstone to 7.82, very clayey 7.82 to 8.00m, iron cemented 8. -8.05m.		Bedrock

09_BH01

Depth from surface (m)	RL	Original description	Other comments	Archaeological interpretation
0.00 – 0.04	9.0 – 8.96	ASPHALTIC CONCRETE		2009 surface
0.04 – 0.7	8.96 – 8.3	FILLING – light grey brown, medium to coarse sand filling with some gravel, humid		Fill associated with 1878 levelling or later works
0.7 – 1.7	8.3 – 7.3	FILLING – poorly compacted, dark grey, silty sand filling with building rubble, humid		Fill associated with 1878 levelling
1.7 – 2.0	7.3 – 7.0	FILLING – grey brown, fine to medium grained, sand filling with trace of silt, humid		Accumulated sediment associated with dam
2.0 – 3.0	7.0 – 6.0	CLAY – firm then soft, light grey to grey clay, moist		Possible natural soil or imported?
3.0 – 5.2	6.0 – 3.8	SANDY CLAY – soft, light brown, fine grained sandy clay with some ironstone, wet	Water table at 3.0m, RL6.0 (6/02/09)	Possible natural soil, prior to dam
5.2 – 5.52	3.8 – 3.48	SANDSTONE – extremely low strength, light grey brown, fine grained sandstone		Bedrock

09_BH02

Depth from surface (m)	RL	Original description	Other comments	Archaeological interpretation
0.00 – 0.03	9.8 – 9.77	ASPHALTIC CONCRETE		2009 surface
0.03 – 0.3	9.77 – 9.5	FILLING – light grey brown, silty sand filling with some roadbase gravel, humid		Fill associated with 1878 levelling of the site
0.3 – 2.0	9.5 – 7.8	FILLING – poorly compacted, light grey to grey, fine grained sand with some silt and plant roots, humid		Fill associated with 1878 levelling of the site?
2.0 – 3.0	7.8 – 6.8	FILLING – poorly compacted, grey, fine grained sand filling, moist to wet	Water table at 2.3m (RL 7.5) (11/02/09)	Accumulated sediment associated with dam
3.0 – 3.8	6.8 – 6.0	SANDY CLAY – firm, light grey brown, fine grained sandy clay, wet		Possible natural soil, prior to dam
3.8 – 4.2	6.0 – 5.6	SANDSTONE – very low strength, light brown to red brown, medium grained sandstone with ironstone bands		Bedrock

09_BH03

Depth from surface (m)	RL	Original description	Other comments	Archaeological interpretation
0.00 – 0.04	10.3 – 10.26	ASPHALTIC CONCRETE		2009 yard surface
0.03 – 0.3	10.26 – 10.0	FILLING – light grey brown, silty sand filling with some roadbase gravel, humid		Fill associated with 1878 levelling of the site
0.3 – 1.0	10.0 – 9.3	FILLING – poorly compacted, dark grey, fine grained, silty sand filling, humid		Fill associated with 1878 levelling of the site
1.0 – 1.7	9.3 – 8.6	FILLING – poorly compacted, grey brown, fine to medium grained, sand filling, moist		Imported levelling fill (c.1840s-1855)?
1.7 – 2.1	8.6 – 8.2	FILLING – grey brown clay filling, moist		Imported levelling fill (c.1840s-1855)?
2.1 – 3.3	8.2 – 7.0	SAND – loose, light grey, fine to medium grained sand (possibly filling), moist to wet	Water table at 2.3m (RL 8.0) (11/02/09)	Possible silting of dam (c.1825-1840s)
3.3 – 4.4	7.0 – 5.9	SANDY CLAY – soft, light grey brown, fine grained, sandy clay, wet		Possible natural soil, prior to dam
4.4 – 6.51	5.9 – 3.79	SANDSTONE – extremely low strength, extremely to highly weathered, light grey brown, medium grained sandstone with high strength ironstone bands		Bedrock

09_BH04

Depth from surface (m)	RL	Original description	Other comments	Archaeological interpretation
0.00 – 0.04	10.4 – 10.36	ASPHALTIC CONCRETE		2009 yard surface
0.04 – 0.2	10.36 – 10.2	FILLING – light grey brown, silty sand filling with some roadbase gravel, humid		Fill associated with 20th-century works
0.2 – 0.7	10.2 – 9.7	FILLING – dark grey, fine grained, silty sand filling with building rubble, humid		Fill associated with 1878 levelling of the site
0.7 – 2.0	9.7 – 8.4	FILLING – poorly compacted, light grey brown, fine to medium grained sand, humid		Imported levelling fill (c.1840s)?
2.0 – 3.5	8.4 – 6.9	FILLING – poorly compacted, grey, fine to medium grained, sand filling, moist to wet		Possible silting of dam (c.1825-1840s)?
3.5 – 4.3	6.9 – 6.1	CLAY – soft, light grey brown, clay with trace of silt and sand, wet	Water table at 3.5m (RL 6.9) (9/02/09)	Possible natural soil, prior to dam
4.3 – 6.0	6.1 – 4.4	SANDSTONE – extremely low to very low strength, light grey and red brown, fine to medium grained sandstone with ironstone bands		Bedrock

09_BH05

Depth from surface (m)	RL	Original description	Other comments	Archaeological interpretation
0.0 – 0.04	8.8 – 8.76	ASPHALTIC CONCRETE		Present surface
0.04 – 0.3	8.76 – 8.5	FILLING – grey, fine to medium grained, silty sand filling with broken brick fragments and building rubble, humid		Fill associated with 1878 levelling of the site
0.3 – 0.8	8.5 – 8.0	FILLING – light brown, fine to medium grained, crushed sandstone filling		Fill associated with 1878 levelling of the site?
0.8 – 3.2	8.0 – 5.6	FILLING – poorly compacted, grey, fine to medium grained, sand filling, moist to wet	Water table at 2.8m (RL 6.0) (6/02/09)	Possible silting of dam
3.2 – 4.8	5.6 – 4.0	SANDY CLAY – soft, light brown, fine grained, sandy clay		Possible natural soil, prior to dam
4.8 – 5.0	4.0 – 3.8	CLAY – soft, red brown clay with some fine grained sand, wet		Possible natural soil, prior to dam
5.0 – 5.3	3.8 – 3.5	SANDSTONE – extremely low strength, red brown, fine grained sandstone		Bedrock

09_BH06

Depth from surface (m)	RL	Original description	Other comments	Archaeological interpretation
0.00 – 0.1	8.8 – 8.7	TOPSOIL – brown silty sand topsoil, with some grass rootlets, humid to moist		2009 garden bed
0.1 – 2.0	8.7 – 6.8	FILLING – poorly compacted, dark grey and light grey brown, fine grained silty sand and building rubble filling, moist		Fill associated with 1878 levelling of the site and possibly material associated with the mid 19th-century yard.
2.0 – 4.8	6.8 – 4.0	FILLING – poorly compacted, fine grained, clayey sand filling, wet	Water table at 2.5m (RL 6.3) (10/02/09)	Early 19th-century topsoil? Possibly blown in or deposited.
4.8 – 5.3	4.0 – 3.5	SANDY CLAY – soft, light brown to red brown, fine grained sandy clay with ironstone gravel, wet		Possible natural soil, prior to 19th century development
5.3 – 6.41	3.5 – 2.39	SANDSTONE – extremely low strength, extremely to highly weathered, light brown to red brown, fine grained sandstone with medium strength ironstone bands		Bedrock

09_BH07

Depth from surface (m)	RL	Original description	Other comments	Archaeological interpretation
0.0 – 0.3	9.0 – 8.7	FILLING – grey brown, fine grained, silty sand filling with some fine gravel, humid		20th-century fill
0.3 – 2.2	8.7 – 6.8	FILLING – poorly compacted, dark grey to grey brown, fine to medium grained sand and building rubble filling, humid		Fill associated with 1878 levelling of the site and possibly material associated with the mid 19th-century yard.
2.2 – 3.7	6.8 – 5.3	FILLING – dark grey, fine grained, sand filling with trace of silt, moist	Water table at 2.3m (RL 6.7) (9/02/09)	Early 19th-century topsoil? Possibly blown in or deposited.
3.7 – 5.1	5.3 – 3.9	SANDY CLAY – very soft, light grey to grey, fine grained sandy clay, wet		Clay associated with Blackwattle Swamp?
5.1 – 5.9	3.9 – 3.1	SANDSTONE – extremely low strength, grey brown, fine grained sandstone with medium strength ironstone bands		Bedrock

09_BH08

Depth from surface (m)	RL	Original description	Other comments	Archaeological interpretation
0.00 – 2.1	8.7 – 6.6	FILLING – grey, fine grained, silty sand filling with some building rubble, humid to damp		Fill associated with 1878 levelling of the site and possibly material associated with the mid 19th-century yard.
2.1 – 3.5	6.6 – 5.1	FILLING – grey brown, clay filling with some gravel, moist		Fills and surfaces associated with distillery
3.5 – 4.5	5.1 – 4.1	SANDY CLAY – very soft, grey, fine grained, sandy clay, wet	Water table at 3.8m (RL 4.9) (11/02/09)	Possible natural prior to site development?
4.5 – 5.7	4.1 – 2.9	SANDSTONE – extremely low to very low strength, light grey brown, medium grained sandstone with ironstone bands		Bedrock

09_EBH01

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.04	ASPHALT		2009 surface
0.04 – 1.6	FILLING – brown clayey sand filling with sandstone, bricks, tiles and concrete		Fill associated with 1878 levelling of the site
1.6 – 2.2	FILLING – yellow brown and grey, sand filling		Accumulated sediment associated with dam
2.2 – 3.9	CLAY – green grey clay		Possible natural soil, prior to dam
3.9 – 5.9	SANDSTONE – yellow brown, low strength sandstone	-medium strength at 5.3 to 5.9m	Bedrock
	Bore discontinued at 5.9m – target depth reached.		

09_EBH02

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.04	ASPHALT		2009 surface
0.04 – 0.4	FILLING – brown sand filling with gravel and brick fragments		Fill associated with 1878 levelling of the site or later works
0.4 – 0.6	FILLING – crushed sandstone and sand filling, with gravel and brick fragments		Fill associated with 1878 levelling of the site
0.6 – 1.0	FILLING – grey and yellow brown, sand filling with some gravel		Possible silting of dam or imported fill
1.0 – 1.6	FILLING – yellow brown, clayey sand filling		Possible silting of dam or imported fill
1.6 – 3.2	FILLING – yellow brown and grey, clayey sand filling	-wet at 2.2m	Possible silting of dam (c1825-1860s)
3.2 – 3.5	CLAY – grey mottled orange brown clay		Possible natural soil, prior to dam
	Bore discontinued at 3.5m – target depth reached.		

09_EBH03

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.04	ASPHALT		2009 surface
0.03 – 0.3	FILLING – grey brown, silty sand filling with gravel, brick and sandstone fragments		Fill associated with 1878 levelling of the site or later works
0.3 – 0.6	FILLING – dark brown, sand filling with brick, sandstone, glass, concrete, shale and minor ash		Fill associated with 1878 levelling of the site or earlier mid 19th-century levelling.
0.6 – 1.6	FILLING- brown, clayey sand filling with sandstone fragments, bricks and concrete.		Fill associated with 1878 levelling of the site or earlier mid 19th-century levelling.
1.6 – 2.2	FILLING – grey brown mottled green, clay filling		Imported levelling fill (c 1840s-1855)?
2.2 – 2.6	FILLING – dark brown, clayey sand filling		Possible silting of dam (c1825-1840s)
2.6 – 3.6	FILLING – light brown and grey, sand filling		Possible silting of dam (c1825-1840s)
3.6 – 4.6	CLAY – grey mottled orange clay		Possible natural soil, prior to dam
	Bore discontinued at 4.5m – target depth reached.		

09_EBH04

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.03	ASPHALT		2009 surface
0.03 – 0.1	FILLING – brown, silty sand filling with gravel		Fill associated with 20th-century works
0.1 – 0.4	FILLING- brown, clayey sand filling with bricks, glass and sandstone fragments		Fill associated with 1878 levelling of the site or later works
0.4 – 2.2	FILLING – yellow brown, sand filling with glass, bricks and gravel		Fill associated with 1878 levelling of the site
2.2 – 2.6	FILLING – dark brown, clay filling		Imported levelling fill (c 1840s)?
2.6 – 4.1	FILLING – dark grey, clayey sand filling, wet	-some brown clay at 3.6m	Possible silting of dam (c1825-1840s)?
4.1 – 5.0	CLAY – dark grey mottled light grey clay, wet		Possible natural soil, prior to dam
5.0 – 6.0	CLAY – grey mottled orange clay		Possible natural soil, prior to dam
	Bore discontinued at 6.0m – target depth reached.		

09_EBH05

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.01	ASPHALT		Present surface
0.01 – 0.3	FILLING- brown, clayey sand filling with bricks, gravel and sandstone fragments		Fill associated with 1878 levelling of the site
0.3 – 1.2	FILLING – yellow brown and grey, sand filling		Fill associated with 1878 levelling of the site?
1.2 – 1.6	FILLING – yellow brown and grey, clayey sand filling		Possible silting of dam
1.6 – 3.5	CLAY – dark grey clay	-wet at 2.6m	Possible natural soil, prior to dam? Or possibly silting of dam
	Bore discontinued at 3.5m – target depth reached.		

09_EBH06

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.3	FILLING- brown, silty sand filling with rootlets (topsoil)		2009 topsoil and 20th-century fill
0.3 – 2.2	FILLING – orange brown mottled grey clay filling with bricks, concrete, sandstone, gravel, ash and slag and granite		Fill associated with 1878 levelling of the site
2.2 – 3.1	FILLING – grey sandy clay filling (wet)		Early 19th-century topsoil? Possibly blown in or deposited.
3.1 – 3.6	SAND – grey sand (possibly filling) (wet)		Early 19th-century topsoil? Possibly blown in or deposited.
3.6 – 4.1	CLAY – grey clay, wet		Clay associated with Blackwattle Swamp?
4.1 – 4.5	CLAY – light grey clay, wet		Clay associated with Blackwattle Swamp?
	Bore discontinued at 4.5m – target depth reached.		

09_EBH07A

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 1.6	FILLING – yellow brown, sand filling with bricks, plastic concrete and sandstone		Fill associated with 1878 levelling of the site
1.6 – 2.2	FILLING – yellow brown and grey sand filling		Early 19th-century topsoil? Possibly blown in or deposited.
2.2 – 4.9	CLAY – dark grey clay with organic odour	-wet at 2.5	Clay associated with Blackwattle Swamp?
4.9 – 5.6	SANDSTONE – medium strength, red brown and light brown sandstone		Bedrock
	Bore discontinued at 5.6m – target depth reached.		

09_EBH08

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.5	FILLING – brown, silty sand with rootlets and plastic	-concrete and gravel at 0.3m	20th-century topsoil and fill
0.5 – 0.7	FILLING – railway ballast filling		Fill associated with 1878 levelling of the site
0.7 – 1.0	FILLING – yellow brown, crushed sandstone filling		Fill associated with 1878 levelling of the site
1.0 – 1.6	FILLING – orange brown, clayey sand filling with bricks, concrete, gravel and railway ballast		Fill associated with 1878 levelling of the site
1.6 – 2.1	FILLING – brown, clayey sand filling with bricks and concrete		Possibly associated with distillery or with later (c. 1878) levelling
2.1 – 2.5	FILLING – orange brown mottled grey filling		Possibly associated with distillery or with later (c. 1878) levelling
2.5 – 3.2	FILLING – brown, clayey sand filling with bricks, concrete and sandstone		Fills and surfaces associated with distillery
3.2 – 4.3	CLAY – light brown clay. –mottled dark grey and wet at 3.6m		Clay associated with Blackwattle Swamp?
4.3 – 4.6	CLAY – dark grey clay with organic odour, wet		Clay associated with Blackwattle Swamp?
4.6 – 5.8	CLAY – orange brown clay		Clay associated with Blackwattle Swamp?
	Bore discontinued at 5.8m – target depth reached.		

09_EBH09

Depth from surface (m)	RL	Original description	Other comments	Archaeological interpretation
0.0 – 0.6		FILLING – brown, silty clay filling with some gravel, rootlets, trace of brick and sandstone fragments,	-slag at 0.6m	20th-century topsoil and fill
		Bore discontinued at 0.6m –on sandstone boulder filling		

09_EBH10

Depth from surface (m)	RL	Original description	Other comments	Archaeological interpretation
0.0 – 0.1		FILLING – brown, silty clay filling with some wood mulch, rootlets, trace of slag, tile fragments and plastic,		20th-century topsoil and fill
		Bore discontinued at 0.1m –on concrete		

09_EBH12

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 1.2	FILLING- brown, silty sand filling with rootlets,	-brick concrete fragments at 0.3m	2009 topsoil and 20th-century fill
1.2 – 1.5	FILLING – orange brown, clay filling with sandstone fragments		Fill associated with 1878 levelling of the site
1.5 – 2.2	FILLING – orange brown, crushed sandstone filling		Fill associated with 1878 levelling of the site?
2.2 – 4.7	CLAY – dark grey, sandy clay with organic odour	-wet at 2.6m	Clay associated with Blackwattle Swamp or mid-19th-century yard?
4.7 – 5.0	CLAY – green grey clay, wet		Clay associated with Blackwattle Swamp?
	Bore discontinued at 5.0m – target depth reached.		

09_EBH13

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.2	FILLING- brown, silty sand filling with rootlets and wood pieces		2009 topsoil and 20th-century fill
0.2 – 0.6	FILLING – grey, silty sand filling with concrete fragments and wood		Fill associated with 1878 levelling of the site or later works
0.6 – 1.2	FILLING – yellow brown and grey, sand filling		Possible silting of dam
1.2 – 1.6	FILLING – brown, sandy clay filling		Possible silting of dam
1.6 – 3.5	FILLING – dark grey, clay filling	-wet at 2.7m -railway sleeper at 3.05-3.4m	Possible silting of dam? 'Railway sleeper' may be a timber beam associated with early to mid 19th-century use of the dam.
3.5 – 4.0	CLAY – yellow brown mottled grey clay, wet		Possible natural soil, prior to dam?
	Bore discontinued at 4.0m – target depth reached.		

09_EBH14

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.2	FILLING- brown, silty sand filling with rootlets		2009 topsoil
0.2 – 0.6	FILLING – yellow brown and brown, sand filling with bricks		Fill associated with 1878 levelling of the site or later works
0.6 – 1.2	FILLING – brown, sandy clay filling		Possible silting of dam
1.2 – 2.7	FILLING – brown, clayey sand filling	-wet at 2.2m	Imported levelling fill (c1840s or 1850s)?
2.7 – 3.0	FILLING – brown, sand filling, wet		Possible silting of dam (c1825-1840s)?
3.0 – 3.5	CLAY – grey clay, wet		Possible natural soil, prior to dam?
3.5 – 4.5	SANDY CLAY – red orange brown, sandy clay, wet		Possible natural soil, prior to dam?
	Bore discontinued at 4.5m – target depth reached.		

09_EBH15

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.04	ASPHALT		2009 surface
0.04 – 0.3	FILLING- brown, sand filling with brick and sandstone fragments		Fill associated with 1878 levelling of the site or later works
0.3 – 1.7	FILLING – yellow brown and grey, sand filling		Fill associated with 1878 levelling of the site or mid 19th-century levelling (c1840s or 1850s)
1.7 – 3.2	FILLING – grey sand filling, wet		Possible silting of dam (c1825-1840s)?
3.2 – 3.7	CLAY – dark grey clay, wet		Possible silting of dam (c1825-1840s)?
3.7 – 4.1	CLAY – dark grey, sandy clay, wet		Possible natural soil, prior to dam?
4.1 – 4.5	CLAY – orange brown mottled grey clay, wet		Possible natural soil, prior to dam
	Bore discontinued at 4.5m – target depth reached.		

09_EBH16

Depth from surface (m)	Original description	Other comments	Archaeological interpretation
0.0 – 0.6	FILLING- brown, silty sand filling with rootlets,	-concrete and gravel fragments at 0.2m	2009 topsoil and 20th-century fill
0.6 – 2.6	FILLING – brown, clayey sand filling with bricks, sandstone and gravel,	-tiles at 2.2m	Fill, probably assoc. with 1878 levelling
2.6 – 3.2	FILLING – orange brown, clay filling		Mid 19th-century working surfaces assoc. with distillery yard?
3.2 – 5.0	CLAY – dark grey clay with organic odour, wet		Clay associated with Blackwattle Swamp?
	Bore discontinued at 5.0m – target depth reached.		