

Historical Archaeological Heritage Impact Assessment

2A Gregory Place, Harris Park, NSW
(Lot 2 in DP 807801)



Report to
2A Gregory Place Pty Ltd

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Report summary

2A Gregory Place Pty Ltd proposes to redevelop the land comprising Lot 2 in DP 807801 that is located at 2A Gregory Place in Harris Park as an affordable housing and build-to-rent housing development within three free-standing four to eight storey buildings overlying two levels of basement carparking.

There are no items of Environmental Heritage on the site but the property it is situated within one the City of Parramatta's more significant non-Aboriginal historic heritage landscapes and is located close to several items and places of recognised heritage significance that are listed on the State Heritage Register that include Hambledon cottage and grounds located to the immediate north and Experiment Farm located to the immediate southwest.

This (non-Aboriginal) historical archaeological heritage impact assessment identifies whether the proposed redevelopment may potentially result in impacts to archaeological relics as defined by the relics provisions of the Heritage Act 1977 and recommends if potential archaeological impacts are identified, how future impacts can be mitigated and managed.

Landuse history and potential historical archaeological resources

The 2A Gregory Place property comprises a consolidation of land subdivided from two early 1790s historical land grants (Experiment farm and Elizabeth Farm). This land may have been used for growing crops and for animal grazing, and as a water source and possibly for clay materials extracted for brick-making sourced from Clay Cliff Creek during the early nineteenth century. However, the land was not built upon until about 1854 when a brick cottage was constructed ('Neale's cottage') on the south side of Hambledon cottage. The dwelling may have been located within the site footprint and was demolished sometime before 1943, and possibly around 1917 when the section of the Clay Cliff Creek stormwater drain that crosses the site is believed to have been constructed.

Evaluation of landuse impacts on potential historical archaeological resources

The construction of the stormwater channel followed by the factory resulted in significant modification of the original drainage and lowering of the ground to significant depths below current levels present in the adjacent grounds of Hambledon cottage. The depth of subsurface impact from building can be established by geotechnical information that show original ground levels have been cut-down by over two metres or more in places. On this basis, it is not expected that significant and intact historical archaeological features and deposits are present at the site and it is evaluated that the potential historical archaeological sensitivity of the 2A Gregory Place site is low.

Archaeological heritage management recommendations

- The site is assessed unlikely to contain or preserve relics as they are defined and protected by the provisions of the Heritage Act 1977, and there are no significant historical archaeological constraints to the proposed development at 2A Gregory Place from proceeding (with caution) as planned.

- Should any historical archaeological materials be unexpectedly discovered that are suspected to be relics in any area of the site during future works, then all excavation or disturbance to the area is to stop immediately and the Heritage Council of NSW should be informed in accordance with Section 146 of the Heritage Act 1977.

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Attachments

Attachment A

Planning Secretary's Environmental Assessment Requirements (SSD-31179510)

Attachment B

Geotechnical bore-log extracts (Alliance Geotechnical Pty Ltd February 2022)

1.0 Introduction

1.1 Background

2A Gregory Place Pty Ltd proposes to redevelop for residential apartment housing the property shown below that is located at 2A Gregory Place in Harris Park in the City of Parramatta. The redevelopment proposal is being assessed as a 'Build-to-Rent' State Significant Development (SSD-31179510) under *State Environmental Planning Policy (State and Regional Development) 2011* and is to provide affordable housing under Division 1 of *State Environmental Planning Policy (Affordable Rental Housing) 2009*.

Figure 1.1: The 2A Gregory Place property (comprising Lot 2 in DP 807801) is approximately 19,500 sqm in size and comprises a former light industrial pharmaceuticals assembly complex that has been adapted for office use and storage (Six Maps 2021)



The site is situated within one the City of Parramatta's more significant Aboriginal and non-Aboriginal historic heritage landscapes and is located close to several items and places of recognised heritage significance that are listed on the State Heritage Register (SHR). The closest of these is Hambledon cottage and its grounds that are located to the immediate north of the Gregory Place property and Experiment Farm that is located to the immediate southwest of the site.

The 2A Gregory Place property is also located on the southern edge of the 'Parramatta Sand Body' (PSB) that is an alluvial floodplain deposit that underlies parts of the City and which contains culturally significant Aboriginal and non-Aboriginal historical archaeology. The PSB is State-heritage listed for its combined archaeological, historical and environmental heritage values.

The Proponent has developed a Concept Design for the redevelopment that acknowledges and responds to the heritage sensitivity of the site and landscape setting.

This (non-Aboriginal) historical archaeological heritage impact assessment has been prepared in response to Issue and Assessment Requirement No. 19 (Environmental Heritage) of the Planning Secretary Environmental Assessment Requirements (SSD-31179510) that have been issued for the proposal (Attachment A). This report identifies whether the proposed redevelopment may potentially result in impacts to archaeological relics as they are defined by the relics provisions of the *Heritage Act 1977* (as amended), and recommends if potential archaeological impacts are identified, how future impacts can be mitigated and managed.¹

1.2 Redevelopment proposal

The proposal for the 2A Gregory Place site is for an affordable housing and build-to-rent housing development within three free-standing four to eight storey buildings overlying two levels of basement carparking.

1.3 Statutory heritage context

1.3.1 2A Gregory Place archaeological heritage status

The 2A Gregory site is not listed as an item of heritage significance in any statutory instrument.

The heritage provisions in Clause 5.10 of Parramatta Local Environmental Plan 2011 (PLEP 2011) provide standard statutory protection of the significance of both individual items and conservation areas in the Parramatta CBD. There are a number of individually listed heritage items in the vicinity of the 2A Gregory Place site that are items of state heritage significance on PLEP 2011 as described below.

Although the 2A Gregory Place site is not a statutory listed heritage item on PLEP 2011 or SHR (or SHI) the *Parramatta Historical Archaeological Landscape Management Study* (PHALMS) identifies the site as a potential archaeological site as forming part of Parramatta Archaeological Management Unit (AMU) 2932.² Following sections of this report outline and evaluate the level of significance and archaeological research potential of this AMU, and in relation to the 2A Gregory Place site and its proposed redevelopment, the likelihood or not that relics occur and survive on the site.

1.3.2 SHR-listed heritage items within proximity of the Gregory Place site

The summaries of significance for the three nearest SHR-listed items to the 2A Gregory Place site (Experiment Farm, Hambledon cottage and the Parramatta Sand Body) are abridged from their respective heritage listings to highlight key points.

¹ The Aboriginal history and cultural heritage values of the place, and the identification and future management of the potential Aboriginal archaeological impact of the proposal are detailed and addressed in a separate Aboriginal Cultural Heritage Assessment Report (DSCA June 2022).

² PHALMS covers archaeological resources in Sydney Regional Environmental Plan (REP) No. 28 Primary Centre that includes Harris Park and identifies (AMU's) that are areas of land with similar archaeological potential and similar archaeological management recommendations. The REP was gazetted in 1999 and included a schedule of heritage items and Parramatta City Centre LEP was gazetted in 2007 and included relevant heritage items from the REP.

1.3.3 Experiment Farm

Experiment Farm is of National significance as one of Australia's oldest standing properties that is on the site of the first British land grant in Australia. It was the first house purchased by the National Trust (NSW) in 1961 after which in 2000 the former Parramatta City Council acquired it and demolished suburban dwellings that encroached onto the cottage.

Figure 1.2: Experiment Farm cottage (Hector Abrahams Architects 2017: Figure 37)



Experiment Farm has a strong association with the earliest free settlement of land in Australia and with the first land grant given to a freed convict (James Ruse). The house is a rare example of an early farmhouse in intact condition and the site possesses archaeological potential to contribute to an understanding of the early development of Parramatta. Experiment Farm cottage and the site of Experiment Farm is of exceptional cultural significance to Australia, NSW, and Parramatta because:

- It forms part of the first European land grant in Australia and is associated with Governor Phillip's 'experiment' to determine how long it would take for a settler to become self-supporting.
- It's role as forming part of "Harris' Farm Estate", one of several large properties established by the "Parramatta Gentry" from the late early 19th century.
- The visual prominence of Experiment Farm cottage (built on a rise) in the surrounding landscape and its relationship to other elements in the landscape including Parramatta River and Clay Cliff Creek.

1.3.4 Hambledon cottage, grounds and archaeology

Hambledon cottage and grounds and archaeology (potentially intact and of high archaeological research potential) are State significance for their important and direct associations with one of the influential families in Australian history (Macarthur's) along with its strong associations with a number of other individuals and families important in the history of the development of Parramatta.

Hambledon cottage was built by John Macarthur in 1824 as a second house on his Elizabeth Farm Estate and the site is significant as representing an important element of an estate (Elizabeth Farm) that became a prototype of Australian land management. The house is considered to be a fine and rare example of an 1820s domestic building and is expressive of the taste, aspirations and needs of its several owners. Its landscape elements include plantings dating from its earliest construction and are now some of the nation's oldest surviving European plantings. The SHR-listing describes the archaeological significance of the site:

The archaeology at Hambledon Cottage and grounds has a high archaeological research potential and is likely to be highly intact and of state significance. Hambledon Cottage also has significance for its role in illustrating the development of the status of Parramatta and holds great value for contemporary society for these reasons. The archaeological resource will be able to contribute to more accurately documenting the development, use and life style associated with the cottage, Parramatta and early colonial society (SHR Database Number 5052762).

Figure 1.3: Hambledon Cottage and its surrounding ground levels that potentially preserve significant archaeological resources below ground with the built-form of the exiting factory on the 2A Gregory Place property in the background. The construction of these buildings in the 1950s cut-down the original ground levels across the footprint of the site to various depths, many areas by at least 1.0m and in some locations (below the main factory building shown for example) considerably deeper



1.3.5 Parramatta Sand Body

Archaeological investigations of the PSB have uncovered an archaeological record that has contributed to our understanding of pre-colonial Aboriginal occupation of Parramatta and the natural environment of prehistoric Parramatta. The age and context of some PSB Aboriginal archaeological materials is scientifically significant and materials present within the PSB as a whole are significant to contemporary Aboriginal communities.

The SHR listing for the PSB recognises the sand body has potential to provide insight into patterns of river flow and flood events and may be able to provide information about changing sea levels in the Pleistocene with implications for possible future sea levels and coastal geography under a warming climate.

The site of the Military Barracks and Soldiers Garden is also on the PSB and is of State significance for its association with the establishment of the town of Parramatta and with the works of Governor Arthur Phillip. Importantly, the current study area is located on the same Quaternary geological formation as the PSB that comprise Pleistocene alluvial terraces that are identified as Qpat by current Quaternary mapping.

1.3.6 NSW Heritage Act 1977 (as amended)

The *NSW Heritage Act 1977* (as amended) is the principal legislation that provides statutory protection for (primarily) non-Indigenous heritage and the requirements for its management in NSW. The purpose of the Act is to protect, conserve and manage the environmental heritage of the State broadly defined as *'those places, buildings, works, relics, moveable objects, and precincts, of State or Local heritage significance'*. Historical-archaeological remains are additionally protected via the operation of the 'relics' provisions of the Act (Division 9, Part 6, Sections 138-146). Amendments to the Act in 2009 have changed the definition of an archaeological 'relic' whereby a relic is now referred as an archaeological deposit, artefact, object, or material evidence that:

- a) *Relates to the settlement of the area that comprises NSW, not being Aboriginal settlement; and*
- b) *Is of State or Local heritage significance.*

Although several of the archaeological provisions of the Act have been streamlined, the Act nevertheless retains the core principals and objectives that require anyone proposing to disturb land to obtain a permit from the *Heritage Council of NSW* (under s.140 or Section 60 of the Act) if it is known or suspected that 'relics' of significance may be disturbed, moved, or destroyed by future land alterations and/or use. Section 139 of the Act stipulates that:

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

If the site is listed on the SHR, approval for an Excavation Permit is required under Section 60 of the Act. Exceptions under Section 139(4) of the Act include an archaeological assessment to be prepared and which indicates any relics on the land are unlikely to have State or Local heritage significance (1A), the excavation or disturbance of land will have a minor impact on archaeological relics (1B), and where the proposed excavation demonstrates that evidence relating to the history of the site, such as its level of disturbance, indicates that the site has little or no archaeological research potential (1C).

1.4 Heritage assessment methodology

This assessment has followed precautionary due diligence approaches to the assessment of impacts to ‘relics and archaeological deposits that are protected under the terms and definitions of the *Heritage Act 1977* (as amended) and has been prepared with reference to the following heritage assessment and reporting standards and guidelines:

- Australia ICOMOS. 1999. The Burra Charter. Australia ICOMOS Charter for Places of Cultural Significance. Australia ICOMOS Inc.
- NSW Heritage Office. 1996. NSW Heritage Manual. NSW Heritage Office and the Department of Urban Affairs and Planning. Sydney (revised 2002 – SoHI).
- NSW Heritage Office. 2006. Historical Archaeology Code of Practice. NSW Heritage Office.
- NSW Heritage Office. 2008. Levels of Heritage Significance. NSW Heritage Office, Sydney.
- NSW Heritage Branch. 2009. Assessing Significance for Historical Archaeological Sites and ‘Relics’. NSW Heritage Branch, NSW Department of Planning.

1.5 Authorship

This report has been written by Dominic Steele. The Quaternary maps used in this report have been prepared by Bryce Sherborne-Higgins and the site photographs have been taken by Adrian Dreyer. The site history for this report has drawn from the Statement of Heritage Impact prepared for the property by GBA Heritage.

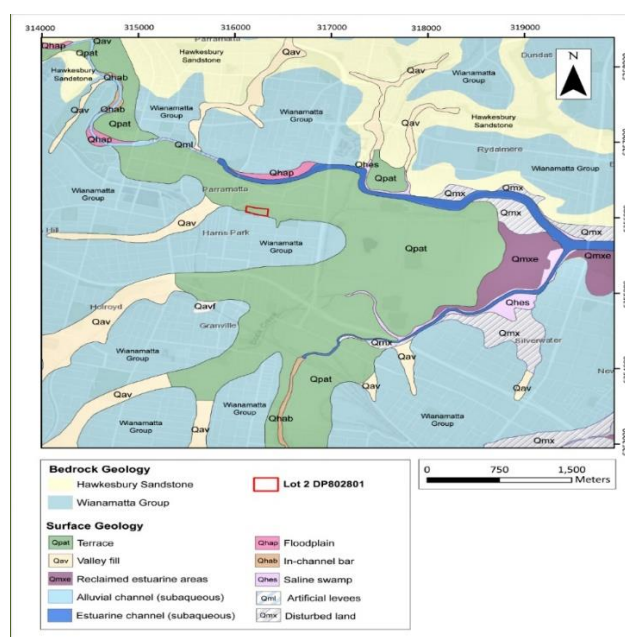
2.0 Landscape context

2.1 Quaternary landscape setting

Quaternary mapping shows the City of Parramatta is built over on ancient alluvial plain with deep fluvial sediment sequences below modern ground levels that infill the lower part of a valley formed on Middle Triassic Ashfield Shale over Hawkesbury Sandstone bedrock. The maps below locate the site and show its relative elevation on the southern edge of fluvial sediments mapped as Pleistocene terrace deposits.

The Quaternary is the most recent period of geologic timescale and is subdivided into the Pleistocene (2.5 million years ago to 11 700 years ago) and the Holocene (11 700 years ago to the present). The ages and the origins of the valley infill sediments are linked to the rise and fall of relative sea-level that resulted from the expansion and melt of global ice sheets that occurred frequently during this period. Most surficial Quaternary deposits are inferred to date from the Late Pleistocene period (last c.120 000 years) and to be associated with particular periods of fluctuating sea-levels that are recorded to have occurred during this period and Late Pleistocene and the mid-Holocene to the present (Troedson et al 2015).

Figure 2.1: Quaternary mapping of Pleistocene Terrace deposits (Qpat) (Troedson et al 2015)



Higher than present sea-levels (about +4-6m) are reported to have occurred around 125,000 years ago and also during the mid-Holocene to the present when sea-levels exceeded present levels by 1-1.5m (Sloss et al 2007, Lewis et al 2013). Remains of Holocene river terraces that formed after about 6,500 years ago occur up to 2m in elevation on both sides of the modern Parramatta River and higher terraces above 5-6m sea-level are believed to have formed during the Last Interglacial (Casey & Macphail 2008).

Figure 2.2: Location of the Gregory Place site relative to Quaternary mapping of Qpat deposits (Troedson et al 2015)

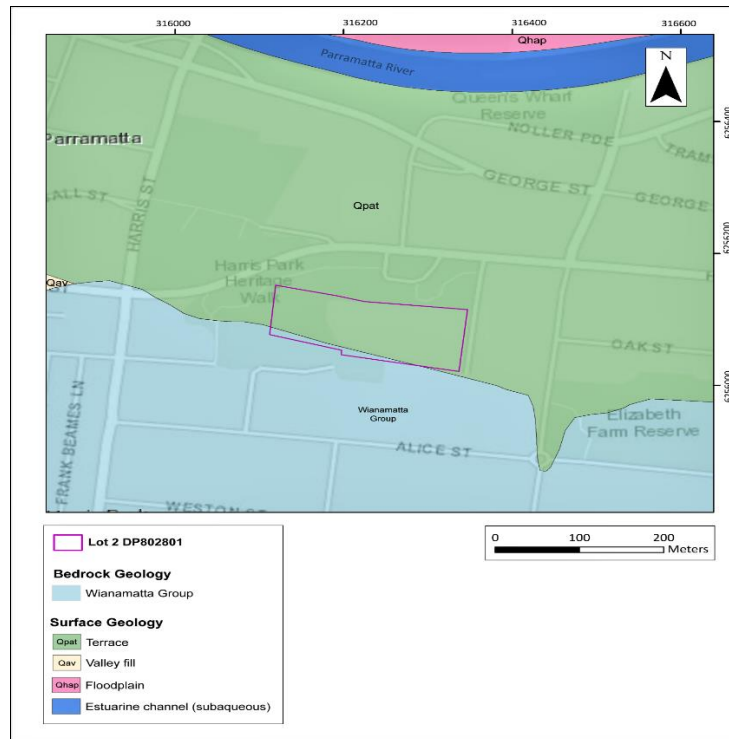
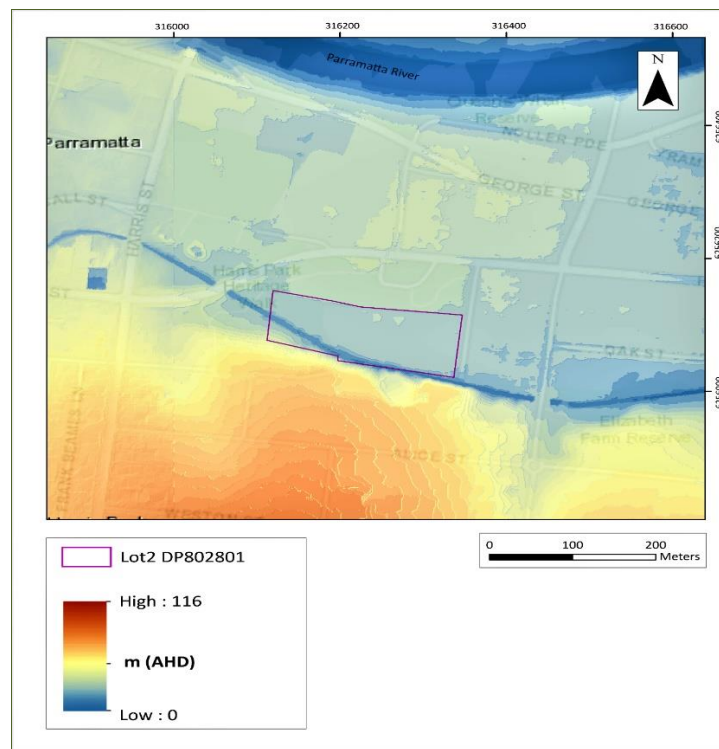


Figure 2.3: Location of the 2A Gregory Place site and relative elevation (Troedson et al 2015)



2.2 Evidence for landscape evolution and old river and creek alignments

2.2.1 Parramatta River

The current alignment of Parramatta River is at least 64,000 years old based on OSL dating of sediments in Parramatta Park (and similar dating at 140 Macquarie Street). There are at least two older palaeo-channels of the proto-Parramatta River that have previously been identified in the CBD area of Parramatta (Lawrie 1982) and these can be traced to depths of 7m below ground surfaces at least as far as between 109-111 George and Union Streets.

2.2.2 Clay Cliff Creek

Mitchell (2008) describes almost no floodplain landscape survives along Clay Cliff Creek because the watercourse has been almost totally converted into a concrete channel. Examples of the original channel that remain intact include a small meander cut into the shale hillslope below Elizabeth Farm adjacent to Alfred Street and a larger meander also cut into a shale bank between Grand Avenue North and Hassall Street. Although there is a terrace present along Clay Cliff Creek it is less well defined than the equivalent feature along Parramatta River. Mitchell reported dark clay soils with minimal development of a texture contrast profile were found in auger holes behind Hambleton cottage, at the southern end of Gregory Place, and along Oak Street, indicating a clay-based terrace extends along the southern bank of the creek.

Evidence for an older alignment of Clay Cliff Creek within an older and lower landscape position is suggested by the following newspaper descriptions from 1908 (Cumberland Argus, 2 May 1908, p.4):

Further interesting discoveries continue to be made by the workmen employed on the Parramatta sewerage works. The other day an interesting memento of barbaric times was unearthed in the shape of a black-fellow's stone tomahawk, which is now in the possession of Mr. E. J. Love. At a depth of 15ft. evidences were found of an old water-worn channel, with stones and pebbles evidently rounded by the action of water. There was also found red soil of a character only found in the neighbourhood at Redbank and near the Industrial School, and which must, at some remote period, have been brought down by water. It is remarkable that similar indications were discovered in connection with the construction of the bridge across the river for the Carlingford line, at a depth of 45 feet, and also 15ft. down in the excavations which are being made at the 'Black Bridge.'

The signs point to the existence of a channel ages ago along the present course of Clay Cliff Creek, or nearly so, which has gradually been buried by accumulating deposits brought down by the water.

A second article in the same 1908 newspaper issue reported that excavations for a concrete foundation for a pier to support a proposed new steel bridge to replace the old wooden 'Black Bridge' had extended down a considerable depth at the southern side of Parkes Street and that digging had revealed '*the existence of old swampy ground and the ancient water channel mentioned elsewhere*' (Cumberland Argus, 2 May 1908, p.4)

3.0 Historical heritage context

3.1 British discovery of Rosehill

Port Jackson was explored and charted by the British soon after landing at Sydney Cove. Captain John Hunter and Lieutenant William Bradley (HMS Sirius) examined the eastern end of the harbour first (28-29 January) and then followed (3 February) with the coves and inlets to the northwest (Lane Cove). The next day was the first of three explorations made by the British to establish the westward termination of the harbour (and to find agricultural land). The river landscape in the vicinity of the ‘head of the harbour’ was first seen by the British on 4-5 February by an exploration party led by Hunter along with three other officers and a dozen sea-men. They were in a six oared boat (along with another small boat) when they reached the tidal flats near to the entrance to today’s Homebush Bay. Bradley (1969:76) described:

‘At noon we were far enough to see the termination of the Harbour as far as Navigable for ships, being all Flats above us with narrow passages that we supposed might run a considerable distance but very shoal. The harbour is navigable for ships twelve miles east and west and the branches extend six miles north and south. It is one continuation of harbour formed by snug coves with good depth of water and fresh water in many of these’

Bradley also noted (ibid:75-77) *‘there being assembled up here an astonishing number of Natives all Arm’d, Flats on which the boats might ground in this channel and put us much in their Power’*. Hunter (in Flynn 1997:17) describes the same incident and recorded they had just landed on shore to take measurements when:

‘we were a little surprised to find the natives here in greater numbers than we had ever seen them before in any other place.....they appeared very hostile, a great many armed men appeared upon the shore wherever we approached it, and, in a threatening manner, seemed to insist upon our not presuming to land. During the whole time we were near them, they hailed each other through the woods, until their numbers were so much increased, that I did not judge it prudent to attempt making any acquaintance with them’.

The second exploration up the harbour and west was made on 15 February 1788 in three boats that proceeded up to the beginning of the ‘Flats’ (Rhodes Point) where the party landed and explored the Concord area for 2-3 miles into the country where the trees were seen to be spaced *‘a considerable distance apart & the soil in general good. Grass very long & no underwood’* (ibid 82-83). Their likely route probably took them midway between Haslam’s Creek and the Parramatta River and possibly ended in the vicinity of Sydney Olympic Park. The next entry in Bradley’s journal (ibid:83-84) and states:

‘At 1pm, returned to Boats & after Dinner went in the smallest boat over the Flats and past a Mangrove Island [Mud island] & followed a Creek [Parramatta River] some distance to the W.ward when it branched away to the NW [Parramatta River] and SW [Duck River] which last we followed 4 Miles as near as we could judge, the lake or drain is very shoal and where we stop’d was entirely filled up with fallen trees from both sides, the water filling fast we had barely time to get down Boats, which we then join’d returned to the Ship’.

The railway line that crosses Duck River and Duck Creek defines the approximate limit shown on both headwaters on Bradley's charts as 'Bridge of Trees' (Bradley's chart stops about a kilometre short) but whether the party had been on Duck River or Duck Creek is not indicated.

The third exploration party (April 22-27) was to pass through the future site of Rose Hill and to proceed west through Seven Hills and Blacktown to reach two hills with views over the Eastern Creek Valley below and towards the Blue Mountains in the distance. The first hill is believed to be today's Bungaribee Hill and the second hill is believed to have been Rooty Hill (Flynn 1995:122ff). During the trip they came across a few 'mean' Aboriginal huts that were located next to water holes and lagoons on the western outskirts of the future Rosehill township, and they saw fleeting glimpses of Aboriginal social activity in progress at Eastern Creek, but they made no direct contact with local Aboriginal groups in Parramatta or on the way west or on their return. The *Historical Records of NSW* (1:134-134) version of Phillip's account of this expedition is:

I set off the 22nd of April, with six days provisions. We were eleven officers and men, and landed near the head of the harbour... We proceeded westward, finding the country in general as fine as any we ever saw, the trees growing from twenty to forty feet from each other... The country thro' which we past was mostly level, or only rising in small hills, which gave it a pleasing and picturesque appearance. The fifth day we got to a rising ground... The country round this hill was so beautiful that I called the hill BelleVeue...

John White's journal gives a more detailed eye-witness account and provides details of the repeated evidence the explorers saw of Aboriginal people's presence and activity in the landscape that are important Aboriginal historical records because they are the first. White describes on 22 April:

'the governor, accompanied by the same party, with the addition of Lieutenant Cresswell of the marines and six privates, landed at the head of the harbour [The landing site was at the confluence of the Parramatta and Duck Rivers], with an intention of penetrating into the country westward, as far as seven days provisions would admit of; every individual carrying his own allowance of bread, beef, rum, and water. The soldiers, beside their own provisions, carried a camp kettle and two tents, with their poles, &c. Thus equipped....we proceeded on our destination. We likewise took with us a small hand hatchet in order to mark the trees as we went on, those marks (called in America blazing) being the only guide to direct us in our return. The country was so rugged as to render it almost impossible to explore our way by the assistance of the compass.

In this manner we proceeded for a mile or two, through a part well covered with enormous trees, free from underwood. We then reached a thicket of brush-wood, which we found so impervious as to oblige us to return nearly to the place from whence we had set out in the morning. Here we encamped, near some stagnant water, for the night, during which it thundered, lightened, and rained' (White 1788:131ff).

White (1788:128ff) describes on 23 April that having got around a wood or thicket which had 'harassed' them the day before they soon fell in with a 'hitherto unperceived branch of Port Jackson harbour' [Parramatta River] where the banks were grassed with chest-high grass interspersed with a plant that closely resembled indigo.

McClymont (2004:43) suggests by skirting to the north of the thicket, the party emerged on the Parramatta River bank around two miles from their previous camp site that would be at a point just west of today's Thackeray Street. The party then followed the Parramatta River west for a few miles, where the same tall grassland again prevailed, until they came to a fresh-water stream that emptied into the river. The party camped here overnight (and ate soup made from a white cockatoo and two crows White had shot on the way). This overnight campsite was on Clay Cliff Creek and was probably in the vicinity of where today's River Road West crosses the watercourse to the west of James Ruse Drive (see McClymont 2004:42).

On the 24 April the group walked along the southern bank of the Parramatta River where there were immense trees spaced at a considerable distance from each other, and where the land was flat and rather low but well covered with long grass and shrubs as previously seen. This was in the vicinity of today's Queens Wharf and west towards probably the vicinity of the foot of today's Smith Street where White records here the tide stopped flowing and further progress for boats was stopped by a flat space of large broad stones over which a fresh-water stream ran. Just above this flat they saw *'a quarry of slates, from which we expected to derive great advantage in respect to covering our houses'* but it proved to be of a crumbling nature (and is likely to have been shale).

White describes that the next day (after having sowed some seeds) the party proceeded west for three or four miles *'where we met with a mean hut belonging to some of the natives but could not perceive the smallest trace of their having been there lately. Close to this hut we saw a kangaroo, which had come to drink at an adjacent pool of stagnated water, but we could not get within shot of it. A little farther on we fell in with three huts, as deserted as the former, and a swamp, not unlike the American rice grounds'*. The party continued for about two more miles and then camped overnight (*'near a stagnant pool'*):

The country about this spot was much clearer of underwood than that which we had passed during the day. The trees around us were immensely large, and the tops of them filled with loraquets and paroquets of exquisite beauty, which chattered to such a degree that we could scarcely hear each other speak. We fired several times at them, but the trees were so very high that we killed but few.

The exploration party is likely to have walked upstream from Parramatta Park and turned west and travelled along Toongabbie Creek. From the overnight camp, they would have followed Blacktown Creek westwards to where the creek branches and today is a small lake (possibly the site of the 'swamp' and Aboriginal huts) and then proceeded by compass over undulating higher ground roughly along the line of present-day Bungarribee Road. White describes the subsequent journey west to Eastern Creek.

- 26th April. *We still directed our course westward, passed another tree on fire, and others which were hollow and perforated by a small hole at the bottom, in which the natives seemed to have snared some animal. It was certainly done by the natives, as the trees where these holes or perforations were, had in general many notches cut for the purpose of getting to the top of them.*

After this we crossed a water-course, which shews that at some seasons the rain is very heavy here, notwithstanding that there was, at present, but little water in it. Beyond the chasm we came to a pleasant hill, the top of which was tolerably clear of trees and perfectly free from underwood. His Excellency gave it the name of Belle Veue.

From the top of this hill we saw a chain of hills or mountains, which appeared to be thirty or forty miles distant, running in a north and south direction. The northernmost being conspicuously higher than any of the rest, the governor called it Richmond Hill; the next, or those in the centre, Lansdown Hills; and those to the southward, which are by much the lowest, Carmarthen Hills. In a valley below Belle Veue we saw a fire, and by it found some chewed root of a saline taste, which shewed that the natives had recently been there. The country hereabout was pleasant to the eye, well wooded, and covered with long sour grass, growing in tufts. At the bottom of this valley, or flat, we crossed another water-course and ascended a hill, where the wood was so very thick as to obstruct our view. Here, finding our provisions to run short, our return was concluded on, though with great reluctance, as it was our wish, and had been our determination, to reach the hills before us if it had been possible.

In our way back, which we easily discovered by the marks made in the trees, we saw a hollow tree on fire, the smoke issuing out of the top part as through a chimney. On coming near, and minutely examining it, we found that it had been set on fire by the natives; for there was some dry grass lighted and put into the hole wherein we had supposed they used to snare or take the animal before alluded to. In the evening, where we pitched our tents we shot two crows and some loraquets, for supper. The night was fine and clear, during which we often heard, as before, a sound like the human voice, and, from its continuance on one spot, we concluded it to proceed from a bird perched on some of the trees near us.

- *27th April. We now found ourselves obliged to make a forced march back, as our provisions were quite exhausted, a circumstance rather alarming in case of losing our way, which, however, we met with no difficulty in discovering by the marked trees. By our calculation we had penetrated into the country, to the westward, not less than thirty-two or thirty-three miles.*

Lieutenant Newton Fowell (Sirius) records that on their return (quoted in Flynn 1995:21):

'he [Phillip] supposed he had been about 40 mile in Land & that it was all the Way like a Park with Trees about 20 yards Distance from each other – the Country in General quite a Plain – the Grass about 3 feet high & paths all the Way that Natives had made – at about the Distance of about 20 Miles from them when Furthest in Land they saw Mountains, the very tops of them can be seen in a clear day from the head of the harbour – Water in Land is in great Plenty – they saw Several Ponds – some of them 200 Yards wide'.

Elsewhere around the harbour the British 'often fell in' with 'native paths' that formed networks leading along rivers, and between woods and through grasslands connecting important places in the Aboriginal geography of the time. It made the colonists travel through the often-unfamiliar country easier as recognised by Hunter (2005 [1793]) who noted *'these paths rendered our march, not only on account of pointing to us the most easy and accessible parts of the hills and woods, but, in point of direction, the shortest which could be found, if we had even been better acquainted with this tract'.*

Additional observations of Aboriginal Parramatta in early 1788 are recorded by Bradley (1969) who describes a further examination of the ‘shale beds’ at Rosehill (12 May 1788):

A party went up the harbour to the lake or creek running to the NW above the flats. We went about 3 Miles up, to a very fine run of water. The country on both sides [was] pleasant and the ground apparently fit for opening, with far less trouble than any in the other parts of the harbour, and the soil good. A little above the part where the fresh water meets the tide is the place supposed would produce slate but had been found on examination not fit for working. We tried it as coal, without success. Found a great number of cranes and other birds about and above the flats, all very shy.

George Worgan was a surgeon on the Sirius, and described on 14 May:

I have had a most delightful Excursion to Day with Captn Hunter and Lt. Bradley, We went in a Boat about 12 Miles up the Harbour. For 3 or 4 Miles the Harbour forms a narrow arm, which at high Water, has the appearance of a River, the sides of this Arm are formed by gentle Slopes, which are green to the Water's Edge. The Trees are small and grow almost in regular Rows, so that, together with the Evenness of the Land for a considerable Extent, it resembles a Beautiful Park. We landed quite up at the Head of this Branch where a fresh Water River runs into it, but which, at this time was dry in many places. We walked about two Miles up the Country in the Direction of this River; the Ground ran in easy ascents and Descents, the Soil was extremely rich, and produced luxuriant Grass.

We now and then, in our Walk, met with Clusters of a very delicate looking Tree, the Trunks of some of Them were 12. 14. 20 Inches round, covered with a green Bark, the leaves of a peculiarly beautiful Verdure and growing like the Fern, but more delicate. Having extended our Excursion as far as we wished, we returned to the Place where we landed and after regaling Ourselves with a cold Kangaroo Pie and a Plum Pudding, a Bottle of Wine &c, all which Comforts we brought from the Ship with Us, We returned on Board.

Worgan provides further details about the nature of the country and its park-like appearance and the evidence for fire in the landscape (quoted in Gammage 2011:44-45):

In our Excursions inland....we have met with great Extent of Park-like country and Trees of a moderate Size and at a moderate Distance from each other, the Soil, apparently, fitted to produce of any kind of Grain, and clothed with extraordinary luxuriant Grass. It is something singular, that all, of this kind of Trees, and many others, appear to have been partly burnt, the Bark of them being like Charcoal.

Watkin Tench (2005b) also adds details about the nature of the water availability in this landscape and the grass and the trees. Tench notes that Phillip’s exploration party, who travelled through the country at Rosehill and continued west to reach what was to be called Eastern Creek, did not encounter any ‘rivulets’ (the term Tench also used to describe the Parramatta River at Rose Hill) but were reliant on drinking water provided by ‘standing pools’ which occurred in the valleys and were supposed to be formed by seasonal rainfall. This is likely describing former chain-of-ponds drainage as further discussed shortly. Similar to previous observations made by others

Tench also reported the trees were spaced a considerable distance from each other and the intermediate space was not filled with underwood but with a thick rich grass. In addition, the grass did not ‘overspread the land in a continued sward’, but grew ‘in small-detached tufts, growing every way about three inches apart, the intermediate space being bare’.

3.2 A culturally managed landscape at Aboriginal Parramatta

These first descriptions of Aboriginal Parramatta describe the rocky shoreline and woodlands on the southern side of the Parramatta River from the harbour to past Balmain the landscape began to flatten and ease into more open country from around Drummoyne and continued to do so westward. The country at Rose Hill and westward to Eastern Creek was undulating terrain with plains and rolling hills that featured open grasslands and widely spaced trees with low-shrub and grass understories free of underwood. The land was also interspersed with watercourses that occurred as discontinuous chains of ponds and wetlands, and the appearance of this landscape was consistently described by the British as resembling ‘park-like country’.

These observations provide insight into likely vegetation community structures that were present in the landscape at Parramatta before they were changed by colonial agricultural land use. The first descriptions of the place also suggest that the landscapes described were constructed and maintained rather than natural. Hunter (2005) alludes to this when describing the land at the head of the harbour: ‘*there is a very considerable extent of tolerable land, and which may be cultivated without waiting for its being cleared of wood; for the trees stand very wide of each other, and have no underwood: in short, the woods on the spot I am speaking of resemble a deer park, as much as if they had been intended for such a purpose*’.

Hunter (ibid) also commented from an agricultural mind-set perspective that although the (clay-loam) soil from Rose-hill to Prospect-Hill was nearly alike he found it ‘*remarkable, that although the distance between these two places is only four miles, yet the natives divide it into eight different districts*’. Flynn (1995:30) describes in 1790 that Lieutenant William Dawes (probably guided by Bennelong) would follow part of the ancient network of pathways in the area to record eight Aboriginal places you would come to in succession after walking so many minutes westward for four miles from Rosehill before reaching Prospect Hill; *Parramatta, Wau-maille, Malgray-matta, Era-worong, Carramatta, Boolbane-matta, Carro-Wotong, and Marrong* (Prospect).

Benson & Howell (1990) propose the higher (Pleistocene) terraces at Parramatta were covered by woodlands dominated by grey box (*Eucalyptus moluccana*) and forest red gum (*Eucalyptus tereticornis*) with an open grass understorey, whilst the lower (Holocene) terraces were colonized by the common reed (*Phragmites communis*), paperbarks (*Melaleuca linariifolia*) and/or rough-barked native apple (*Angophora floribunda*) depending on soil drainage. Macphail & Casey (2008) note colonial documents do not record the presence of she-oaks (casuarinas) such as black she-oak (*Allocasuarina littoralis*), or river-oak (*Casuarina cunninghamiana*) or saltwater tolerant swamp-oak (*C. glauca*) that also grew at Parramatta. The combined data point to the landscape that was cleared

was ‘a savanna grassland with scattered eucalypts (*Eucalyptus sensulato*), sclerophyll shrubs (rare) and she-oaks (*Allocasuarina/Casuarina* spp.) lined local creek lines on the Pleistocene terraces and probably the sides of the river valley upstream of the tidal limit’ (Macphail & Casey 2008).

The open and lightly wooded grassland is believed to have been shaped and maintained by Aboriginal people over a long period of time who managed the landscape and its ecological communities through the use of fire (see Fletcher et al 2020; Gammage 2013; 2014; Hunter 2017; Mooney et al 2012). Fires of varying intensities were used to create mosaic grassland and woodland ecological communities that contained and attracted different animals and promoted different plants.

When the British arrived in Port Jackson, they were according to Hunter (ibid) perplexed as to why the country looked the way it did where ‘two-thirds of the trees in the woods were very much scorched with fire, some were burnt quite black, up to the very top’. The colonists frequently saw large fires and ‘firing of the country, which the natives constantly do when the weather is dry’ and the results of this burning that often occurred in windy weather that helped spread the fires over several miles of country. It was soon concluded that the firing was generally for the purpose of ‘disturbing such animals as may be within reach of the conflagration’ and thereby providing the opportunity for people to catch these animals, and to also ‘clear that part of the country through which they have frequent occasion to travel’ of brush or underwood to create and maintain the network of paths that connected the important places in the Aboriginal Parramatta landscape.

Long term Aboriginal land management practices including ‘firestick farming’ is believed to be reflected by the increase in charcoal percentages in sediments and soils during the LGM and the Holocene (see Hunter 2017; Fletcher et al 2020; Mooney et al 2012) and there is evidence that management was based on mosaic patterns according to cultural divisions of landforms, geology and ecology (see Mooney et al 2012; Bowman et al 2012).

3.3 Reconstructing the nature of the Clay Cliff Creek landscape in 1788

3.3.1 Chain of Ponds drainage vs (incised) ‘creeks’ at Parramatta in 1788

A now almost disappeared drainage network was present in parts of Parramatta in 1788. Valley flats contained irregularly spaced and often steep-sided ponds separated by preferential water flow paths that would only see continuously running water during high rainfall events and would otherwise remain as intermittent ponds for the remainder of the time. These landforms are known as swampy meadows formations (Mactaggart et al 2007) and represent in-channel forms that were vegetated with grasses, rushes and sedges and interspersed with irregularly spaced, disconnected ponds (Eyles 1977, Mactaggart et al 2007:Figure 2.19).

These were fragile ecological systems and their demise was caused by vegetation clearance for agriculture and impacts from hard-hooved grazing animals that led to the loss of swamps and wetlands, native grasses and trees, and the entrenchment of drainage flows into continuous creek channels. The former presence of this important

element of the landscape is reflected in the naming of a number of today's western Sydney watercourses including First Ponds Creek, Second Ponds Creek, Gidley Chain of Ponds (Bells Creek), and the Killarney Chain of Ponds. Lawrence and Davies (2018:240-241) further explain:

It was not until the late 1960s that geomorphologists began to recognise that the prevalence of deeply incised creek lines in Australia was the product of settler activity (see review in Bird 1982). Crucial to this discovery was the use of historical sources that documented the observations of early European explorers and settlers and recorded the form of waterways and ponds on early maps. Before settler colonisation, watercourses were discontinuous chains of ponds and wetlands that relied on heavy rain to overflow the ponds and join them into a stream. The ponds drought-proofed the land by keeping water available for plants, animals and people. Settler activity disrupted this by draining the wetlands, clearing vegetation, grazing sheep and cattle and introducing rabbits. These activities caused rain to bite into the watercourses, converting the chains of ponds into continuous streams in incised channels up to 15 metres deep, with water draining quickly away.

Some first edition Parish maps for the Cumberland Plain show watercourses as connected chains of individual ponds as shown below (left) for a tributary of Breakfast Creek near Quakers Hill and (right) for the Gidley Chain of Ponds (later renamed Bells Creek) crossing through the Blacktown Native Institute in the early 1830s.

Figure 3.1: Chain of Ponds drainage depicted on Breakfast Creek (undated Parish of Gidley map) and Felton Mathews 1833 sketch of Crown Reserve and school house at Blacktown (Bickford 1981: Figure 3)

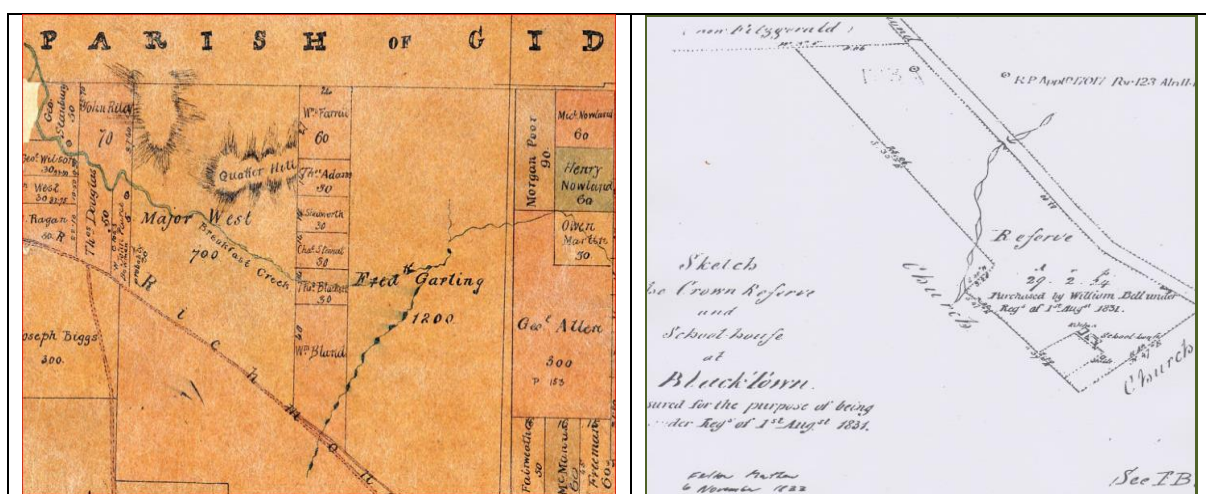


Figure 3.2: An example (left) of a swampy meadow located in a valley of the Upper Shoalhaven of NSW with disconnected pools. A typical swampy meadow (Neville State Forest) showing a valley floor vegetated with sedge and tussock grass (Mactaggart et al 2007: 462)



3.3.2 Ponds and lagoons on Clay Cliff Creek

It is likely the landscape contained within the back-plain country between Clay Cliff Creek and the Parramatta River had some low-lying surface topography that featured chain of ponds drainage and swampy meadows formation vegetation. Mapping (Mitchell 2009:2) of known creeks and waterholes and swamps present in 1788 confirms the surface of the sand body was uneven topography.

Walter Campbell recollects in the 1850s (Cumberland Argus, 8 December 1920, P.4) that at 'Harris' paddock', and likely to refer to the immediate landscape of Experiment Farm, was largely cleared of timber by this time but there was on the '*summit of the hill*' an open forest of mahogany trees '*which probably were in much the same condition as they were when Parramatta was first discovered*'. Campbell also described that meandering through the paddock was Clay Cliff Creek that was '*generally a series of waterholes*' and that he used to '*collect thistles, clover and soft grasses on the Old Experiment Farm, where John Ruse cultivated his historical wheat*'.

Insights into the nature of the wider Experiment Farm - Elizabeth Farm estate grounds around this time, and the survival of indigenous vegetation in this otherwise well-established agricultural landscape are provided by a first-hand overview of the flora of the district in 1857 (Sydney Morning Herald 1857, 24 December 1857:8). Black-butt and Bloodwood and Turpentine trees were abundant near creeks north of Parramatta and on the south side of Parramatta Woolly-butt (*E. gomphocephala*) grew abundantly. In part of 'General Macarthur's bush' this tree type was found more plentiful than any other species. In the lower parts of the estate, towards Duck River, 'water gum' (*Tristania nereifolia*) grew in abundance. Near Red Bank there were some small turpentines, but the locality did not seem favourable for them (but purple coloured *Mirbelia* grew plentifully).

The author also noted there was one grass in the neighbourhood (*Anisopogon avenaceus*) that grew at the North Rocks but was not common elsewhere that had an oat-like appearance, but owing to the introduction of foreign grasses in the immediate neighbourhood, the native grasses were rapidly disappearing,

3.4 British settlement at Rosehill

Surveyors and a party of marines had been to the Crescent in Parramatta Park to mark out the ground for a 'redoubt' and convicts were sent who '*understood the business of cultivation*' by November 1788. Pollen (1983) suggests James Ruse was probably amongst this party. By July 1789, a '*small redoubt was thrown up, and a captain's detachment posted in it, to protect the convicts who were employed to cultivate the ground*' (Tench 1979:136). The (first) barrack, and store, and convict huts enclosed within the redoubt were located on the south bank of the river nearby a timber bridge crossing (end of Bridge Street). Collins (1798:46) reported that '*some ground had been opened on the other side of the stream of water which ran into the creek.....in which the produce of the ground he (Henry Dodd) was then filling with wheat and barley was to be deposited*'.

During this period, areas were cleared and cultivated south to today's Great Western Highway, past Northmead to the north, and to the east the Government Farm stretched as far as present day Charles Street. The main street at Rose Hill (High Street, later George Street) was laid out on an east-west axis from Government House to the first wharf.

Tench (1979:246) described the alignment of the road from starting near the Landing Place to the Governor's house was a mile long and in many places was '*carried over gullies of considerable depth, which have been filled up with trunks of trees, covered with earth*' that describes the originally undulating nature of the terrain and location of drainage along this stretch of the river (one such north flowing freshwater creek was identified during archaeological excavations at 184-188 George Street - Steele 2018). By September 1790 '*twenty-seven huts were in great forwardness at the end of the month*' (ibid:113), and by November 1790 thirty-two houses were completed (Tench 1979:195). By December 1791 one hundred houses were finished. The first wharf at the '*Landing Place*' (approximately the site of Queens Wharf) was also completed (September 1790) and site for the storehouse and for the new barracks chosen (August 1790).

3.5 James Ruse and Experiment Farm

James Ruse had a hut built for him and an acre and a half of ground cleared before he took occupancy of his land grant in November 1789. The Governor promised if he made a success of his farm, it would be increased in size to thirty acres. A deed of grant issued in March 1791 called the grant 'Experiment Farm' and describes it was situated near the 'barracks ponds' (Jervis 1935) and is likely to refer to a chain of ponds or lagoons were once a dominant feature of the natural landscape in this part of the early town.

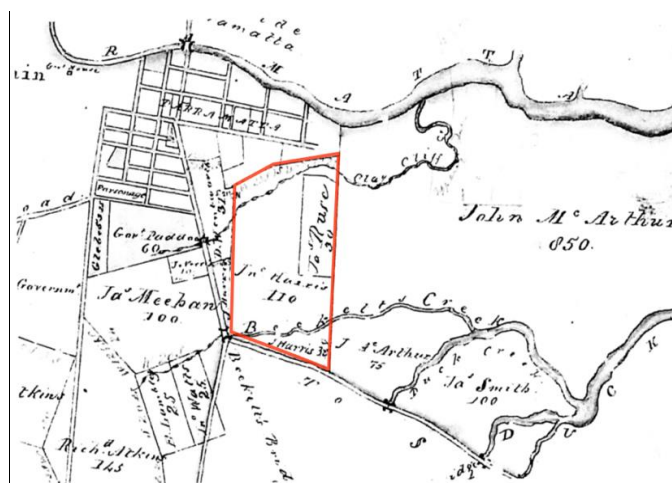
When Watkin Tench visited his farm in 1790, Ruse advised he did not know the precise limits of his land but had cleared and burnt fallen timber and cultivated as much land as he could. By early 1791 Ruse could support himself and family without assistance from the government. In March 1791 Phillip moved to increase Ruse's land to 30 acres with Clay Cliff Creek playing the central role in the agricultural use of the land. However, Ruse's

self-sufficiency could not be sustained because of drought and the rapid decline in agricultural fertility of the soils on his land ('soil exhaustion'). In October 1793 Ruse's land grant (30 acres) was sold to Surgeon John Harris who had arrived in Sydney 1790 as surgeon's mate to the New South Wales Corps and was stationed at Parramatta by May 1791.

3.6 Harris Farm

The grant of 110 acres made to John Harris in February 1794 was bound on the north by present-day Hassall Street and on the south by Becketts Creek. In addition to Becketts Creek the grant included a section of Clay Cliff Creek. Harris continued to add to his land holding at 'Harris Farm' over the following years and from June 1793 he lived there temporarily (Rosen 2009:107).

Figure 3.3: Detail from the map of the Parish St John dated around 1835. The extent of John Harris' land by grant and purchase is delineated (Source: Land & Property Information).



Experiment Farm is believed to have been built in the mid-1830s although a mid-1790s date has also been proposed (ibid). In the 1790s Harris' attention was focussed on Harris Farm (and on developing his grant at Ultimo from around 1804) and details of how the land was used is revealed in land and stock returns. In February 1794, 40 acres of the 110 acres were cropped with wheat, 70 acres were about to be planted with maize, there were 120 sheep and 300 goats, and the clays of Clay Cliff Creek were also extracted for brick making. There are no direct historical references to Aboriginal people in the earliest records for the place.

3.7 Elizabeth Farm

It is likely that the land taken in by what was to become Elizabeth Farm contained a diversity of food and resource ecologies and many long-used campsites and other social places that were important to Aboriginal people when John Macarthur received his first grant of land at Rosehill in 1793 and expanded his grant by purchasing an adjacent 100-acre land parcel from William Cummins, along with James Stuart's adjoining land parcel (GBA Heritage 2021:15).

The Macarthur landholding encompassed the peninsula of land bound by Parramatta River to the north and Duck River to the south. Today this land slopes down from west to east from a high point (12m AHD) adjacent to Rosehill Railway Station after which the land falls to 7m AHD at Rosehill Racecourse and then it drops again to about 3m AHD near the confluence of the Parramatta and Duck Rivers.

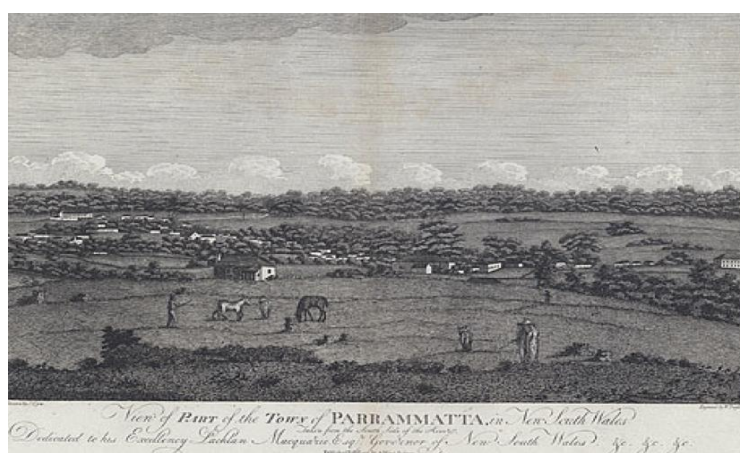
This landscape will likely to have contained a complex mosaic of shaped and maintained savanna grasslands, woodlands and saltwater-freshwater wetlands, and chain of pond drainage and associated swampy meadows. The fabric of the country also provided the raw materials used for the first Elizabeth Farm buildings including hand-moulded bricks that were made from clay sourced from nearby Clay Cliff Creek, and the roof was formed of pit-sawn timber baulks with shingles made from swamp oaks. Fowlie (1919:7) recalls the bricks were made from a pit near today's Camellia Station (*'this part of Macarthur's Estate was called Redbank'*) and that lime was made from shells that were procured from the *'great kitchen middens found along the riverbanks at the time'* that were processed a little to the east of the clay-pit (site of the Australian Kerosene and Oil Company).

During the mid to late 1790s, the Parramatta township began to take shape through the subdivision of land on both sides of the river, laying out of the main streets of the town and the foundations of the first Town Hall, the construction of the first goal, and the beginning of the conversion of former convict accommodation huts to private use as houses and business premises (ibid:15).

3.8 Agricultural development of the land

During this period, John Harris had been expanding his land southward by purchasing land between A'Becketts Creek and Parramatta River but generally, relatively little is known of the physical development of Harris Farm in the nineteenth century. An engraving made around 1812 by Walter Preston is believed to show John Harris' cottage and other structures between this cottage and Clay Cliff Creek to the north.

Figure 3.4: Detail from Preston's 1814 'View of part of the town of Parramatta in New South Wales. Taken from the south side of the river'. The drawing depicted the rear of Harris' cottage within the thirty acres granted to Ruse (Source: National Gallery of Australia)



3.9 Parramatta in 1820s

3.9.1 Macquarie period

The township grew substantially from the 1800s with new building and enlargement of the street network. The first town planning was during the Macquarie period (1811-1821). In the 1820s the best situations and streets in town were owned by people with money (that enabled successful farming and stock grazing) and lower classes were obliged to choose allotments in less attractive parts of town (GBA Heritage 2021:15). It appears that John Harris did not make any significant building improvements on his land from 1805, but John Macarthur constructed Hambledon cottage on the northwest side of the Elizabeth Farm property in the early 1820s.

3.9.2 Hambledon cottage

Hambledon cottage was constructed in c.1824 for the Macarthur's children's nanny, Penelope Lucas, who lived there from 1827 until 1838 after which ownership transferred to Edward Macarthur. It was initially occupied in 1825 by Thomas Hobbs Scott (first Anglican Archdeacon of NSW) who built a stable and a single storey brick coach house as an addition to Hambledon cottage on its western side.

3.10 Mid nineteenth century developments

3.10.1 Experiment and Elizabeth Farm estates

During the 1850s Experiment Farm was changed by Thomas Harris who established a dairy farm and fenced the land into paddocks and Edward MacArthur built a brick cottage between Hambledon cottage and Clay Cliff Creek for a long-term employee, George Neale.

Figure 3.5: *A single fronted cottage facing east, enclosed by a semi-circular picket fence, with stables and outbuildings to the south. The well-established garden and coach house of Hambledon is seen to the north across a three railed hardwood fence' (HHT 2006)*



3.10.2 'Neale's cottage'

George Neale was a wheelwright who worked for the Macarthur family for most of his adult life. In 1831 he and Bridget Neale and their young daughter Elizabeth Mary moved into a small timber cottage that had been built between Hambledon Cottage and Clay Cliff Creek. In about 1854 a replacement brick cottage was built for the Neale family by Edward Macarthur within the immediate vicinity of the Gregory Place site.

Figure 3.6: The Neale family and cottage, undated (GBA Heritage 2021: Figure 2.25)

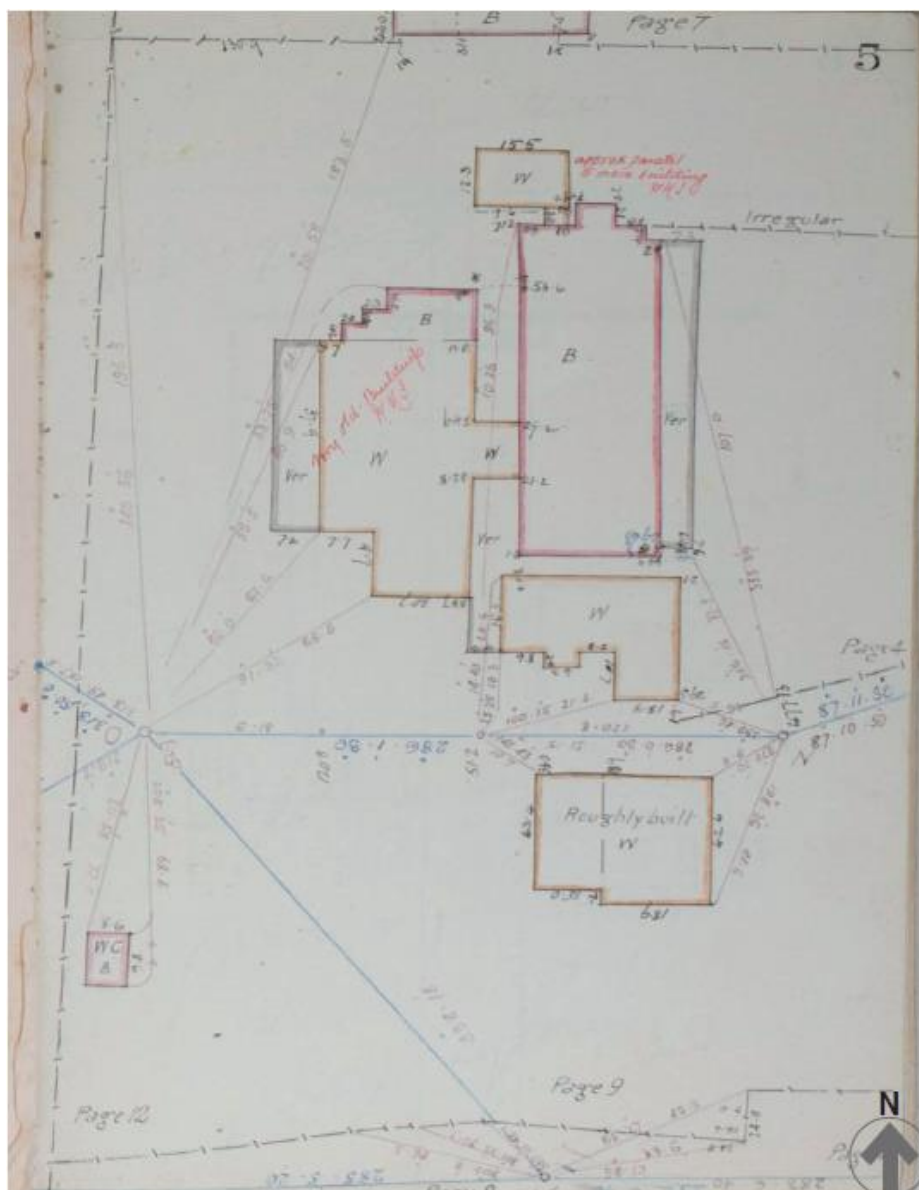


The 1895 survey of Parramatta shows the cottage faced east and the stables and outbuilding were to the south and west of the cottage. The Neale family stayed in the cottage until around 1882 when it is assumed it was demolished during construction works that changed the original Clay Cliff Creek drainage into a confined stormwater channel (ibid:21).

Figure 3.8: Detailed survey of Parramatta showing Neale's cottage with stable and outbuilding (blue) on the south side of Hambledon cottage (red) and coachman's cottage (green) on the southwest side of Hambledon Cottage (GBA Heritage 2021: Figure 2.22)



Figure 3.7: 1893 survey showing form of Neale's cottage and associated structures (GBA Heritage 2021: Figure 2.23)



3.11 Late nineteenth and early twentieth century changes

3.11.1 Gregory Place study area

The previous plans show Neale's cottage with stable and outbuildings on the south side of Hambledon cottage and in the vicinity of the northern boundary of the 2A Gregory Place property. The cottage and any associated structures were demolished sometime before 1943 when the land was purchased by the Goodyear Tyre and Rubber Co. It is believed the section of the stormwater drain that crosses the 2A Gregory Place site was constructed in c.1917.

Figure 3.8: The 2A Gregory Place site shown as vacant land crossed by the stormwater channel of Clay Cliff Creek in 1943 (Sullivan-ES 2015)



Figure 3.9: The study area in 1961 (Sullivan-ES 2015)



3.11.2 Clay Cliff Creek

With the rapid urbanisation of the land within the catchment of Clay Cliff Creek from the late 1870s the flow and the sanitary condition of the creek deteriorated. By 1890, channelling the water course was necessary (Cumberland Argus, 21/2/1891). A portion of the concrete channel, between Church and Station Streets appears to have been completed in the early 1890s. The project was stopped (lack of funds) in 1895 and revived in the late 1890s with completion of the channel to the west of Harris Street by 1900 (Cumberland Argus, 21/11/1900; 17/4/1901). Harris Street was the terminus of the channel for several years and there was continued periodic flooding of the old creek course east of Harris Street (Cumberland Argus, 4/7/1914).

3.11.3 Subdivision and construction of the exiting factory

The Statement of Heritage Impact prepared for the site (GBA Heritage 2021) details the early twentieth century land subdivision and purchases that led to the consolidation and creation of a large lot for the construction of the existing factory. The images below drawn from the SoHI show the nature of the ground surface and the coachman's cottage before the factory was built.

Figure 3.10: The 2A Gregory Place site prior to the construction of the existing factory in 1945 (GBA Heritage 2021: Figure 2.84)



Figure 3.11: Looking west at the coachman's cottage located on the southwestern side of Hambleton cottage before the construction of the factory on the 2A Gregory Place site in 1945 (GBA Heritage 2021: Figure 2.85)



[illegible]

4.0 Existing condition of the site

4.1 Buildings and built-form

The former 1950s factory site is located approximately 6.5m to 4.5m above sea-level (AHD) and comprises a relatively flat concrete or asphalt sealed surface that is also largely covered by a number of main buildings and works areas that are illustrated below.

The main buildings on the site comprise an office/warehouse/factory building that covers about two-thirds of the property, with an asphalt carpark covering the western area and concrete loading dock covering part of the southern area.

An open storm-water channel gently grades from the west from 2.67m to 2.13m RL (and is 6m wide and 3m deep from ground level) that contains the flow of Clay Cliff Creek runs the length of the southern site boundary then cuts through the site in the southwest corner. Clay Cliff Creek drains to the east and eventually empties into the Parramatta River adjacent to James Ruse Drive.

Figure 4.1: 2A Gregory Place context and setting and built form



Figure 4.2: Indicative external building space along southern side of site (looking west) showing the boundary it shares with the grounds of Hambledon Cottage (left) and the extent to which the factory construction has lowered the ground here



Figure 4.3: Indicative external space – southern side of building (looking east). Note to the right the difference in height between the existing (higher) ground on the adjacent Hambledon Cottage grounds and the bitumen surface



Figure 4.4: Building and carpark surface at the eastern side of the site



Figure 4.5: Indicative internal spaces (warehouse) in the east and center of the site

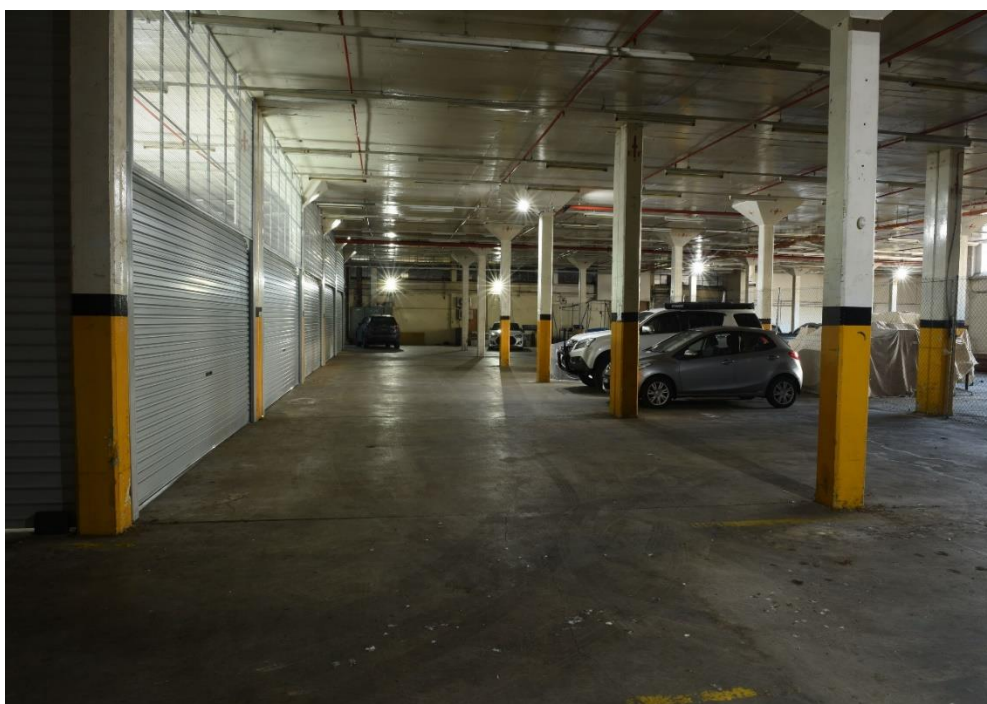


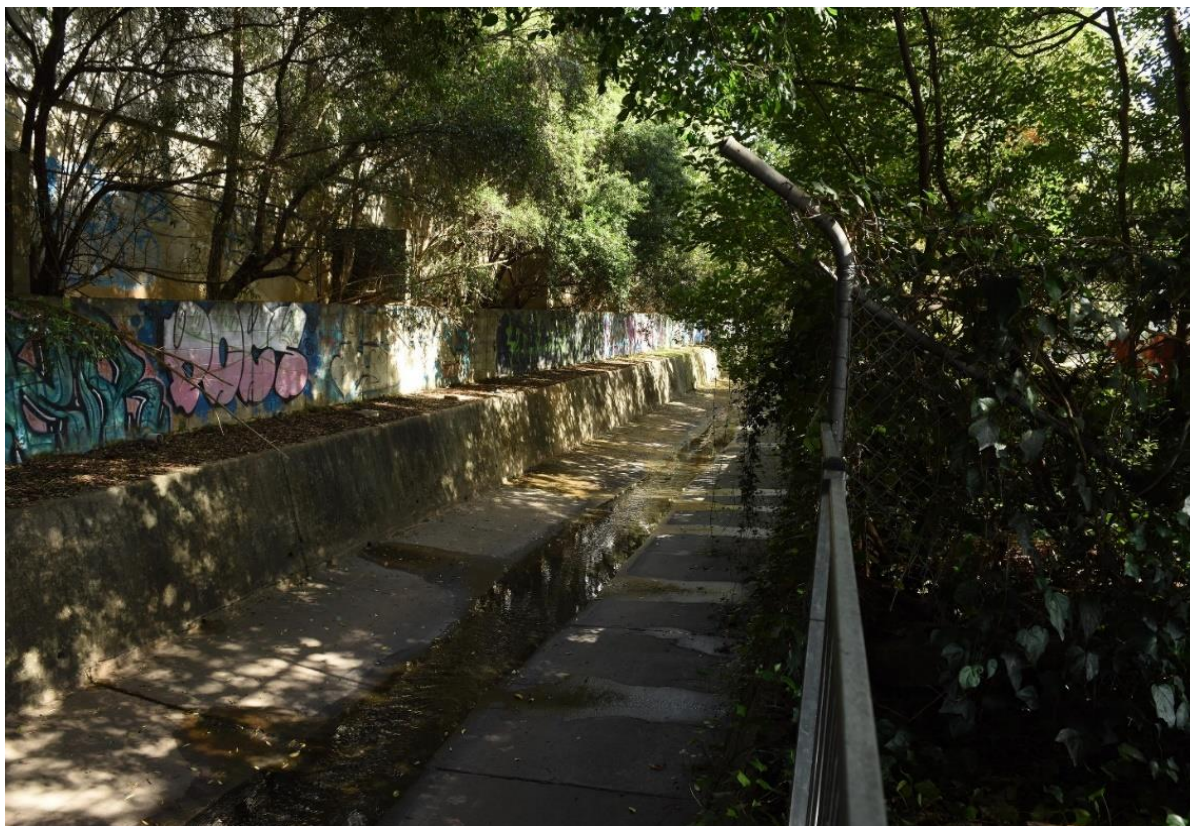
Figure 4.6: Indicative internal spaces (manufacturing and offices) in the western part of the site



Figure 4.7: Indicative internal space in the northwestern part of the site (looking east). The canal for Clay Cliff Creek is about 6m to the right (obscured by vegetation)



Figure 4.8: Indicative view of the canal for Clay Cliff Creek (looking east)



4.2 Contamination

Sullivan Environmental Services (Sullivan E-S) completed a Preliminary Site Investigation (PSI) at the Gregory Place site in 2015. This study concluded that historic activities may have caused potential site contamination and may pose a potential health risk to future human and environmental receptors. Key items and activities that were identified as warranting further investigation included the presence of underground storage tanks, on-site storage of bulk chemicals, a boiler room with potential fuel and chemicals storage, on-site manufacture of pharmaceutical products, fuel leaks from vehicle parking, and groundwater conditions.

The PSI recommended a Phase 2 Detailed Site Investigation (DSI) be undertaken to assess if the identified issues have caused impacts to soils and groundwater and enable health risks to onsite and offsite receptors to be quantified in consideration of State Environmental Planning Policy 55 – Remediation of Land 1998 (SEPP55).

Sullivan E-S (March 2022) have prepared a Detailed (Phase 2) Site Investigation (DSI) that included evaluation of the presence of soil and groundwater contamination, assessment of potential health risks for future use of the land under high-density residential landuse and provides recommendations for additional investigations or remediation if this is required. The sampling points for this investigation are shown below.

Figure 4.9: Outdoor sampling locations (Sullivan E-S 2021)

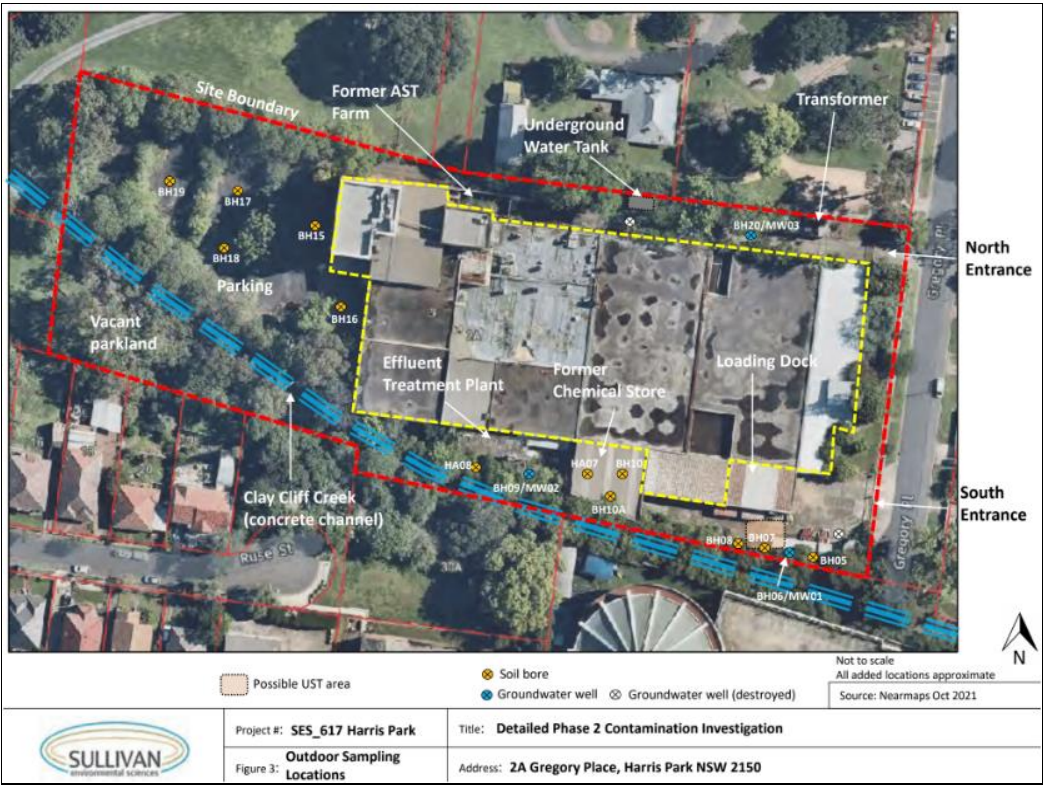


Figure 4.10: Indoor sampling locations (Sullivan E-S 2021)

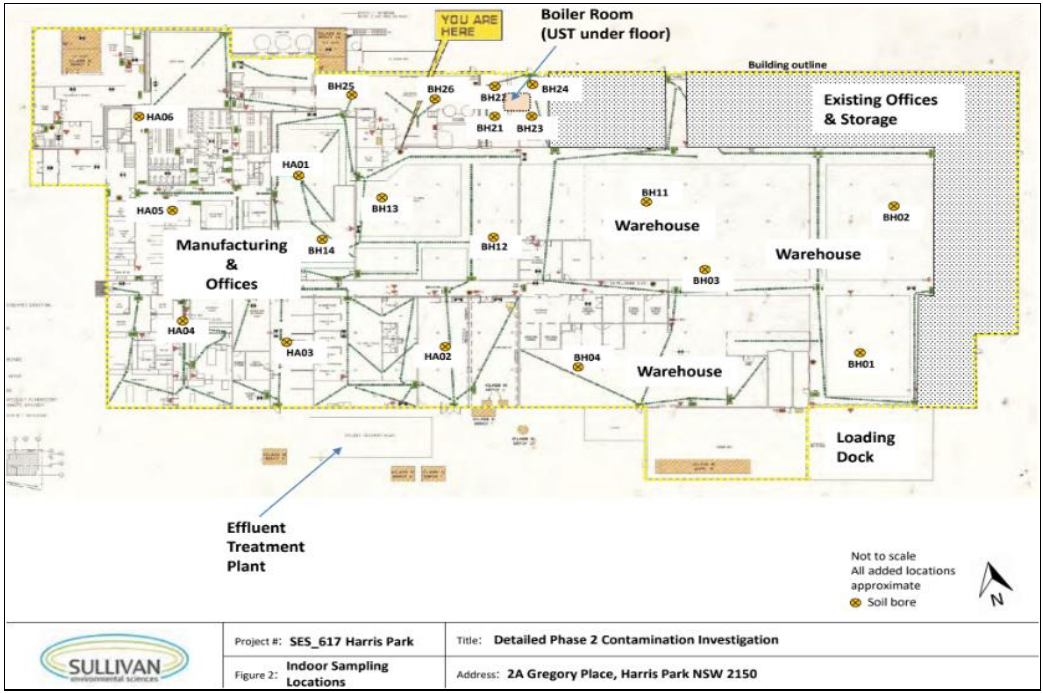


Figure 4.11: Outdoor soil exceedances (Sullivan E-S 2021)

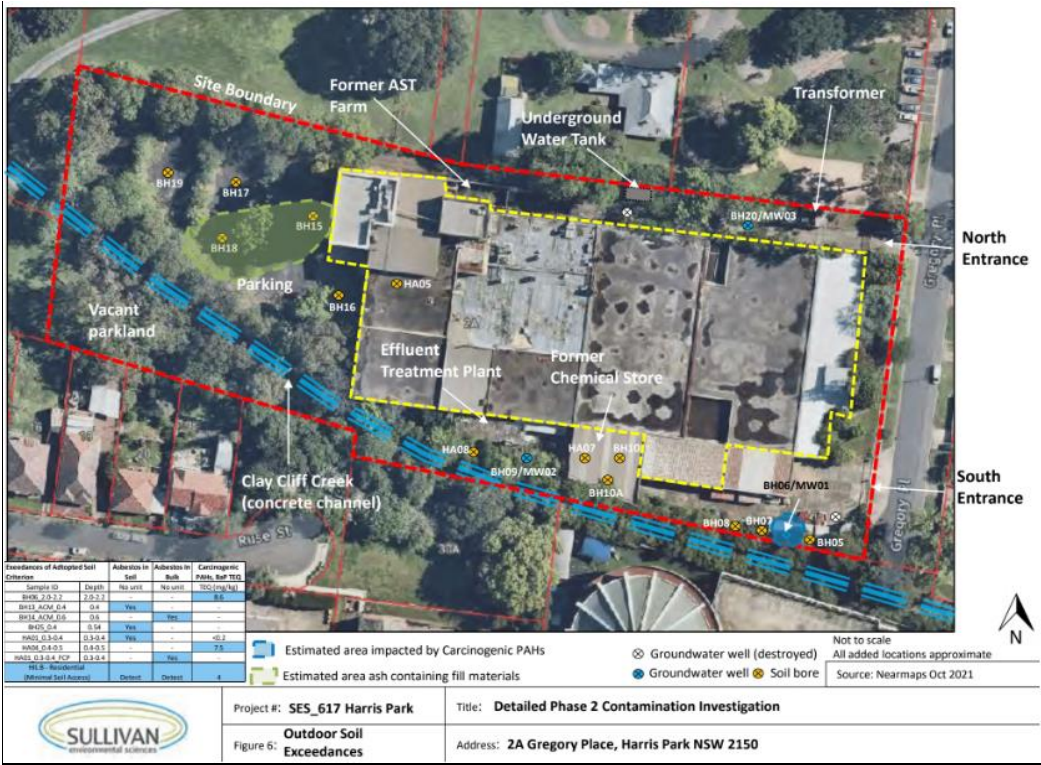
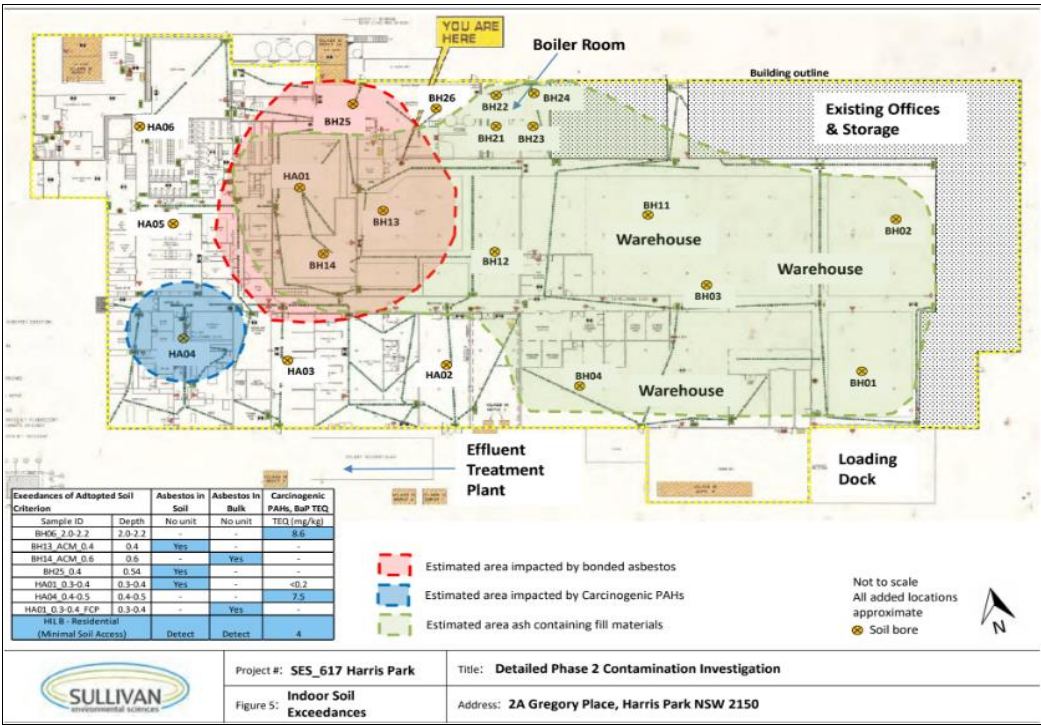


Figure 4.12: Indoor soil exceedances (Sullivan E-S 2021)



The key findings of this DSI study (Sullivan E-S March 2022) are summarised below:

- Asbestos containing fibre cement fragments observed in gravelly ash fill at sample locations BH13, BH14, BH25 and HA01, clustered together and sealed under concrete beneath former manufacturing and offices area of main building. Area sealed under concrete but potential risk to future site users by asbestos impacted fill that requires remediation prior to or during site development.
- Gravelly sandy fill soils at sampling locations HA04 and BH06 have carcinogenic PAHs in concentrations that exceed human health criterion. Areas sealed under concrete but potential risk by contaminated soils at HA04 and BH06 that requires remediation prior to or during site development.
- Volatile compounds in fill soils beneath the former buildings area adjacent to the ETP tank and former chemical store. Concentrations below adopted health screening levels, low level in soils and not detectable in groundwater. Chemicals may be residues of chemicals causing low level concentrations in soils or potential unknown contamination source beneath structures which may present potential health risk for proposed development.
- Preliminary assessment shows potential acid sulphate soils exist onsite. Potential acid generation of soils deeper than 1.5m may not require treatment but shallower soils at boreholes BH05 and BH19 have high values and an Acid Sulphate Soils Management Plan to be prepared.
- Exact position of suspected UST near loading dock not verified but likely under Boiler Room floor.
- Groundwater onsite has no exceedances of human health screening levels for vapour intrusion or ecological receptors except for PFAS.
- PFAS compounds in groundwater not significant to warrant further consideration (site history shows no current or historical onsite source of PFAS).
- Liquid contained within ETP tank is waste and requires disposal offsite during decommissioning.

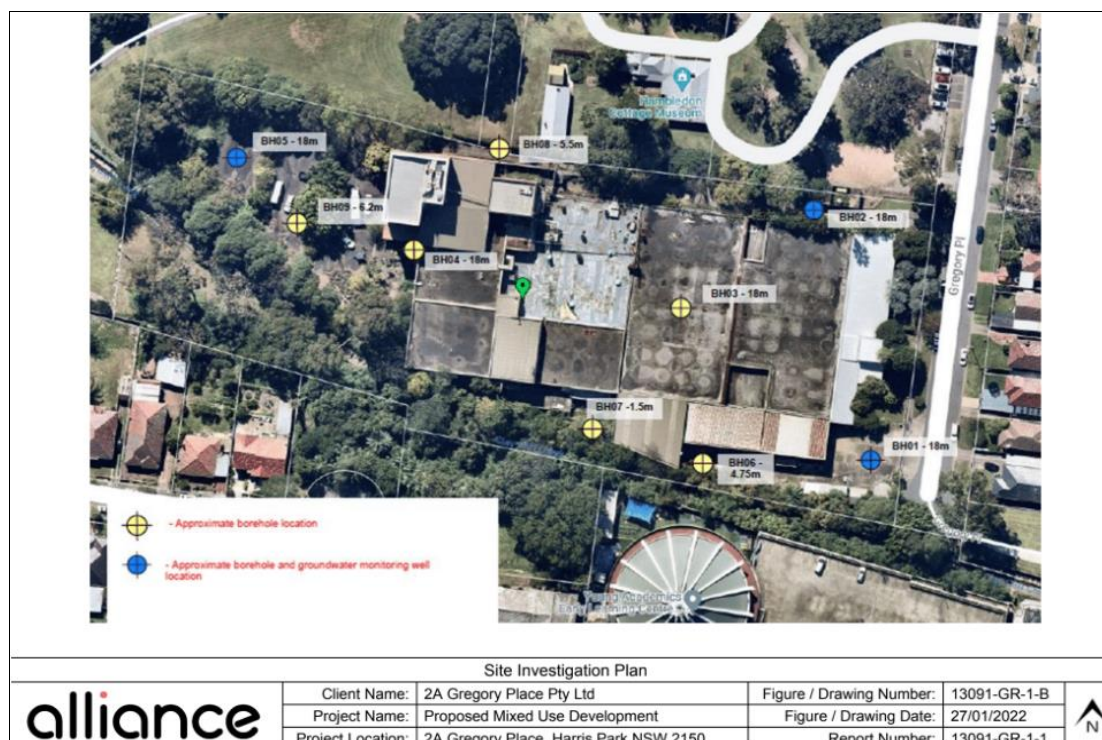
The DSI recommends:

- Decommissioning of USTs
- Remediation of impacted fill materials for bonded asbestos in and around BH13, BH14, BH25 and HA01 including any additional delineation sampling to refine localised remediation extent(s).
- Remediation of impacted fill materials for carcinogenic PAHs at HA04 and BH06 including any additional delineation sampling to refine localised remediation extents.
- Data gap closure including additional sampling to characterise contamination status associated with former manufacturing/offices/laboratory areas of the building, adjacent to the EFT and former chemical store for volatile and semi volatile organic compounds.

4.3 Geotechnical investigations

Geotechnical investigations have been undertaken at the site (Alliance Geotechnical Pty Ltd February 2022) and the sampling comprised drilling of five boreholes to a maximum depth of 18.0m and four boreholes drilled to a maximum depth of 7m. The sampling locations are shown below.

Figure 4.13: Geotechnical sampling locations (Alliance Geotechnical Pty Ltd 2022)



The bore-logs for the geotechnical investigations show the site subsurface profile below the existing concrete and asphalt ground surfaces across the site consists of up to 1.5m thick deposits of uncontrolled fill underlain by very soft to firm alluvium silty clay which is up to 5.9m thick. Stiff to very stiff residual clay, and up to 1.5m in thickness, underlies the alluvium clay stratum in some areas.

The alluvial/residual soil is underlain by extremely weathered, very low strength shale (ranging in thickness from 1.1m to 5.5m), which is underlain by fresh, medium to high strength shale at depths ranging between -6.4mRL and -0.8mRL.

The tables below are drawn from this geotechnical study that summarise borehole termination depths, groundwater (seepage was encountered in all boreholes) and overviews the subsurface stratigraphic profile.

Figure 4.14: Subsurface soil and sediment data (Alliance Geotechnical Pty Ltd 2022)

Type	Location ID	Existing Ground Surface Level (mRL)	Termination Depth (m)
Borehole	BH01	4.70	18.45
	BH02	5.50	17.52
	BH03	5.15	14.90
	BH04	5.00	18.00
	BH05	5.00	19.00
	BH06	5.18	4.75
	BH07	5.18	1.50
	BH08	5.40	5.50
	BH09	5.40	6.20

Well	Borehole Elevation (mRL)	Well Screen Depth (m)	Well Screen Length (m)	Groundwater level (mRL)	
				16/12/2021	24/01/2022
BH01	4.70	0.5 – 13.0	13.0	3.21	3.12
BH02	5.5	1.0 – 11.0	10.0	3.72	3.88
BH05	5.0	2.13 – 8.13	6.0	3.77	3.76

Table 6 - Summary of Subsurface Profile

Ground Profile	Consistency/ Strength	RL at top of unit (mRL)	Depth to top of unit (m)	Thickness (m)
Fill: Silty Sandy CLAY: low plasticity, dark grey, with gravel poorly to moderately compacted	-	4.70 – 5.50	0	0.2 – 1.5
Alluvium: Sandy/Silty CLAY: pale grey, orange brown, low to medium plasticity, fine to medium grained sand	Very soft to firm	3.5 – 5.3	0.2 – 1.5	2.7 – 5.9
Residual: Silty CLAY; dark grey and brown, low to medium plasticity	Stiff to very Stiff	(-1.0) - 0.5	4.7 - 6	0 – 1.5
SHALE (Class V and IV); dark grey and grey brown, extremely weathered to highly weathered	Very low strength	(-2.5) - 1.0	4.2 - 7.5	1.1 – 5.5
SHALE (Class II and better): dark grey, fresh	Medium to high strength	(-6.4) - (-0.8)	5.5 – 11.6	Not penetrated

4.4 Landuse history and potential historical archaeological resources

4.4.1 Landuse history in summary

The 2A Gregory Place site comprises a consolidation of land subdivided in the 1880s from two early 1790s historical land grants (Experiment farm and Elizabeth Farm) and the land has had a long history of agricultural use prior to the development of the site in the 1950s. The land may have been used for growing crops and animal grazing, and as a water source and possibly for clay materials for brick-making sourced from Clay Cliff Creek. The land was not built upon until the 1850s.

4.4.2 Potential archaeological resources on the 2A Gregory Place site in summary

There is a possibility archaeological traces related to the early agricultural history of the land may be present and survive preserved below the current site buildings and hard surfaces.

‘Neale’s cottage’ and a stable and outbuilding were present on the south side of Hambledon cottage and within vicinity of the northern boundary of the 2A Gregory Place property before they were demolished. The cottage may have been located within the site footprint and was demolished sometime before 1943, and possibly around 1917 when the section of the Clay Cliff Creek stormwater drain that crosses the site is believed to have been constructed.

4.4.3 Landuse impacts on potential historical archaeological resources

The construction of the Clay Cliff Creek stormwater channel during WW1 followed by the construction of the existing factory building post-WW2 resulted in the complete modification of the original drainage on the land and the lowering of the level of the ground through excavation to significant depths below the current ground levels that are present in the grounds of Hambledon cottage.

5.0 Significance assessment

5.1 Heritage assessment criteria

Cultural significance is defined by the *Burra Charter* as ‘*aesthetic, historic, scientific or social value for past, present or future generations*’ (Article 1.1). Significance may derive from the fabric of an item or place, its association with other items or places, or the research potential of an item or place. Linking this assessment process with a site's historical or archaeological context is currently achieved via the use of seven evaluation criteria which reflect significance categories and representativeness whereby a site, place or item can be evaluated in the context of State or Local historical themes. Documented and potential historical archaeological sites are routinely evaluated according to these criteria.

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

Different components of a site, place or item may make a different relative contribution to its heritage value. Loss of integrity or poor condition are factors commonly caused by development impacts on archaeological sites and may diminish a site or an item’s significance. Relative grades to determine the heritage significance of items (both built and archaeological) include:

- Exceptional: Rare or outstanding item of Local or State significance. High degree of intactness. Item can be interpreted relatively easily. Fulfils criteria for Local or State listing.
- High: High degree of original fabric. Demonstrates a key element of the item’s significance. Alterations do not detract from significance. Fulfils criteria for Local or State listing.

- Moderate: Altered or modified elements. Elements with little heritage value but which contribute to the overall significance of the item. Fulfils criteria for Local or State listing.
- Little: Alterations detract from significance. Difficult to interpret. Does not fulfil criteria for Local or State listing.
- Intrusive: Damaging to the item's heritage significance. Does not fulfil criteria for Local or State listing.

5.2 Assessment of significance against criteria

Criterion (a) – item is important in course, or pattern, of NSW's cultural or natural history

The 2A Gregory Place site forms a part of a large river headwaters landscape that was first partially explored by the British in early 1788 during explorations to find critically needed agricultural land. The site has associations with the earliest free settlement of land in Australia and is located close to the site of the first land grant given to a freed convict. The site also has historical associations with two early 1790s and historically prominent land grants (Experiment Farm and Elizabeth Farm) that are important in the agricultural history of Parramatta.

The 2A Gregory Place site was likely used for agricultural purposes from the 1790s but the land itself was not built-upon until the 1850s when a dwelling was constructed near Clay Cliff Creek that defines to the northern site boundary, and which was occupied until the house was demolished most likely when the watercourse was channelised in the early twentieth century. The open storm-water channel is wide (6m) and (3m) deep and its construction has had a significant impact on the original topography and form of this drainage landform.

The subsequent construction of the existing factory buildings on the site in the 1950s has further disturbed and cut-down the original ground levels across the footprint of the site. Geotechnical records show this has occurred to a depth of least 1.0m generally below the undisturbed ground-levels that occur around adjacent Hambledon cottage and grounds, and in some locations subsurface impacts from 1950s building has also been a greater depth, and this depth of disturbance will have impacted survival chances of potential archaeological resources. Unlike for Hambledon cottage, the potential 2A Gregory Place site historical archaeology is unlikely to be intact and possess high archaeological research potential, and is not of state significance.

The history of the 2A Gregory Place site, and the nature and integrity of the potential archaeological record of this landuse history that may survive, does not fulfill this criterion.

Criterion (b) – item has strong/ special association with life/works of a person, or groups, of importance in NSW's cultural or natural history

The 2A Gregory Place site is situated within one Parramatta's more significant historical heritage precincts and is located close to several places listed on the SHR (Hambledon Cottage and Experiment Farm). However, the landuse history of the site itself is unremarkable. It was likely used for agriculture in the early years followed by animal grazing and was not built on until the second half of the nineteenth century ('Neale's Cottage').

The site has associations with the life or works of a group of persons of importance in NSW's cultural or natural history (Macarthur family), but the potential archaeology at the site does not relate directly to the occupation and use of the site by the Macarthur's, and in general terms the site does not fulfil this criterion.

Criterion (c) – item is important in demonstrating aesthetic characteristics/high degree of creative or technical achievement

The site is currently occupied by a 1950s factory that has seen multiple additions and amendments to the fabric over time and the structures do not show a high degree of creative or technical achievement and does not fulfil this criterion.

The potential historical archaeological resources that may be at the site, if they have survived the extensive depth of subsurface impacts caused by the construction of the Clay Cliff Creek stormwater canal around 1917 and the factory in the 1950s, will comprise

Criterion (d) – item has strong/special association with particular community/cultural group for social, cultural or spiritual reasons

The 2A Gregory Place site forms part of a wider Aboriginal cultural heritage landscape at Parramatta that has values that are important to contemporary Aboriginal communities. Consultation that has been undertaken for this project for the development of an Aboriginal Cultural Heritage Assessment for the land redevelopment (separate to this historical archaeological assessment) establishes that contemporary cultural heritage values include in particular the care and ongoing management of the Parramatta Sand Body (PSB) and the known and potential archaeological objects, and historical and environmental records it contains.

The 2A Gregory Place site itself has not been flagged to possess strong or special associations by the Aboriginal community groups that have been consulted with.

Criterion (e) – item has potential to yield information that will contribute to understanding of NSW's cultural or natural history

The site history of landuse and potential archaeological record that may have been created as a result (1850s agricultural cottage on a watercourse) is unlikely to remain intact and contain in situ and extensive historical archaeological features and deposits, and the site has limited potential to yield new and significant information that may contribute to an increased understanding of the cultural and natural history of Sydney.

Criterion (f) – item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history

The site is unlikely to contain historical archaeology that is rare or uncommon and that can provide information that documents aspects of NSW's cultural and natural history that is not available from any other source.

Criterion (g) – item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places/environments.

The site is unlikely to contain natural and cultural (historical archaeological) deposits that may potentially be of significance under this criterion.

5.3 Evaluation

The 2A Gregory Place site landuse history suggests potential relics and historical archaeological deposits that may survive on the site is of Local significance. Potential historical archaeology that may have survived the building of the Clay Cliff Creek stormwater canal that is likely to have triggered the need for the demolition of 'Neale's Cottage' is likely to have been subsequently removed by the construction of the existing factory buildings that have truncated and lowered the ground levels that are still intact in the grounds of Hambledon cottage by over a metre or more in places, and this impact is likely to have removed and/or extensively disturbed any relics and archaeological deposits that were formerly present on below the ground to this depth.

On this basis, it is not expected that significant and intact historical archaeological features and deposits are present at the site and it is evaluated that the potential historical-archaeological sensitivity of the 2A Gregory Place site is low.

6.0 Archaeological impact assessment and recommendations

6.1 Potential archaeological impact

The landuse history of the 2A Gregory Place site combined with the topographically low-lying (watercourse) landscape context suggests that the potential historical archaeological remains associated with the pre-1950s use of the land, and potential in the form of an unremarkable mid-nineteenth dwelling house on a creek, is likely to be of local archaeological significance.

Potential historical archaeological survival at the site has however likely to have been considerably impacted upon and the chances reduced by the scale and nature of the modern building and creek alterations that occurred between about 1917 and the early 1950s. In this context, it is considered possible that deep-cut archaeological features (such wells or cess pits) that may have been associated with the cottage and present before it was demolished may have survived below the depths that have been disturbed by the construction of the current factory. However, this is considered to be relatively unlikely because of the nature and depth of ground disturbances recorded at the site through survey and geotechnical/contamination data which suggests that the 1950s excavations for the factory is likely to have totally removed all former evidence of the cottage.

Figure 6.1: Assumed former location of 'Neale's cottage' within the proposed redevelopment (Stanisic Architects 2022)

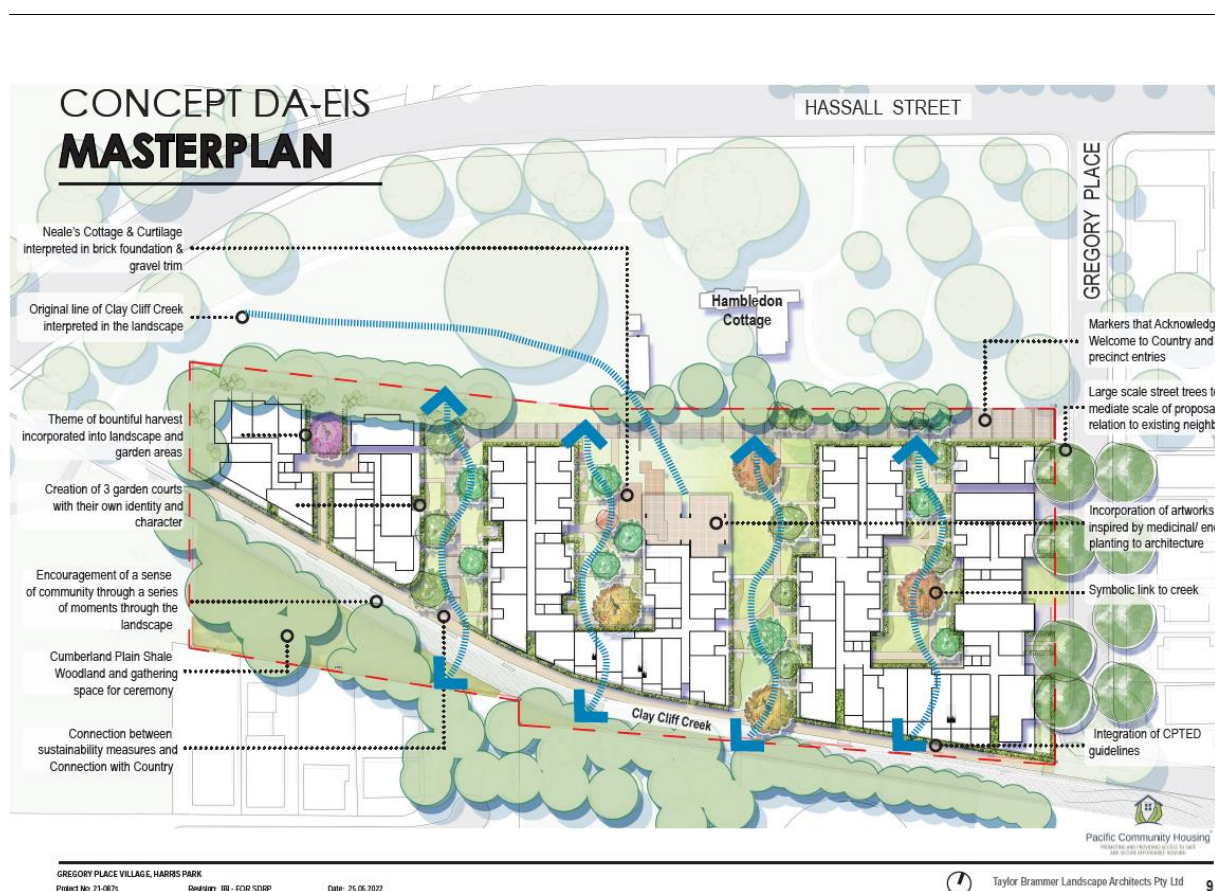


This depth of potential subsurface impact below the footprint of the factory can be seen through comparison of the existing ground levels across the site with those recorded in the adjacent Hambledon cottage reserve and geotechnical information that provide building construction excavation depths.

For example, early twentieth century works for the construction of the Clay Cliff Creek stormwater channel extended over an area wider than just the 6m for the canal itself, and the depth of this feature is 3m below current ground-slab levels at the northern site boundary. Likewise, at the southern site boundary the factory shares with Hambledon cottage, geotechnical bore-logs in the vicinity of the assumed former location of the cottage (BH3 and BH4 for example in Attachment B) show that the original ground level has been lowered by at least 2.0m and deeper in places and the potential for substantial and intact historical archaeological features and deposits to survive is limited.

Notwithstanding this, the proposed redevelopment will acknowledge and the history and heritage of the site through interpretation of the location of the former cottage and Clay Cliff Creek watercourse.

Figure 6.2: Future interpretation opportunities for the location of 'Neale's cottage' and Clay Cliff Creek within the proposed redevelopment (Taylor Brammer Landscape Architects Pty Ltd 2021)



6.2 Archaeological heritage management recommendations

The site is assessed unlikely to contain or preserve relics as they are defined and protected by the provisions of the *Heritage Act 1977*, and there are no significant historical archaeological constraints to the proposed development at 2A Gregory Place from proceeding (with caution) as planned.

Should any historical archaeological materials be unexpectedly discovered that are suspected to be relics in any area of the site during future works, then all excavation or disturbance to the area is to stop immediately and the Heritage Council of NSW should be informed in accordance with Section 146 of the *Heritage Act 1977*.

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Attachments

Attachment A

Planning Secretary's Environmental Assessment Requirements (SSD-31179510)

Attachment B

Geotechnical bore-log extracts (Alliance Geotechnical Pty Ltd February 2022)

Attachment A

Planning Secretary's Environmental Assessment Requirements (SSD-31179510)

Planning Secretary's Environmental Assessment Requirements

Build-to-rent housing



Development details

Application number	SSD-31179510
Project name	Gregory Place Build-to-Rent Concept Development
Description	Concept proposal for an affordable housing and build-to-rent development comprising approximately 483 dwellings within three freestanding four to eight storey buildings
Location	Lot 2 DP 802801 2A Gregory Place, Harris Park
Applicant	PACIFIC PLANNING PTY LIMITED
Date of issue	28 April 2022

Content and guidance

Any Environmental Impact Statement (EIS) must meet the minimum form and content requirements as prescribed by Part 8 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) and the *State Significant Development Guidelines*.

Relevant policies and guidelines can be found at <https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines>.

Some issues, assessment requirements and documentation may not apply to all developments. Applicants should identify and respond to the requirements that are applicable to the proposed development. If an issue is not considered to apply, applicants should provide reasoning as to why.

Key issues and documentation

Issue and Assessment Requirements	Documentation
1. Statutory Context <ul style="list-style-type: none"> Address all relevant legislation, environmental planning instruments (EPIs) (including drafts), plans, policies and guidelines. Identify compliance with applicable development standards and provide a detailed justification for any non-compliances. If the development is only partly State significant development (SSD) declared under Chapter 2 of SEPP (Planning Systems) 2021, provide an explanation of how the remainder of the development is sufficiently related to the component that is SSD. 	<ul style="list-style-type: none"> Address in EIS
2. Capital Investment Value and Employment	<ul style="list-style-type: none"> Cost Summary Report

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Planning Secretary's Environmental Assessment Requirements

Build-to-rent housing



Issue and Assessment Requirements	Documentation
<ul style="list-style-type: none"> Provide a detailed calculation of the capital investment value (CIV) of the development, prepared by a qualified quantity surveyor. Provide an estimate of the retained and new jobs that would be created during the construction and operational phases of the development, including details of the methodology to determine the figures provided. 	
3. Design Quality <ul style="list-style-type: none"> Demonstrate how the development will achieve: <ul style="list-style-type: none"> design excellence in accordance with any applicable EPI provisions. good design in accordance with the seven objectives for good design in Better Placed. Demonstrate that the development has been reviewed by the State Design Review Panel (SDRP). Recommendations are to be addressed prior to lodgement. Detail the measures to ensure design integrity is maintained in subsequent stages of the planning process (such as post approval and any modifications). 	<ul style="list-style-type: none"> Design Review Summary (where the project has been reviewed by the SDRP)
4. Built Form and Urban Design <ul style="list-style-type: none"> Explain and illustrate the proposed built form, including a detailed site and context analysis to justify the proposed site planning and design approach. Demonstrate how the proposed built form (layout, height, bulk, scale, separation, setbacks, interface and articulation) addresses and responds to the context, site characteristics, streetscape and existing and future character of the locality. Specifically, explain how the proposed building heights are justified given the site context, existing controls and overall design. Demonstrate how the building design will deliver a high-quality development, including consideration of façade design, articulation, activation, roof design, materials, finishes, colours, any signage and integration of services. Assess how the development complies with the relevant accessibility requirements. 	<ul style="list-style-type: none"> Architectural drawings Design Report Survey Plan Building Code of Australia Compliance Report Accessibility Report
5. Environmental Amenity <ul style="list-style-type: none"> Address how good internal and external environmental amenity is achieved, including access to natural daylight and ventilation, pedestrian movement throughout the site, access to landscape and outdoor spaces. Provide details on internal wayfinding, pedestrian access and pathway connections. Assess amenity impacts on the surrounding locality, including lighting impacts, reflectivity, solar access, visual privacy, visual amenity, view loss and view sharing, overshadowing and wind impacts. A high level of 	<ul style="list-style-type: none"> Shadow Diagrams SEPP 65 Verification Statement SEPP 65 Assessment View Analysis

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Build-to-rent housing



Issue and Assessment Requirements	Documentation
<p>environmental amenity for any surrounding residential or other sensitive land uses must be demonstrated.</p> <ul style="list-style-type: none"> Provide a draft/concept solar access analysis of the overshadowing impacts of the development within the site, on surrounding properties and public spaces (during summer and winter solstices and spring and autumn equinox) at hourly intervals between 9am and 3pm, when compared to the existing situation and a compliant development (if relevant). 	
<p>6. Visual Impact</p> <ul style="list-style-type: none"> Provide a visual analysis of the development from key viewpoints, including photomontages or perspectives showing the proposed and likely future development with respect to existing views from the street, nearby reserves and heritage items. Where the visual analysis has identified potential for significant visual impact, provide a visual impact assessment that addresses the impacts of the development on the existing catchment. 	<ul style="list-style-type: none"> Visual Analysis Visual Impact Assessment
<p>7. Public Space</p> <ul style="list-style-type: none"> Demonstrate how the development maximises the amount, access to and quality of public spaces (including open space, public facilities and streets/plazas within and surrounding the site), reflecting relevant design guidelines and advice from the local council and the Department. Demonstrate how the development: <ul style="list-style-type: none"> ensures that public space is welcoming, attractive and accessible for all. maximises permeability and connectivity. maximises the amenity of public spaces in line with their intended use, such as through adequate facilities, solar access, shade and wind protection. maximises street activation. minimises potential vehicle, bicycle and pedestrian conflicts. Address how Crime Prevention through Environmental Design (CPTED) principles are to be integrated into the development, in accordance with <i>Crime Prevention and the Assessment of Development Applications Guidelines</i>. 	<ul style="list-style-type: none"> Public Space Plan (as part of the Design Report) CPTED Report
<p>8. Trees and Landscaping</p> <ul style="list-style-type: none"> Assess the number, location, condition, and significance of trees to be removed and retained and note any existing canopy coverage to be retained on-site. Provide a concept site-wide landscape plan that details indicative site planting and: <ul style="list-style-type: none"> provides evidence that opportunities to retain significant trees have been explored and/or informs the plan. 	<ul style="list-style-type: none"> Arboricultural Impact Assessment Landscape Plan

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Build-to-rent housing



Issue and Assessment Requirements	Documentation
<ul style="list-style-type: none"> demonstrates how the proposed development would: <ul style="list-style-type: none"> contribute to long term landscape setting in respect of the site and streetscape. mitigate the urban heat island effect and ensure appropriate comfort levels on-site. contribute to an increase in urban tree canopy cover. maximise opportunities for green infrastructure, consistent with Greener Places. 	
9. Ecologically Sustainable Development (ESD) <ul style="list-style-type: none"> Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development. Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards. Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources. 	<ul style="list-style-type: none"> Draft/Concept ESD Report
10. Traffic, Transport and Accessibility <ul style="list-style-type: none"> Provide a transport and accessibility impact assessment, which includes: <ul style="list-style-type: none"> an analysis of the existing transport network, including the road hierarchy and any pedestrian, bicycle or public transport infrastructure, current daily and peak hour vehicle movements, and existing performance levels of nearby intersections. details of the proposed development, including pedestrian and vehicular access arrangements (including swept path analysis of the largest vehicle and height clearances), parking arrangements and rates (including bicycle and end-of-trip facilities), drop-off/pick-up-zone(s) and bus bays (if applicable), and provisions for servicing and loading/unloading. analysis of the impacts of the proposed development (including justification for the methodology used), including predicted modal split, a forecast of additional daily and peak hour multimodal network flows as a result of the development (using industry standard modelling), identification of potential traffic impacts on road capacity, intersection performance and road safety (including pedestrian and cyclist conflict) and any cumulative impact from surrounding approved developments. measures to mitigate any traffic impacts, including details of any new or upgraded infrastructure to achieve acceptable performance and safety, and the timing, viability and mechanisms of delivery (including 	<ul style="list-style-type: none"> Transport and Accessibility Impact Assessment Draft Construction Traffic Management Plan Draft Green Travel Plan or equivalent

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Build-to-rent housing



Issue and Assessment Requirements	Documentation
<p>proposed arrangements with local councils or government agencies) of any infrastructure improvements in accordance with relevant standards.</p> <ul style="list-style-type: none"> proposals to promote sustainable travel choices for employees, residents, guests and visitors, such as connections into existing walking and cycling networks, minimising car parking provision, encouraging car share and public transport, providing adequate bicycle parking and high quality end-of-trip facilities, and implementing a Green Travel Plan. Provide a draft Construction Traffic Management Plan detailing predicted construction vehicle movements, routes, access and parking arrangements, coordination with other construction occurring in the area, and how impacts on existing traffic, pedestrian and bicycle networks would be managed and mitigated. 	
<p>11. Biodiversity</p> <ul style="list-style-type: none"> Assess any biodiversity impacts associated with the development in accordance with the <i>Biodiversity Conservation Act 2010</i> and the <i>Biodiversity Assessment Method 2020</i>, including the preparation of a Biodiversity Development Assessment Report (BDAR), unless a waiver is granted, or the site is on biodiversity certified land. If the development is on biodiversity certified land, provide information to identify the site (using associated mapping) and demonstrate the proposed development is consistent with the relevant biodiversity measure conferred by the biodiversity certification. 	<ul style="list-style-type: none"> Biodiversity Development Assessment Report or BDAR Waiver
<p>12. Noise and Vibration</p> <ul style="list-style-type: none"> Provide certification from an acoustic engineer that the development could achieve compliance with the relevant NSW Environment Protection Authority (EPA) guidelines. 	<ul style="list-style-type: none"> Noise and Vibration Impact certification
<p>13. Ground and Water Conditions</p> <ul style="list-style-type: none"> Provide an assessment of the potential impacts on soil resources, including related infrastructure and riparian lands on and near the site. Provide an assessment of the potential impacts on surface and groundwater resources (quality and quantity), including related infrastructure, hydrology, aquatic and groundwater dependent ecosystems, drainage lines, downstream assets and watercourses. Provide an assessment of salinity and acid sulfate soil impacts. 	<ul style="list-style-type: none"> Geotechnical Assessment Surface and Groundwater Impact Assessment Salinity Management Plan and/or Acid Sulfate Soils Management Plan

Planning Secretary's Environmental Assessment Requirements

Build-to-rent housing



Issue and Assessment Requirements	Documentation
14. Stormwater and Wastewater <ul style="list-style-type: none"> Provide an Integrated Water Management Plan for the development that: <ul style="list-style-type: none"> Is prepared in consultation with the local council and any other relevant drainage or water authority. details the proposed drainage design for the site including any on-site treatment, reuse and detention facilities, water quality management measures and the nominated discharge points. demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse impacts on any downstream properties. Where drainage infrastructure works are required that would be handed over to the local council, or other drainage or water authority, provide full hydraulic details and detailed plans and specification of proposed works that have been prepared in consultation with, and comply with the relevant standards of, the local council or other drainage or water authority. 	<ul style="list-style-type: none"> Integrated Water Management Plan
15. Flooding Risk <ul style="list-style-type: none"> Identify any flood risk on-site having regard to adopted flood studies, the potential effects of climate change, and any relevant provisions of the <i>NSW Floodplain Development Manual</i>. Assess the impacts of the development, including any changes to flood risk on-site or off-site, and detail design solutions and operational procedures to mitigate flood risk where required. 	<ul style="list-style-type: none"> Flood Risk Assessment
16. Contamination and Remediation <ul style="list-style-type: none"> In accordance with Chapter 4 of SEPP (Resilience and Hazards) 2021, assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable (or will be suitable, after remediation) for the development. 	<ul style="list-style-type: none"> Preliminary Site Investigation
17. Waste Management <ul style="list-style-type: none"> Provide the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements for the site. If buildings are proposed to be demolished or altered, provide a hazardous materials survey. 	<ul style="list-style-type: none"> Hazardous Material Survey
18. Aboriginal Cultural Heritage <ul style="list-style-type: none"> Provide an Aboriginal Cultural Heritage Assessment Report prepared in accordance with relevant guidelines, identifying, describing and assessing any impacts for any Aboriginal cultural heritage values on the site. 	<ul style="list-style-type: none"> Aboriginal Cultural Heritage Assessment Report

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Build-to-rent housing



Issue and Assessment Requirements	Documentation
19. Environmental Heritage <ul style="list-style-type: none"> Provide a Statement of Heritage Impact (SOHI) prepared by a suitably qualified heritage consultant in accordance with the guidelines in the NSW Heritage Manual and the following: <ul style="list-style-type: none"> all heritage items (state and local) within the vicinity of the site including built heritage, landscapes and archaeology, detailed mapping of these items, and assessment of why the items and site(s) are of heritage significance; compliance with the relevant Conservation Management Plan; compliance with the advice and recommendations provided by the Heritage Council Approvals Committee (HCAC) at its meeting on 2 March 2021; the impacts of the proposal on heritage item(s) including a visual impact assessment; the attempts to avoid and/or mitigate the impact on the heritage significance or cultural heritage values of the site and the surrounding heritage items; and justification for any changes impacting on the heritage significance or cultural heritage values of the site and the surrounding heritage items including any options analysis. If the SOHI identifies impact on potential historical and/or maritime archaeology, an historical and/or maritime archaeological assessment should be prepared by a suitably qualified archaeologist in accordance with the guidelines Archaeological Assessment (1996) and Assessing Significance for Historical Archaeological Sites and Relics (2009). Archaeological Assessment (if potential impacts to archaeological resources are identified), prepared in accordance with the relevant guidelines, which assesses any impacts and outlines measures to ensure they are minimised and mitigated. 	<ul style="list-style-type: none"> Statement of Heritage Impact Archaeological Assessment
20. Social Impact <ul style="list-style-type: none"> Provide a Social Impact Assessment (SIA) prepared in accordance with the Social Impact Assessment Guidelines for State Significant Projects. Where possible, the SIA should also discuss the following: <ul style="list-style-type: none"> The physical distribution of the affordable dwellings with the market (BTR) dwellings on the site The distribution and type of common areas with consideration to the social locality Common pedestrian connections Short and long term impacts on the surrounding locality 	<ul style="list-style-type: none"> Social Impact Assessment
21. Infrastructure Requirements and Utilities <ul style="list-style-type: none"> In consultation with relevant service providers: 	<ul style="list-style-type: none"> Infrastructure Delivery, Management and Staging Plan

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Planning Secretary's Environmental Assessment Requirements

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Issue and Assessment Requirements	Documentation
<ul style="list-style-type: none"> ○ assess the Impacts of the development on existing utility Infrastructure and service provider assets surrounding the site. ○ identify any Infrastructure upgrades required on-site and off-site to facilitate the development and any arrangements to ensure that the upgrades will be implemented on time and be maintained. 	
22. Construction, Operation and Staging <ul style="list-style-type: none"> • If staging is proposed, provide details of how construction and operation would be managed and any impacts mitigated. 	<ul style="list-style-type: none"> • Address in EIS
23. Contributions and Public Benefit <ul style="list-style-type: none"> • Address the requirements of any relevant contribution plan(s), planning agreement or EPI requiring a monetary contribution, dedication of land and/or works-in-kind and include details of any proposal for further material public benefit. • Where the development proposes alternative public benefits or a departure from an existing contributions framework, the local council, the Department and relevant State agencies are to be consulted prior to lodgement and details, including how comments have been addressed, are to be provided. • Demonstrate a contribution to public benefit which is commensurate with the scale of the development. 	<ul style="list-style-type: none"> • Address in EIS
24. Engagement <ul style="list-style-type: none"> • Detail engagement undertaken and demonstrate how it was consistent with the <i>Undertaking Engagement Guidelines for State Significant Projects</i>. Detail how issues raised and feedback provided have been considered and responded to in the project. In particular, applicants must consult with: <ul style="list-style-type: none"> ○ the relevant Department assessment team. ○ any relevant local councils. ○ any relevant agencies (including the Western Parkland City Authority for development within the Western Parkland City). ○ the community. ○ If the development would have required an approval or authorisation under another Act but for the application of s 4.41 of the EP&A Act or requires an approval or authorisation under another Act to be applied consistently by s 4.42 of the EP&A Act, the agency relevant to that approval or authorisation. 	<ul style="list-style-type: none"> • Engagement Report

Attachment B

Geotechnical bore-log extracts (Alliance Geotechnical Pty Ltd February 2022)



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BH No: BH01
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Job No: 13091

Borehole Log

Client: 2A Gregory Place Pty Ltd				Started: 19/11/2021					
Project: Proposed Mixed Residential & Commercial Development				Finished: 19/11/2021					
Location: 2A Gregory Place, Harris Park NSW				Borehole Size 110 mm					
Rig Type: Hanlin D&B 8D		Hole Location: Refer Drawing: 13091-GR-1-A		Driller: SZ		Logged: KT			
RL Surface: 4.70m		Contractor: BG Drilling Pty Ltd		Bearing: —		Checked: MS			
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition Consistency Density Index	Additional Observations
ADT						CONCRETE SLAB, 100mm thickness. FILL: Sandy CLAY, low plasticity, dark grey, appears poorly to moderately compacted		M	FILL
		4	1		SP	SAND: medium grained, brown and orange, trace clay	SPT 1, 2, 1 N=3 ASS: 0.5m ASS: 1.0m	M	VL
			2			At 1.5m, becomes wet.	SPT 0, 1, 3 N=4 ASS: 1.5m ES 2.0m	W	
			3		SC	Clayey SAND: medium grained, dark grey and orange brown.	ASS: 2.5m	M	MD
			4			At 3.0m. As above, with fine ironstone gravel.	SPT 5, 5, 8 N=13 ASS: 3.0 ASS: 3.5m ASS: 4.0m		
		0	5		CI	SILTSTONE / SHALE: extremely weathered, recovered as Gravelly CLAY, medium plasticity, dark grey.	SPT 18/100mm HB	MC < PL	VSt H
2 NON-CORED BOREHOLE (NO COORDINATES) 13091 GR 1 GHE 87D AUSTRALIA GDT 19/11/21						Borehole BH01 continued as cored hole			
		1.1	6						
		1.2	7						
		1.3	8						
		1.4	9						
		1.5	10						



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BH No: BH02
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Job No: 13091

Borehole Log

Client: 2A Gregory Place Pty Ltd				Started: 23/11/2021						
Project: Proposed Mixed Residential & Commercial Development				Finished: 23/11/2021						
Location: 2A Gregory Place, Harris Park NSW				Borehole Size: 110 mm						
Rig Type: Christie Engineering (CE180)				Location: Refer Drawing: 13091-GR-1-A		Driller: MW		Logged: DX		
RL Surface: 5.50m				Contractor: BG Drilling Pty Ltd		Bearing: ---		Checked: MS		
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT						CONCRETE SLAB, 150mm thickness.				FILL
		5.5				FILL: Silty SAND, fine to medium grained, pale brown, trace clay, trace fine gravel		M		
			1		SP	Silty SAND: fine to medium grained sand, brown and red mottled yellow, trace clay	SPT 1, 1, 2 N=3 ASS: 0.5m ASS: 1.0m	M	VL	ALLUVIUM
		4	2				SPT 2, 3, 3 N=6 ASS: 1.5m ES 1.5m - 2.5m ASS: 2.0m ASS: 2.5m	M - W	F	
			3		CL-CI	Sandy CLAY: low to medium plasticity, orange mottled yellow, fine to medium grained sand, trace silt				
			4							
			5							
			6		SP	SAND: fine to medium grained, yellow-brown	SPT 2, 1, 3 N=4 ASS: 3.0m ASS: 3.5m	W	VL	
			7							
			8							
			9			At 4.7m: becoming pale grey	SPT 1, 4, 5 N=10 ASS: 4.5m ASS: 5.0m	W	L - MD	
			10				ASS: 5.5m			
			11		CI	SHALE: extremely weathered. Recovered as Gravely CLAY, medium plasticity, dark grey	ASS: 6.0m ASS: 6.5m	MC - PL	H	EXTREMELY WEATHERED SHALE
			12			Borehole BH02 continued as cored hole				
			13							
			14							
			15							

2. NON-CORED BOREHOLE (NO COORDINATE), 13091-GR-1, GHT (STD AUSTRALIA GHT) 16/12/21



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BH No: BH03
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Borehole Log

Client: 2A Gregory Place Pty Ltd				Started: 22/11/2021							
Project: Proposed Mixed Residential & Commercial Development				Finished: 22/11/2021							
Location: 2A Gregory Place, Harris Park NSW				Borehole Size: 110 mm							
Rig Type: Christie Engineering (CE180)				Location: Refer Drawing: 13091-GR-1-A		Driller: MW		Logged: KT			
RL Surface: 5.15m				Contractor: BG Drilling Pty Ltd		Bearing: ---		Checked: MS			
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Content	Consistency	Density Index	Additional Observations
ACTEST	GW Table Encouraged 2.0m during Augering	5.15	0		-	CONCRETE SLAB, 150mm thickness.		-	-	-	FILL
			-		FILL: Sandy GRAVEL, fine to coarse gravel, grey and brown, with fine to medium grained sand, appears well compacted		-	-	-		
			-		FILL: Clayey SAND / Sandy CLAY, low plasticity, dark grey and dark brown, with medium grained sand, trace gravel		-	-	-		
			1		SC	Clayey SAND: fine to medium grained, orange and brown		M	VL	-L	ALLUVIUM
			2		SP	SAND: fine grained, orange and brown, poorly graded	SPT 2, 3, 2 N=5	M	VL	-L	
			2			At 2.0, becoming moist to wet		M	-	W	
			3		SP	SAND: medium grained, brown, poorly graded, trace clay		M	VL	-L	
			3		SC	Clayey SAND: medium grained, grey and brown, poorly graded	SPT 3, 5, 7 N=13 ES at 3.5m	M	-	W	MD
			5		CL-CI	CLAY with silt: grey and brown orange, low to medium plasticity, trace medium grained sand.	SPT 2, 4, 5 N=9	MC	St	PL	RESIDUAL
			6		CI	SHALE: extremely weathered. Recovered as Gravely CLAY, medium plasticity, grey and dark grey.		MV	VSI	PL	EXTREMELY WEATHERED SHALE
Borehole BH-03 continued as cored hole											
			8								
			9								
			10								

Borehole Log

Client: 2A Gregory Place Pty Ltd				Started: 19/11/2021						
Project: Proposed Mixed Residential & Commercial Development				Finished: 22/11/2021						
Location: 2A Gregory Place, Harris Park NSW				Borehole Size: 110 mm						
Rig Type: Hanin D&B 8D		Hole Location: Refer Drawing: 13091-GR-1-A		Driller: SZ		Logged: KT				
RL Surface: 5.00m		Contractor: BG Drilling Pty Ltd		Bearing: ---		Checked: MS				
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Content	Consistency/Density Index	Additional Observations
ACT						CONCRETE SLAB, 200mm thickness.		-	-	FILL
		4	1		-	FILL: Sandy GRAVEL, fine to coarse gravel, well graded, dark grey and pale yellow, with silt. Appears moderately to poorly compacted.	SPT 1, 2, 2 N=4 ASS: 0.5m ASS: 1.0m	M	-	
		3	2		CL	Silty CLAY: low plasticity, yellow and dark grey, with fine grained sand.	SPT 0, 0, 0 N=0 ASS: 1.5m ASS: 2.0m	MC 2 PL	VS	ALLUVIUM
		2	3		CL	Silty CLAY: low plasticity, yellow dark grey, with fine grained sand.	SPT 1, 2, 2 N=4 ASS: 3.0m	MC 2 PL	VS	
		1	4		CL-CI	Silty Sandy CLAY: low to medium plasticity, dark grey orange yellow, fine grained sand.		MC 2 PL	S	
		0	5		SP	Silty SAND, light grey, fine grained.	SPT 2, 1, 1 N=2 ASS & ES: 4.5m ASS: 5.5m	M - W	VL - L	
		-1	6		CI	Silty CLAY, medium plasticity, dark grey pale yellow, trace shale gravel.	SPT 25, Refusal ASS: 6.5m	MC 2 PL	H	RESIDUAL
		-2	7		CI	SHALE: extremely weathered. Recovered as Silty Sandy CLAY, medium plasticity, dark grey pale yellow, trace shale gravel.	SPT Refusal ASS: 7.5m ASS: 8.0m	MC 2 PL	H	EXTREMELY WEATHERED SHALE
		-3	8			Borehole BH04 continued as cored hole				
		-4	9							
		-5	10							

2. NON-CORED BOREHOLE (NO COORDINATE). 13091-GR-1-AHNT 8D AUSTRALIA GDT 19/12/21

Borehole Log

Client: 2A Gregory Place Pty Ltd				Started: 19/11/2021							
Project: Proposed Mixed Residential & Commercial Development				Finished: 19/11/2021							
Location: 2A Gregory Place, Harris Park NSW				Borehole Size 110 mm							
Rig Type: Hanin D&B 8D		Hole Location: Refer Drawing: 13091-GR-1-A		Driller: SZ		Logged: KT					
RL Surface: 5.00m		Contractor: BG Drilling Pty Ltd		Bearing: —		Checked: MS					
Method	Water	RL (m)	Depth (m)	Graphical Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Content	Consolidation	Density Index	Additional Observations
ADT					-	ASPHALT CONCRETE: 50mm thickness FILL: SAND, medium grained, brown and orange, trace fine gravel, appears moderately compacted					FILL
		4	1		CL-CI	Sandy CLAY: low to medium plasticity, grey and brown	SPT 4, 6, 7 N=13 ASS: 0.5m ASS: 1.0m	MC 2 PL	F	St	ALLOVIUM
		3	2			At 2.0, becoming MC >~ PL	SPT 1, 3, 2 N=5 ASS: 1.5m ASS: 2.0m ASS: 2.5m	MC 2 PL	F		
		2	3		CL-CI	Sandy CLAY: low to medium plasticity, grey and orange brown, fine to medium sand, with silt. At 3.5, As above, dark grey and orange-brown.	SPT 2, 2, 2 N=4 ASS: 3.0m ASS 3.5m ASS & ES: 4.0m	MC 2 PL	F		
		1	4				SPT 2, 3, 4 N=7 ASS: 4.5m ASS: 5.0m	MC 2 PL	VSt		RESIDUAL
		0	5		CI	CLAY: medium plasticity, dark grey, with silt, trace fine sand.		MC 2 PL			
		-1	6		CI	SHALE: extremely weathered. Recovered as Gravely CLAY, medium plasticity, grey and brown.	SPT 10, 18, 23/15cm HB	MC 2 PL	H		EXTREMELY WEATHERED SHALE
		-2	7								
		-3	8								
		-4	9								
		-5	10								

2. NON-CORED BOREHOLE (NO CORING) 13091-GR-1-A 8D AUSTRALIA GDT 19/11/21



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Job No: 13091

Borehole Log

Client: 2A Gregory Place Pty Ltd					Started: 19/11/2021		
Project: Proposed Mixed Residential & Commercial Development					Finished: 19/11/2021		
Location: 2A Gregory Place, Harris Park NSW					Borehole Size: 110 mm		
Rig Type: Hanlin D&B 8D		Hole Location: Refer Drawing: 13091-GR-1-A		Driller: SZ		Logged: KT	
RL Surface: 5.00m		Contractor: BG Drilling Pty Ltd		Bearing: —		Checked: MS	

Method	Water	RL (m)	Depth (m)	Graphs Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency Density Index	Additional Observations
ADT		-6	11		CI	SHALE: extremely weathered. Recovered as Gravelly CLAY, medium plasticity, grey and brown. (continued)		MC	H	
		-7	12			Borehole BH05 continued as cored hole				
		-8	13							
		-9	14							
		-10	15							
		-11	16							
		-12	17							
		-13	18							
		-14	19							
		-15	20							

2. NON-CORED BOREHOLE (NO COORDINATE), 13091-GR-1-A, 8D, AUSTRALIA, 19/11/21

