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St Peters Interchange and Local Roads

Heritage Interpretation Plan

Volume Three: Appendices

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Contents

List of figures

Appendix A: Historical Overview

This chapter provides a background to the natural, Aboriginal, colonial and contemporary history and development of the study area and, where relevant, the surrounding area. This history has been prepared to identify places, themes and stories of heritage significance to the study area, and thereby to guide understanding of the heritage significance of the place and the aspects of the study area that require interpretation.[1] This history is not meant to be the definitive history of the St Peters area, but rather an exploration of the aspects of the place's history that can most usefully inform understanding of heritage significance and interpretation in this context.

Environmental History

The Ashfield Shale, exposed in the former brick pit, is a rock unit within the sedimentary sequence that comprises the Sydney Basin. The basin covers 64,000 square kilometres, 36,000 square kilometres of which are onshore in the state of New South Wales with the city of Sydney centrally located within the geographic region of the basin. Another 28,000 square kilometres are offshore under water depths of up to 4,500 metres.[2]

The Sydney Basin is part of a major basin system that extends for over 1,500kms from the Bowen Basin in central Queensland through to the Gunnedah Basin in New South Wales. Basin sedimentation thins out eastwards and thickens westwards. Onshore, the basin contains 4,500 metres thickness of Permian to Triassic clastic sediments, the offshore basin contains 6,000 metres thickness of sediments.[3] The basin overlies the folded and deformed sequences of the Lachlan Fold Belt and suite of Late Carboniferous volcaniclastic sediments.

Despite the preservation of thick, mostly flat lying clastic sequences, a number of structural units are recognised in the Sydney Basin. In the north of the basin are the Hunter Valley Dome Belt, the Blue Mountains Plateau and the Hornsby Plateau. In the south of the basin are the Sassafras, Illawarra and Woranora Plateaus and in the central region is the Cumberland Basin.[4] The St Peters site is on the eastern margin of the Cumberland Basin. The structural margins that define these regions within the Sydney Basin are transitional rather than sharply defined boundaries. For example the Lapstone Monocline represents a change between the relatively uplifted region of the Blue Mountains Plateau and strata to the east and defines the western edge of the Plateau. Much of the Basin landscape is elevated sandstone plateau, with the exceptions being the Hunter Valley and the low-lying Cumberland Plain.

Triassic sediments (including the Ashfield Shale) are the youngest in the Sydney Basin. They were deposited during the Hawkesbury Tectonic Phase. This saw extensive deposition of clastic

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[1] Details related to heritage interpretation are contained in the *Thompson Square Interpretation Strategy* (AAJV October 2016), which provides the high-level framework for interpretation, and the *Thompson Square Interpretation Plan* (AAJV, March 2017 – in development), which provides the detailed interpretive locations and media.

[2] Geoscience Australia website, 2016

[3] Ibid.

[4] Bembrick et al 1980: Fig. 1.1

sediments that formed three major rock units. These are the oldest Narrabeen Group, this is overlain by the Hawkesbury Sandstone which in turn is overlain by the Wianamatta Group.[5] The Hawkesbury Sandstone dominates the landscape within 100 km radius of Sydney. It is a flat-lying Middle Triassic quartz sandstone with an extent of about 20,000 square kilometres and a maximum thickness of 250m. The formation contains numerous thin mudstone intervals. The sandstone has a history of speculation on its origin which goes back to Charles Darwin (1844) and with only a reasonably recent consensus about its origins.[6]

Coastal stream erosion has formed a landscape of deep gorges and remnant plateaus across which an east-west rainfall gradient and soil differences control a vegetation of eucalypt forests, woodlands and heaths (Branagan et al 1976). The Wianamatta Group was the last phase of sedimentation directly related to the tectonic development of the Sydney Basin. Sediments were deposited in a continuous succession of environments grading upwards from subaqueous, to shoreline, and ultimately to alluvial. Therefore, the Wianamatta Group was deposited during a single, major regression. About the middle of the Triassic Period, the basin was uplifted to become dry land, and erosion has occurred from this time to the present. If any younger sediments (Jurassic and Cretaceous) were deposited in the basin after the Wianamata Group they have subsequently been removed by erosion.

Aboriginal History

The Aboriginal people of the Sydney region lived in clans of between thirty to fifty, related by birth and/or marriage. Each group was associated with specific areas of land (country), often taking their name from it. The name of the traditional land owners of the Alexandria area is not clear. The traditional owners of the land that is Sydney, belongs to the Eora Nation. Eora translates to ‘people’ or ‘here, from this place’. Within the Eora Nation, the Cadigal clan stretch from South Head to Long Cove on Parramatta River and took their name from Cadi (the south side of Port Jackson). The Cadigal were a clan of the Darug people and spoke the coastal Eora language. Other clans of the area included the Wangal, the Kameygal and the Bediagal. The Wangal inhabited the area between the Parramatta River and Cooks River from Darling Harbour to Rose Hill. The Kameygal clan lived on the north side of Botany Bay, with land to the south from the Cooks River to the Georges River belonging to the Bedigal.[7]

The coastal Eora peoples of the Sydney region, were renowned for their fishing skills. The freshwater wetlands and sandhills of Waterloo and Alexandria provided a rich supply of natural resources, with the swamps supplying edible roots and tubers, and the shrubland providing small edible succulent fruits. The freshwater swamps, creeks and lagoons were also rich in sources of fish, shellfish, crayfish, yabbies, tortoises, platypus and water rats. The area teemed with water birds—swans, ducks, ibis, egrets, water hens, quail and many more.[8]

[5] Branagan et al 1976
[6] Conaghan & Jones 1975
[7] ‘The Aboriginal Dispora’ by Alex Sharpe in “Histories of Green Square”, p. 41-48.
[8] Ibid.

With the spread of smallpox disease from the first fleet, the Aboriginal groups were decimated. The disposition of people and disease saw the aboriginal population of Sydney dwindle to approximately 300 living in Sydney by 1845.

One notable Kameygal individual, Terribilong has direct associations with the site. He was born sometime in the late 1760s or early 1770s and is first mentioned in the journal of Marine Lieutenant William Dawes in 1791. Ha accompanied a number of European exploratory parties in the early 1790s. Terribilong assisted master shipwright Daniel Paine to select timber along the Hawkesbury and by 1796 was a familiar sight in Sydney. Terribilong returned to his own country before 1798 and in that year was described as servant to Provost Marshal Thomas Smyth whose house was located approximately 180m southeast of St Peters Church, that is, within the later Austral brickpit (see below).[9] By 1805 Terribilong had gained sufficient status within the Aboriginal community to have sufficient authority to be able to bring a series of ritual punishments to an end in January of that year.[10] Terribilong spent much of his time in Sydney during the following years and died near the King's Wharf on the night of 13 June 1826.[11]

Early European History

Lands Grants and Subdivision

Early lands grants in Sydney were made to retired military personnel and the social elites. The area of Tempe was first granted to Thomas Smyth in 1799 and was known as the Bulanaming District or Bulanaming Farm, a 470-acre lot covering the area of what is now St Peters, Sydenham, Tempe, Marrickville, Erskineville, Macdonaldtown and Beaconsfield West. Smyth's grant was the largest landholding in the district and was used for both convict and agricultural purposes.[12]

On 11 August 1804 Smyth assigned the Bulanaming property to Robert Campbell, senior, to secure a payment of £254/12/8.[13] Smyth died shortly after and on 7 March 1805 Thomas Smyth's Bulanaming Farm was placed at auction by his executors.[14] The property was purchased by John Palmer on 10 March 1805, Palmer later conveyed the property to his brother-in-law, Robert Campbell, senior, on 13 December 1808.[15]

Robert Campbell arrived in Australia on the Hunter in April 1798 to expand his company, Campbell & Co's trading interesting. This was a highly successful venture in Australia and afforded Robert Campbell to title 'father of the mercantile community'. Robert Campbell held a prominent, respected and well-established position in colonial society. Campbell held the property intact until the early 1830s. In 1836 Campbell prepared the release of 42 allotments

[9] Willsteed (2006) and McDonald (2012)
[10] Sydney Gazette 13 January 1805 p.2
[11] Sydney Gazette 17 June 1826 p.3
[12] Extent Heritage Pty. Ltd (2017) "28-44 and 82 Campbell Street, St Peters: Historical Archaeological Assessment" prepared for CPB Dragados Samsung Joint Venture;
NSW Office of Environment and Heritage, State Heritage Register listing sheet for *Timber Slab Cottage* #01412.
[13] NSW Lands Department Old System Register Book 1 page 92 entry 482 11 August 1804
[14] *Sydney Gazette and New South Wales Advertiser* 3 March 1805, page 1
[15] *The Sydney Morning Herald* 7 Dec 1937 Page 9

from the former Smyth Estate.[16] The sale was reduced to 30 allotments of which 17 were sold.[17] These were sold as 'villa' estates varying in size from 4 to 12 acres. They were advertised as follows:

> for "Villas"' the sites cannot be excelled, as they are of sufficient magnitude for all purposes required in such establishments, with the advantage of a good Road thereto. Merchants, Professional Gentlemen and Civil Officers would find these Plots highly desirable, as the distance from the heart of the capital can be considered a mere walk.[18]

[16] Plan of 42 allotments of land in the parish of Petersham and county of Cumberland: being a portion of Smith's 470 acre farm, now the property of R. Campbell, Esq., M.C., for sale by auction by Mr. Polack on the 10th March 1837 John Armstrong, Land Surveyor, Dec. 1836.SLNSW Mitchell Map Collection Maps/0137

[17] Sale advertisement: *Sydney Gazette and New South Wales Advertiser* 18 Feb 1837 p.3. Sale results: *Sydney Herald* 13 Mar 1837 p. 5.

[18] *Sydney Gazette and New South Wales Advertiser* 18 Feb 1837 p.3

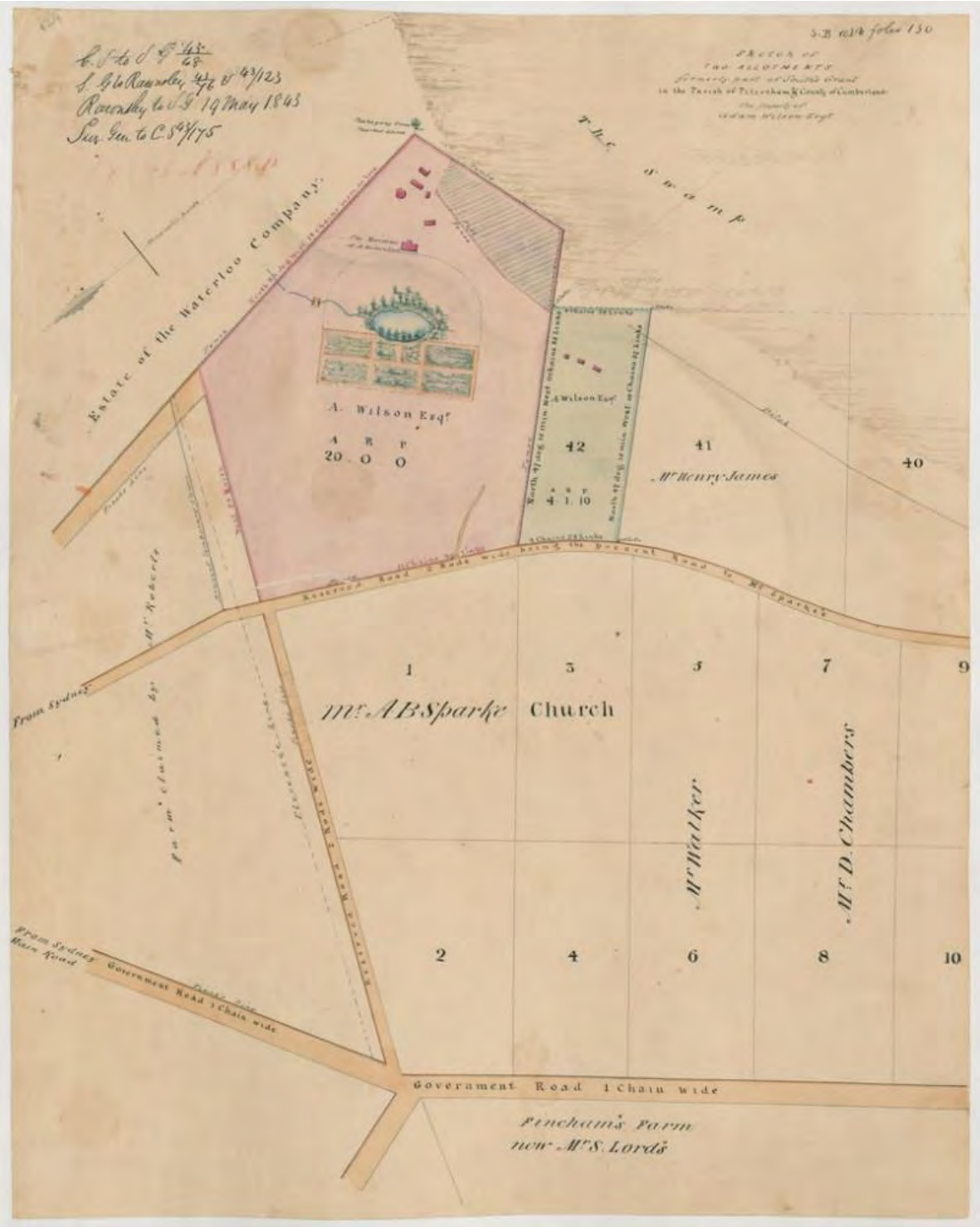

Figure 1. Barwon Park (1843) Sketch of two allotments formerly part of Smith's Grant in the Parish of Petersham & County of Cumberland. The property of Adam Wilson Esqr (Source: State Archives NSW Surveyors Sketch books Sketch book 4 folio 130 NRS13886[X757]_a110_000037).

Village of St Peters

In 1835, Alexander Brodie Spark purchased 63 acres of land to the north of the Cooks River and west of Sheas Creek from Robert Campbell.[19] This land holding became known as the 'Village of St Peters' after a failed subdivision of the land in 1942.

A. B. Spark became a very successful merchant, landowner, churchman and private collector.[20] His prominence in the colony was recognised when he joined the board of the Bank of Australia in 1826 and became managing director in 1832.[21] During this period of success, Spark made the acquaintance of Robert Campbell, another Sydney merchant who served on the board and was involved in conservative groups such as the Library and the Agricultural Society.[22] It was through this acquaintance with Campbell that Spark came to acquire property within this area. Within Spark's early occupation of the site he built Tempe House and continued to farm the land.[23]

Towards the end of 1840, Spark began to experience financial difficulties similar to those of many other merchants in Sydney. During the 1820s, European settlers had bought numerous and extensive parcels of land across the east coast of Australia using generous loans from the National Bank of Australia, believing that their value would increase exponentially. Instead, a drought began in 1838 and financial depression hit in the early 1840s. As land owners across the country attempted to convert their title holdings to cash, the price of land crashed; in some cases, it was valued as worthless. For these reasons, in 1842 Spark sought to subdivide his land holdings, titled 'Village of Tempe'. The subdivision was unsuccessful, however the name remained. The 'Village of St Peters' was repossessed by the Bank of Australia and sold as part of the Banks land lottery in 1849.

The land lottery facilitated the subdivision of the land into smaller residential allotments. The Bank of Australia established the Land Lottery as a means of disposing of the land reprocessed during the 1840s depression. For tickets of five pounds each, buyers could enter the lottery from which lots of land were drawn at random.[24] Eleven thousand, two hundred and forty-eight tickets were issued representing land lots repossessed from almost two thousand insolvencies, in an attempt to reconvert land title holdings into much needed cash after the depression.[25] The value of individual lots was not made known until just before the lottery – sixty-five of the St Peters lots had no value attached.[26]

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[19] NSW OEH. SHR Listing #01412.

[20] Abbott, G. and G. Little (eds) (1976) "The Respectable Sydney Merchant: A.B. Spark of Tempe" Sydney University Press: Sydney, p. 1;

Alexander Brodie Spark. Australian Royalty: a family tree of colonial Australians, their forbears and descendants. Available at http://australianroyalty.net.au/individual.php?pid=I32471&ged=purnellmccord.ged [Last accessed October 2017].

[21] *Spark, Alexander Brodie (1792-1856)*. Australian Dictionary of Biography. Available at http://adb.anu.edu.au/biography/spark-alexander-brodie-2684 [Last accessed October 2017].

[22] Abbott, G. and G. Little (eds). "The Respectable Sydney Merchant: A.B. Spark of Tempe", p. 36.

[23] NSW OEH. SHR Listing #01412.

[24] National Library of Australia, 278367156

[25] Schedule of the lots in the plan of partition of the Bank of Australia: the drawing to commence on Monday, January 1st, 1849. National Library of Australia, 278367156. Abbott, G. and G. Little (eds). 1976.

[26] *The Argus* 23 January 1848 p 2. These lots appear to have formed the eastern extension of the village undertaken in 1843.

The Barwon Park Estate was valued at £1200 with an annual rent of £50 and was won by ticket No. 5370 that had been sold by a 'Mr Craig to John Wanz, a German employed by Mr Mackintosh of Lochinvar' in the Hunter Valley.[27] Even with the lottery of properties, St Peters did not develop to any appreciable extent in the early 1850s. By 1860 the only known buildings within the village, apart from the Church were a scatter of buildings along the western side of Cook's River Road between Campbell Street and the churchyard. In 1855 the population of the district was sufficiently large enough for a Sabbath school associated with St Peters Church to be formed. This was a substantial building constructed on the northwest corner of Victoria Street and Cook's River Road, this would become the temporary St Peters Public School in 1881 until its replacement by the current school buildings in 1886. During the 1850s and early 1860s the population of the village was small possibly due to the absence of places of employment within a short distance of the village.

The development of the village of St Peters accelerated in the late 1860s and early 1870s due primarily to an increase in Sydney's need for bricks. St Peters was adjacent to an area referred to as the 'brickyards', now known as Sydney Park. This area was occupied by a number of small brickwork leases that were exploiting the extensive clay deposits in the region. St Peters was within walking distance of the yards and over the following two decades St Peters would develop as a suburb tied directly to the operation of Sydney's main brickyards. St Peters was proclaimed a municipal district in 1871 and it was estimated that there were approximately 3500 residents and 1088 houses within the borough.[28] By the late 1890s these figures had risen to approximately 1200 houses and 5600 residents.[29]

[27] *South Australian* 30 January 1849 p. 2
[28] *Australian Town and Country Journal* 2 August 1899, page 35 (2)
[29] *Australian Town and Country Journal* 2 August 1899, page 35 (7)

Figure 2. Steeple chase Barwon Park 1854 (Source: NLA pic-an 8021489)

Figure 3. Barwon Park Dairy (Source: Marrickville Library RH Postcard18_A)

Figure 4. Map of the country around Sydney, 1881 from Reconnaissance by Lieut. Parrott, Volr. Engineers (Published 1882) (Source: NLA MAP RM 903).

Terracing St Peters

For many years, St Peters was considered distant enough from Sydney to deter ordinary workmen and their families settling in the district. That situation prevailed until the 1840s when large estates were sold off and subdivided into smaller allotments. By the 1870s the growth of industry in St Peters, particularly the brickworks, encouraged the subdivision of large estates. The industries attracted a working-class population. By the early 20th century the large homes had been demolished and replaced with industry and the associated working-class residential terrace housing.

The development of St Peters accelerated in the late 1860s and early 1870s due primarily to an increase in Sydney's need for bricks. St Peters was adjacent to an area referred to as the 'brickyards', now known as Sydney Park. This area was occupied by several small brickwork leases that were exploiting the extensive clay deposits in the region. Over the following two decades St Peters would develop as a suburb tied directly to the operation of Sydney's main brickyards.

Several Campbell Street residences were constructed from local bricks and occupied by brick makers. The established 'Bradfield Terraces' at 28-44 Campbell Street are one such example. The Bradfield Terraces were a group of nine, two-storey residences constructed by the local brick maker Henry Woodley. Woodley constructed the first two buildings at 34 and 36 Campbell Street in 1882 and occupied by 1884. The two additional residences, 38 and 40 Campbell Street

were added soon after and occupied by 1885.[30] In 1906 Woodley completed the row of residences with the construction of 28, 30 and 32 Campbell Street and 42 and 44 Campbell Street.

82 Campbell Street was another example of workers cottages present along Campbell Street. The dwelling formed the westernmost structure in a group of three conjoined cottages; 78 on the corner of Church and Campbell Streets, 80 and 82 Campbell Street. Although 80 and 82 Campbell Street appeared to form two sections of a duplex the cottages were of different sizes. 82 Campbell Street was the larger cottage and 80 may have been infill between 78 and 82. The style of construction, dimensions and layout suggest that all three structures were built within a few years of each other. The precise date of construction is unknown although it is likely to post-date 1857 and was probably one of several worker's cottages constructed within the St Peters district in the mid-1860s or early 1870s. Occupants of the three houses between the 1880s and 1920s followed a number of professions that were not necessarily tied to the brickyards. The length of occupancy was often short, although many of the occupants remained within the district at different addresses over long periods of time.

During the latter half of the 19th and early 20th centuries, the properties were occupied by workers associated with a number of trades reflecting the diversification of businesses and industries in St Peters. Although the cottages may have been constructed to house workers at the near-by brickyards they may have housed people from a variety of occupations. The improved transport connections following the completion of the tramline connecting St Peters with the City also provided access to employment outside the local industries.

[30] Sands Sydney Directory 1882 to 1886

Cook's River Road, St. Peters, before widening and reconstruction (Prince's Highway).

Figure 5. Cooks River Road (now Princes Highway) in St Peters showing former buildings and tramway, circa 1925, view from Campbell Street looking south (Source: Main Roads Board of NSW First Annual Report 1925-26 p.9).

Figure 6. Cooks River Road (now Princes Highway) in St Peters, looking south from Campbell Street towards the Austral Yard (Source: SLNSW, Digital Order Number d1 21470).

Figure 7. Measured drawing of 28-44 Campbell Street, St Peters (Source: Peter Scotton, The Archivist Pty Ltd, 2016).

Industrial Development of St Peters

General Overview

The industrial development of St Peters distinctly altered the urban and social fabric of St Peters. With the influx of industry and the intensified subdivision of the St Peters and Tempe area, what had once been a primarily agricultural landscape with large country estates, now presented a light industrial area. The landscape of St Peters from the 1830s was a chequered scene of gardens, grazing cattle and cultivated farms competing with chimneystacks of brick pits, the excavation of quarries and the pungent smell of tanneries.[31]

The construction of Sheas Creek and Alexander Canal paired with the discovery of suitable clays for brickmaking meant the area was a magnet for industry. The accessibility to water and distance from the city fuelled the industrial development of noxious trades. The industrial development of St Peters and Tempe area was further facilitated by the demand for expanding industries, the improved transport and environmental regulations.

This inevitably saw the social status and desirability of St Peters and Tempe shift. The area now catered to light industry and housed the associated working class. Large estates were subdivided, and grand houses were demolished to make way for Brick pits and manufacturing.[32]

Brickworks

Brickmaking was a substantial industrial activity in Sydney that transitioned from a relatively small-scale industry in the 1840s to a sophisticated and highly capitalised enterprise in the 1880s. This was spurred on by the use of steam machinery to better manufacturing techniques. This enabled the rapid production of bricks to meet the growing market demand.

Bricks made in St Peters and Tempe were distinguished by their reddish-brown colour, from clays that formed part of the geological band referred to as Ashfield Shale. Ashfield Shale is part of the Wianamatta shales group. It was laborious work extracting the dense clays and harden shales that had to then be crushed and ground into dirt before they can be pressed into bricks. To speed up the process required a heavy investment in plant and machinery, which had grave implications for family operations well before the end of the nineteenth century.[33]

The innovation of steam powered machinery introduced new ways of mass-producing bricks through a refined crushing, mixing and moulding process. Frederick Goodsell is considered to be one of the pioneer producers of shale plastic bricks in 1871. The processes introduced to the Goodsell's Newtown brickyard, meant they were able produce 15,000 bricks a day, compared to an output of 1250 a day by earlier methods.[34]

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[31] Ron Ringer, *The Brickmasters: 1799*-2008, (Dry Press Publishing Pty Ltd: Australia, 2008) 34
[32] Chrys Meader and Richard Cashman, *Marrickville: Rural Outpost to Inner City*, (Hale & Iremonger: Petersham, 1990) 148
[33] Ron Ringer, "Bricks", *Dictionary of Sydney* (2008)
[34] Ron Ringer, *The Brickmasters: 1799*-2008, 49. Also see; Chrys Meader and Richard Cashman, *Marrickville: Rural Outpost to Inner City*, 149.

Brickmaking was important local industry with various individual companies operating in the St Peters area, however, by the end of the 19th century ownership gradually concentrated into the hands of relatively few companies. This was spurred by short term fluctuations in the trade cycle and catastrophic depressions (1840, 1890s and 1930s).[35] One of the largest brickmaking enterprises in St Peters was Austral Brick Company, which took over Josiah Gentle's Bedford Brickworks in the 1930s. A descendant of Josiah Gentle remembers many brickworks growing up in St Peters, stating there was Austral, Spears, Charlesworths, Lynchs, Sydney and Bedford.[36]

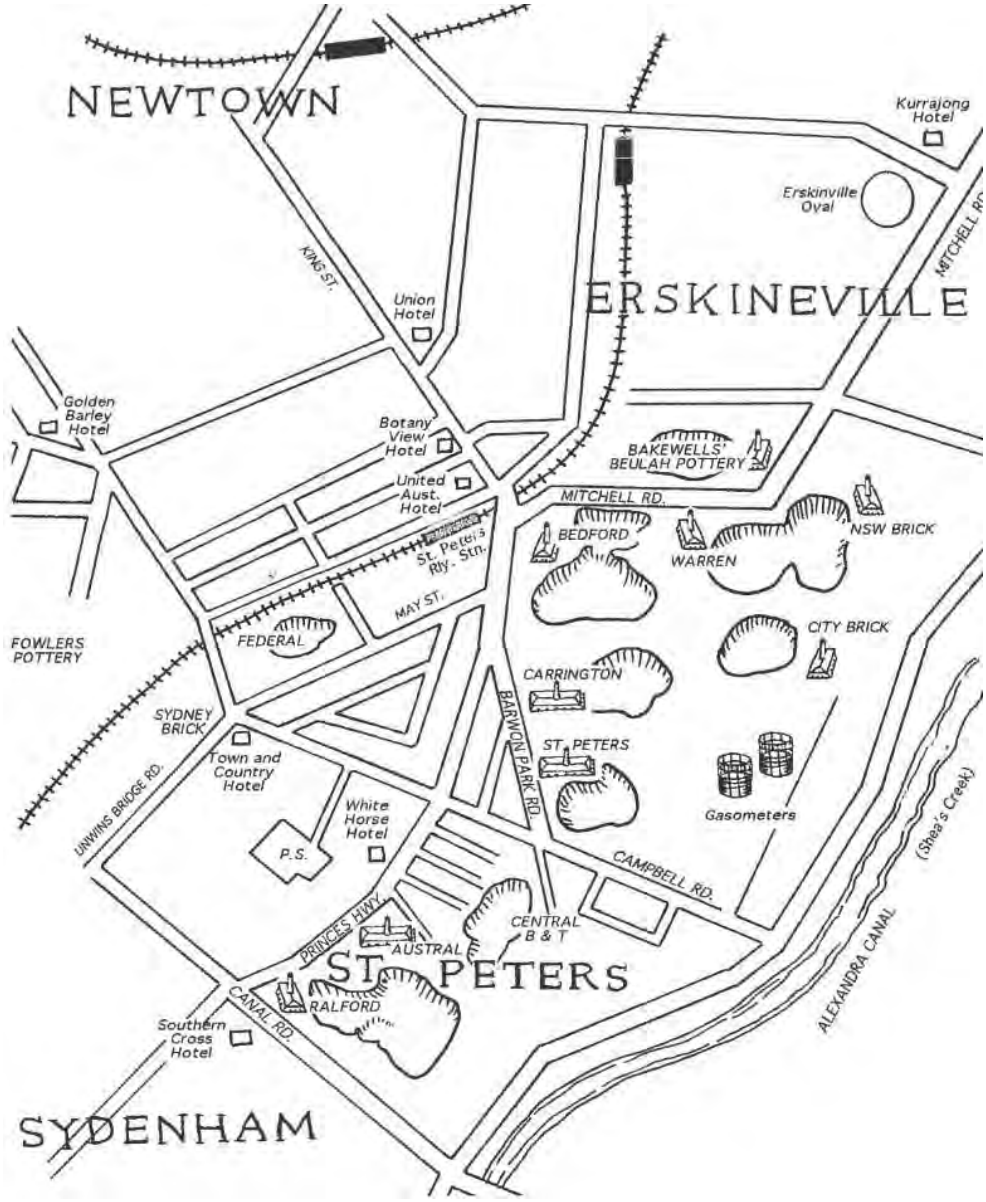

Figure 8. Brickyards and hotels in the district of St Peters, circa 1945. (Source: Ron Ringer (2008) "The Brickmasters 1788-2008", Dry Press Publishing, p. 252)

[35] Ron Ringer, "Bricks", *Dictionary of Sydney* (2008)
[36] Chrys Meader and Richard Cashman, *Marrickville: Rural Outpost to Inner City*,150

Figure 9. 1943 aerial view of the St Peters area showing several brickworks across the St Peters Interchange site, Sydney Park and Camdenville Oval (Source: LPI SIX Maps).

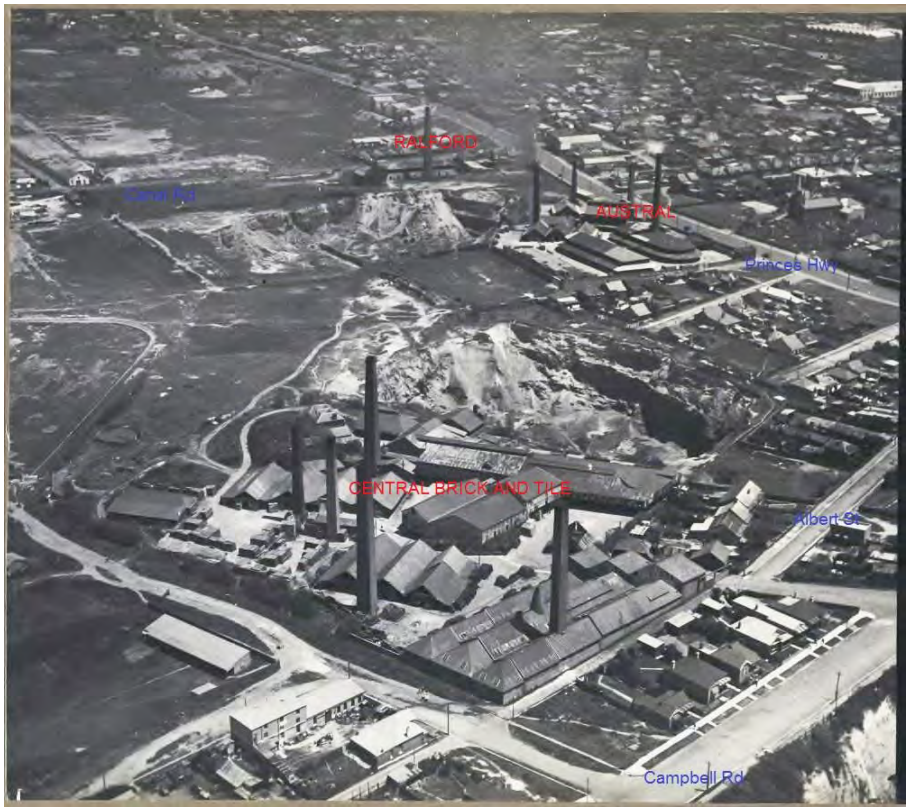

Figure 10. View looking south west across the St Peters Interchange site showing Central Brick and Tile Co in the foreground, and the Austral and Ralford yards in the background. Photograph taken in 1929 (Source: National Library of Australia, ID 142183880-1).

Figure 11. Aerial view of brickpits, taken in 1984 (Source: Land and Property Information).

Austral Brick Company Limited: 1908-1984

Austral Brick Company was incorporated on the 25th September 1908 with a starting capital of £20,000. Although few records exist to properly document the first years of the company, it appears to have been comprised of members from the building and real estate industries whom saw an opportunity for speculative investment in a growing industry. The first few driving members tied to Austral Bricks, appear to be the first managing director, Edwin 'Ted' Specman, real estate owner Ernest Alfred Turtle, company secretary W.C. Turland and his immediate predecessor A. Grant.[37]

In December 1908, the investing members of Austral Bricks purchased the adjoining properties of Petersleigh and Finningham located on 238 and 196 King Street. Both properties covered a modest area of approximately 16 acres and consisted of what was said to be good clay and shale. In that same month, the company sent a letter to council declaring their intention to construct a brick plant and brick pit on the site.

[37] Ron Ringer, *The Brickmasters: 1799*-2008, 106-108.

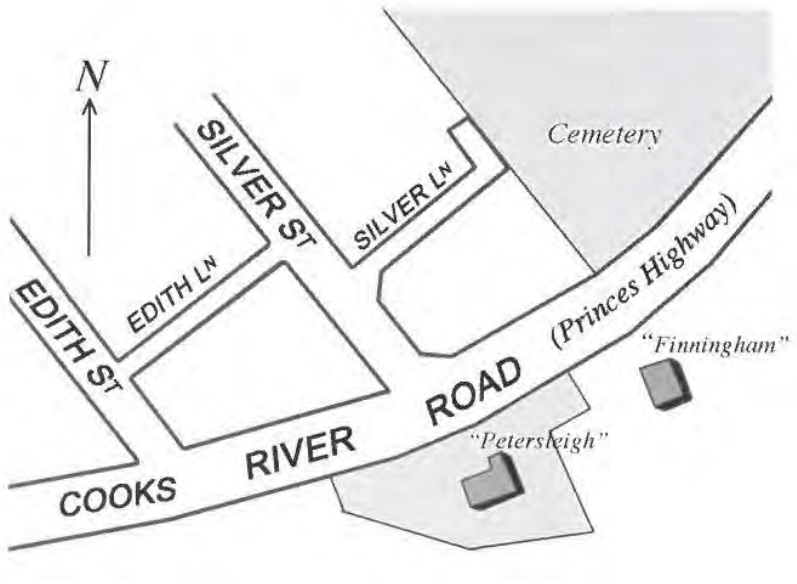

Figure 12. Location of Petersleigh and Finningham in relation to Cook's River Road. No photographs survive of either of these two mid-Victorian buildings (Source: Ron Ringer (2008) "The Brickmasters 1788-2008", Dry Press Publishing, p.109).

The following year (1909) saw a flurry of activity for the Austral Brick Company, with kilns, chimneys and sheds being constructed while pit boundaries were drawn and blasted. Machinery for the project was sourced both locally and abroad from England, circumscribed by availability and cost. By late 1909, the plant was in production making good quality dry press bricks from clays and crushed hard shales.

The Austral Brick Company Ltd was one of a number of small brick making companies established during a busy 15-year window from 1900 to 1915. These companies were all buoyed by a general economic upturn due to population growth, post-federation optimism and excitement over the newly emerging ideas in urban design. In spite of archaic supply practices and a brief demand slump caused by drought, many of these middling companies were able to operate successfully in the semi-ruralised landscapes of what are currently the inner-western suburbs. The physical impact and labour-intensive nature of the brick manufacturing industry came to underwrite the physical and social make up of St Peter's and Alexandria during the course of the late nineteenth to the mid twentieth century.

In 1912, shrewd real estate decisions by the company made possible the purchasing of another parcel of land measuring 821 by 200 feet along Canal Road, enlarging the size of the Austral Brick Pit. In the preceding year of 1913, the original investors of the Austral Brick Company Ltd set up a new company under the same title and bought out its predecessor. The result was a healthy increase in the company's start-up capital, improving it from £20 000 to £100 000 just 5 years later. This placed Austral brickworks among the more profitable pits in the area despite competition from the larger Bedford Brick Works.

The immediate post First World War period saw the Austral Brick Company manage long term growth by dedicating a substantial amount of time and money to attracting a number of young builders and technical professionals. Furthermore, throughout the 1920s, under Chief Engineer

Bob Young, the company followed a pattern of forward-thinking management by modernising its equipment away from steam technologies and towards electricity and diesel powered machines. However, by as early as 1927, post war growth had created such a demand that afforded Austral Bricks the opportunity to purchase three more parcels of land on King Street and expand their clay and shale holdings in the area.

The parcels of land acquired by the Austral Brick Company during its growth periods from 1908 through to 1927 constituted the land clay and shale holdings bounded by the Austral yards and the Ralford yards. Operating strictly as a subsidiary of The Austral Brick Company and never as an incorporated site, the Ralford yards were a small brickwork comprised of 1 patent kiln and under Austral continued to work until 1961. Throughout the 1930s, as the clays and shales at greater depth began to get harder to excavate, new machinery was installed at the Austral Brick yard ensuring several more decades of production.

During the 1930s depression the Austral Brick Company pursued an aggressive price cutting strategy under the management of William King Dawes, driving many manufacturers to either sell or file for bankruptcy. Seizing the opportunity, Dawes purchased the preeminent Bedford Brick Works and over the next few decades would come to incorporate the Warren Brick Company, the Carrington Brick Company, St Peters Brick Company and the City Brick Company. As a result of these other holdings, by the 50s emphasis shifted away from the Austral brick pit itself until it eventually became defunct. In 1984 the last brick manufacturer in St Peters was at the Bedford Brick Yard.

Upon the closure of the Austral Brick Pit, the area was used as a dumping site for landfill.

Figure 13. Advertisement for Austral Brick Co (Source: Ron Ringer (2008) “The Brickmasters 1788-2008”, Dry Press Publishing, p.)

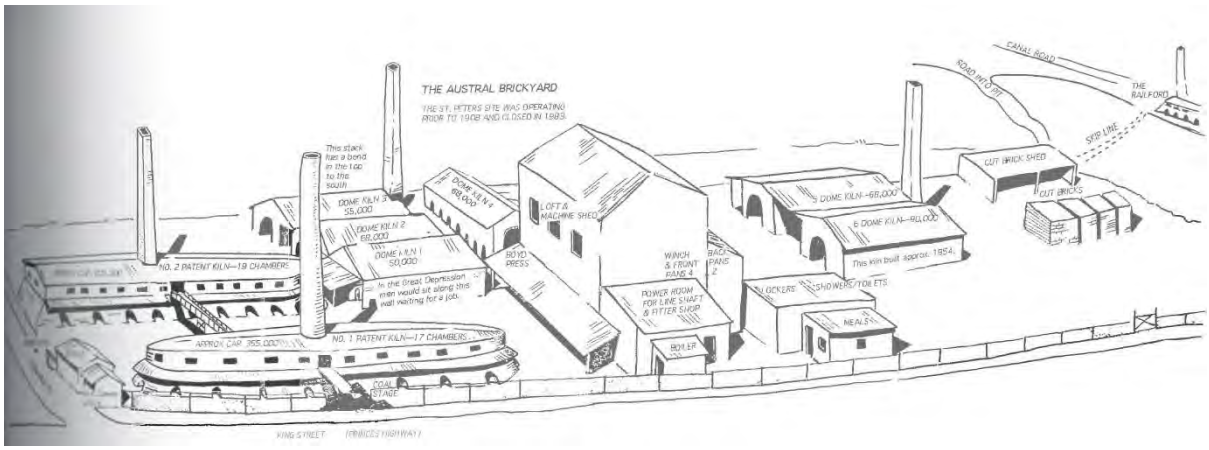

Figure 14. Illustration of Austral Brick Co by David Dickson (Source: Ron Ringer (2008) "The Brickmasters 1788-2008", Dry Press Publishing, p.235).

Central Brick & Tile Company

Central Brick & Tile Company was situated within the old Barwon Park Estate, neighbouring the Austral Brickpits - now Sydney Park. Central Brick & Tile Company was the only company in the immediate pre-war period in 1913 to make an appearance in the industry. The company was one Austral's larger competitors who not only manufactured commons and face brick, they made pipes, tiles, marble wash stands and other pottery items. They were claimed to be of the highest quality.[38]

During the 1920s, Central Brick & Tile co. supplied brick to councils such as Marrickville who had engaged in programmes of paving footpaths and roads with bricks. These works were extended to provide relief for unemployed men during the 1930s depression, which Central Brick & Tile co. continued to supply the bulk of bricks for. Some of these paved areas can still be seen in some streets in Enmore and Tempe.[39]

A call for all brick manufactures in Sydney to vote on the proposal to establish a management committee called the Brick Committee was made in 1932. The formation of this committee was established to conduct all matters in a similar way to that of a director of a company; such as appoint a secretary, fix up bank accounts and other matters. Under this scheme yards that had closed would receive an income through their affiliation with the association. Although the proposal was accepted, Central Brick & Tile Co. remained outside the Brick Committee.

The Central remained a strong contender in the brickmaking industry until 1951, when a detrimental fire destroyed the site. Six fire brigades fought the blaze that destroyed the sheds, tile machinery, brick machinery and drying racks of the patent kiln. According to The Clay Products Journal of Australia (1951) 12% of the Sydney Metropolitan output of terracotta tiles was lost due to the fire. The fire signalled the end of a career that stretched back to 1913. Production seems to have ceased in 1965.[40]

[38] Ron Ringer, *The Brickmasters: 1799*-2008, 252
[39] Ron Ringer, *The Brickmasters: 1799*-2008, 153.
[40] Ron Ringer, *The Brickmasters: 1799*-2008, 252.

Figure 15. Central Brick and Tile Co., c.1929 (Source: Ron Ringer (2008) "The Brickmasters 1788-2008", Dry Press Publishing, p.154).

Alexandra Canal

The Alexandra Canal is an artificial waterway that follows the tributary off Cooks River known as Shea's Creek. The landscape surrounding Shea's Creek was progressively and extensively altered by European settlement. This intensified at the turn of the century with the industrial development of Alexandria. The move for industries to develop on land either side of Shea's Creek and Cooks River was in part facilitated by the Slaughter House Act of 1848, that required all noxious trades to operate more than one mile outside the city area. The particularly noxious trades established in Alexandria included wool washing, tanneries, boiling down works and market gardens which were drawn to the area for the accessibility of water.

Dredging for the construction of the canal began in 1887, with the government seeking to encourage industrial development by creating better shipping opportunities through a wider and deeper water course with wharves and embankments, providing better commercial access upstream. Furthermore, the proximity to the creek enabled local trades to extract water for industrial purposes and service dairy farms, brickworks, quarries, factories and residential properties nearby. The construction of the canal attracted industry to nearby land, with the use of stormwater channels to remove excess water converting land into sites suitable for industrial use. As a result of the industrial wastes and by-products disposed into the Creek, amongst the sewage and storm water run offs, the Shea's Creek and Cooks River water suffered severe degradation and contamination.

To alleviate the severe public health problems associated with the contamination of Alexandra Canal, the government proposed the construction of various stormwater channels along the

natural waterways of Sheas Creek.[41] Construction of these channels begun in 1896 and was completed in stages by 1906. The Macdonaldtown stormwater drain is one branch constructed during this time, that extended west from Alexandra Canal to the present Sydney Park Road (a continuation of Huntley Street), was completed in 1904.

The use of the canal as a commercial shipping route declined with the advent of commercial road and railway transport in the 1930's, and the wharves were eventually demolished in the 1940's. Further alterations to the canal were expressed at the junction of Cooks River during the airports three phases of expansion between 1940's and 1970's.

Figure 16. 1984 view of abandoned Wool Sheds along Alexandra Canal. (Source: Graeme Andrews 'Working Harbour' Collection: 80134. GKA. City of Sydney Archives, file no. 080/080134)

Prior to the construction of the canal, Shea's creek wound from Surry Hills, through swampy lands to reach the Cooks River one kilometre from the entrance at Botany Bay. The canal was built to reflect the original path of the creek, however where the creek meanders in the northern section, the canal provided a clear direct path with subtle curves. Early construction of the canal included sandstone walling with stone ballast at the footing, with the upper reaches featuring sandstone ashlar masonry.

Progressively throughout 1890 the canal was extended and excavated, so that by 1900, the canal was predominately complete. The main work conducted between 1900 and 1947 involved the dredging of silt built up, caused the canal to become shallow and narrow. During this time

[41] "Macdonaldtown Stormwater Channel", Volume 2: Inventory Forms for recommended Heritage Listings, Prepared by City of Sydney. (Undated) http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0020/250292/Study-Volume-2A-inventories.pdf

two new wharves were built and the timber 1897 Rickety Street Bridge was rebuilt. In 1937 this bridge was replaced with reinforced concrete and by 1911 there were four wharves.

In 1922 the Sydenham to Botany railway line crossed the canal with the first ever constructed lifting span railway bridge in Australia. The construction of this type of bridge suggests the use of the canal was intended to continue, despite the increased use of rail and road to transport commercial goods. However, by the 1950's Alexandra Canal ceased to operate as a viable commercial transport corridor.

Later alterations to the southern reaches of the Canal have been rebuilt in a variety of 20th century materials including concrete block, shotcrete over rubble and fabricon, dating to the airports expansion between 1947 and 1970. The canal now only operates as a stormwater channel.

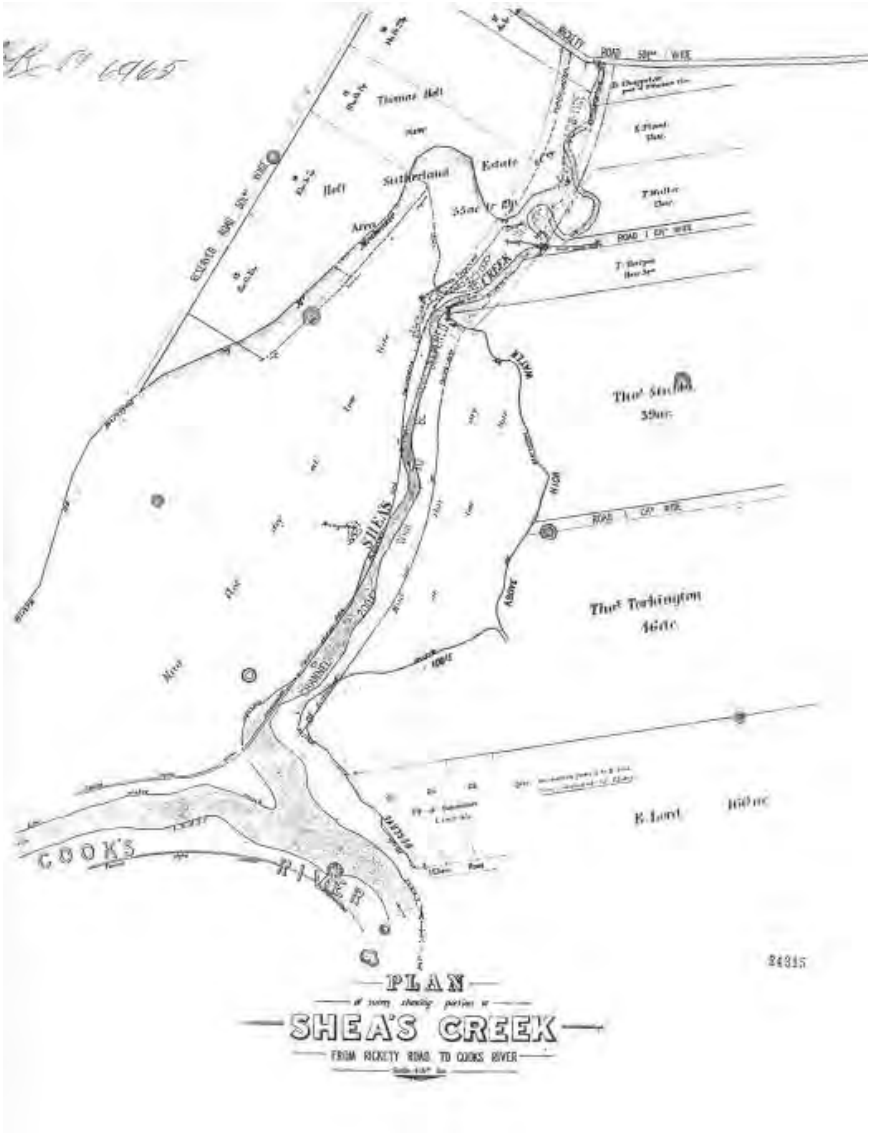

Figure 17. An undated plan of the Alexandra Canal by 1889 showing the Canal and fascine dyke up to Ricketty Street completed and construction beyond Ricketty Street has commenced.

Figure 18. View of Lifting Span Railway Bridge across Alexandra Canal. (Source: 'H.C Sleigh's Shea's Creek Depot, Alexandria', State Library of NSW, call no.20943)

Rudders Bond Store

Site and Building Development

The former Symonds Warehouse was located at 53-57 Campbell Road, St Peters. Various histories of the site provide a conflicting timeline of events. Given the conflicting accounts found in the documentation, this history primarily relies on aerial photographs and historic maps and plans to present a history of site development.

It is presumed that Ralph Symonds acquired the site at some stage in the early 1940s. A 1943 aerial photograph (Figure 15) shows a large rectangular building on the site fronting Campbell Street, perpendicular to Euston Road. The building looks to have an arched roof and appears to be an igloo style of building and records indicate in may have been used for aircraft works. There is evidence of arched timber in the yard to the west indicating Symonds may have had a presence here at this time.

By 1949 this building has been demolished and a new factory along Holland Street constructed (Figure 16). This is also shown in a plan dated 1950 (Figure 17). Reportedly this first section was built c1946 at which point the Symonds factory is believed to have begun operating at the site. A fire also occurred here in 1946. A 1951 aerial photograph (Figure 18) shows the Holland Street pavilion extended to near the juncture with Woodley Street.

A plan dating c1953 (Figure 19) shows the Holland Street building along with another pavilion added fronting Campbell Street, the establishment of which is shown in building surveyors plans dated 1956 (Figure 20). The full building at its largest extent and as it stood for approximately 40 years is shown in a 1970s aerial photograph (Figure 22). This is the layout of the building as it was documented in 1994 (Figure 23), however at some stage since then the original c1946 section at the west end of Holland Street has been removed, leaving the c1953 sections of the structure.

Shortly after construction was completed, the council granted permission for the premises to be used for general storage by Rudders with the property being leased to them by Symonds.[42]

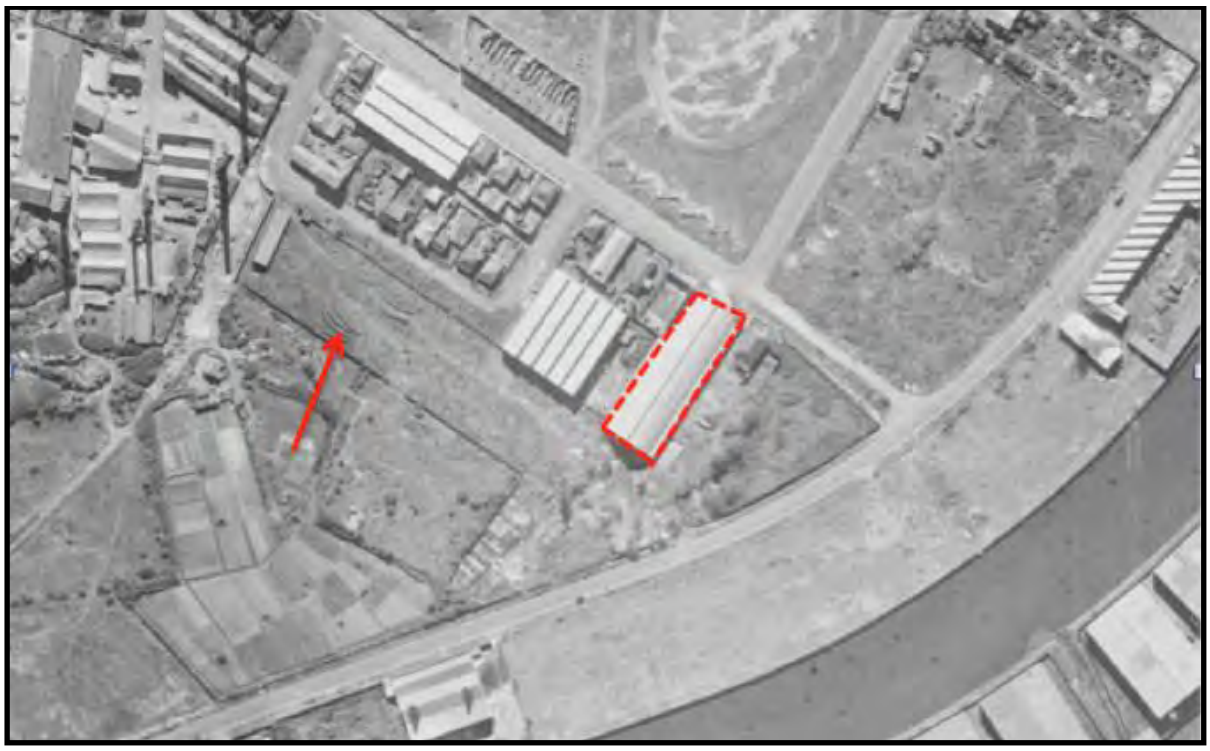

Figure 19. 1943 aerial of the subject site showing building fronting Campbell Street (red outline) and arch timber in yard (red arrow) (Source: SIX Maps, NSW Land and Property Information).

[42] AECOM Australia Pty Ltd (November 2015) *WestConnex New M5 Environmental Impact Statement*

Figure 20. 1949 aerial photograph of the subject site. Former Campbell Street building is no longer extant (green oval). New building can be seen on Holland Street (red outline) (Source: Sydney Historical Atlas).

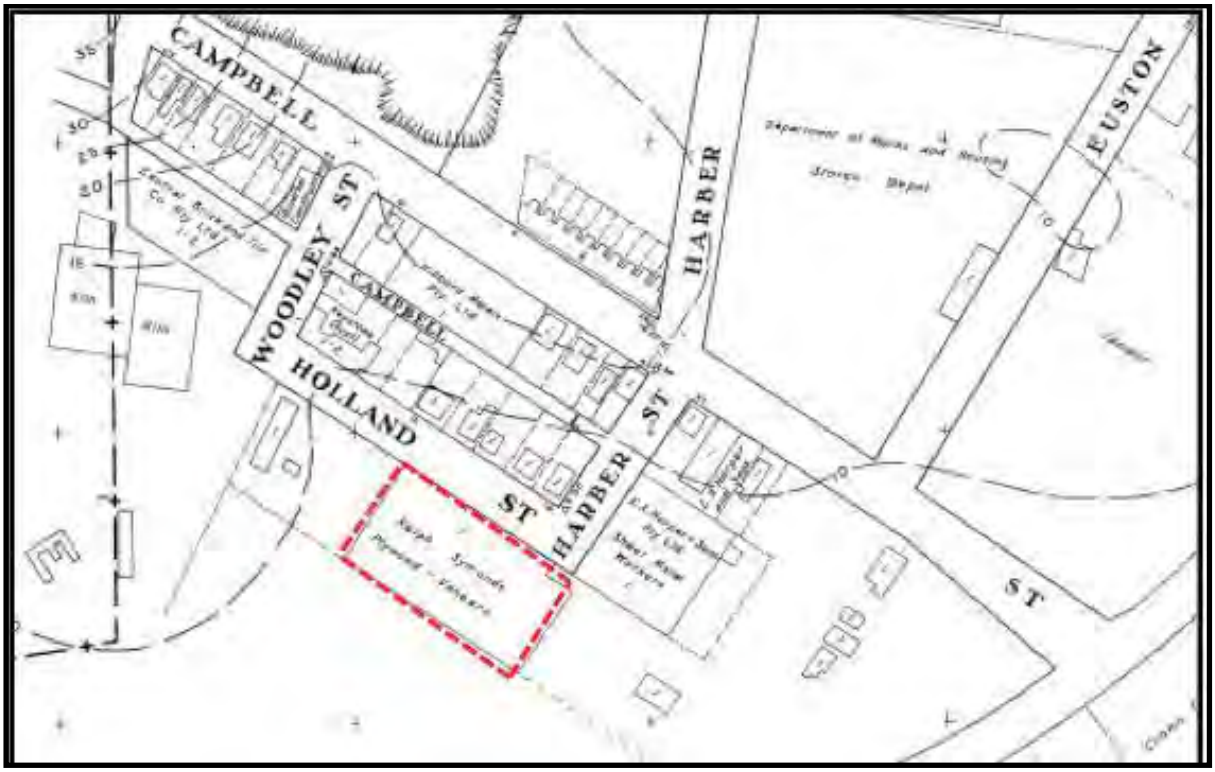

Figure 21. Excerpt of Civic Survey, c1950 – Alexandria West (Source: City of Sydney Archive). Ralph Symonds Factory highlighted (red outline).

Figure 22. 1951 aerial photograph of the subject site. Holland Street pavilion has reached its extent (red outline) and Campbell Street site is still vacant (green oval).

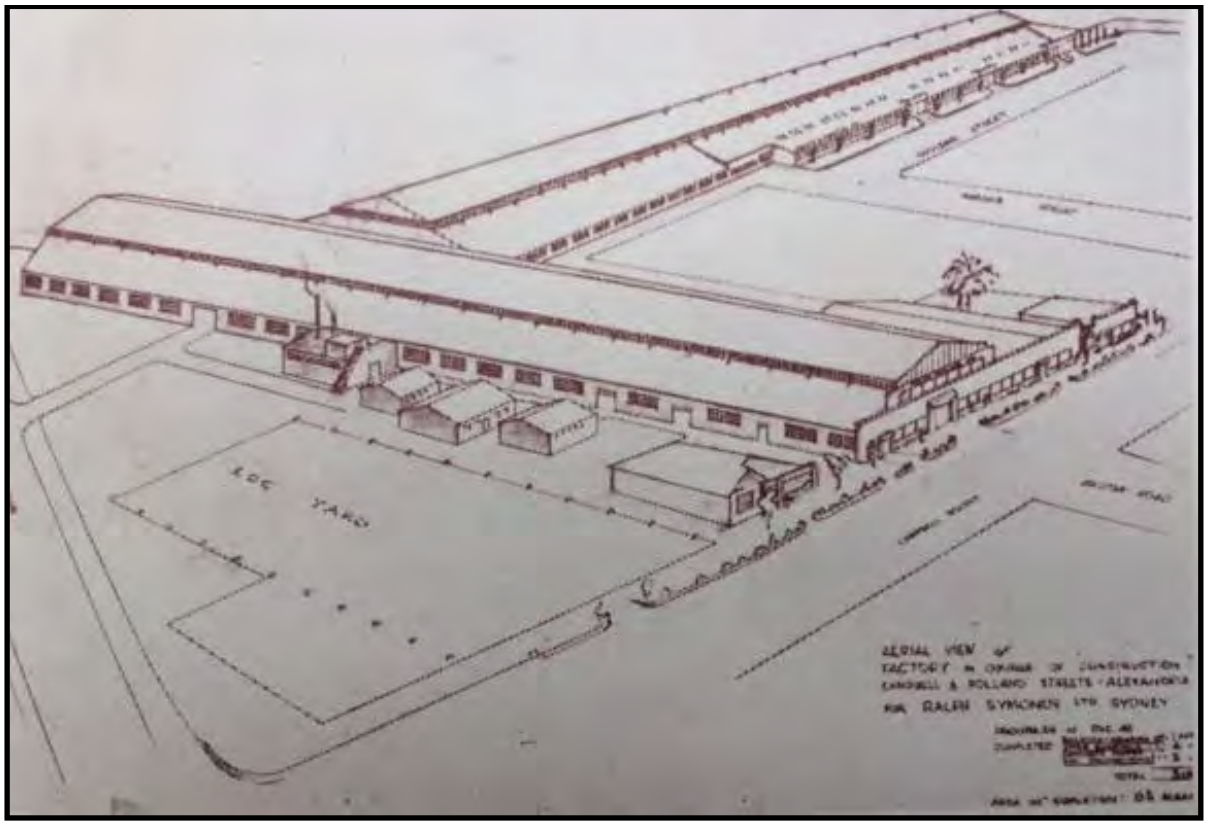

Figure 23. 'Aerial view of factory in course of construction, Campbell & Holland Streets – Alexandria for Ralph Symonds Ltd, Sydney' c1953. (Source: NSW State Library).

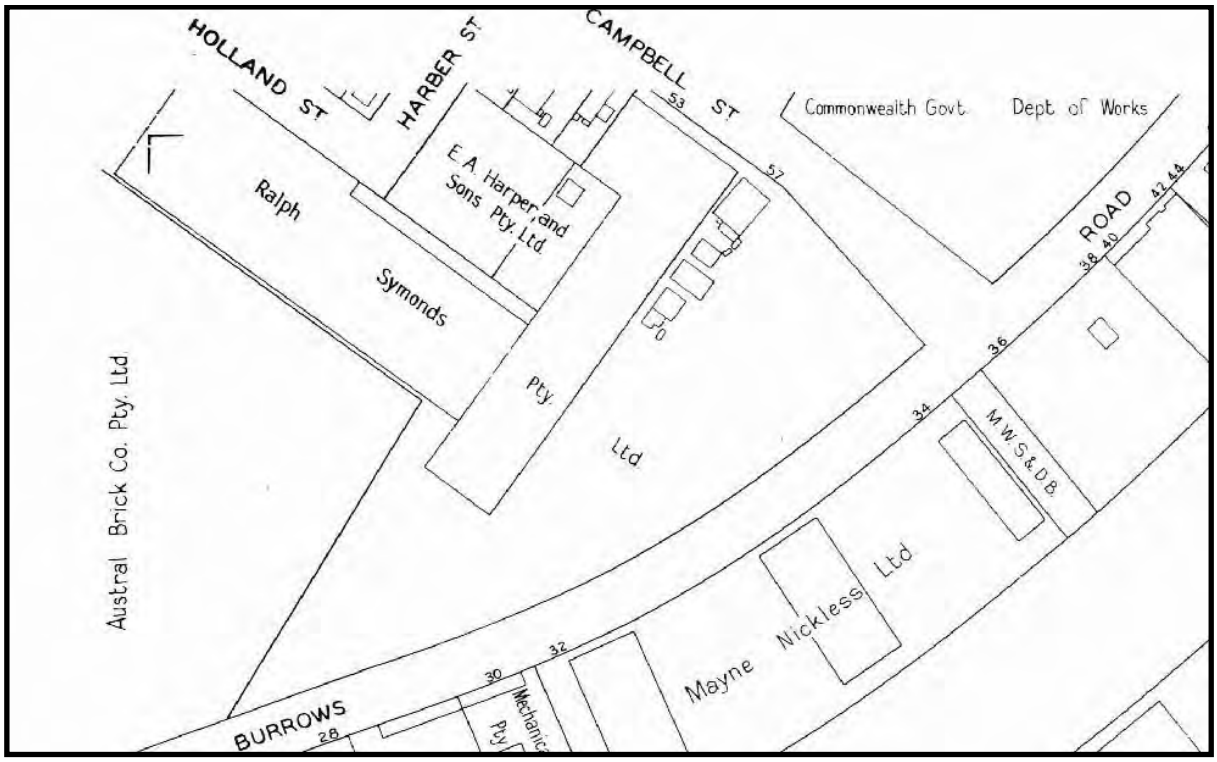

Figure 24. City Building Surveyors Detail Sheets, c1956, Sheet 26. Shows Ralph Symonds Pty Ltd with building fronting both Holland and Campbell Streets (Source: City of Sydney Council Historic Maps).

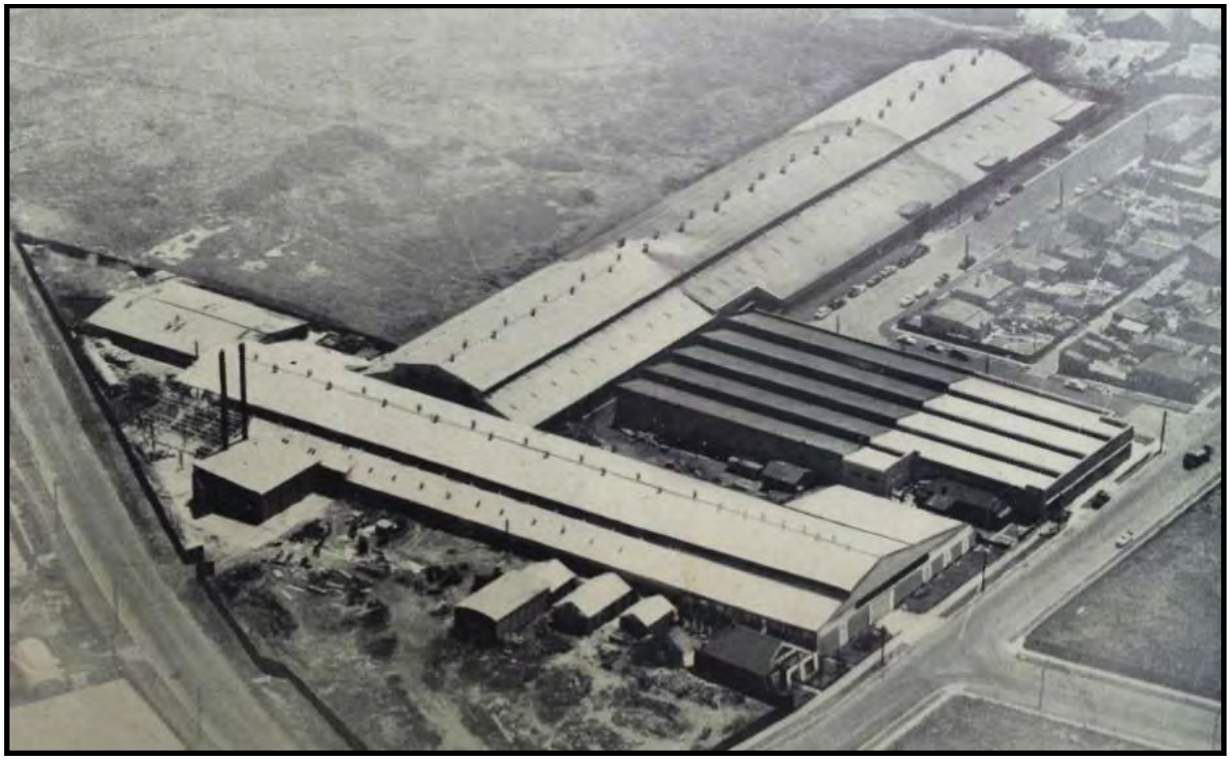

Figure 25. Undated photograph of Symonds St Peters factory (now Rudders Bond Store), showing full structure as per 1950s layout (Source: Ralph Symonds promotional material, NSW State Library).

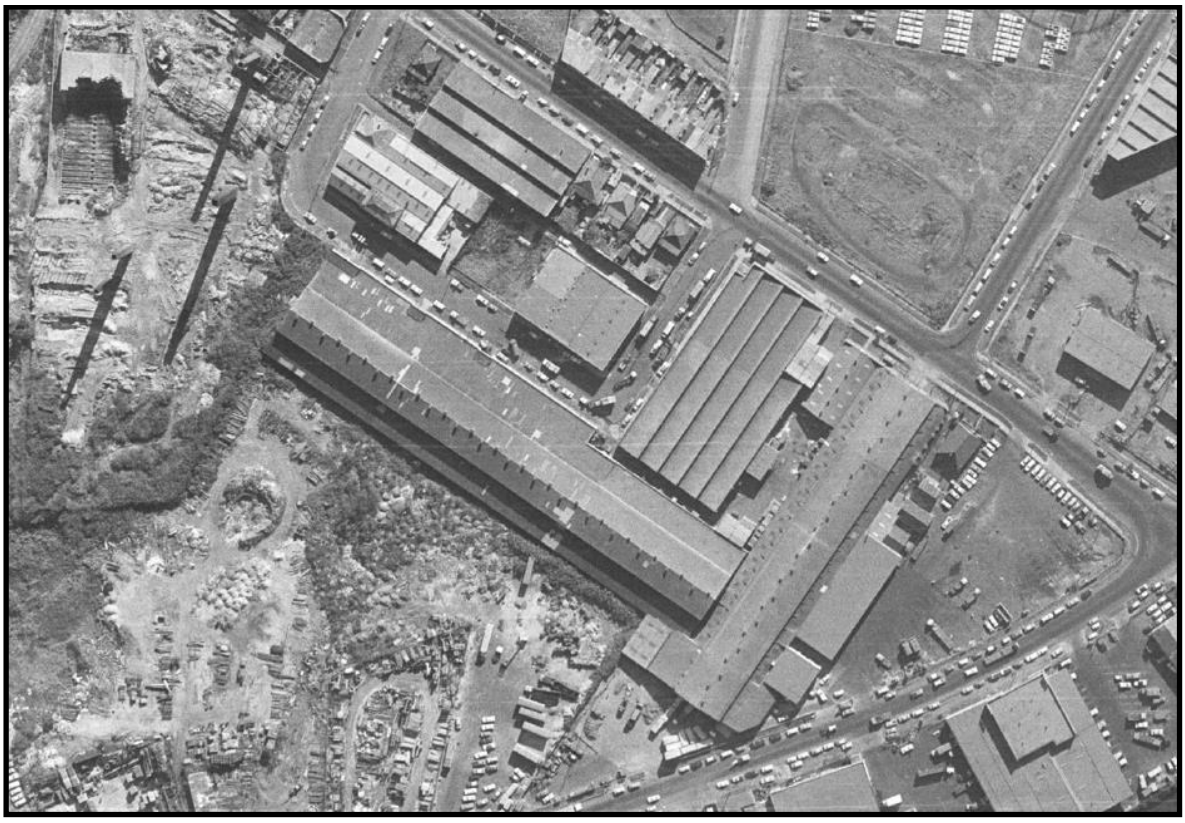

Figure 26. Aerial photograph, 1970. Shows full building as per early 1950s planned layout. (Source: NSW Department of Lands).

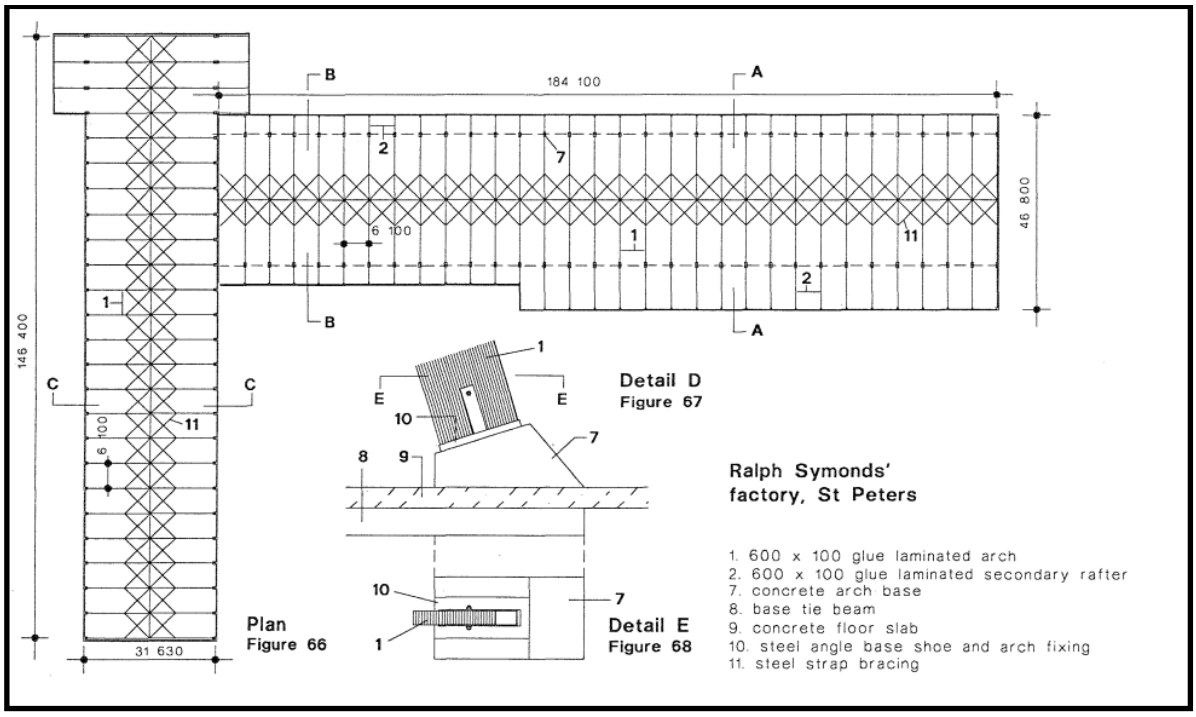

Figure 27. Plan of building 1994. Shows full extent of Holland Street arm (horizontal), which has since been shortened. (Source: Nolan, 1994).

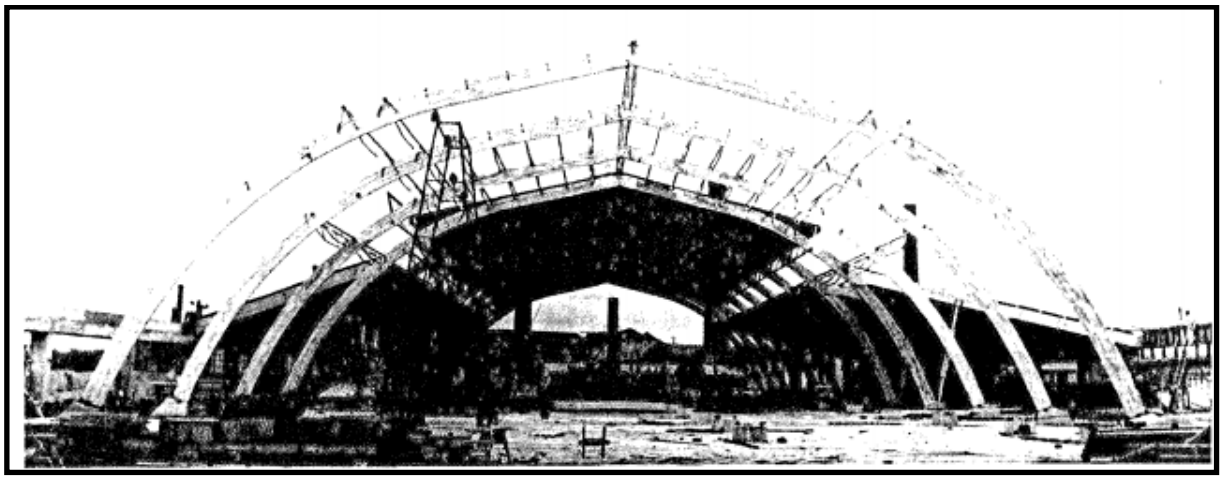

Figure 28. Arches under construction at Symonds St Peters Factory (Holland Street section), c1946. (Source: Nolan, 1994)

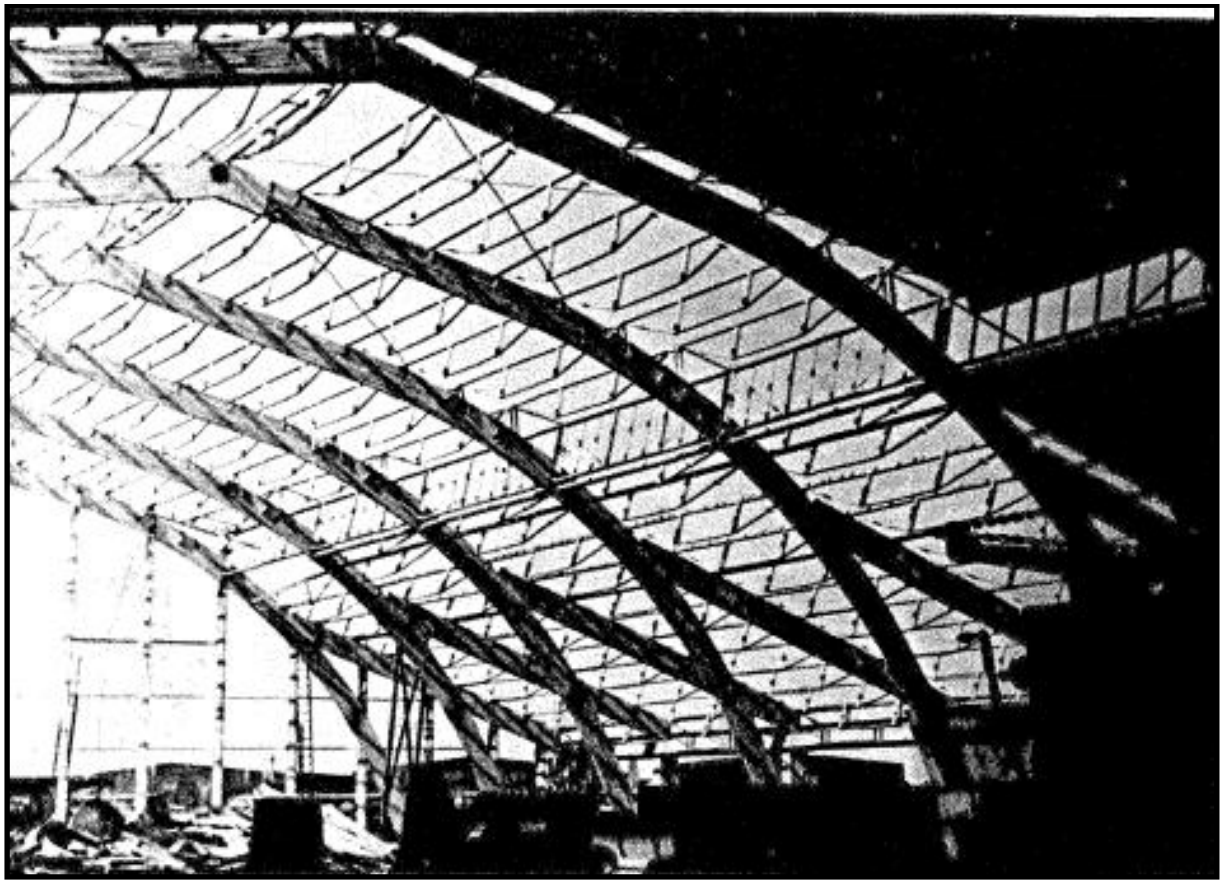

Figure 29. South end of the Holland Street section, Symonds St Peters Factory, c1946. (Source: Nolan, 1994).

Ralph Symonds and his Company

Ralph Symonds commenced his lifelong association with timber fabrication in 1924 with the foundation of Standardised Furniture at Marrickville in Sydney, which specialised in sliced veneer faced plywood panels.[43] By 1942 he had registered as a proprietary company and became a public company in 1950. He moved into the design of machines for the manufacture of large sheets and incorporated these into his factories where he produced some of the first durable and fire-resistant plywoods.[44]

In 1935 Symonds rented a factory in Moreley Avenue, Rosebury and set it up with machinery for his wood manufacture. By 1943 he had added to this to have other premises at Lilyfield as well as occupying two small spaces on Regent Street, Redfern.[45] Symonds then began construction on his own factory building at St Peters (Rudders Bond Store), which commenced operations in 1946, though the Morley Avenue plant continued to be the main site of operations until 1958.[46]

Symonds was renowned as a master of plywood who specialised in doing things that most people said could not be done. He went bankrupt more than once and built a series of one-off timber and plywood structures. He regarded these projects as essential aspects of product development and company promotion.[47] Symonds maintained "that glue laminated factories were most economic for spans greater than 90ft (27.4 m). Anything less than that and it was cheaper to build in steel."[48] Symonds was reportedly considered a larrikin and clashed with the dominant engineering establishment.[49]

The shortage of steel during WWII created an ideal environment for the use of laminated timber and it was widely used until steel became more available following the close of the war. The advantages of laminated timber were quick construction times and the ability to create wide spans, which was suited to the war-time conditions. Symonds applied this technology for the construction of buildings as well as other projects over the WWII and post-war eras.

Thought to be Symonds' first building venture is the extant former National Springs igloo building at 52-54 O'Riordan Street in Alexandria, constructed in 1941 and used for the engineering and construction of aircraft during the war.[50] This building is credited with being the first use of glue laminated timber for large-scale building construction in Australia.

In 1959 the Symonds company moved to a new structure purpose built by Symonds at Homebush Bay. The new factory covered an area of over 14 acres and made use of a waterside location for transport. It consisted of three parallel rows of tied three pin glue laminated arches.

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[43] Cochrane, J. *Ralph Symonds Pty Ltd and the Sydney Opera House*, Faculty of Architecture, The University of Newcastle.
[44] Wyatt, Ken (2000) Ralph Symonds Plywood Factory. In: Lowe, PG (Editor); Hill, RF (Editor). Second Australasian Conference on Engineering Heritage, Auckland: Proceedings. Auckland, N.Z.: Institution of Professional Engineers New Zealand: 243-248.
[45] Honchcroft, Y. (1987). *Company History of Ralph Symonds Australia Ltd* (unpublished). Mitchell Library, Sydney.
[46] Honchcroft, Y. (1987). *Company History of Ralph Symonds Australia Ltd* (unpublished). Mitchell Library, Sydney.
[47] Cochrane, J. *Ralph Symonds Pty Ltd and the Sydney Opera House*, Faculty of Architecture, The University of Newcastle.
[48] From an address entitled Facts & Fallacies of Timber Design; Reported in Australian Timber Journal; January, 1957; p. 103. In Noland G. (1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.
[49] Nolan G. (October 1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.
[50] AECOM Australia Pty Ltd (November 2015) *WestConnex New M5 Environmental Impact Statement*

The arches were glue laminated on the ground slab of the building and erected by Symonds' own work force. The immense structure took only 18 months to construct. Each row of arches is at 52 m centres while each arch spans 43 m. Glue laminated rafters span between. There are 46 arch bays in each row at 7.6m centres. This gives a building over 156m wide and 350m long. This is the largest timber building constructed in Australia. [51]

Symonds work was used in other notable structures, including the Sydney Opera House. The technology developed by Ralph Symonds Limited was essential to architect Joern Utzon's method of design development for the structure. Utzon was an ally to Symonds in his willingness to technically develop Symonds ideas about the creative potential for plywood in architecture. Symonds and Utzon appear to have worked in collaboration, with Symonds solutions being applicable to the irregular plan and form of the building. Ralph Symonds died prematurely in 1961 and Ralph Symonds Ltd carried on the work on the Opera House under the direction of Mr Ellis Ezra.[52]

Symonds' entrepreneurship and creative experimentation in plywood lead to a number of interesting commissions. During the war, he made plywood landing craft for the Army and decoy Kittyhawk aircraft for the Air Force. Constructed specifically for a singular event was the 'Ceremonial Arches' commemorating Queen Elizabeth II's visit to Sydney in 1954. Six arches were constructed for the event for display in Sydney as well as an additional arch manufactured for Melbourne. They were named: 'The Timber Development Association's Log Arch'; 'The City Council Boomerang Arch'; 'The Insurance Companies' Arch'; 'The Bankers' Arch'; 'The Retail Traders' Arch'; The Agricultural Society's Arch'.53 Only documentary evidence of these arches remains.

Symonds other projects included a diverse range of structures including prefabricated schools for the NSW Department of Education, roofing for the Myer music bowl, the curved copper awning for the Wentworth Hotel, Sydney, framing for the Leonard French glass ceiling at the National gallery of Victoria and an enclosure for the astronomical telescope at Mt Stromlo.[54]

Symonds produced at least one other major arch building before 1958. This was a 120 ft (36.6 m) span factory for Neon Industries in Melbourne. The arches for this building appear very similar to those used in Symonds' St Peters factory. They were 28 x 4ins (710 x 100mm) members glue laminated from oregon. Symonds shipped them from St Peters to Melbourne on a special truck and bogey. He is also responsible for another Victorian building, the Turner & Burge factory built in 1945.

It is possible that Symonds constructed other glue laminated timber arch buildings in Sydney and other cities between 1942 and his death in 1961.[55]

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[51] Nolan G. (1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.
[52] Cochrane, J. (1998) *Ralph Symonds Pty Ltd and the Sydney Opera House*, Faculty of Architecture, The University of Newcastle.
[53] Nolan G. (October 1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston, p.34-7
[54] Cochrane, J. (1998) *Ralph Symonds Pty Ltd and the Sydney Opera House*, Faculty of Architecture, The University of Newcastle.
[55] Noland G. (October 1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.

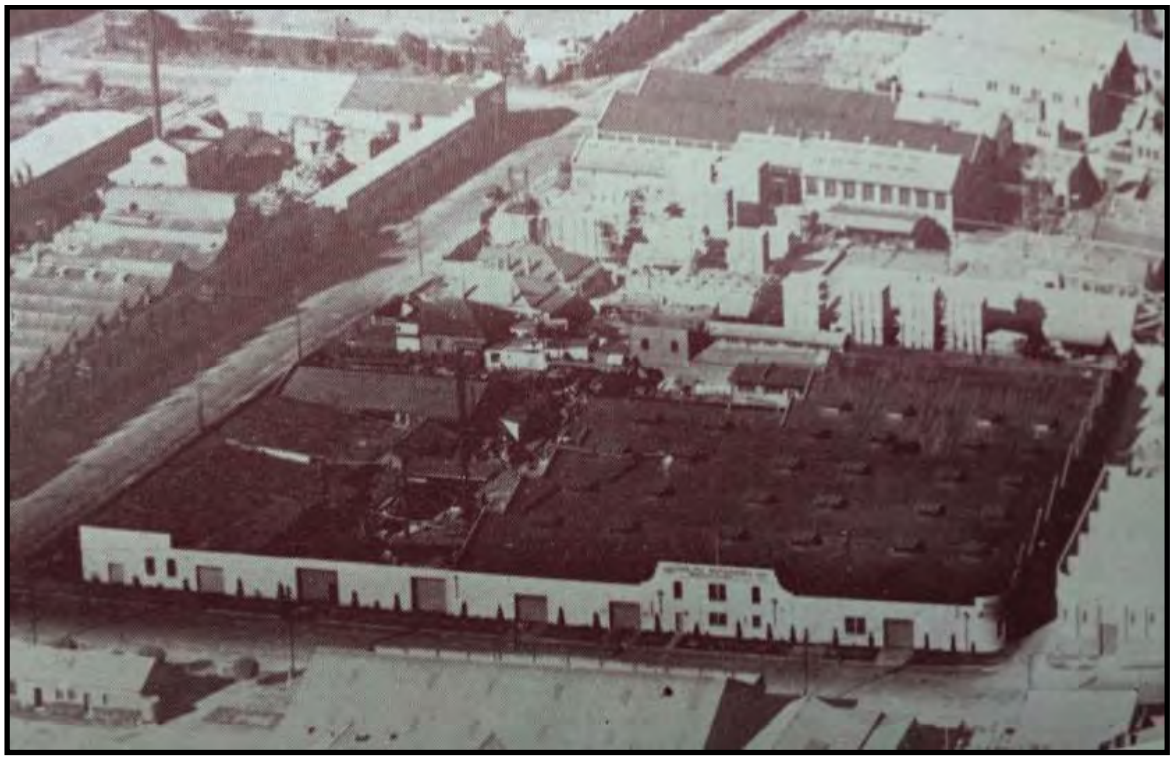

Figure 30: Photograph of Ralph Symonds Morley Avenue factory (Source: A School Is Born, Ralph Symonds Ltd, Sydney. c1950. NSW State Library).

Figure 31. Symonds' Homebush Bay factory (Source: Ralph Symonds Promotional Pamphlet, NSW State Library).

Figure 32. One of Symonds' ceremonial arches, Martin Place (1954) (Source: NSW State Library).

Figure 33. Laminated timber arches manufactured by Ralph Symonds Ltd, Sydney, for transportation to Melbourne for the Neon Industries building (Source: "120ft Laminated Timber Arches, Transported from Sydney to Melbourne. Building Lighting Engineering, 24 March 1955 p.33. NSW State Library).

Timber Construction – World War II and Post War

Following the commencement of WWII, the Government began to order the resources of the Commonwealth for the nation's defense and it recognised that timber was now an essential construction material. As a consequence, it established an office of the Controller of Timber and placed all the timber resources of the nation under its control. To co-ordinate this mass of construction work associated with defense building, the government established the Allied Works Council (AWC) and from 26 February 1942, it assumed control for all defense projects for the Allied Armies.[56]

With the huge war building program and with the necessity to conserve steel, the AWC recognized the advantages of the use of Australian timber as a building material for large engineering structures.[57] The AWC made departures from accepted design practices in timber and the war removed major factors that had previously restricted design and construction in timber. Timber design technology and experience became available from elsewhere and an urgent demand existed for large structures. As a result largely untried timber technologies became the foundation of most major building construction in the period 1942-45, during which

[56] Noland G. (1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.
[57] Allied Works Council Report (1942-43), p354. In Noland G. (1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.

time the AWC built thousands of structures, many timber, throughout Australia. The longest span, most numerous, most diverse and most widely spread examples of timber buildings seen in Australia were all built at this time.[58] However, little reliable information regarding war time timber structures is available. This is partly due to war time censorship which meant that records do not indicate the extent and location of buildings.[59]

In the post-war period a major cycle of building was underway by 1950 and all building materials were in short supply. Following 1945, all forms of manufacturing increased enormously for the next two decades. This represented the strongest period of Australia's industrial history.[60] Timber design and engineering re-emerged to take advantage of this opportunity with an expansion in long span industrial timber structures. During this time, timber was used as a comparable alternative to steel by several dedicated engineering practitioners. However, while it held economic advantages it was still not seen as a favoured choice by the dominant professional groups.[61]

The war time shortage of materials demanded experimentation with timber building solutions. During the war and post-war period, the manufacturer Ralph Symonds along with the engineer Malcolm Stanley were two of major practitioners using long span timber construction in the form of glue laminated timber. The conditions allowed for experimentation with timber structures and both used glue laminated timber in their work.

Glue Laminated Timber

Glued laminated timber is a type of structural engineered wood product comprising a number of layers of lumber bonded together with adhesives. By laminating a number of smaller pieces of lumber, a single large, strong, structural member is manufactured. Using this technology creates freedom in shaping the timber, which can include curved and arched shapes. This methodology can also produce long span beams and arches due to its high strength.

Use of glue laminated timber is recorded in use in Europe in the sixteenth century and was widely used in Europe before WWII. German Otto Hetzer obtained the first patent for glue laminated wood members in 1906, though his system (Known as the Hetzer System) may have been used as early as 1890.[62] The Hetzer system was also used to some extent in Austria, Czechoslovakia, France and Italy and had been introduced to the USA by the 1920s.[63]

Following on from growing use in the USA, glued laminated timber arches were discussed in print for the first time in the 1942 supplement to Langlands & Thomas's Handbook of Structural Timber Design.[64] There has been a claim that glue laminated arches were used in the Methodist

[58] Nolan G. (1994). *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston
[59] Nolan G. (1994). *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston
[60] City Plan Heritage (2014). *City of Sydney Warehouses and Industrial Buildings Heritage Study Report*
[61] Nolan G. (1994). *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston
[62] Lewis, M. B. (2012). *Australian building a cultural Investigation* http://www.mileslewis.net/australian-building/.
[63] Lewis, M. B. (2012). *Australian building a cultural Investigation* http://www.mileslewis.net/australian-building/.
[64] Lewis, M. B. (2012). *Australian building a cultural Investigation* http://www.mileslewis.net/australian-building/.

church in Hesse St, Queenscliff, Victoria, in 1868, and though the appearance of arches is consistent with this, it is unconfirmed.

There are records of glue laminated timber being in use as a technology in Australia in 1938 and the first documented application using glue laminated rafters was a store building designed by H. Garnet Alsop, Architect in 1941. It used 325 x 90mm beam laid up from 105 x 18 floor boards to span 6m with a 3m cantilever.[65] Additionally laminated wood was used in bridges in Australia in the 1850s, with the earliest in Australia possibly being Edmund Blackett's Wallis Creek bridge at Maitland NSW built in 1851. A variety of bridges built in this period used laminated timber but without glue.[66] In the 1850/60s laminated timber was used in a number of structures in Western Australia and Victoria, including the Fremantle Prison Chapel, the Perth Town Hall, in a cell block in Melbourne Gaol, Melbourne Metropolitan Meat Market and in the Maldon market house, though these were shorter spans. The Sydney Exhibition Building (1878-9) also has laminated arches.[67]

Though not the first use of the material, Ralph Symonds Ltd is credited with the first large-scale building constructed using glue laminated timber as its principal structural members in Australia. It was for the National Springs Ltd building in O'Riordan Street, Alexandria in 1942. The building is a three pin parabolic arch structure for which Symonds fabricated the arches from 29 laminations of low grade rimu. The building's construction demonstrates an early and innovative structural use of laminated timber to achieve the quick construction, efficient use of materials and wide spans needed for wartime factories at a time of materials and labour shortages.[68] There is reference to another building, called the ETC Building, designed by Tate and Turner with arches made by Ralph Symonds, constructed in the same period but demolished in 1990, however no records of this building have been located.

The timber, according to Symonds, was dried and accurately machined to exact thickness prior to gluing, and: "After the glue is prepared it is mechanically applied and placed under pressure by the use of this Company's patents which makes possible a time lag not exceeding 45 minutes. Our system of using compressed air enables the required pressure of 90 lbs per sq. inch to be applied and maintained simultaneously over the whole area of the arch and such pressing is done in one operation."[69]

Previous methods had involved progressive cramping of the laminated arch in four or five operations, taking several days, but during the war Symonds had developed and patented a method, using thousands of 'metal hangers', together with air pressure, to complete the whole operation in forty-five minutes. The radius of curvature was never less than eighty times the thickness of the laminate, and the number of laminations in an arch never less than twenty-four.[70] Symonds's patent application for his 'purlin' or lateral bracing system appears to date from 1944.[71]

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[65] Nolan G. (October 1994). *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston
[66] Lewis, M. B. (2012). *Australian building a cultural Investigation* http://www.mileslewis.net/australian-building/.
[67] Lewis, M. B. (2012). *Australian building a cultural Investigation* http://www.mileslewis.net/australian-building/.
[68] Former National Motor Springs Igloo Building, State Heritage Inventory Listing #5062448, City of Sydney Council.
[69] Ralph Symonds, Managing Director, Ralph Symonds Pty Ltd, Rosebery NSW, to H Burge Bros, Carlton, 6 June 1945, MCC building application file no 23118. In Lewis, M. (2015). Timber Engineering and Lamination.
[70] Lewis, M. B. (2012). *Australian building a cultural Investigation* http://www.mileslewis.net/australian-building/.
[71] Lewis, M. B. (2012). *Australian building a cultural Investigation* http://www.mileslewis.net/australian-building/.

Another practitioner that used laminated timber technology was Symonds friend Malcolm Stanley. He was involved with glue laminated arch structures from at least 1943. Then as senior partner of the consulting engineering firm of Stanley and Llewellyn, he designed a steady stream of long span industrial structures in timber from 1950 to 1955. He and his office developed the flat pier to pier two pin tied arch form to such an extent that by 1952, they had patented a stiffened tied arch. The arches became known as 'Stanley' arches. They were site laminated from a variety of timbers using casein-based glues. Stanley's work was widely reputed in the building and timber literature of the day. It greatly interested the CSIRO and they struggled to keep up with his developments. The clients for Stanley's timber buildings were major companies. At least one was so satisfied with their timber product that they had a second larger building constructed. Also being a respected engineer, Stanley had credence in intellectual and professional circles.[72]

Stanley used stitch bolts through the arches at about 900mm centres to guarantee adhesion.[73] Symonds' three pin glue laminated arch form and Stanley's pier to pier two pin tied glue laminated arch form can be traced directly from both men's earliest work with glue laminated timber construction and were developed during the War. Neither Stanley nor Symonds exploited nailed joints and their work showed sophistication in aesthetics, construction and amenity. Post war design used glue laminated arches derived from circular arcs for the main structure with bolts and shear connector joints fixing secondary members. Besides the construction in Sydney, buildings of this form were built in Adelaide, Melbourne and in various parts of Queensland.[74]

In 1951 architect Frank Zipfinger published an article on laminated timber. He was involved with a project (Rheem Factory, Rydalmere) that used bow truss laminated arches made of Swedish fir and treated with xylamon to resist pests, imported from Dutch fabricators NV Nemano-Holland.[75] Walter & Morris of Port Adelaide also manufactured glue laminated beams from the 1950s.[76]

In late 1954, several major South Australian timber merchants, including Geddes, Lloyds and Wadlows, established a new company called Laminated Timber Products Limited to exploit the developments in glue laminated technology.[77] During 1955, they constructed at least four major glue laminated buildings: a 32ft (9. 75m) span steep three pin portal church, a 32ft (9. 75m) span three pin gothic arch church at Kurralta Park, a 130ft (39.6m) semi-circular three pin foundation arch factory in Hanson Road, Adelaide, and a large factory at Kalangadoo. Though the company was reported to have further orders for 1956, it went out of business before 1963.

True foundation arch industrial buildings proved impractical as large areas at the sides were too low to be used effectively. They were also very difficult to light and heat. These problems were

[72] Nolan G. (1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston, p49.
[73] Nolan G. (1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.
[74] Nolan G. (1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.
[75] Lewis, M. B. (2012). *Australian building a cultural Investigation* http://www.mileslewis.net/australian-building/.
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[77] Nolan G. (1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.

resolved with the introduction of the pier to pier, two pin tied arch form in 1943 and the use of secondary rafters with the foundation arch form in 1946[78].

After Stanley's death in 1955, evidence of further long span timber structures reduces considerably. Though Symonds and other practitioners continued to design or produce glue laminated structures, the concentrated construction of successful timber structures seen in Sydney in the early 1950's was not repeated. The cycle that began with Symonds' St Peters Factory in 1946 ended with his death in 1961.[79]

Laminated timber was also used in a number of churches in Australia in the c1950s, though these were smaller spans less that 15-20m. The Mormans are recorded as building twenty-three churches throughout Australia in the 1950s using laminated timber manufactured by John Sharp's joinery works using Tasmania hardwood, scarf jointer, dowelled and pressed.[80]

Scientific

Some of the most significant fossil discoveries in the Sydney Basin were discovered in St Peters during the brickmaking period. The following section outlines the history of Palaeontological discovery in Sydney generally, followed by a section on the St Peters Brickpits.

History of Paleontological Discovery in Sydney

The early history of palaeontology in Australia is associated with inland journeys of exploration during early colonial times and the subsequent transfer of specimens collected to British collecting institutions (Vallance 1978). It was not until the arrival of settlers schooled in the classical European, mainly British, education system that interest in documenting fossil material found in Australia commenced, even then many specimens were still systematically returned to the United Kingdom for analysis.

One of the earliest examples was a labyrinthodont from Australia that was held in the British Museum and documented by T.H. Huxley (1859). Although Huxley was a visitor to Sydney in the 1840s the original locality of the specimen is cited as "unknown" in the paper (Huxley 1859).

The first publication of fossil material definitely recovered from the Sydney region was that of fossil fish from units probably equivalent to the Ashfield Shale (Egerton 1863). Two fossil fish were sent by Reverend William Clarke to England. Both were Triassic age fish, one from a shale unit near Campbelltown and another from a shale unit intersected at Cockatoo Island during excavation work for docking facilities (Willis & Thomas 2005).

An impression of a bone was also found at Cockatoo Island, subsequently identified as a Mastodontasaurus (a type of labyrinthodont) but this specimen while documented (Stephens 1886) remains unillustrated, most likely because of its poor preservation. This would be followed

[78] Nolan G. (1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.
[79] Nolan G. (1994) *The Forgotten Long Span Timber Structures of Australia*, *A Thesis for the Degree of Master Of Architecture,* Department of Architecture, University of Tasmania Launceston.
[80] Lewis, M. B. (2012). *Australian building a cultural Investigation* http://www.mileslewis.net/australian-building/.

by a 150-year history of similar fossil finds that would provide insights into the ecosystem of a large river delta prior to the age of dinosaurs.

Clarke is known as the father of Australian geology because of his pioneering work on the rocks of Australia. He studied geology at Cambridge University then migrated to Australia in 1839. He wrote extensively about the Hunter Valley Coal deposits, was associated with some early discoveries of gold, and maintained an active correspondence with scientists in the United Kingdom particularly concerning fossil discoveries in the colonies (Mozly 1969).

In the 1870s and 1880s there was a great expansion of the Australian colonies on the back of new found wealth from gold mining, railway systems were spreading across the country. Building the railways involved excavations for ballast. One site for this was just north of the Gosford Railway station. This site yielded a large number of fish and four labyrinthodonts (Stephens 1887) as well as various plant specimens such as Phyllotheca sp. (Willis & Thomas 2005). The fish from Gosford were mostly previously unknown to science and included the rare lungfish Gosfordia (Woodward 1890).

At around the same time, elsewhere in the Sydney Basin on the other side of the city, the Gibraltar railway tunnel was being built north of Bowral in the southern highlands. This site yielded an unidentifiable labyrinthodont specimen and two species of fish. The importance of this discovery was that it is located stratigraphically higher than the specimens recovered from Gosford representing an age difference of some tens of millions of years despite both being Triassic in age. The Gosford sequence is a shale lens in the underlying Hawkesbury Sandstone whereas the specimens from Bowral were recovered from the basal unit of the overlying Wianamatta Group, equivalent to the Ashfield Shale.

Another tranche of fossils was recovered from the Manly Brick and Tile Company's quarry at Beacon Hill near Brookvale. While operations commenced in the 1890s, fossil discoveries were first recorded in 1912 and continued for another 30 years, although it has been reported that amateur collectors were still recovering specimens as late as 1950 (Willis & Thomas 2005). In total this site is believed to have yielded several thousand individual specimens. There were 28 species of fish, the majority new to science, a range of insects, including a cicada and a dragon fly, Mesotitan scullyi with a wingspan of 30cms (Tillyard 1918). There was also a labyrinthodont Paratosaurus, smaller than the specimen from St Peters but with only a well-preserved skull recovered. The Beacon Hill site is an exposure of a shale unit within the Hawkesbury Sandstone and therefore older than the Ashfield Shale. Nothing further was recovered from this site once extraction techniques were mechanised in the 1950s.

In 1986, excavations in a shale lens in the Hawkesbury Sandstone that was being quarried by the Gosford Brick Company revealed a fossil rich layer about 10cm thick. Quarry operators allowed the Australian Museum to organise a dig with volunteer labour to extract as many fossil fish specimens as possible over a 12-week period (Ritchie 1987, Simpson 1988). A rare lungfish, Gosfordia had been previously discovered on the site in 1972. Seven hundred fish were recovered from the site during the dig, 600 of which belonged to the one species Promecosimina sp. It has been noted that all these fish died with their mouths open and their gills filled with blood. This suggests a sudden shortage of oxygen probably caused by the

freshwater being disconnected from the main river flow and forming an abruptly layered and partially deoxygenated water column (Simpson 1988).

There are plenty of other records of fossils sites in the Sydney Basin. A quarry at Hornsby Heights previously used to extract building stones has yielded six species of fish in the 1970s for the Australian Museum. The museum considered the possibility of exposing the fossil rich shale layer for a more extensive program of fossil recovery, but a lack of resources precluded this possibility. The site was bulldozed over to protect the shale layer from exploitation by amateur collectors because of its accessibility, effectively sealing it off for possible future investigations under more propitious economic circumstances.

Other lesser known discoveries include fossil fish fragments from shale during the excavation of a sewerage tunnel at Tambourine Bay in 1927. The Bowral Brickworks pit produced a specimen of the shark Xenocanthus and the fish Cliethrolepis was recovered from a brick pit at Asquith in 1954. The Australian Museum also has fish from quarries at Kogarah, Gore Hill and Thornleigh (Willis & Thomas 2005). The skull of a labyrinthodont has also been reported from the Hurstville Brick Company's quarry at Mortdale (Willis & Thomas 2005).

Other fossil finds in the Sydney Basin also include trace fossils of labyrinthodonts. A set of footprints and curved grooves in sandstone from the tail of an animal dragging through sediment were uncovered at Berowra in 1948 and another was found while digging a sewage tunnel in 1970 (Peperill & Grigg 1974). Willis & Thomas (2005) also report that as recently as 2003 the Australian Museum was receiving reports of the discovery of trackways, this time from the Wisemans Ferry area north of Sydney.

All these discoveries indicate evidence of substantial and diverse fossil record from Triassic rock units in the Sydney Basin, the majority of which date from a time prior to the mechanisation of extractive processes and are most commonly associated with the fine-grained sediments of the Hawkesbury Sandstone and Wianamatta Group.

St Peters Paleontological Discoveries

Some of the most significant fossil discoveries occurred in the St Peters Brickpits. Operations commenced in earnest in the 1880s and fossils were discovered over the subsequent 40 years. Most of the early collecting was done by the state government employee, Benjamin Dunstan who regularly checked on the pits on behalf of the Geological Survey of New South Wales and collect specimens that workmen had set aside. All the pits; Gentle's, Federal, Jubilee, Vickery's, Woodleigh's, Carrington, Beulah and Harper's Newtown brick pits extracted material by manual labour.

The most important specimen collected was the labyrinthodont, Paracyclotosaurus, thought to be recovered from Vickery's pit (Woodward 1908). Ten species of fish were recovered from St Peters including the lungfish Ceratodus and the shark Pleuracanthus. Most of this material was housed for many years at the former Geological and Mining Museum in the Rocks, Sydney. Since the closure of this facility the material was transferred to the WB Clarke Geocentre at Londonderry in western Sydney where it remains today. The labyrinthodont was transferred to the British Museum in London, where it was eventually prepared in the 1950s. There is some

controversy as to whether the specimen was transferred for further identification as was commonly the case in the pioneering days of Australian palaeontology or was sold to the museum. The specimen was cast by infilling the surrounding ironstone with plastic then recasting the internal structure of the mold (Watson 1958), a copy of the specimen was produced for the Australian Museum but the original remains in London.

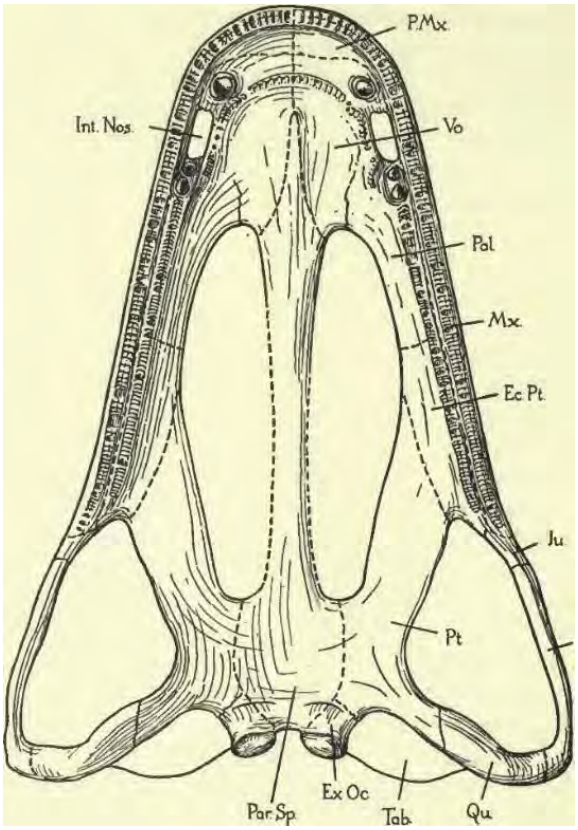

Figure 34. Paracyclotosaurus davidi skull.

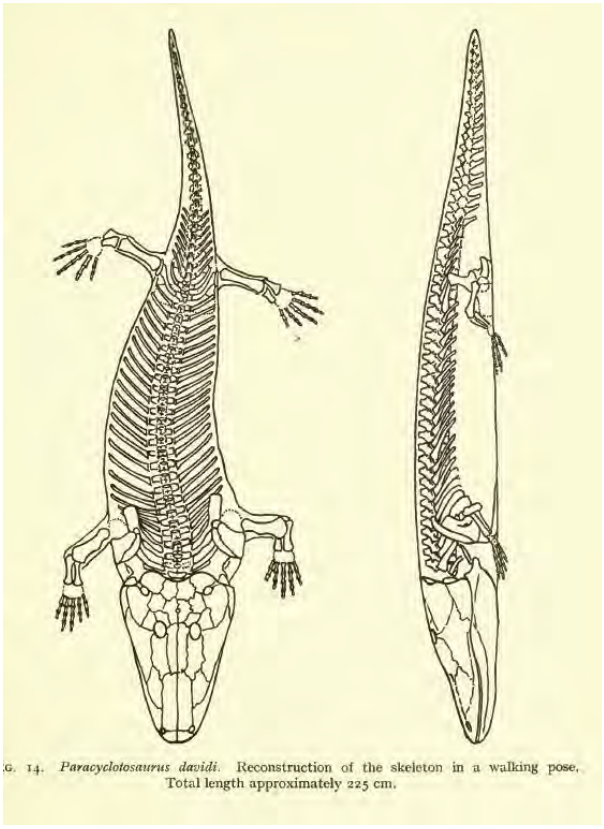

Figure 35. Paracyclotosaurus davidi reconstruction.

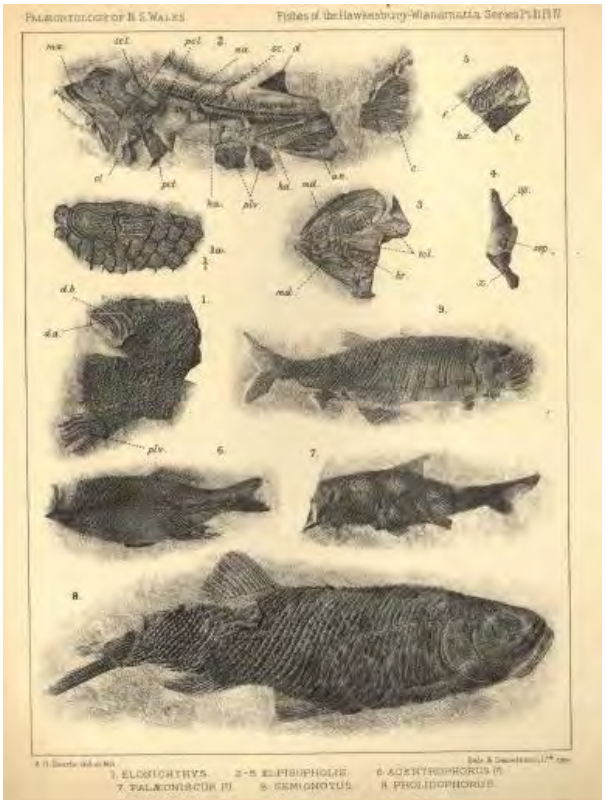

Figure 36. Selection of fish fossils recovered from the St Peters brick pits in the nineteenth century.

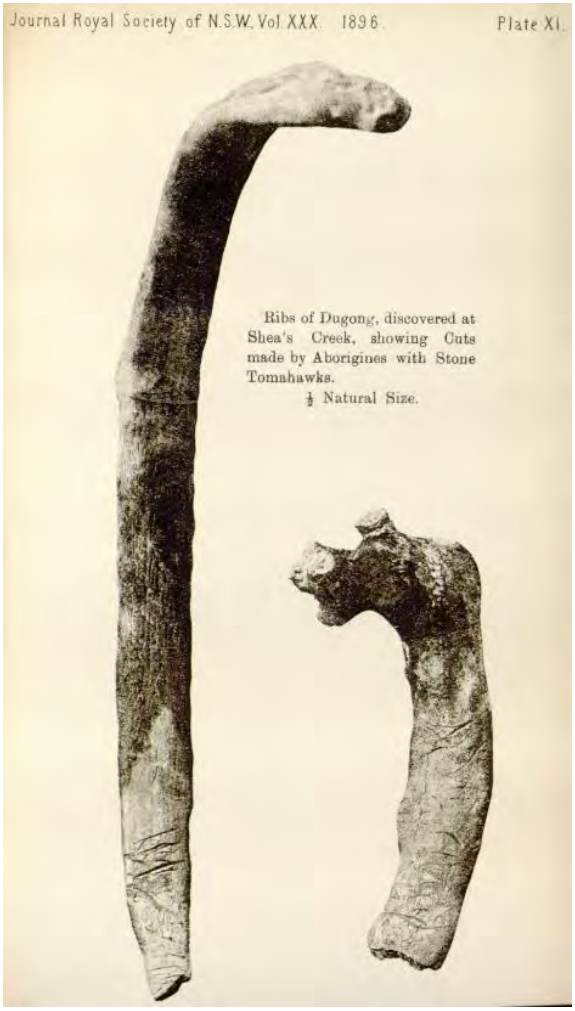

Figure 37: Dugong bones discovered during the excavation of Alexandra Canal in 1894 (Source: Detail of Plate XI, 'On the occurrence of a submerged forest, with remains of the Dugong, at Shea's Creek near Sydney' by R Etheridge, Junr, Professor TW Edgeworth David, BA, FGS, and HW Grimshaw, M Inst CE, Journal and proceedings of the Royal Society of New South Wales, Vol 30, 1896, p 158).

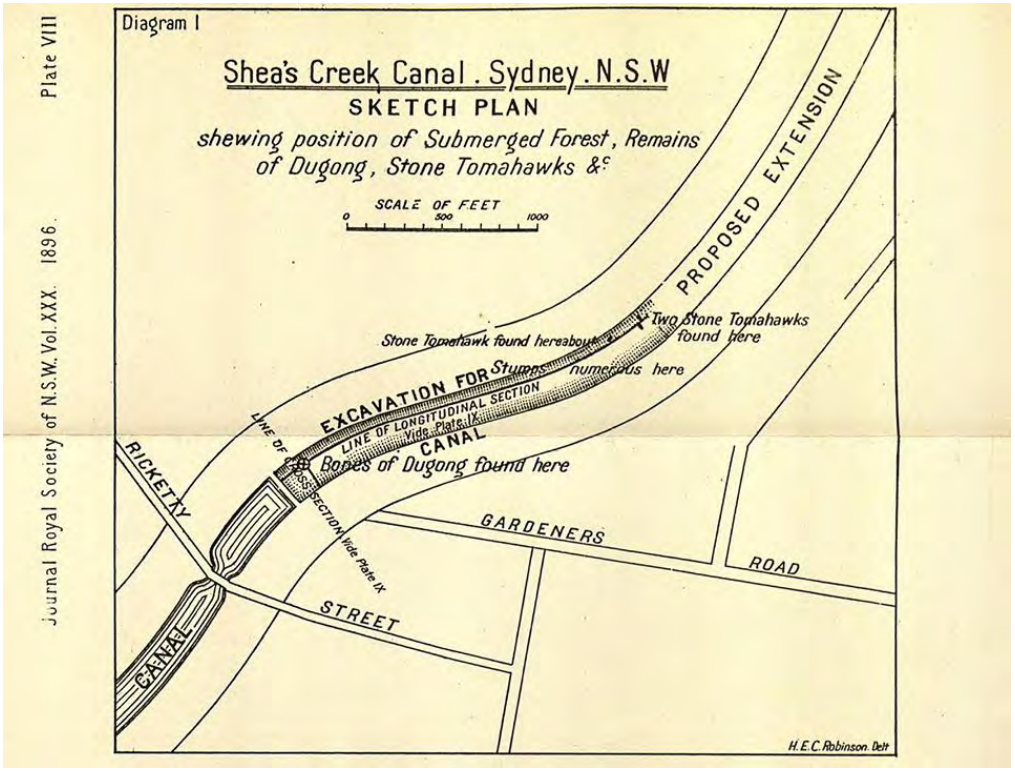

Figure 38. Shea's Creek Canal, sktch plan showing the position of submerged forest, remains of dugong, stone tomahawks, c. 1896 (Source: Plate VIII, 'On the occurrence of a submerged forest, with remains of the Dugong, at Shea's Creek near Sydney' by R Etheridge, Junr, Professor TW Edgeworth David, BA, FGS, and HW Grimshaw, M Inst CE, Journal and proceedings of the Royal Society of New South Wales, Vol 30, 1896, p 158).

Figure 39. Palaeontologist William Dun (left) and Australian Museum Curator Robert Etheridge Jnr watch as Dugong bones are excavated from Shea's Creek during the construction of Alexandra Canal (Source: Australian Museum Archives. V9817)

The following has been quoted from the St Peters Brick Pit Geological Site Assessment of Impact written by Dr Andrew Simpson.

> The exposure of Ashfield Shale at the St Peters site was used extensively by the Geology Department at the University of Sydney for undergraduate science education (email from D. Branagan to author 24.05.16), in particular as an exemplar for understanding the development and geological history of the Basin. This practice ceased in the 1970s but material that was produced specifically for the purposes of tertiary education of students is currently being sought. It has also been reported (Branagan 2016 pers com) that a film was made of the site and the tuition of students in the field. The correspondent is unsure if a copy of the film still exists but a search is being undertaken.

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Appendix B: St Peters Brickpit Geological Site Heritage and Contributory Item Archival Recording and Research Report

'St Peters Brickpit Geological Site Heritage and Contributory Item Archival Recording and Research Report', prepared by Extent Heritage (2016).

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St Peters Brickpit Geological Site

Heritage and Contributory Item Archival Recording and Research Report

Prepared for CPB Dragados Samsung Joint Venture

February 2019 - Final

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[redacted]	22 January 2019	FINAL revised	[redacted]			6 February 2019

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Contents

List of Figures

1. Introduction

1.1 Project Description

In 2016 EXTENT Heritage Pty Ltd was commissioned by CPB Dragados Samsung joint venture to prepare an Archival Recording and research report for the St Peter's Brick Pit Geological Site. The purpose of the report is to record the current state of the geological site (cliff face) prior to the modification of the area. This report serves as a permanent record of the place prior to that work being undertaken.

This report is in fulfillment of the conditions of consent for the WestConnex Stage 2 New M5, specifically D42:

> *The Proponent must undertake photographic and drawn archival recordings of the geological features of the St Peters Brick Pit Geological Site prior to undertaking any works that would result in the features being obscured. The recordings should be included in the Heritage Interpretation Plan required by condition B40.*

This report is in fulfilment of the conditions of consent for the WestConnex Stage 2 New M5, specifically D37:

> *Prior to commencement of construction in proximity to, or affecting, a heritage item or contributory item in a heritage conservation area, the proponent must complete the archival recordings, including photographic recording of the heritage item, unless otherwise agreed by the Secretary. The archival recording must be undertaken by a qualified and experienced heritage consultant, in accordance with the How to Prepare Archival Records of Heritage Items (2003) guidelines issued by the Heritage Council of NSW. Within 12 months of completing the archival recording, or as otherwise agreed by the Secretary, the proponent must submit a* ***heritage contributory item archival recording and research report*** *containing the archival and photographic recordings and historical research, to the Department, the Heritage Council of NSW, the local library, and the local historical society in the respective local government area(s).*

1.2 Approach and Methodology

The methodology used in the preparation of this report is in accordance with the principles and definitions as set out in the guidelines to the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance- The Burra Charter and the latest version of the NSW Heritage Branch's Photographic Archival Recording guidelines, accessed January 2016.

1.3 Limitations

The study area was inspected and photographed by Kylie Christian on the 16th August 2016. The inspection was undertaken as a visual study only.

The historical overview provides sufficient historical background to provide an understanding of the place in order to present the significance of the site.

1.4 Authorship

The following staff members at EXTENT Heritage Pty Ltd have prepared this report:

[redacted]	Senior Associate
[redacted]	Senior Heritage Advisor
[redacted]	Heritage Advisor
[redacted]	Research Assistant

1.5 Ownership

The site is owned by Roads and Maritime Services.

2. Site

2.1 Location

The St Peters Brickpit Geological Site is located at the WestConnex Stage 2 interchange and is legally defined as Lot 2 DP1168612. The site is located within the former Austral Brick Pit. The northern boundary of the brickpit site is met by the Princes Highway, while the Eastern boundary is curtailed by Albert Street, Campbell Lane and Holland Street. The southern boundary of the Brick pit is contained by industrial buildings butting off Burrows Road with Canal Road completing the western boundary.

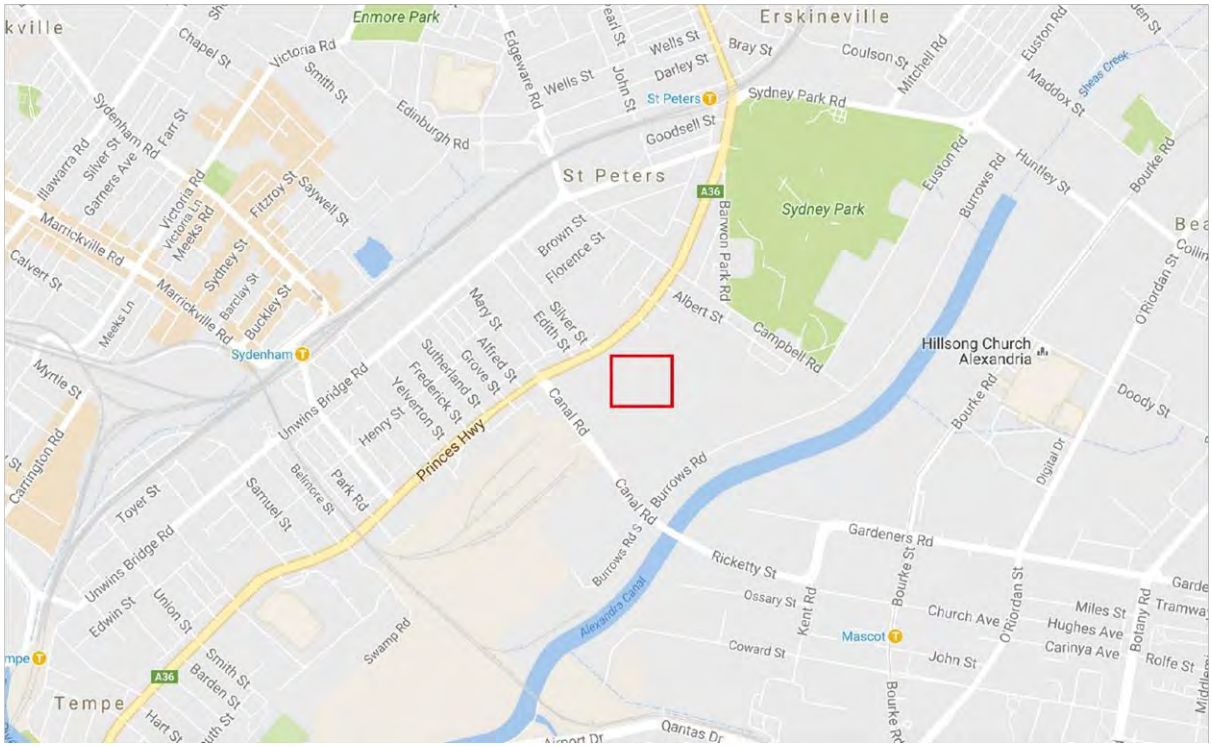


Figure 1. Map indicating location of Westconnex Stage 2 interchange outlined in red (Source: Nearmap, accessed 24th February 2016).

Figure 2. Aerial view with subject property outlined in red (Source: NearMaps accessed 12.08.16).

2.2 Statement of Significance

As per the Register of the National Estate (Non-statutory Archive), the Statement of Significance for the St Peters Brickpit Geological Site is as follows:

> *St Peters Brickpit contains a section of prior Botany Bay shoreline sediments of late Pleistocene/early Holocene Age (18,000 to 6,000 years bp). These sediments provide important evidence of the extent to which the waters of Botany Bay rose at the end of the last glaciation. The deposits found within the brickpit are a rare occurrence of this shoreline (Criterion A.1 and B.1). The Ashfield shale in the vicinity of the brickpit has been a rich source of fossils of upper Triassic Age (approximately 210 million years bp). With both vertebrate and invertebrate fossils identified including an amphibian named PARACYCLOTOSAURS DAVIDII, a member of the sub-class Labyrithondontia. This species has only been identified from this site. It is one of few species of this sub-class of this age discovered in Australia to date. This species has contributed to the understanding of the evolution of the Australian amphibian fauna (Criterion A.1). The quarry is used extensively as a teaching resource by local tertiary institutions. It provides an excellent opportunity for students of geography ot observe structures in fresh shale and siltstone of the Ashfield formation. These structures include joints, faults and recent mass movement on the edges of the quarry. There is also potential for significant additional fossil finds within the Ashfield formation of the former Botany Bay shoreline deposits are of research value, providing evidence of former sea levels around Botany Bay. The shell within the deposit may yield information on environmental conditions that existed as sea levels rose*

at the end of the last glaciation (Criterion C.1). The site contains a representative example of Ashfield shale which is the lowest formation of the upper Triassic Wianamatta group of the Sydney Basin the shoreline deposits provide an important example of the former shoreline of Botany Bay (Criterion D.1). The site is of historic interest for the way it demonstrates part of the geographical spread of the St Peters brick-shale deposits and so complements the restored Bedford Brickworks to the north (Criteria A.4 and B.2).

2.3 Statement of Significance - Note

The Statement of Significance listed above was the statement employed in the project EIS and is derived from the Register of the National Estate listing (as site ID # 162040). The site was placed on the Register of the National Estate in 1991 and the listing appears to have been based on information using the immediate post-1983 site configuration. At the time of listing the rock face consisted of a 35m high scarp that extended from a bench within the pit. The base of the pit itself was 10m below the bench resulting in a 45m high exposure of the Ashfield Shale horizons. This scarp demonstrated all of the physical features of the Ashfield Shale, as well as the Quaternary shoreline deposits on the eastern side of the pit. The Albert Street Disposal Depot had been in operation for approximately two years prior to the listing but filling had not obscured the rock face to any appreciable degree. In the years after 1991 filling had reduced the visible rock face to a remnant with a maximum height of 18.5m of which part consisted of fill and the weathered upper portion of the shales. The base of the rock-face was obscured by talus cones consisting of weathered shale, shale fragments and rubble. The exposed deposits associated with the former Quaternary shoreline had been largely removed from the RNE listed curtilage.

In effect, most of the values for which the site had been originally listed had been lost or obscured prior to the preparation of the EIS in 2015 (AECOM *New M5 Environmental Impact Statement. Technical Working Paper Non-Aboriginal heritage*. Appendix R November 2015). The RNE curtilage on current aerial image is shown in Figure 3.

Figure 3. Peters Brick Pit (Alexandria Landfill) – RNE boundary

3. Historical Context

3.1 Industrial Development at St Peters

The following history has been quoted from the Dictionary of Sydney entry for Bricks, written by Ron Ringer (2008):

In the early 1840s there was little to suggest that the area was about to be transformed into an industrial conurbation. As brickmasters trundled their families and chattels along New Town's King Street in search of the new El Dorado, the only indicators of industry was the presence of tanneries and leatherworks on the banks of Sheas Creek. Tanning, however, was a cottage industry rather than a major industrial enterprise. Brickmaking was different, and arguably constitutes the first wave of substantial industrial activity in Sydney. Certainly, with the establishment of yards on land acquired as a result of the subdivision known as the Needham Estate, and the close proximity to markets, the conditions for rapid development and industrial organisation on a larger scale were present.

Beneath the thin layer of surface clays, these early pioneers soon discovered deep bands of prime, brick-making shales belonging to the Wianamatta group, the brickmakers' equivalent of gold. Shale, which has the appearance of slate, must be crushed and ground into dirt before it can be pressed into bricks. The process requires heavy investment in plant and machinery, which had grave implications for family operations well before the end of the nineteenth century.

For the more prosperous and entrepreneurial brickmakers of the St Peters–Marrickville–Tempe district, it was only towards the end of the nineteenth century, with the formation of limited liability companies, that sufficient investment capital enabled production units to become large enough to meet the demand. Unsurprisingly, many family businesses failed, and ownership of brick firms was gradually concentrated into the hands of relatively few companies. The transition, which took nearly a century, was spurred by short-term fluctuations in the trade cycle, and catastrophic depressions (1840s, 1890s, and 1930s).

More than a century passed before houses again encroached on the brickfields and their fire and smoke-belching kilns, bringing issues of pollution to a head once more. For many residents, the end could not come soon enough. The last bricks were burnt in the main Austral yard opposite St Peters church in May 1983.

3.2 Industrial Development of the Austral Brick pit

The following history is summarised from, *The Brickmasters 1788 – 2008* and the Dictionary of Sydney entry for Bricks, both written by Ron Ringer in 2008. It is intended to be a brief history of the site's usage since its purchase by the Austral Brick Company.

In 1908 on the 25th of September, the Austral Brick Company became incorporated with a starting capital of 20 000£. Although few records exist to properly document the first years of

the company, it appears to have been comprised of members from the building and real estate industries whom saw an opportunity for speculative investment in a growing industry. The first few driving members which can be tied to Austral Bricks, either by correspondence or oral history, appear to be the first managing director, Edwin 'Ted' Specman, real estate owner Ernest Alfred Turtle, company secretary W.C. Turland, and his immediate predecessor A. Grant. (Ringer, p.106-108).

In December 1908, the investing members of Austral Bricks purchased the adjoining properties of Petersleigh and Finningham located on 238 and 196 King Street (see Fig 3). Both properties covered a modest area of approximately 16 acres and consisted of what was said to be good clay and shale. In the same month the company sent a letter to council declaring their intention to construct a brick plant and brick pit on the site. This site known formerly as the Austral Brick Pit now constitutes sections of the currently named Westconnex Stage 2 interchange (Ringer, 2008, p.109-111).

The following year (1909) saw a flurry of activity for the Austral Brick Company, with kilns, chimneys and sheds being constructed while pit boundaries were drawn and blasted. Machinery for the project was sourced both locally and abroad from England, circumscribed by availability and cost. By late 1909 The plant was in production, making good quality dry press bricks from clays and crushed hard shales (Ringer, 2008, p.109-111).

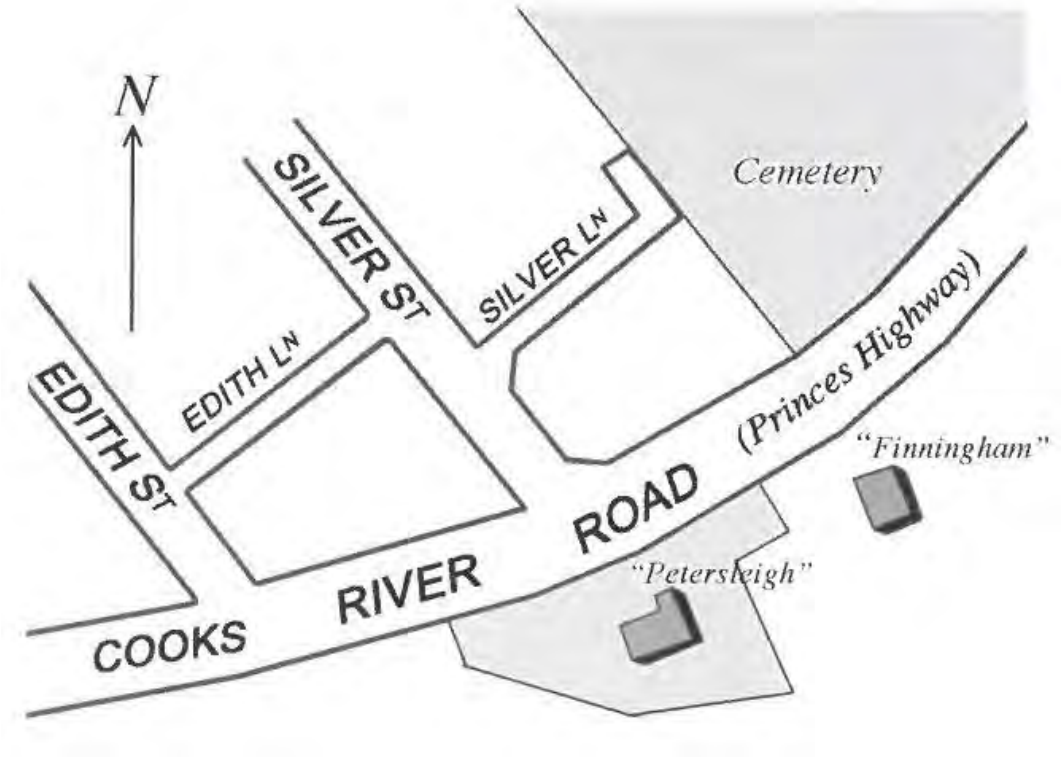


Figure 4. Location of Petersleigh" and Finningham in relation to Cook's River Road. No photoprahps surviv of either of these two mid-Victorian buildings. (Source: Ron Ringer (2008) "The Brickmasters 1788-2008", Dry Press Publishing, p.109)

The Austral Brick Company Ltd was one of a number of small brick making companies established during a busy 15-year window from 1900 to 1915. These companies were all buoyed by a general economic upturn due to population growth, post-federation optimism and excitement over the newly emerging ideas in urban design. In spite of archaic supply practices and a brief demand slump caused by drought, many of these middling companies were able to operate successfully in the semi-ruralised landscapes of what are currently the inner-western suburbs. The physical impact and labour intensive nature of the brick manufacturing industry came to underwrite the physical and social make up of St Peter's and Alexandria during the course of the late nineteenth to the mid twentieth century. (Ringer, the Brickmasters, p.115-119).

In 1912, shrewd real estate decisions by the company made possible the purchasing of another parcel of land measuring 821 by 200 feet along Canal Road, enlarging the size of the Austral Brick Pit. In the preceding year of 1913, the original investors of the Austral Brick Company Ltd set up a new company under the same title and bought out its predecessor. The result was a healthy increase in the company's start-up capital, improving it from 20 000£ to £100 000 just 5 years later. This business acumen further established the success the brick pit and placed it among the more profitable pits in the area despite competition from the larger Bedford Brick Works. (Ringer, the Brickmasters, p.120-122)

The immediate post First World War period saw the Austral Brick Company manage long term growth by dedicating a substantial amount of time and money to attracting a number of young builders and technical professionals. Furthermore, throughout the 1920s, under Chief Engineer Bob Young, the company followed a pattern of forward-thinking management by modernising its equipment away from steam technologies and towards electricity and diesel powered machines. However, by even as early as 1927 post war growth had had created such a demand that Austral Bricks equivalent growth afforded them the opportunity to purchase three further parcels of land on King Street and expand their clay and shale holdings in the area next to equivalent competitor Central Brick and Co. (Ringer, the Brickmasters, p.134; 148).

The parcels of land acquired by the Austral Brick Company during its growth periods from 1908 through to 1927 constituted the land clay and shale holdings bounded by the Austral yards and the Ralford yards. Operating strictly as a subsidiary of The Austral Brick Company and never as an incorporated site, the Ralford yards were a small brickwork comprised of 1 patent kiln and under Austral continued to work until 1961 (see Fig 4). Throughout the 1930s, as the clays and shales at greater depth began to get harder to excavate, new machinery was installed at the Austral Brick yard ensuring several more decades of production. (Ringer, the Brickmasters, p.189; 204).

During the 1930s depression the Austral Brick Company pursued an aggressive price cutting strategy under the management of William King Dawes, driving many manufacturers to either sell or file for bankruptcy. Seizing the opportunity, Dawes purchased the preeminent Bedford Brick Works and over the next few decades would come to incorporate the Warren Brick Company, the Carrington Brick Company, St Peters Brick Company and the City Brick Company. As a result of these other holdings, by the 50s emphasis shifted away from the Austral brick pit itself until it eventually became defunct. In 1984 the last brick manufacturer in St Peters was at the Bedford Brick Yard (Ringer, Dictionary of Sydney Bricks).

Upon the closure of the Austral Brick Pit, the area was used as a waste management facility. This continued up until 2015 when the site was taken over for the WestConnex New M5 project.

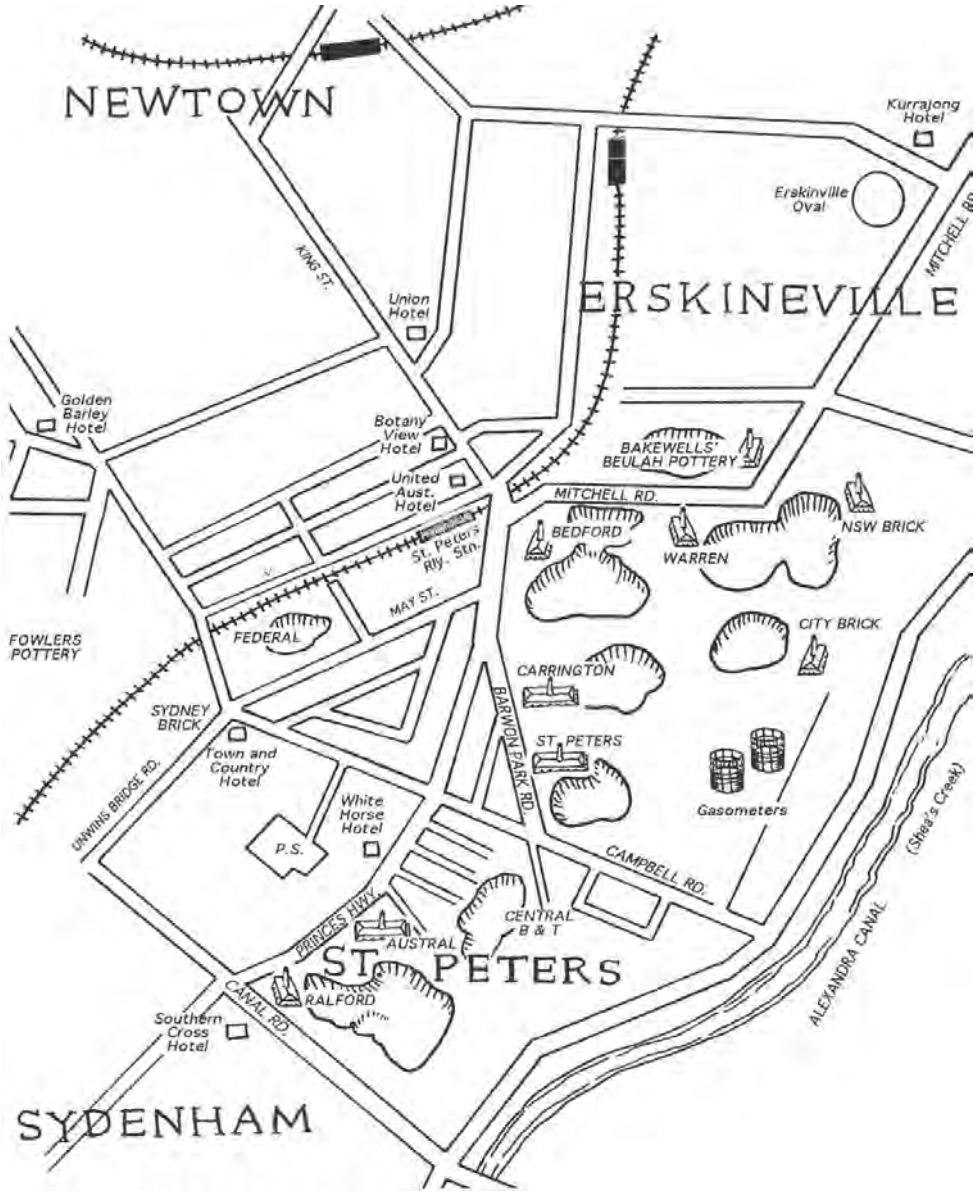


Figure 5. Brickyards and hotels in the district of St Peters, circa 1945. (Source: Ron Ringer (2008) "The Brickmasters 1788-2008", Dry Press Publishing, p. 252)

Figure 6. View of pit face looking west, late 1980s (Source: McNally (1998): 96)

Figure 7. Landfilling operations 16 Nov 1989, pit face at left ,'Aerial view of Albert Street Disposal Depot, St Peters' (Source: NSCA CRS 904/1028)

3.3 St Peters Geological Site Educational Purposes

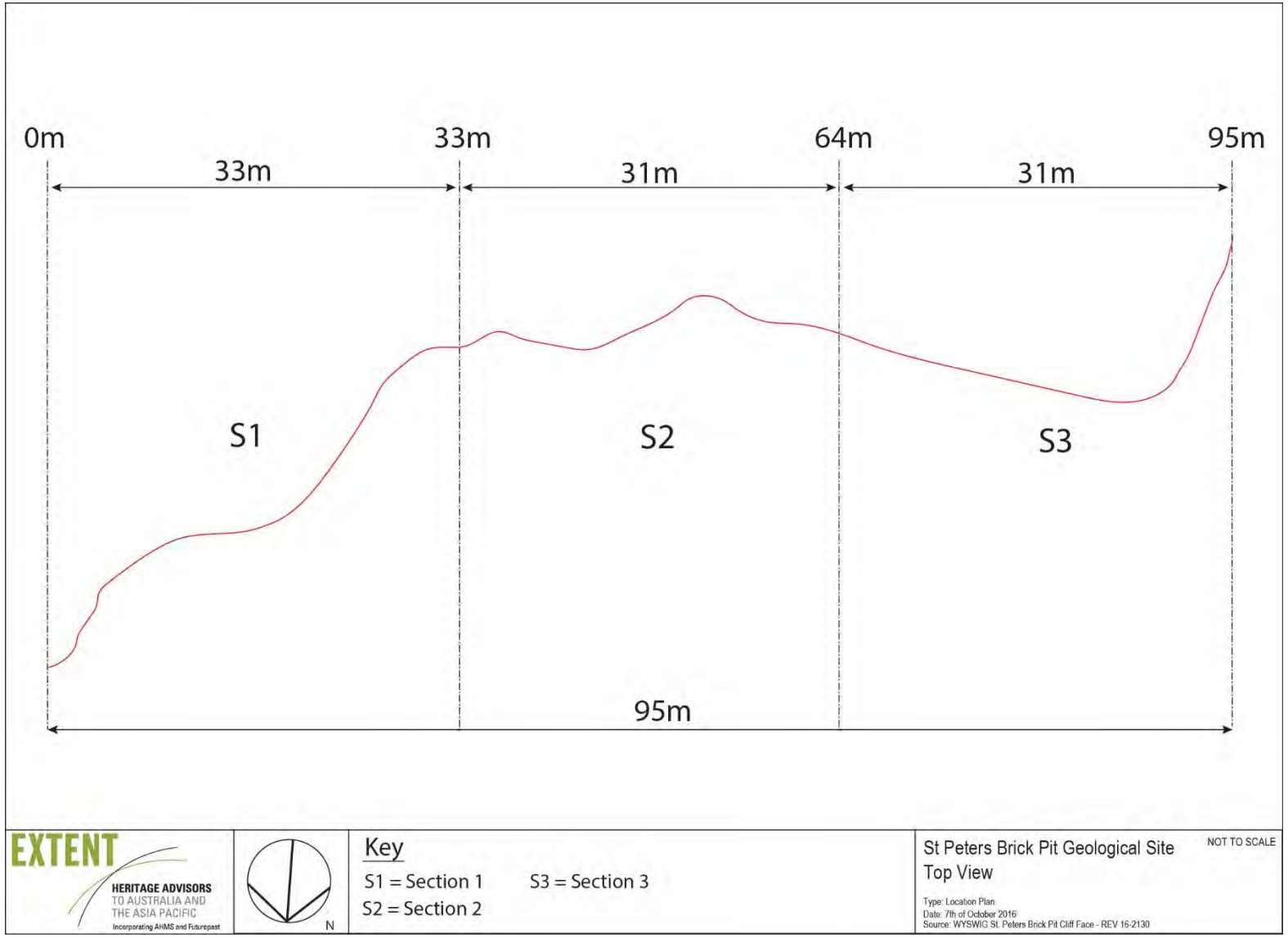
The following has been quoted from the St Peters Brick Pit Geological Site Assessment of Impact written by Dr Andrew Simpson.

The exposure of Ashfield Shale at the St Peters site was used extensively by the Geology Department at the University of Sydney for undergraduate science education (email from D. Branagan to author 24.05.16), in particular as an exemplar for understanding the development and geological history of the Basin. This practice ceased in the 1970s but material that was produced specifically for the purposes of tertiary education of students is currently being sought. It has also been reported (Branagan 2016 pers com) that a film was made of the site and the tuition of students in the field. The correspondent is unsure if a copy of the film still exists but a search is being undertaken.

4. Photo Location Plans

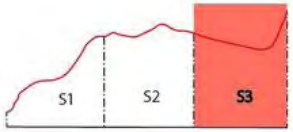
The following location plan is derived from the WYSWIG 3D scans *Drawing No. St. Peters Brick Pit Cliff Face REV 16-2130*. These plans are indented to provide relevant dimensions of the St Peters Geological Site for the purpose of providing accurate description. For the purpose of this photographic archival recording the subject site has been divided into three sections and shall be referred to as such: each section is marked as either Section 1, Section 2, or Section 3.

The red line representing the cliff face is measured from the scree deposit at the base of cliff and not the cliff face itself.


0m
33m
64m
95m
33m
31m
31m
S1
S2
S3
95m
EXTENT
HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast
N
Key
S1 = Section 1
S2 = Section 2
S3 = Section 3
St Peters Brick Pit Geological Site
Top View
NOT TO SCALE
Type: Location Plan
Date: 7th of October 2016
Source: WYSWIG St. Peters Brick Pit Cliff Face - REV 16-2130


S1
S2
S3
DANGER
FALLING DEBRIS
DO NOT ENTER
EXTENT
HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast
N
St Peters Brick Pit Geological Site
Front on view - Section 1
NOT TO SCALE
Type: Section Panel
Date:11th of October 2016
Source: St Peters Brick Pit Geological Site Archival Recording


S1
S2
S3
EXTENT
HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast
N
St Peters Brick Pit Geological Site
Front on view - Section 2
NOT TO SCALE
Type: Section Panel
Date:11th of October 2016
Source: St Peters Brick Pit Geological Site Archival Recording



EXTENT HERITAGE ADVISORS TO AUSTRALIA AND THE ASIA PACIFIC
Incorporating AHMS and Futurepast

N

St Peters Brick Pit Geological Site
Front on view - Section 3

NOT TO SCALE

Type: Section Panel
Date: 11th of October 2016
Source: St Peters Brick Pit Geological Site Archival Recording

5. Photographic recording sheets

Site Name:	St Peters Brickpit Geological Site
Photographer:	[redacted]
Date:	16th August 2016
Camera:	Canon EOS 5D and 7D
Lens:	10-20mm, 24-80mm
Comments:	Archival recording of site prior to Westconnex Stage 2 works

Image N	Direction	Details	Image
001_GEOLOGICAL_SITE_2016	North	Section 1 view with 5-metre measure to indicate scale.	
002_GEOLOGICAL_SITE_2016	North	Section 1 view with 5-metre measure to indicate scale.	
003_GEOLOGICAL_SITE_2016	North	Section 1 view with 5-metre measure to indicate scale.	
004_GEOLOGICAL_SITE_2016	North	Section 1 view with, 5-metre measure to indicate scale	

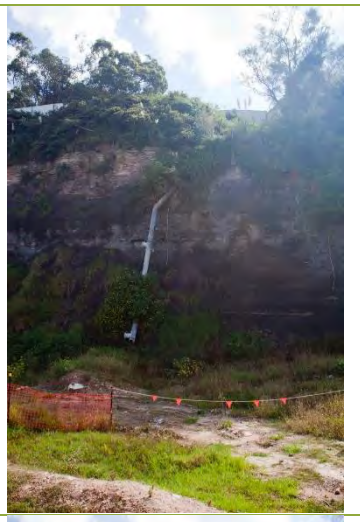
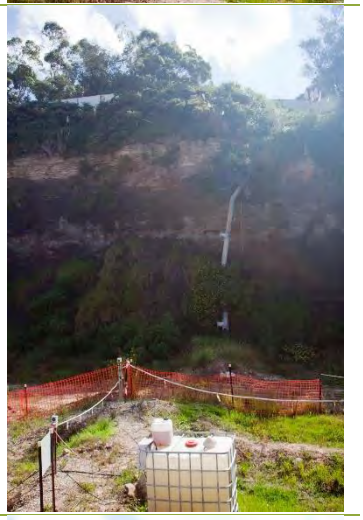
005_GEOLOGICAL_SITE_2016	North	Section 1, detail of overhanging vegetation on far eastern edge.	
006_GEOLOGICAL_SITE_2016	North	Section 1, frontal view of scarp face.	
007_GEOLOGICAL_SITE_2016	North	Section 1, frontal view of scarp face.	

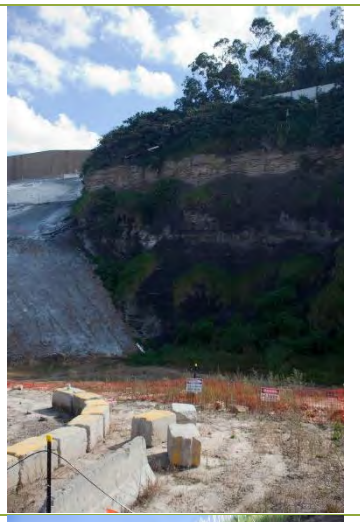
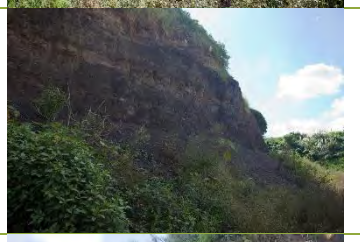
008_GEOLOGICAL_SITE_2016	North	Section 1, frontal view of scarp face.	
009_GEOLOGICAL_SITE_2016	North	Section 1, frontal view of scarp face.	
010_GEOLOGICAL_SITE_2016	North	Section 2, frontal view of scarp face.	

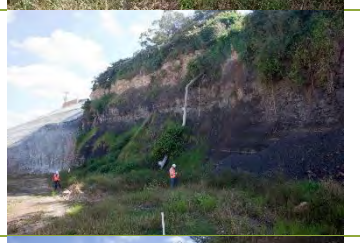
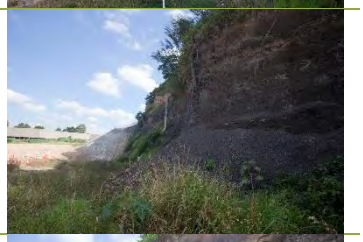
011_GEOLOGICAL_SITE_2016	North	Section 2, frontal view of central scarp face projection.	
012_GEOLOGICAL_SITE_2016	North	Section 2, frontal view of scarp face projection.	
013_GEOLOGICAL_SITE_2016	North	Section 2, frontal view of scarp.	

014_GEOLOGICAL_SITE_2016	North	Section 2, frontal view of scarp.	
015_GEOLOGICAL_SITE_2016	North	Section 2, frontal view of scarp.	
016_GEOLOGICAL_SITE_2016	North	Section 2, frontal view of scarp.	

017_GEOLOGICAL_SITE_2016	North	Section 3, frontal view of scarp.	
018_GEOLOGICAL_SITE_2016	North	Section 3, view of scarp face and drainage pipe.	
019_GEOLOGICAL_SITE_2016	North	Section 3, view of scarp face and drainage pipe.	

020_GEOLOGICAL_SITE_2016	North	Section 3, view of scarp face and drainage pipe.	
021_GEOLOGICAL_SITE_2016	North	Section 3, view of scarp face and drainage pipe.	
022_GEOLOGICAL_SITE_2016	North	Section 3, frontal view of scarp face.	

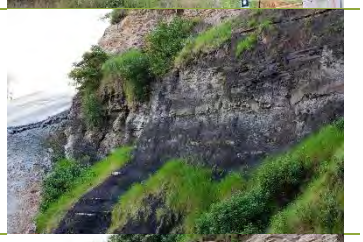
023_GEOLOGICAL_SITE_2016	North-West	Section 3, view of scarp face and benched earth slope.	
024_GEOLOGICAL_SITE_2016	North-West	Section 1, view of central scarp projection from eastern side of scarp.	
025_GEOLOGICAL_SITE_2016	North	East of central scarp projection, detailing scarp face.	
026_GEOLOGICAL_SITE_2016	North	Section 1, detailing scarp face and overhanding vegetation.	
027_GEOLOGICAL_SITE_2016	North-East	Section 2, view of central scarp projection from western side of scarp	
028_GEOLOGICAL_SITE_2016	North-West	Section 2, view of western side of scarp face.	

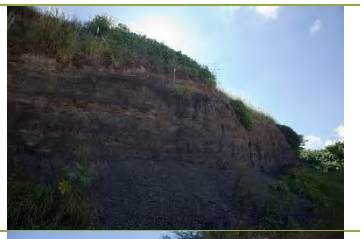
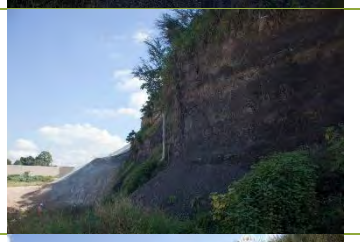
029_GEOLOGICAL_SITE_2016	North-West	Section 2, view of western side of scarp face	
030_GEOLOGICAL_SITE_2016	North-West	Section 2, view of western side of scarp face.	
031_GEOLOGICAL_SITE_2016	North-West	Section 2, view of western side of scarp face and benched earth slope.	
032_GEOLOGICAL_SITE_2016	North-West	Section 2, view along western scarp face, including benched earth slope.	
033_GEOLOGICAL_SITE_2016	North-West	Section 2, detail of scarp face.	
034_GEOLOGICAL_SITE_2016	North-West	Section 2, detail of scarp face.	
035_GEOLOGICAL_SITE_2016	North-West	Section 2, detail of geological bands in scarp face.	
036_GEOLOGICAL_SITE_2016	North-West	Section 2, detail of geological bands in scarp face.	

037_GEOLOGICAL_SITE_2016	North-West	Section 2, View of geological bands in scarp face.	
038_GEOLOGICAL_SITE_2016	North-East	Section 3, detail of geological bands in scarp face.	
039_GEOLOGICAL_SITE_2016	North-East	Section 3, detail of geological bands in scarp face.	
040_GEOLOGICAL_SITE_2016	North	Section 3, detail of scree deposit at foot of scarp face.	
041_GEOLOGICAL_SITE_2016	North	Section 3, detail of geological band and scree deposit.	
042_GEOLOGICAL_SITE_2016	North	Section 3, detail of exposed scarp face degradation.	
043_GEOLOGICAL_SITE_2016	North	Section 3, detail of exposed scarp face degradation.	
044_GEOLOGICAL_SITE_2016	North	Section 3, detail of exposed scarp face degradation.	

045_GEOLOGICAL_SITE_2016	North	Section 3, detail of exposed scarp face degradations.	
046_GEOLOGICAL_SITE_2016	North-West	Section 3 detail of geological band and scree deposit at the foot of the scarp face.	
047_GEOLOGICAL_SITE_2016	North	Section 3, detail of geological band and scree deposit at the foot of the scarp face.	
048_GEOLOGICAL_SITE_2016	North	Section 3, view of vegetation on scarp face.	
049_GEOLOGICAL_SITE_2016	North	Section 3, view of vegetation on scarp face.	

050_GEOLOGICAL_SITE_2016	North	Section 3, frontal view of vegetation on scarp face.	
051_GEOLOGICAL_SITE_2016	North	Section 3, frontal view of vegetation on scarp face.	
052_GEOLOGICAL_SITE_2016	North	Section 3, view of western edge of scarp face.	
053_GEOLOGICAL_SITE_2016	North-West	Section 3, view of western edge of scarp face.	
054_GEOLOGICAL_SITE_2016	North	Section 3, view of western edge of scarp face.	

055_GEOLOGICAL_SITE_2016	North-East	Section 3, view east along scarp toward central scarp face projection.	
056_GEOLOGICAL_SITE_2016	North-West	Section 3, view of lower section of western scarp face.	
057_GEOLOGICAL_SITE_2016	North-West	Section 3, view of upper and lower section of western scarp face.	
058_GEOLOGICAL_SITE_2016	North	Section 3, view of geological band and scree deposit at the foot of the scarp face.	
059_GEOLOGICAL_SITE_2016	North-West	Section 3, view of vegetation and geological band.	
060_GEOLOGICAL_SITE_2016	North-West	Section 1, view toward the west scarp face projection.	
061_GEOLOGICAL_SITE_2016	North-West	Section 1, view toward the west of central scarp face projection.	
062_GEOLOGICAL_SITE_2016	North-East	Section 1, view toward the eastern edge of the scarp face.	

063_GEOLOGICAL_SITE_2016	North-East	Section 1, view of scree deposit and scarp face.	
064_GEOLOGICAL_SITE_2016	North-West	Section 2, view of scree deposit, scarp face and benched earth slope.	
065_GEOLOGICAL_SITE_2016	North-West	Section 2, view of scree deposit, scarp face and benched earth slope.	
066_GEOLOGICAL_SITE_2016	North-East	Section 2, eastern view of central scarp face projection.	
067_GEOLOGICAL_SITE_2016	North-East	View of eastern side of scarp face deposit from central scarp face projection.	
068_GEOLOGICAL_SITE_2016	West	Section 2, view of WestConnex Stage 2 Interchange site, from scarp face.	
069_GEOLOGICAL_SITE_2016	South-West	Section 2, view of WestConnex Stage 2 Interchange site, from scarp face.	
070_GEOLOGICAL_SITE_2016	South-East	Section 3, view of WestConnex Stage 2 Interchange site, from scarp face.	

071_GEOLOGICAL_SITE_2016	East	Section 3, view of WestConnex Stage 2 Interchange site, from scarp face.	
072_GEOLOGICAL_SITE_2016	North	Frontal view of entire Scarp face.	
073_GEOLOGICAL_SITE_2016	North	View of western scarp face and benched earth slope.	
074_GEOLOGICAL_SITE_2016	North	View of eastern edge of scarp face and boardering vegetation.	
075_GEOLOGICAL_SITE_2016	North-West	View of WestConnex interchange site and benched earth slope.	
076_GEOLOGICAL_SITE_2016	North	View of entire scarp face.	
077_GEOLOGICAL_SITE_2016	North	View of entire scarp face.	
078_GEOLOGICAL_SITE_2016	North	View of entire scarp face.	

079_GEOLOGICAL_SITE_2016	North-West	View of scarp face and benched earth slope.	

6. Photographic proof sheets

Geological Site, St Peters
Archival Photographic Recording - 2016 - Photographer: [redacted]

001_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/160 s

002_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/250 s

003_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/200 s

004_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/125 s

005_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/100 s

006_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/250 s

007_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/200 s

008_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/125 s

009_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/100 s

010_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/100 s

011_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/125 s

012_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/250 s

013_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/125 s

014_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/100 s

015_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/100 s

016_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/100 s

017_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/80 s

018_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/80 s

019_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/125 s

020_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/160 s

Page 1 of 4

Geological Site, St Peters
Archival Photographic Recording - 2016 - Photographer: [redacted]


021_GEOLOGICAL_SITE_2016
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022_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/125 s


023_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/160 s


024_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/160 s


025_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/100 s


026_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/250 s


027_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/250 s


028_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/200 s


029_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/200 s


030_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/200 s


031_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/200 s


032_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/400 s


033_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/250 s


034_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/320 s


035_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/250 s


036_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/320 s


037_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/250 s


038_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/200 s


039_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/200 s


040_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s

Geological Site, St Peters
Archival Photographic Recording - 2016 - Photographer: [redacted]


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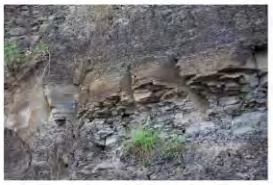
f/8 ISO 400 1/125 s


042_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/160 s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044_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


045_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


046_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/100 s


047_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/100 s


048_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


049_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


050_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


051_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


052_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


053_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/100 s


054_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


055_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/160 s


056_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


057_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


058_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/100 s


059_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/125 s


060_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/320 s

Geological Site, St Peters
Archival Photographic Recording - 2016 - Photographer: [redacted]

061_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/250 s

062_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/250 s

063_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/320 s

064_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/320 s

065_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/200 s

066_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/200 s

067_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/400 s

068_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/1600 s

069_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/2500 s

070_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/3200 s

071_GEOLOGICAL_SITE_2016
f/8 ISO 400 1/1600 s

072_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/400 s

073_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/400 s

074_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/500 s

075_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/1000 s

076_GEOLOGICAL_SITE_2016
f/8 ISO 200 1/640 s

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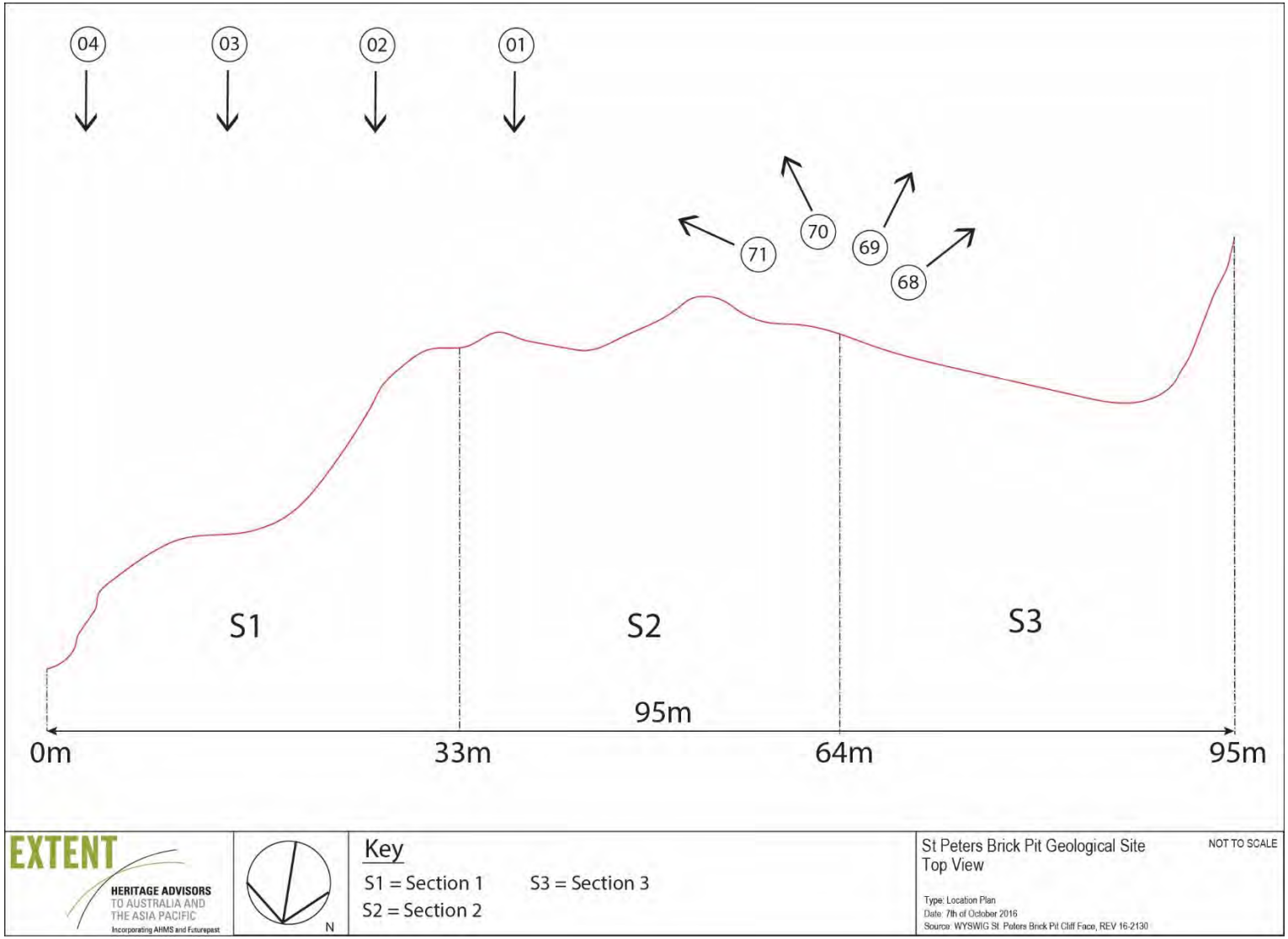
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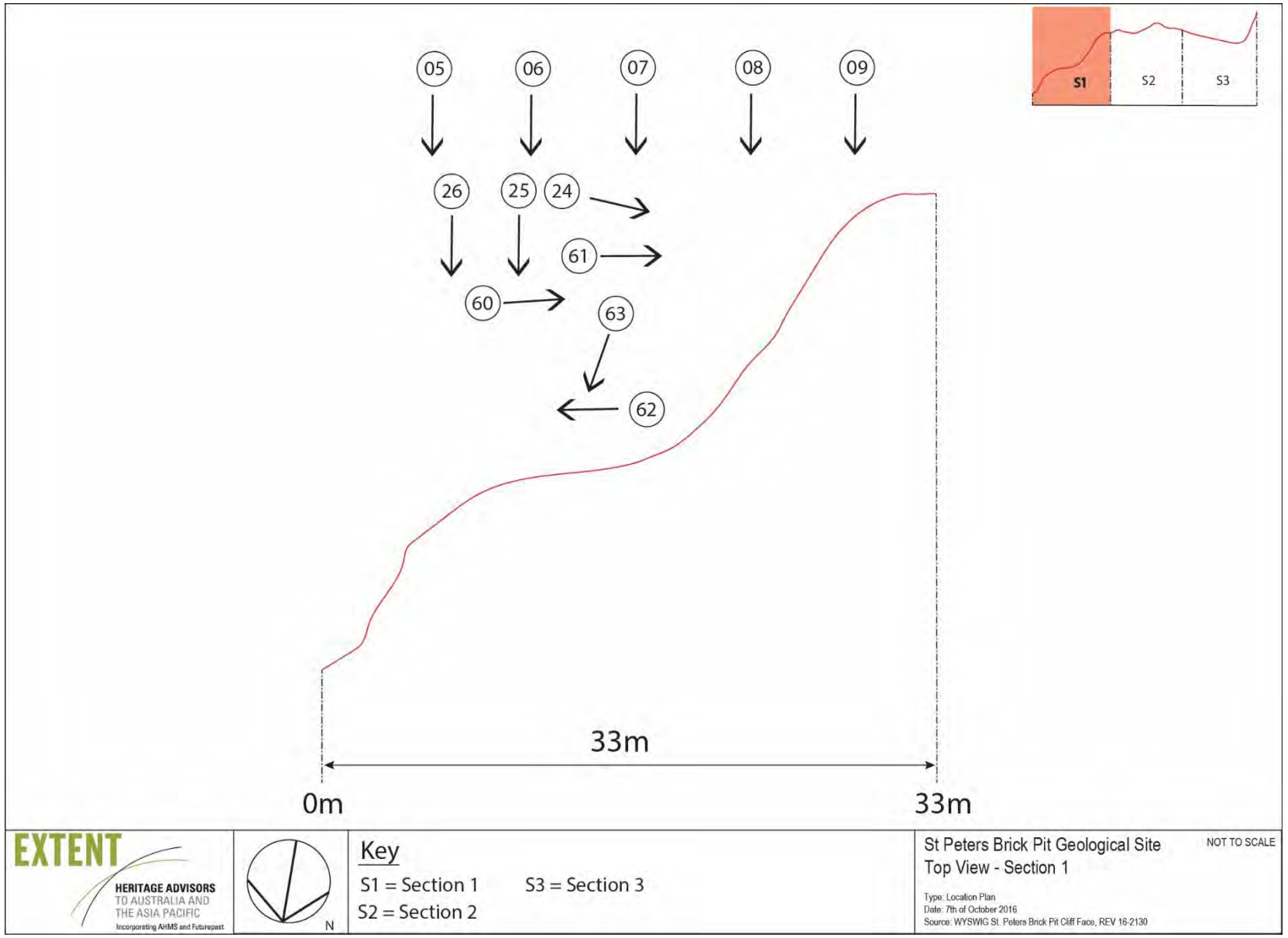
03
02
01
71
70
69
68
S1
S2
S3
95m
0m
33m
64m
95m
EXTENT
HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast
N
Key
S1 = Section 1
S2 = Section 2
S3 = Section 3
St Peters Brick Pit Geological Site
Top View
NOT TO SCALE
Type: Location Plan
Date: 7th of October 2016
Source: WYSWIG St. Peters Brick Pit Cliff Face, REV 16-2130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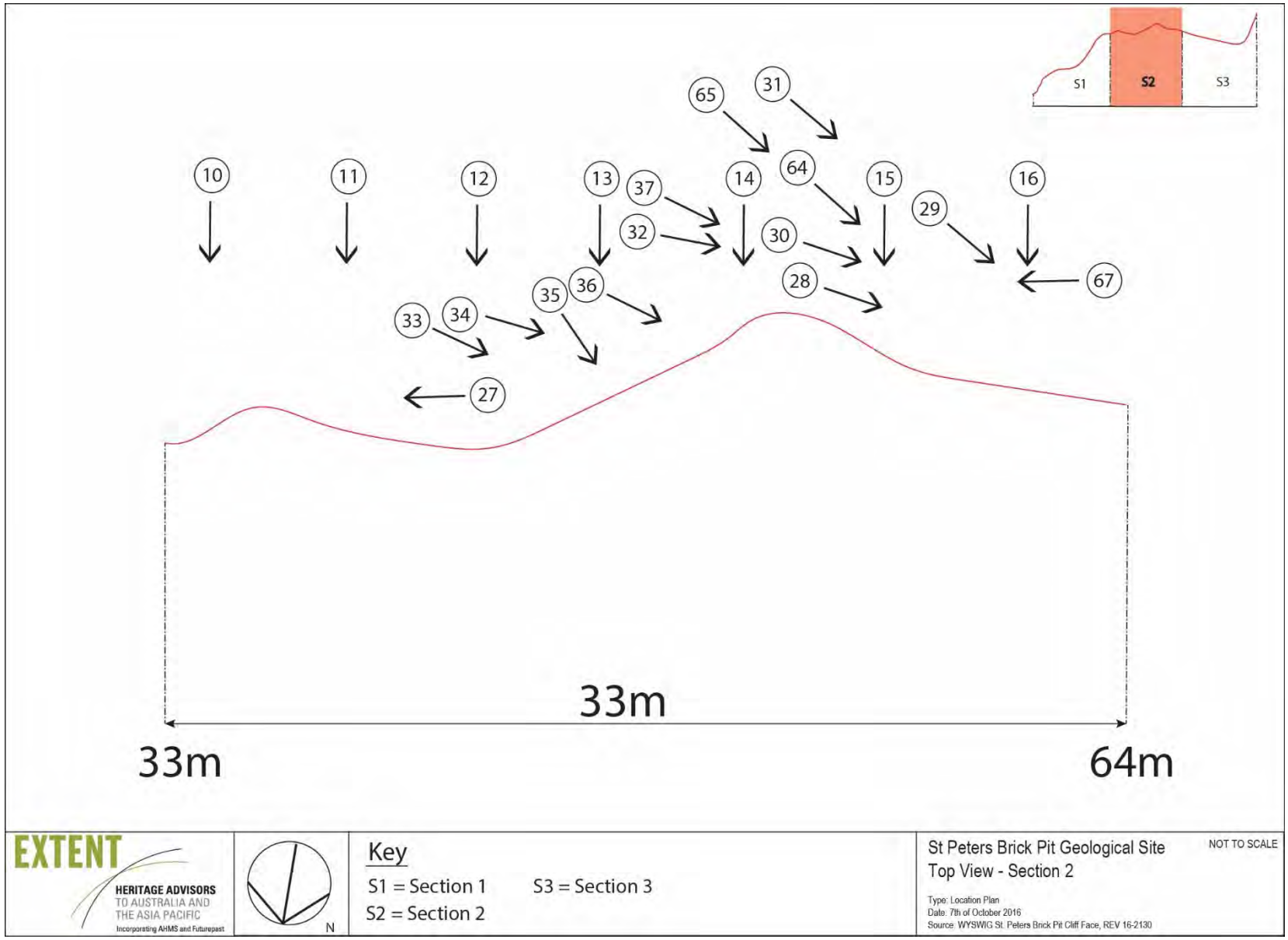
EXTENT
HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast
N
Key
S1 = Section 1
S2 = Section 2
S3 = Section 3
St Peters Brick Pit Geological Site
Top View - Section 1
NOT TO SCALE
Type: Location Plan
Date: 7th of October 2016
Source: WYSWIG St. Peters Brick Pit Cliff Face, REV 16-2130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33m
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64m
EXTENT
HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast
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S1 = Section 1
S2 = Section 2
S3 = Section 3
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Top View - Section 2
NOT TO SCALE
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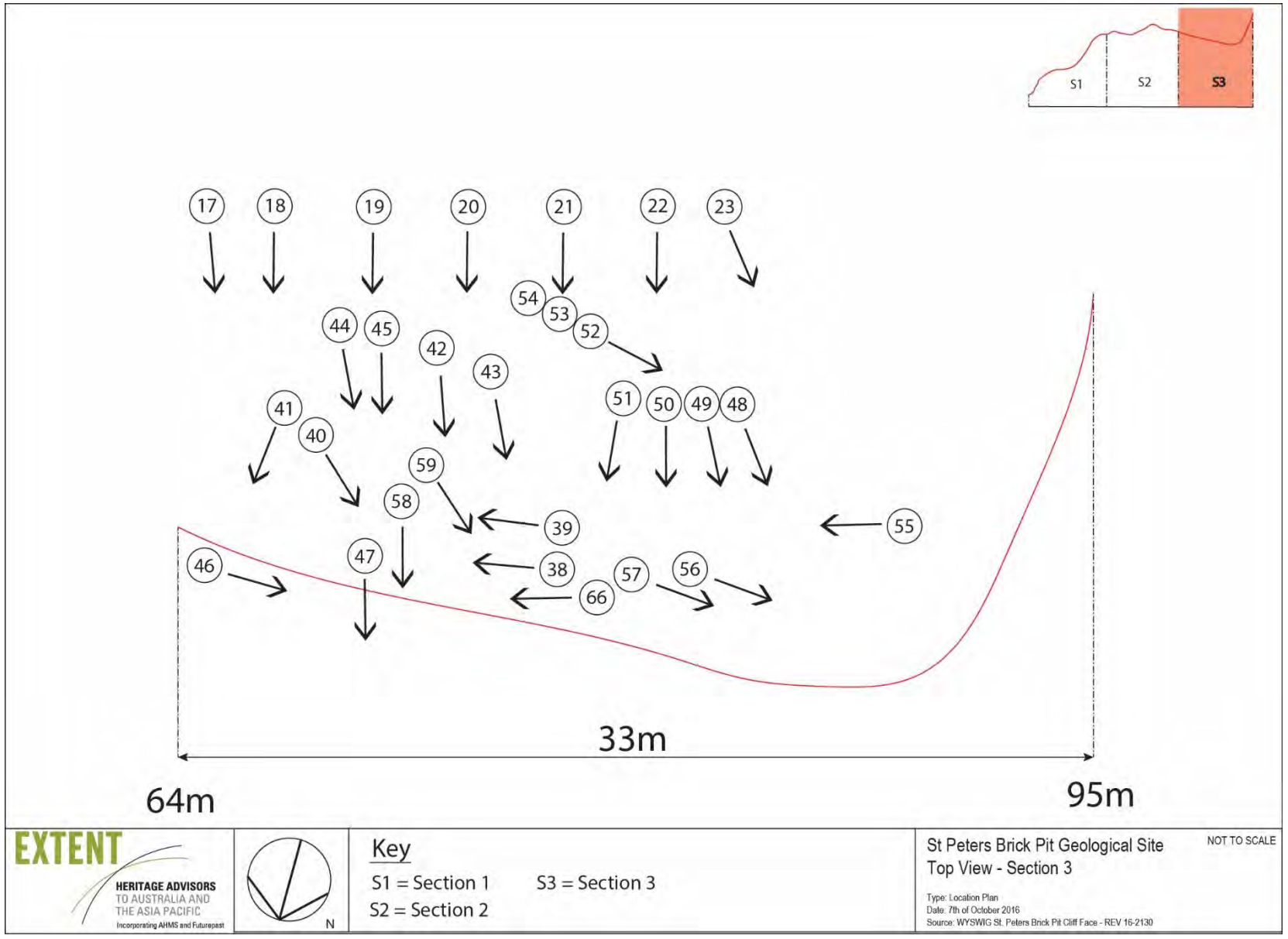
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HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast
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Key
S1 = Section 1
S2 = Section 2
S3 = Section 3
St Peters Brick Pit Geological Site
Top View - Section 3
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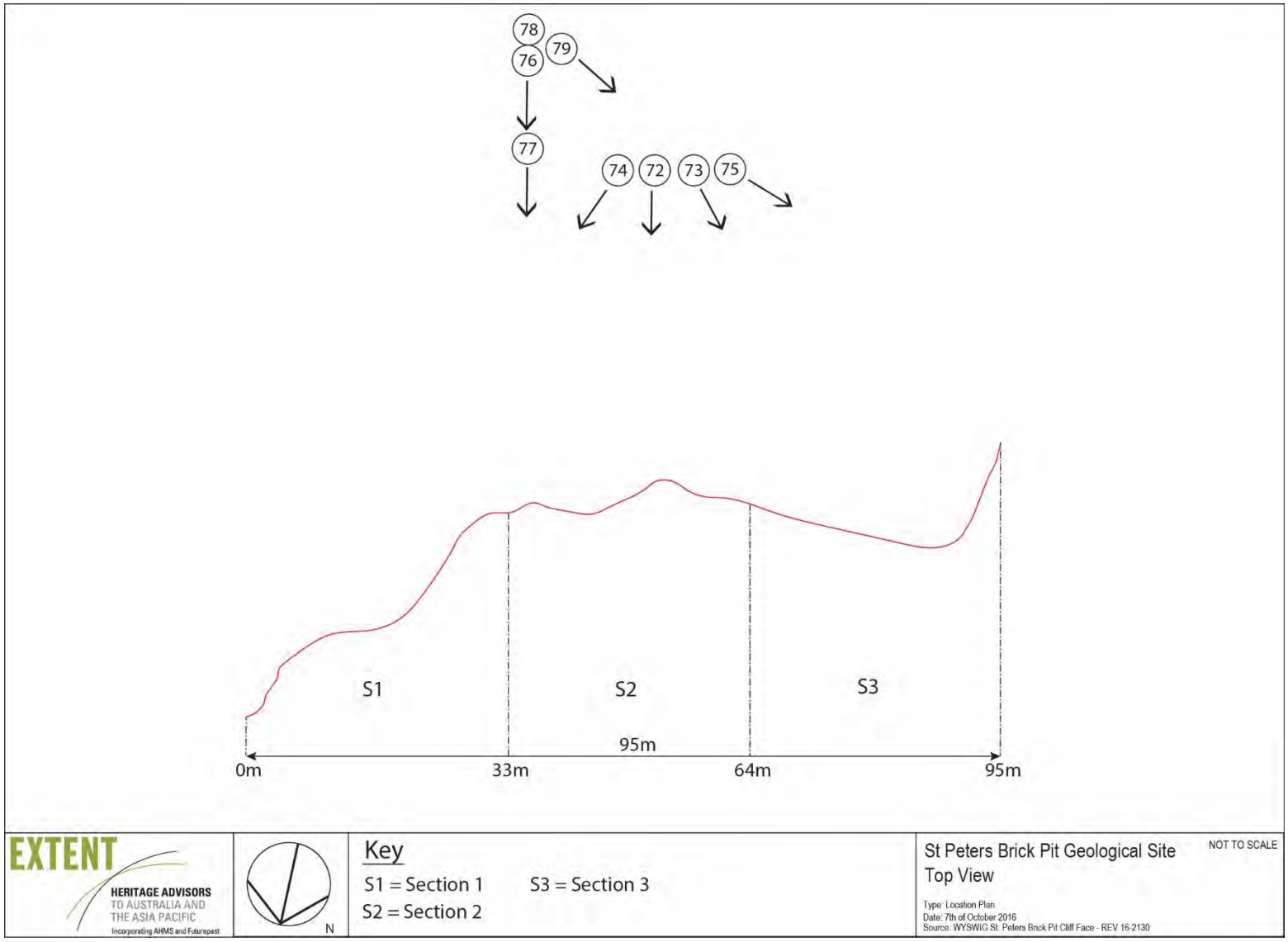
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S1
S2
S3
95m
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64m
95m
EXTENT
HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast
N
Key
S1 = Section 1
S2 = Section 2
S3 = Section 3
St Peters Brick Pit Geological Site
Top View
NOT TO SCALE
Type: Location Plan
Date: 7th of October 2016
Source: WYSWIG St. Peters Brick Pit Cliff Face - REV 16-2130

7. Measured Drawings

EXTENT
HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast

N

St Peters Geological Brick Pit

NOT TO SCALE

Type: 3D Photogrametry Image (Front View)
Date: 15th of Feburary 2017
Source: Extent Heritage

EXTENT
HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast

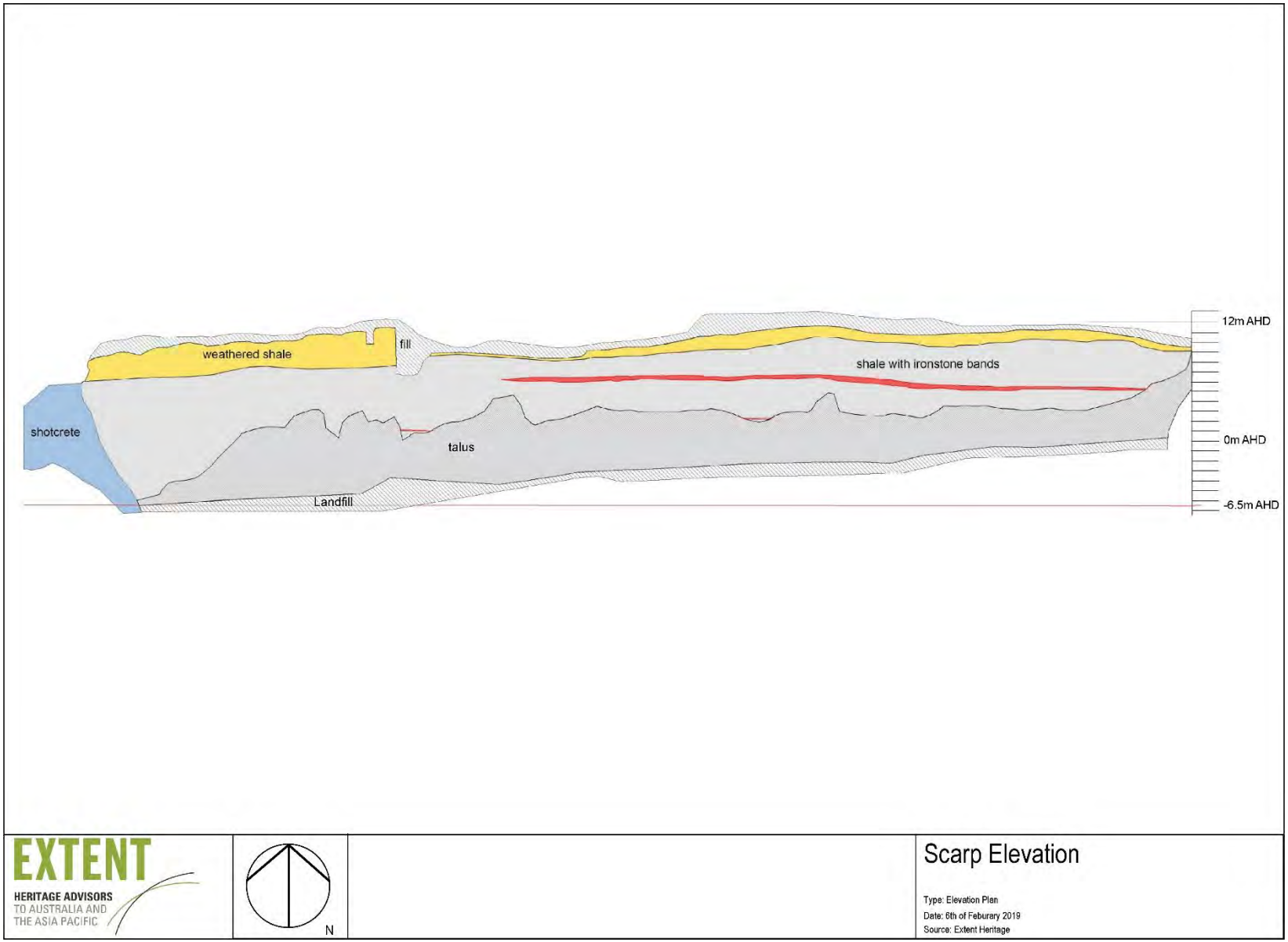
N

Key
Base Contour Line
Distance from Base
Contour Line to rock face

St Peters Geological Brick Pit

NOT TO SCALE

Type: Aerial Imagery
Date: 15th of Feburary 2017
Source: NearMap Pty Ltd


weathered shale
fill
shale with ironstone bands
shotcrete
talus
Landfill
12m AHD
0m AHD
-6.5m AHD
EXTENT
HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
N
Scarp Elevation
Type: Elevation Plan
Date: 6th of Feburary 2019
Source: Extent Heritage

8. BIBLIOGRAPHY

G H McNally and D F Branagan, 'The St Peters brickpits: their geology, operation and reclamation, and adjacent Quaternary shoreline' in McNally G H and Jankowski J, Environmental Geology of the Botany Basin, EEHSG of the Geological Society of Australia, 1998

Register of the National Estate, St Peters Brickpit Geological Site, Canal Rd, St Peters NSW, Australia, Place ID 16240.

Ron Ringer (2008), Bricks, published by Dictionary of Sydney, http://dictionaryofsydney.org/entry/bricks

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[redacted] (2016), WestConnex New M5 St Peters Brick Pit Geological Sit Assessment of Impact, Extent Heritage.

Appendix C: HASSEL Furniture & Signage Strategy

Furniture & Signage

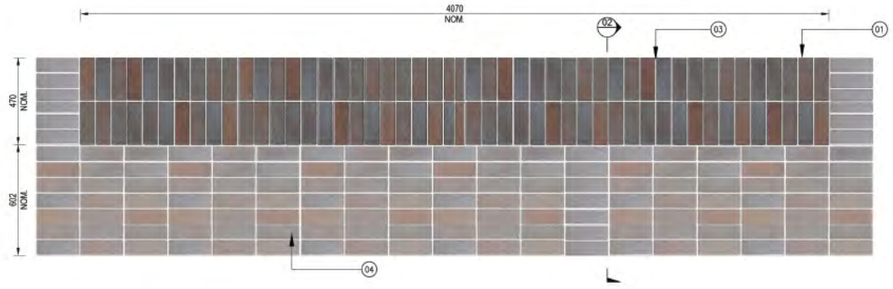
CHARACTER IMAGES - SEATING

Option 1 (Preferred)

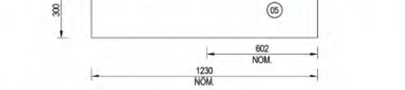
existing custom seating - Sydney Park

- Bespoke furniture recently installed at Sydney Park
- Close proximity to SPI and Local Roads
- Ties in with heritage importance of the site and SWTC requirements, including but not limited to
  - Appendix B.11 Section 11 (c) (iii) A - most importantly carry the landscape character of Sydney Park across Campbell Road;
  - Appendix B.11 Section 11 (g) - Where appropriate opportunities exist, certain elements must reflect or express the significant heritage of the site.
  - Appendix B.11 Section 12 (b) (i) - St Peters Interchange must be an iconic interchange with a high degree of legibility for clear wayfinding.

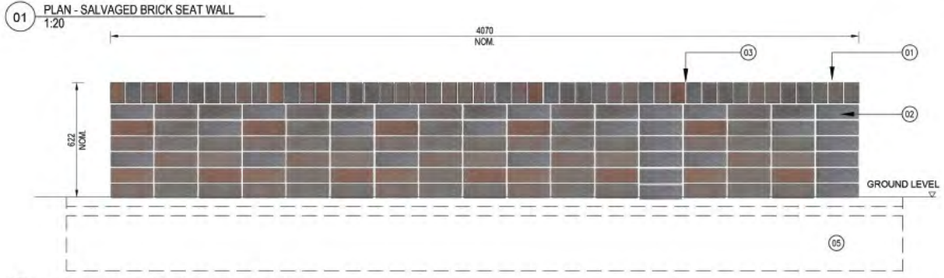
custom brick furniture - Example from M4 East UDLP



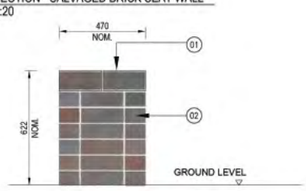
01 PLAN - SALVAGED BRICK SEAT WALL
1:20



02 SECTION - SALVAGED BRICK SEAT WALL
1:20



03 FRONT ELEVATION - SALVAGED BRICK SEAT WALL
1:20



04 SIDE ELEVATION - SALVAGED BRICK SEAT WALL
1:20

Furniture & Signage

CHARACTER IMAGES - SEATING

Option 2

existing furniture - Sydney Park

- Street Furniture Australia - Plaza Suite

Option 3

proposed furniture suite - City of Sydney

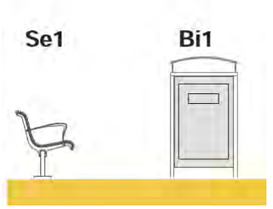
- Sydney Streets Code 2013 - Part C.2.3 - Local Areas Standard Palette

Indicative images representative of the updated furniture set.

Option 4

proposed furniture suite - Inner West Council

- Marrickville Public Domain Design Guide - September 2016 DRAFT



Se1 Seat Type 1

Type
Classic Plaza Seat

Known Supplier
Street Furniture Australia or Similar Approved

Description
Classic, contoured seat supported by strong marine-grade stainless steel frames. Street furniture uses sustainably sourced timber from certified managed forests.

Dimension
Battons
40mm x 20D x 1750L

Material and Finish
Battons: Eco-accredited hardwood 'lacquered'
Arms: Stainless Steel or Hot Dip Galvanised and Powdercoated

Powdercoated
'Interpon bronze'- Heritage Application
Black - Standard Application
To match adjacent pallete- refer section 4

Anti-Graffiti Coating
To manufacturers specification

Fixing:
Surface

Bi1 Bin enclosure Large

Material
Stainless Steel
Frame Bin Enclosure
Product Code: WBE-F240

Known Supplier
Street Furniture Australia or Similar Approved

Dimensions
725W x 810D x 1335H mm
fits 240L wheeled bin
(80L, 120L, 140L bin options also)

Thickness
Frame and Panels: Stainless Steel 316 Linished
Roof: Curved
Body:Solid

Furniture & Signage

PROPOSAL ATTENDER

Referencing local heritage

The art strategy places a large importance on aligning and integrating with the existing design language of Sydney Park.

The scale of the Brick kiln chimneys at the north west corner of Sydney Park make them the dominant feature of the local skyline. Listed as a heritage site, the former Bedford and later Austral Brickworks buildings have influenced design decisions throughout the park. The simplicity and elegance of reclaimed clay bricks have been used throughout the park to add detail to many of the basic urban elements as well as to create unique artistic features, such as the brick bird baths.

Using an artistic strategy that ties into the successfully restored and much loved heritage items in Sydney Park, means that 'Brickpit park' will be well received by the community and be easily integrated into future developments, extending the green network and cultural ribbon across Campbell Road.

Using brick art as a core strategy throughout the parklands remains honest to the recent history of the site.

Transformational Landscape

Art can be a healing force, it can be empowering and it can be enlightening.

The journey of the St Peters Interchange site has at times been difficult and turbulent but through this robust and informed urban design and art strategy, an honest and beautiful story of its transformation from forest to swamp, from quarry to landfill, from interchange to parkland can be told.

The way in which this strategy integrates the planting design, small scale art installations and tree planting with the portal veils will set a precedent for all future projects and provide an invigorating and enlightening space that serves the local community and strengthens the identity all of the adjoining neighbourhoods.

Layout

The following art strategy features are proposed throughout the site:

- Interpretive signage that responds to the sites former uses and natural history and tells the story of the sites history through a series of interpretive sign panels throughout the site
- Provision for three large art installation sites
- Landscape feature walls throughout the centre of the Interchange in glazed or select face brickwork that reflects the former use of the site
- Bridge abutments will typically be lined with a select masonry unit surfacing such as patterned, glazed or select face brickwork that reflects the former use of the site.

Refer adjoining Figure 3 for indicative outline, subject to detailed design development.

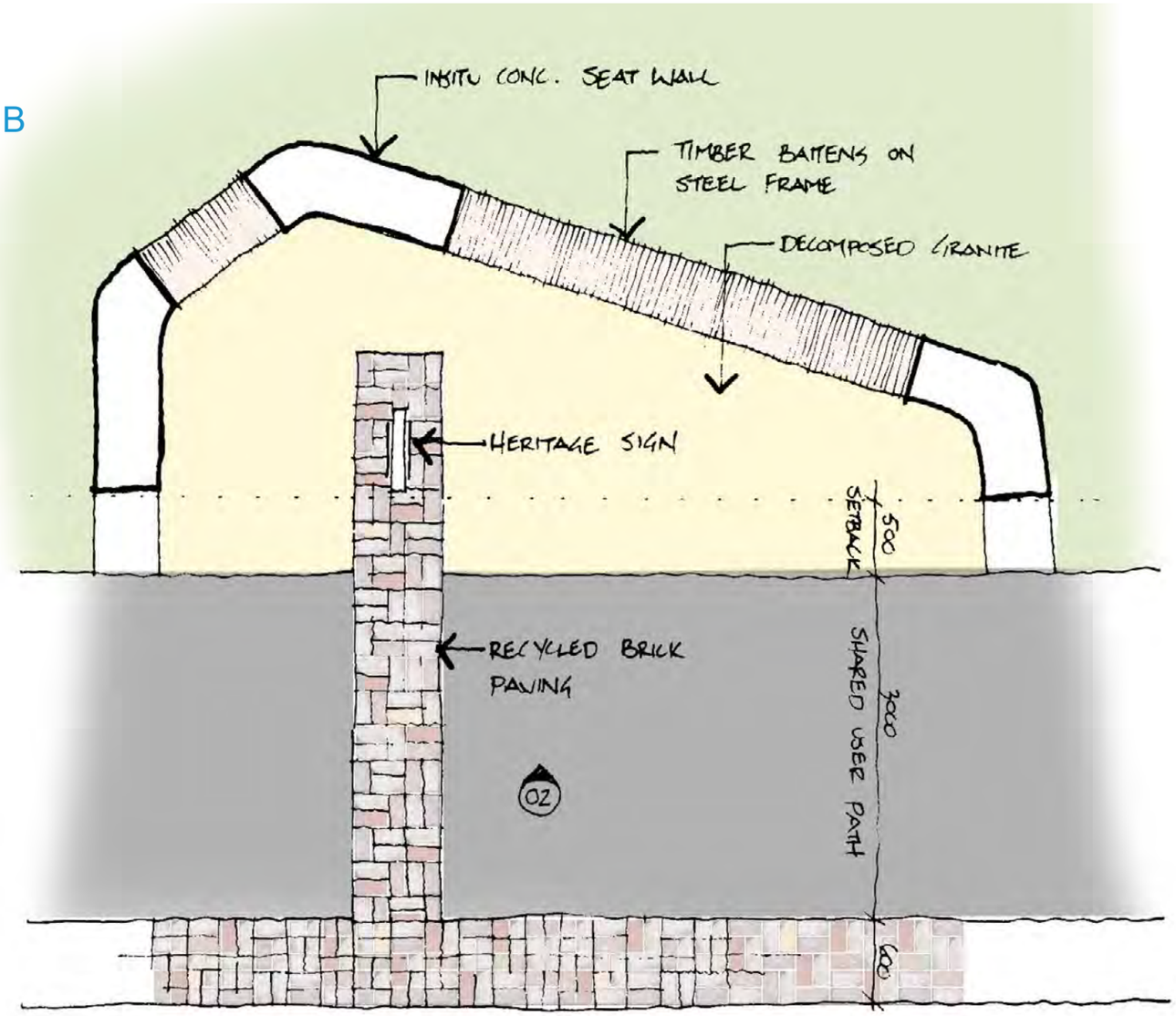
Figure 3 Art Strategy - key plan

Furniture & Signage

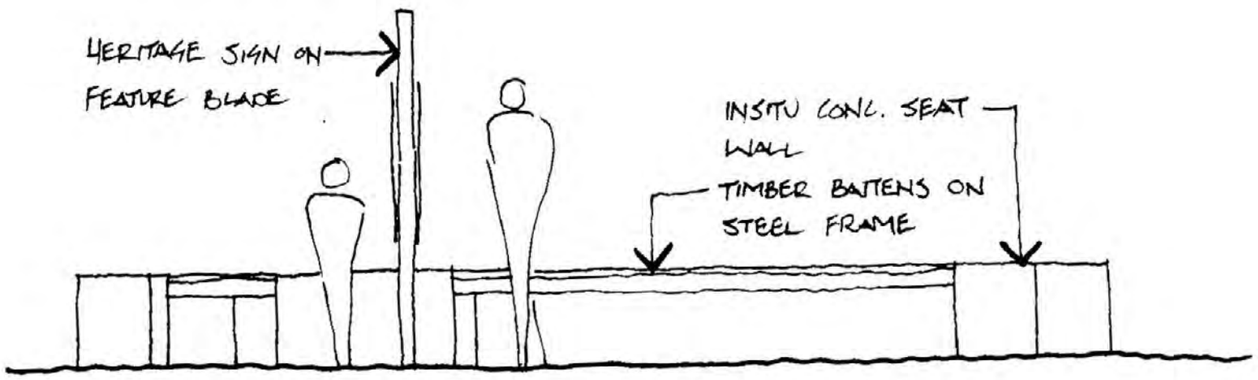
CHARACTER IMAGES - SIGNAGE

Furniture & Signage

CONCEPT SKETCH - FURNITURE HUB



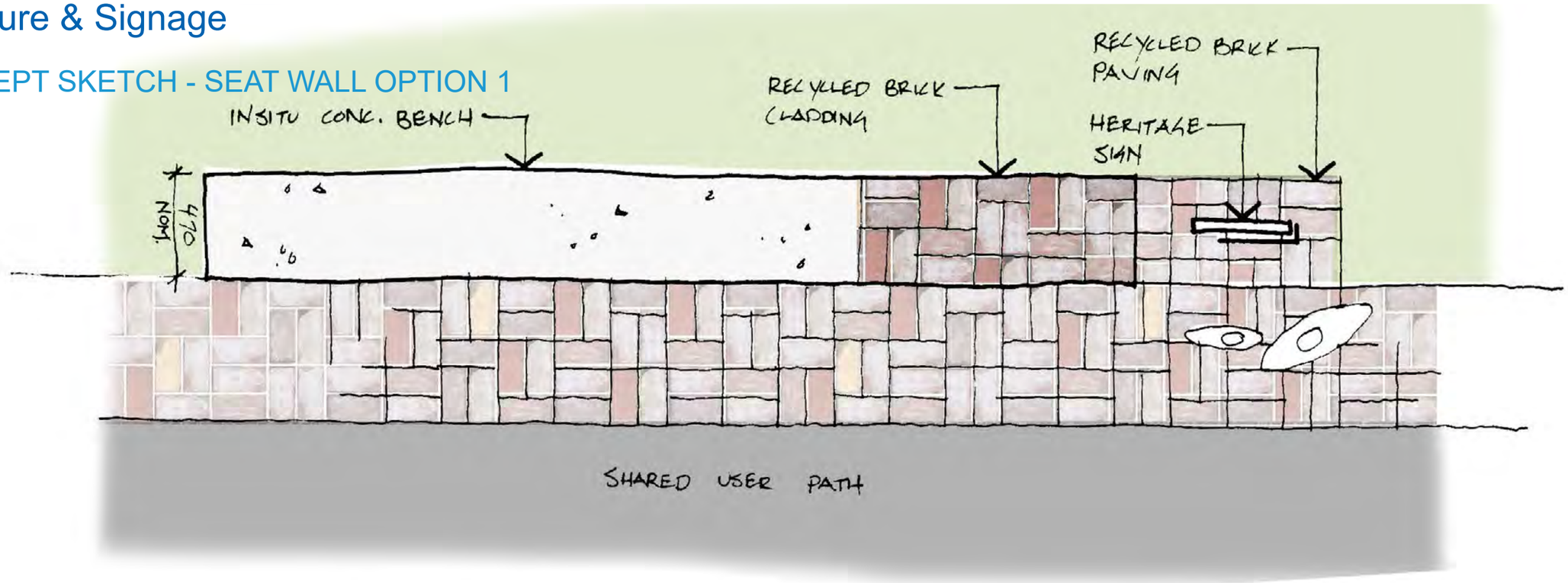
01 PLAN - FURNITURE HUB WITH HERITAGE SIGN & RECYCLED BRICK PAVING SCALE 1:40



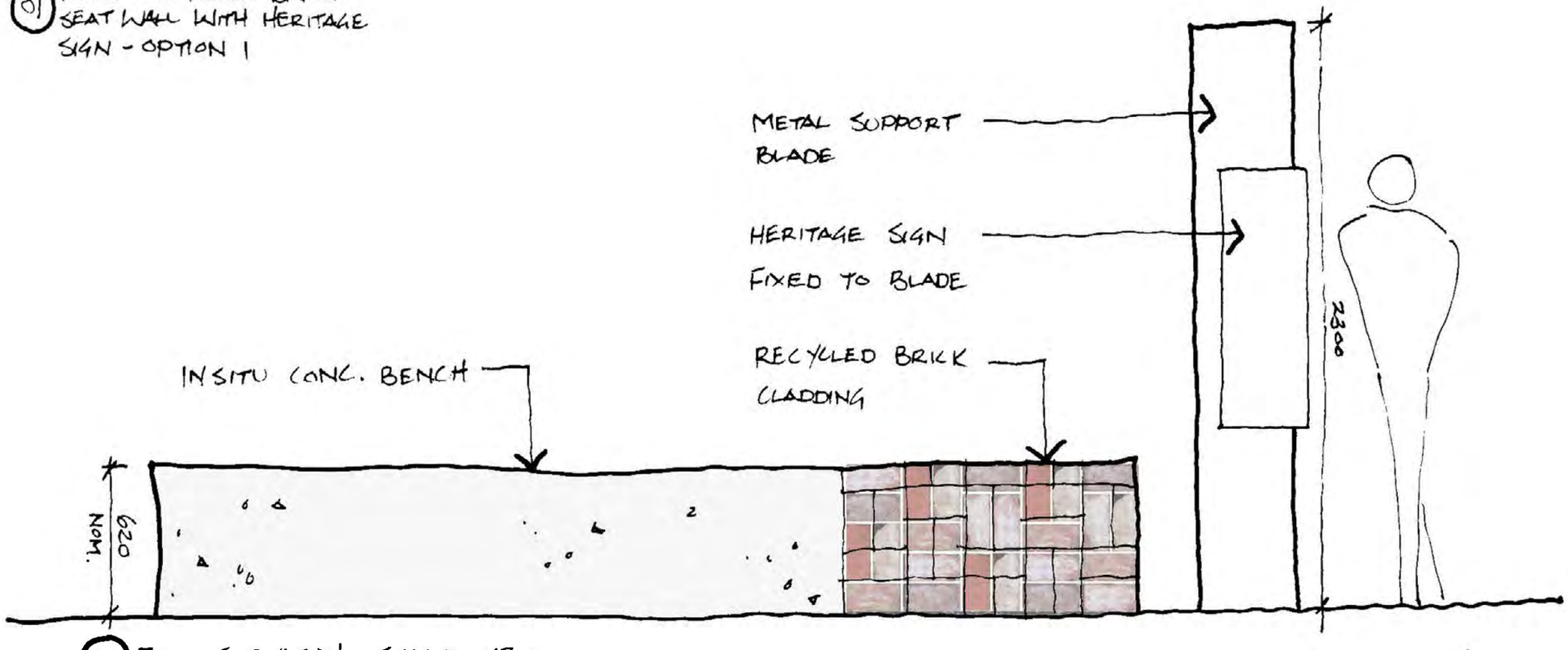
02 ELEVATION - SCALE 1:40

Furniture & Signage

CONCEPT SKETCH - SEAT WALL OPTION 1



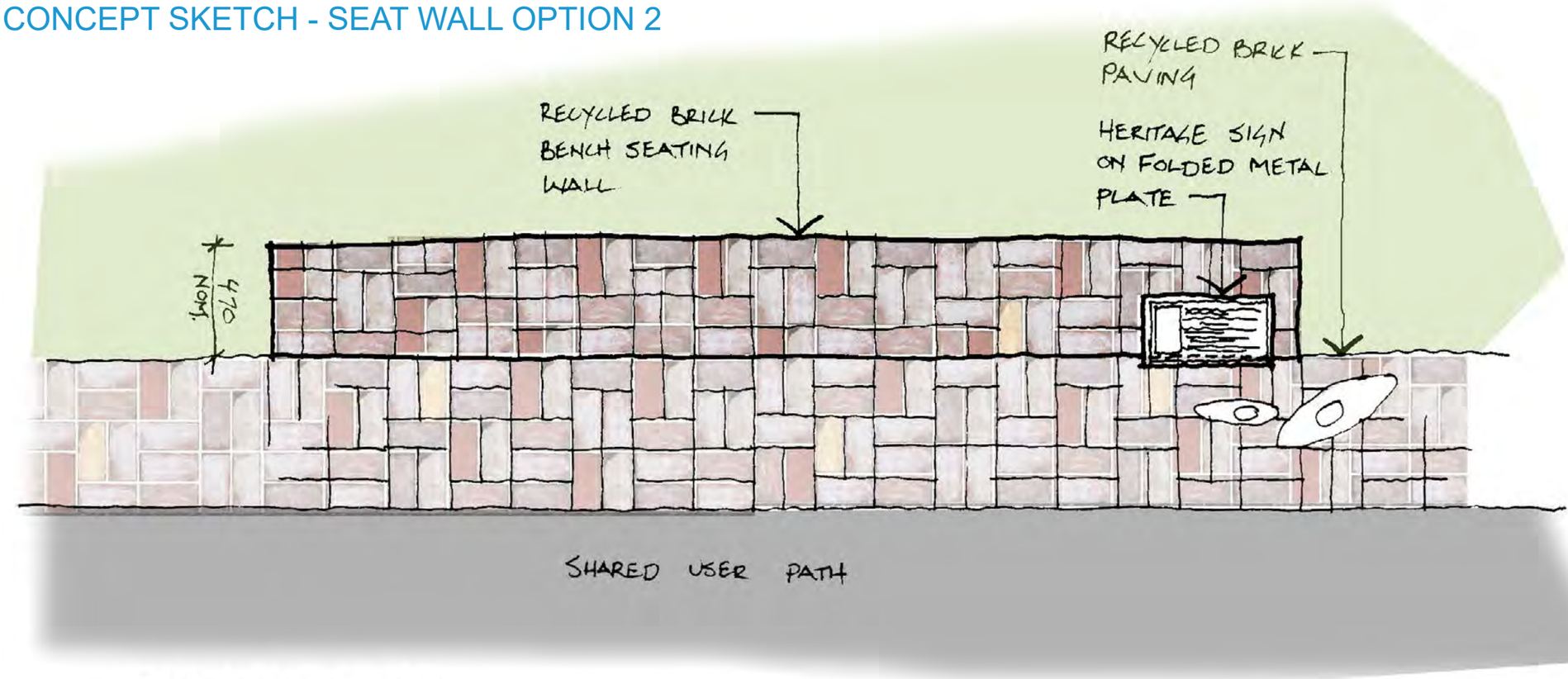
01 PLAN - RECYCLED BRICK SEAT WALL WITH HERITAGE SIGN - OPTION 1



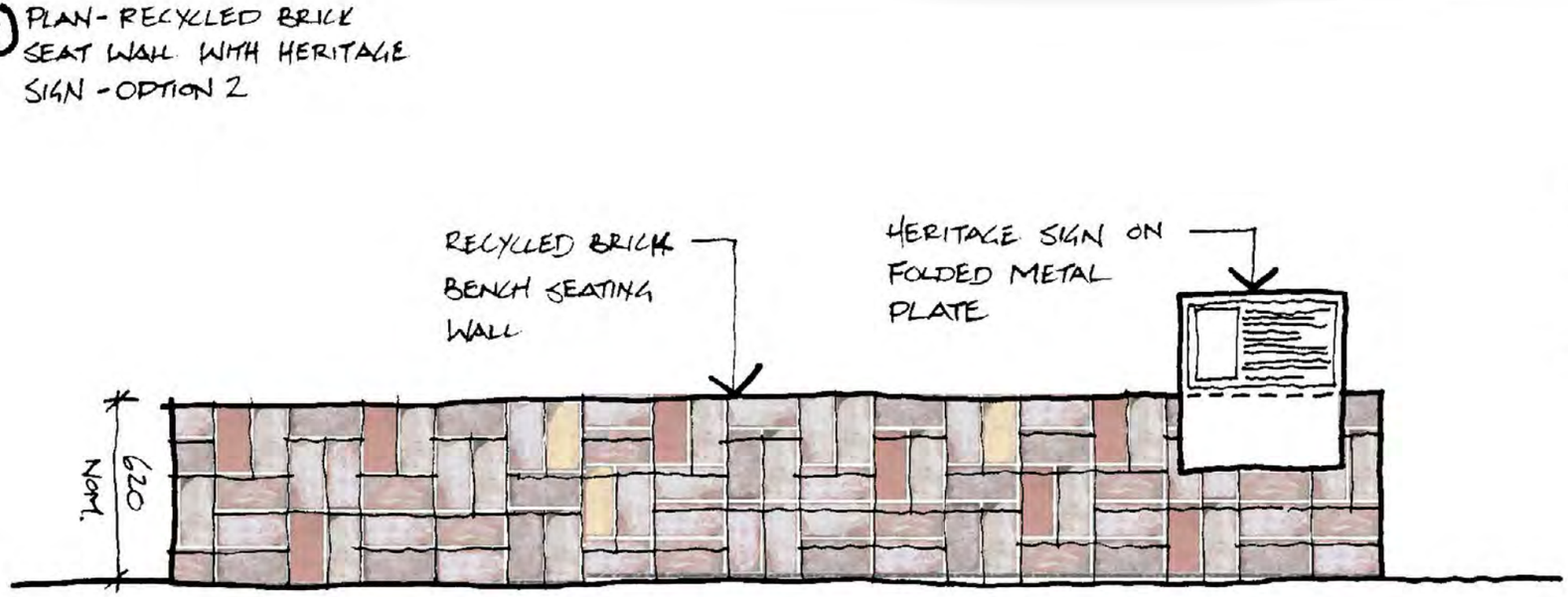
02 FRONT ELEVATION - SCALE 1:20

Furniture & Signage

CONCEPT SKETCH - SEAT WALL OPTION 2



01 PLAN - RECYCLED BRICK SEAT WALL WITH HERITAGE SIGN - OPTION 2



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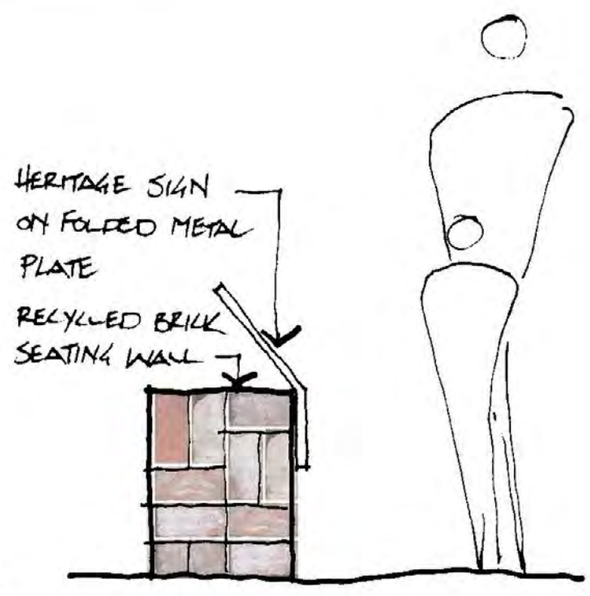
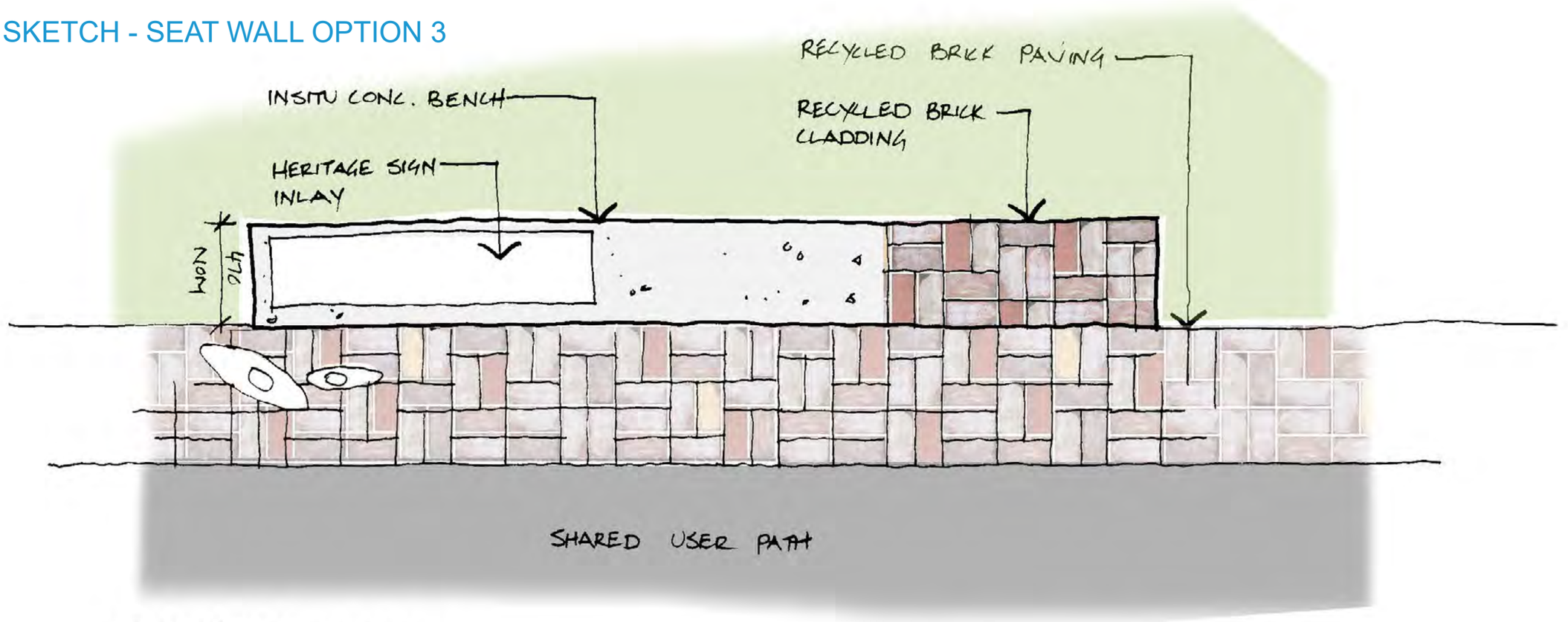


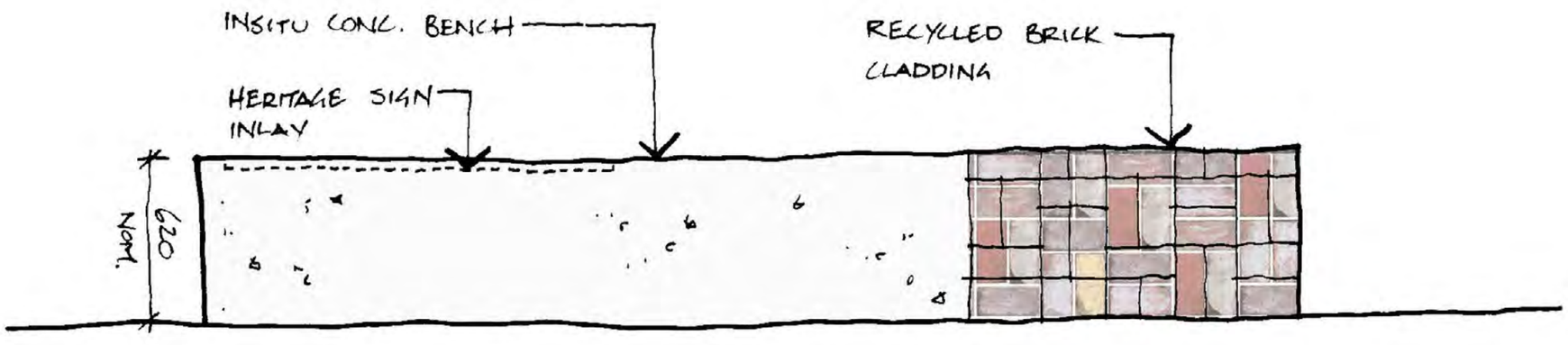
03 SIDE ELEVATION

Furniture & Signage

CONCEPT SKETCH - SEAT WALL OPTION 3



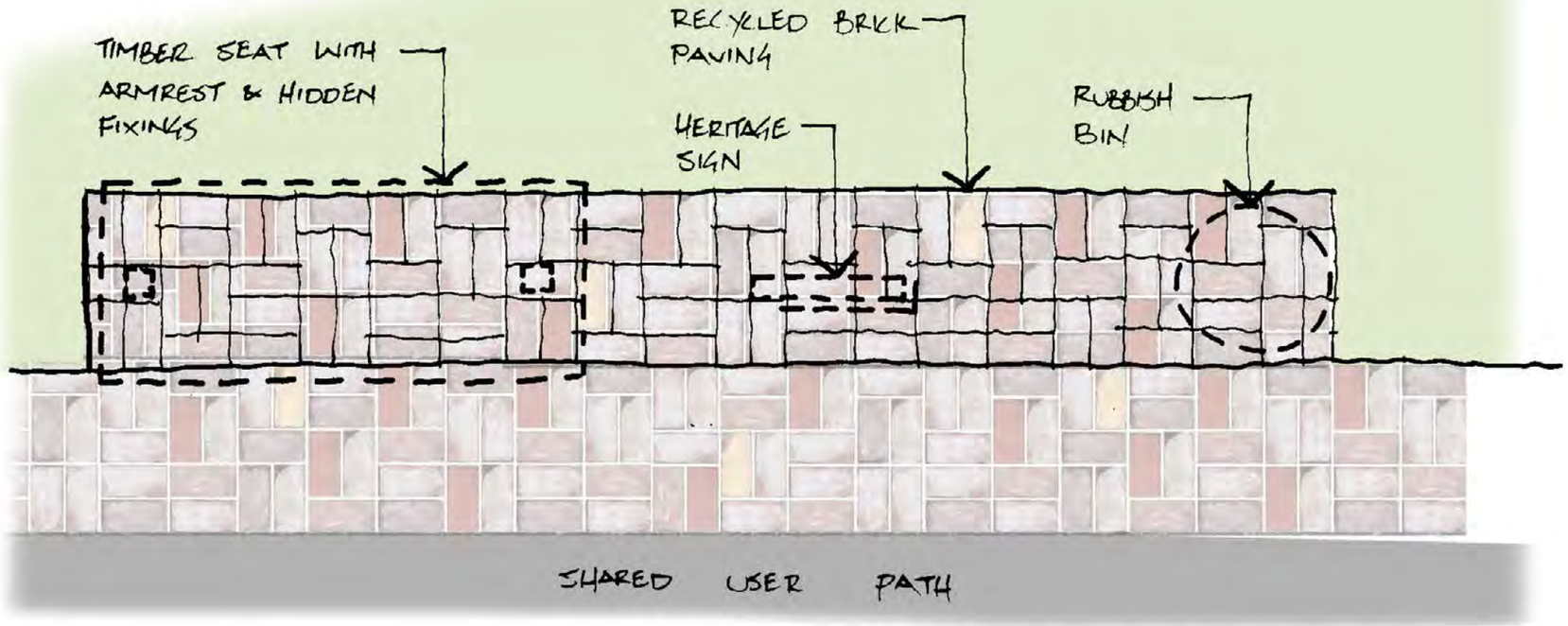
01 PLAN- RECYCLED BRICK SEAT WALL WITH HERITAGE SIGN - OPTION 3



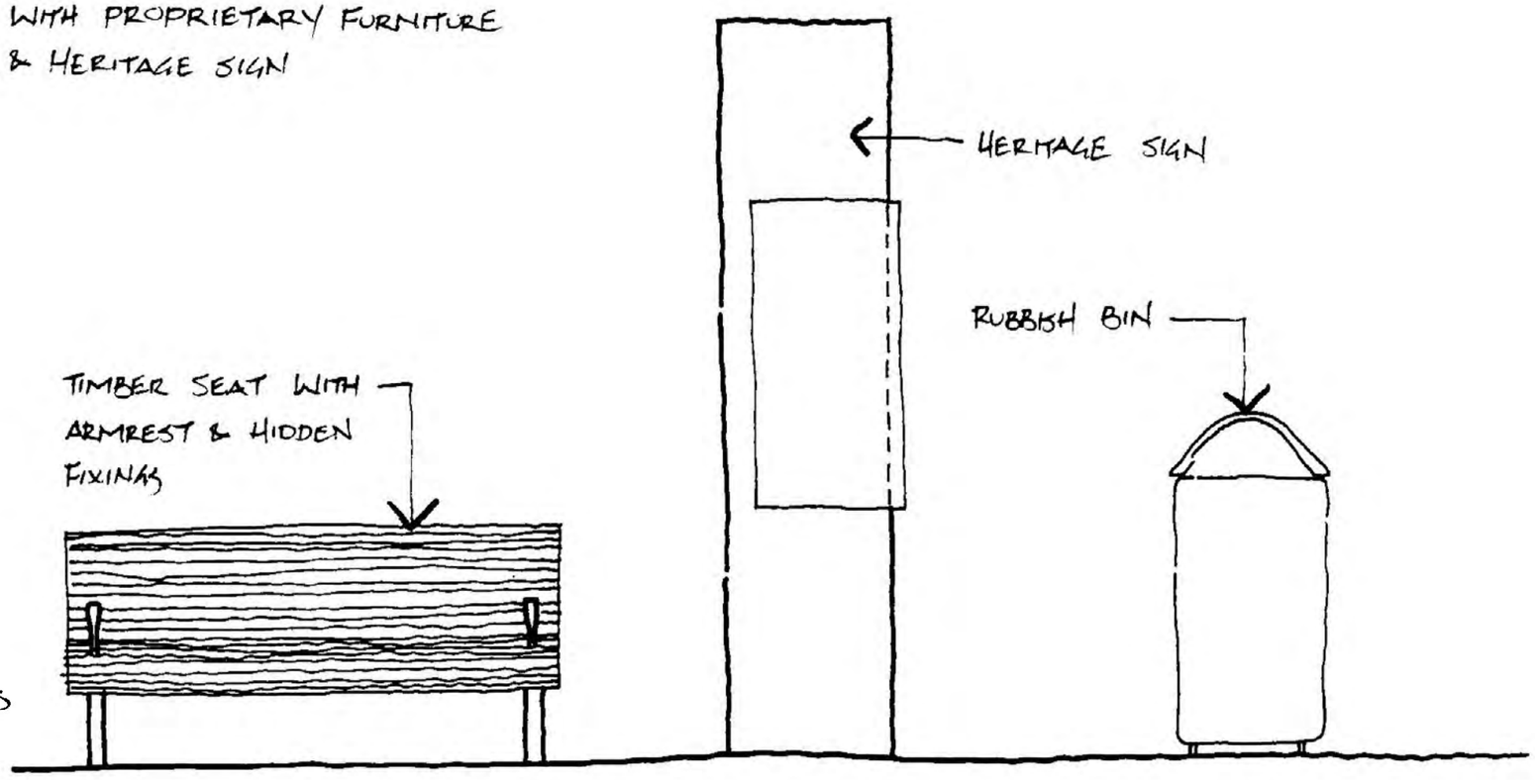
02 FRONT ELEVATION - SCALE 1:20

Furniture & Signage

CONCEPT SKETCH - PROPRIETARY FURNITURE



01 PLAN - RECYCLED BRICK PAVING WITH PROPRIETARY FURNITURE & HERITAGE SIGN



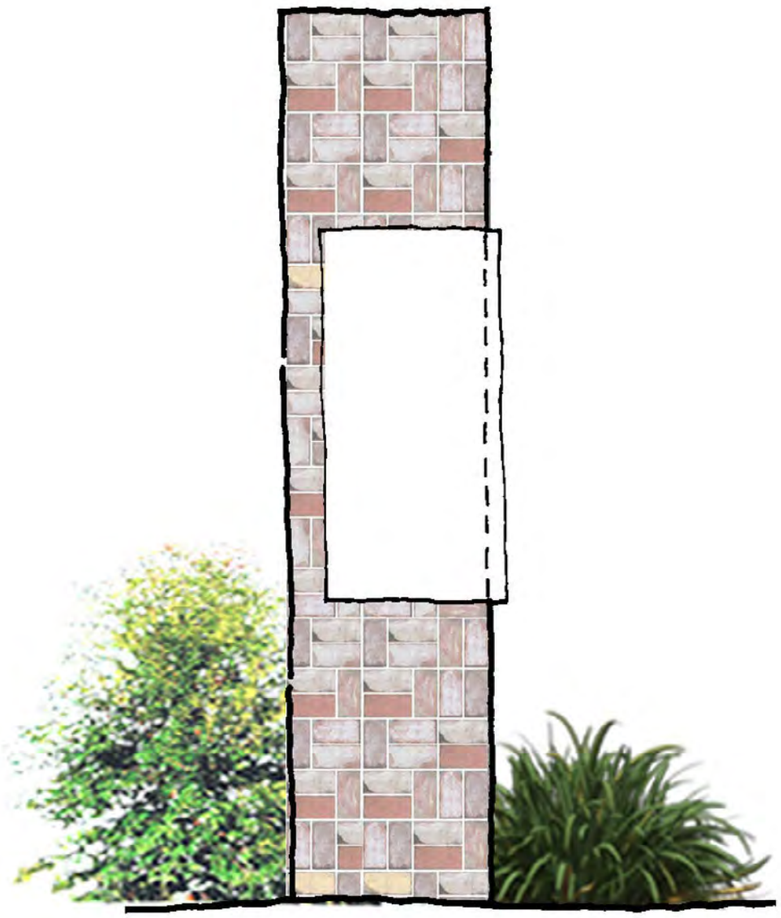
02 ELEVATION - SCALE 1:25

Furniture & Signage

CONCEPT SKETCH - SIGNAGE WALL

Furniture & Signage

CONCEPT SKETCH - PILLAR SIGN



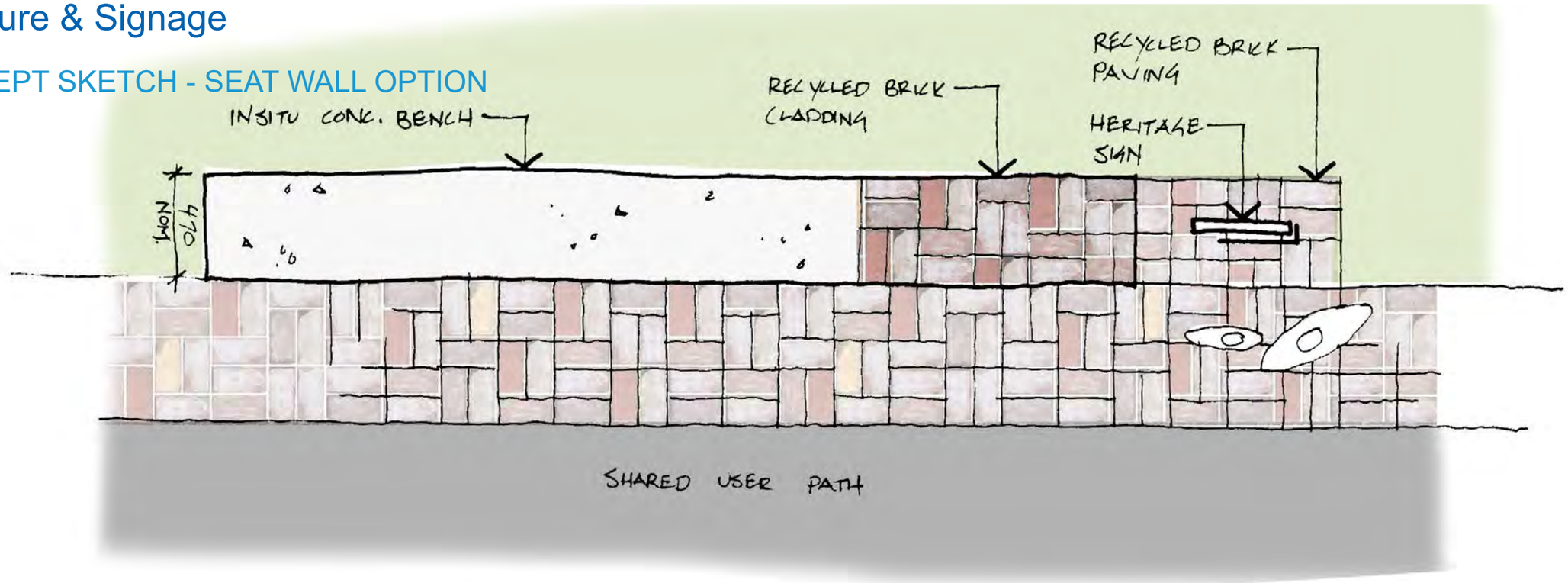
Loca l Roads - Furniture & Signage

LEGEND

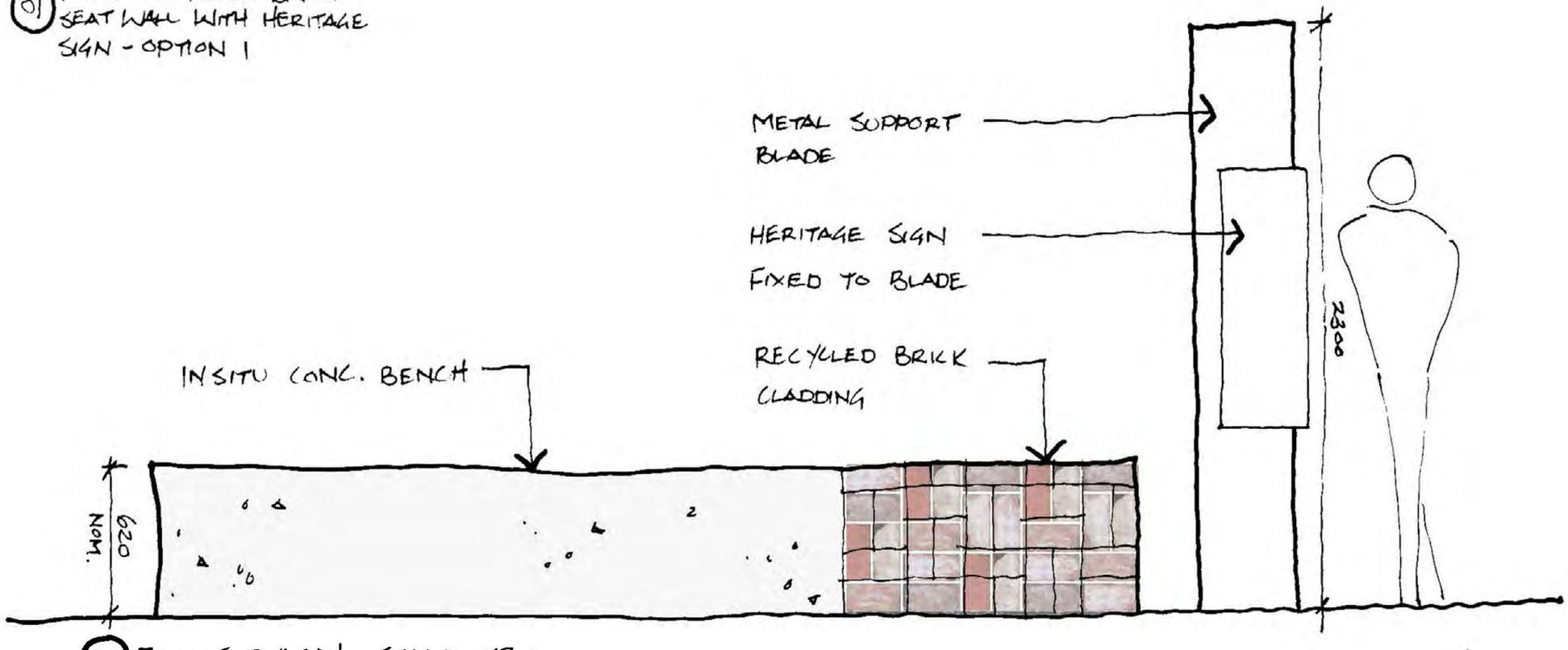
SEATING ELEMENTS AND INTERPERATIVE SIGNAGE ELEMENT

Furniture & Signage

CONCEPT SKETCH - SEAT WALL OPTION



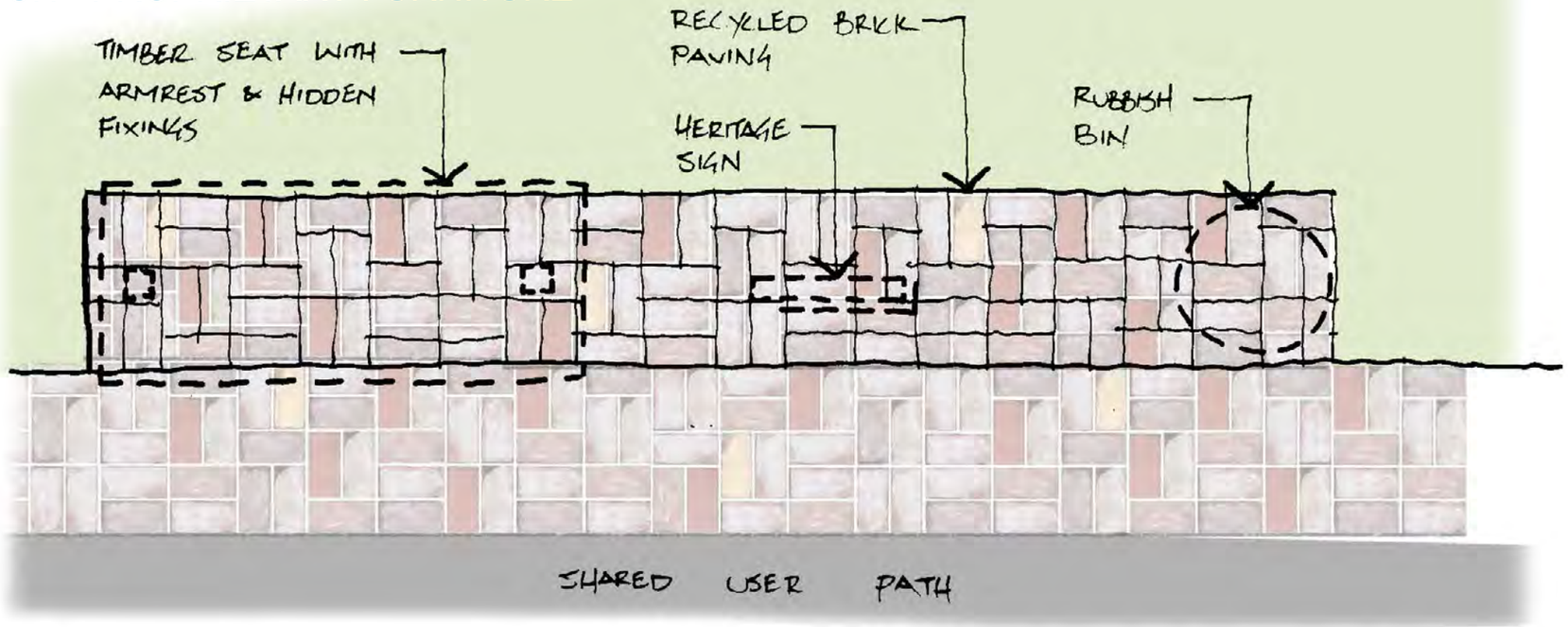
01 PLAN - RECYCLED BRICK SEAT WALL WITH HERITAGE SIGN - OPTION 1



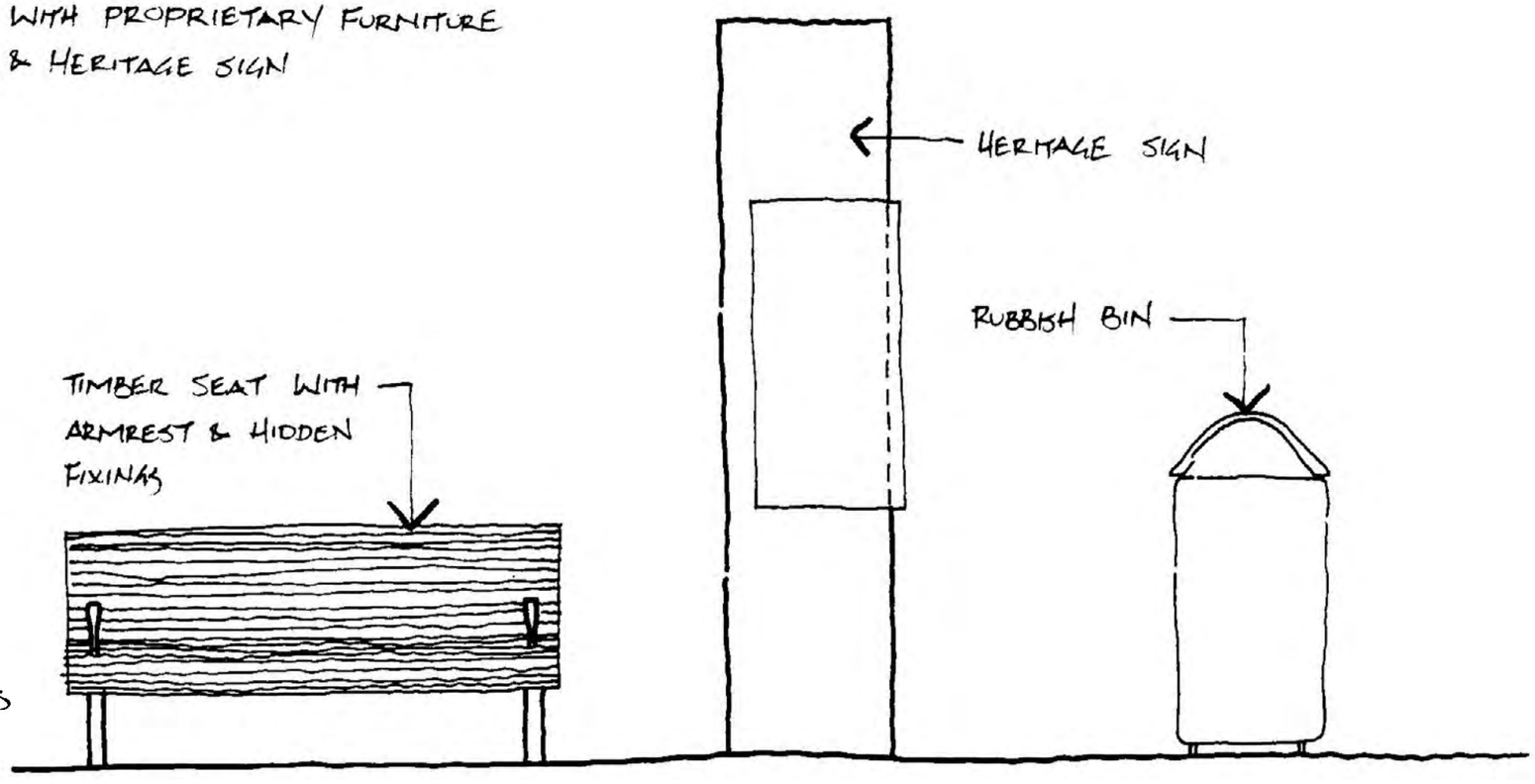
02 FRONT ELEVATION - SCALE 1:20

Furniture & Signage

CONCEPT SKETCH - PROPRIETARY FURNITURE



01 PLAN - RECYCLED BRICK PAVING WITH PROPRIETARY FURNITURE & HERITAGE SIGN



02 ELEVATION - SCALE 1:25