HERITAGE COUNCIL OF WESTERN AUSTRALIA

REGISTER OF HERITAGE PLACES

Assessment Documentation

11. ASSESSMENT OF CULTURAL HERITAGE SIGNIFICANCE

Cultural heritage significance means aesthetic, historic, scientific, social or spiritual value for individuals or groups within Western Australia.

In determining cultural heritage significance, the Heritage Council has had regard to the factors in the *Heritage Act 2018* and the indicators adopted on 14 June 2019.

PRINCIPAL AUSTRALIAN HISTORIC THEME(S)

- 3.13 Developing an Australian manufacturing capacity
- 3.14.2 Using Australian materials in construction
- 4.1.2 Making suburbs
- 4.2 Supplying urban services (sewerage)
- 5 Working

HERITAGE COUNCIL OF WESTERN AUSTRALIA THEME(S)

- 106 Workers (including Aboriginal, convict)
- 310 Manufacturing and processing
- 605 Famous and infamous people

11(a) Importance in demonstrating the evolution or pattern of Western Australia's history

Bristile Kilns (fmr), Belmont were part of the clay pipe and tile industry that has played a significant part in the development of Western Australia's building industry from 1905 to 1982.

Bristile Kilns (fmr), Belmont represents the development of the clay industry in the Belmont area and has had a significant impact on the development of the City of Belmont from 1905 to 1982.

As Pitman, Piercy & Co., the site was the location of the first specialised pottery works established in Western Australia in 1905.

11(b) Importance in demonstrating rare, uncommon or endangered aspects of Western Australia's heritage

Bristile Kilns (fmr), Belmont, comprising eight circular downdraught kilns and five associated chimney stacks, is the largest cluster of circular downdraught kilns and stacks in Australia. Although a common kiln type in the c.1920s to 1950s, they are becoming an increasingly rare industrial structure in Australia. The remaining structures represent the 'firing' mode for the production of stoneware pipes and tiles.

11(c) Potential to yield information that will contribute to an understanding of Western Australia's history;

Bristile Kilns (fmr), Belmont has the potential, through archaeological investigation, to yield information about the technological, functional, and evolutionary aspects of early kiln design and operation in Western Australia, a technique no longer in practice. The site also has the potential to yield intact cultural deposits that can inform us of the lifeways of workers and other site personnel.

Bristile Kilns (fmr), Belmont, as an example of an industrial site with a long time depth of use, will form an important resource for future investigations of the site and its operation.

11(d) Its importance in demonstrating the characteristics of a broader class of places;

The circular downdraught kilns and associated chimney stacks located at *Bristile Kilns (fmr), Belmont* are representative of the design and standard of circular kilns used throughout Australia.

11(e) Any strong or special meaning it may have for any group or community because of social, cultural or spiritual associations;

Bristile Kilns (fmr), Belmont has been a particular feature of the Belmont area dating from 1905, and known beyond the local community due to its location adjacent to Ascot Racecourse. Its impact on the development of the area and the building industry as well as its landmark qualities is highly valued by the local and wider Perth communities.

11(f)[1] Its importance in exhibiting particular aesthetic characteristics valued by any group or community;

Bristile Kilns (fmr), Belmont, located on Grandstand Road, is a landmark feature of the City of Belmont. The eight brick circular downdraught kilns are an unusual built form in the Western Australian landscape and the five tall brick chimneys dominate the local landscape.

11(g) Any special association it may have with the life or work of a person, group or organisation of importance in Western Australia's history;

Bristile Kilns (fmr), Belmont is associated with H. L. Brisbane, the Chairman of the Board of the company from 1929 to 1966. Using *Bristile Kilns (fmr), Belmont* as his first place of business, Brisbane developed the Bristile building empire, which has been prominent in the Western Australian building industry since the late 1930s, and received a knighthood in 1961.

Bristile Kilns (fmr), Belmont is associated with Richard Piercy and Frederick Pitman who established the potteries at the site and who also served as members of the Belmont Roads Board.

11(h) Its importance in demonstrating a high degree of creative or technical achievement;

Bristile Kilns (fmr), Belmont demonstrates a high degree of technical achievement.

12. DEGREE OF SIGNIFICANCE

12. 1 CONDITION

Bristile Kilns (fmr), Belmont is in sound to poor condition.

The surviving kilns have all suffered severely from efflorescence. Salts have crystallised at the wall face, causing the brick surface to flake off, and there are dramatic accumulations of crystalline salt (salt was used for glazing).

There are other problems due to expansion and movement generally, and even the domes, which have not been replaced in modern times, have had to be patched in some cases. It is the arched openings and fire boxes which show the most signs of imminent collapse.

The iron bands on both kilns and stacks are severely rusted and in some cases are coming away from their fastenings.

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[1] For consistency, all references to architectural style are taken from Apperly, R., Irving, R., Reynolds, P. *A Pictorial Guide to Identifying Australian Architecture. Styles and Terms from 1788 to the Present,* Angus and Robertson, North Ryde, 1989.
For consistency, all references to garden and landscape types and styles are taken from Ramsay, J. *Parks, Gardens and Special Trees: A Classification and Assessment Method for the Register of the National Estate,* Australian Government Publishing Service, Canberra, 1991, with additional reference to Richards, O. *Theoretical Framework for Designed Landscapes in WA*, unpublished report, 1997.

The stacks show serious signs of cracking in the brick walls.

The timber and iron factory structure is in a fair condition. However, the iron is in most places rusted and the timber beams appear to be rotted.

Bristile Kilns (fmr), Belmont, because of its location, is subject to unauthorised access and vandalism. This is a potentially dangerous situation as it is causing damage to the brick structures and some of the flues have not been safely covered.

12. 2 INTEGRITY

This section explains the extent to which the fabric is in its original state.

Bristile Kilns (fmr), Belmont has a moderate degree of authenticity.

The factory buildings and equipment necessary to the extraction of clay and the manufacture of pipes and tiles have been entirely removed with the exception of the remaining eight circular downdraught kilns and five chimney stacks.

The seven rectangular kilns have been demolished and the two stacks associated with these kilns stand alone. Three of the kilns were demolished in 1993. It is not known when the other four were removed, but it is thought somewhere between 1961 and 1985.

Only eight, from a total of twelve circular downdraught kilns constructed on the site since 1905, still exist with the associated stacks. Four of these original twelve kilns were part of the Westralian Potteries complex, but as with the rectangular kilns, these four were probably demolished between 1961 and 1985, though demolition of some may have occurred earlier.

As a result of expansion and movement, the circular downdraught kilns have at various times been patched and in some cases the domes have been replaced entirely. However, this is a typical result of the firing process and, throughout Australia, this kind of maintenance was undertaken.

The flue system is original, although expanded upon when the factory went through its various phases of development.

The gas fittings and pipes, seen in the factory structure, date from 1977 when the kilns were converted from oil to gas. The roof was re-clad in 1991.

Concrete pads and ramps provide a footprint where the factory sheds once stood.

12. 3 AUTHENTICITY

This section explains the extent to which the original intention is evident, and the compatibility of current use.

Bristile Kilns (fmr), Belmont has a low degree of authenticity.

Although *Bristile Kilns (fmr), Belmont* does indicate its past use as a clay and pipe factory, this has been seriously diminished with the loss of most of the original factory fabric.

13. SUPPORTING EVIDENCE

The documentation for this place is based on the heritage assessment completed by Kris Bizzaca, Historian, and Kevin Edwards, McDonald Hales & Associates, in 1999, with amendments and/or additions by State Heritage Office staff and the Register Committee. The documentary and physical evidence were reviewed and updated in 2009 by Jacqui Sherrif and Annabel Wills, and again in 2019 using the TPG Ascot Kilns Heritage strategy (2016), with amendments and/or additions by the Heritage Council and the Department.

13. 1 DOCUMENTARY EVIDENCE

Bristile Kilns (fmr), Belmont is located at Grandstand Road, Ascot. The site comprises eight circular downdraught kilns (also commonly called beehive kilns) and five tall brick chimneys. When the site was interim listed in the Register of Heritage Places in 1992, the site comprised eight circular downdraught kilns, five chimneys and three rectangular (tunnel) kilns. The three rectangular kilns were demolished in July 1993. The two chimneys associated with these kilns now stand alone on the eastern boundary of the site.

The development of Perth was hugely impacted by the discovery of gold, first in the Kimberley region in the 1880s, then in the Murchison and Kalgoorlie regions in the late 1880s and 1890s.[2] The granting of Responsible Government to Western Australia in 1890 also affected the growth of Perth. Sir John Forrest's new State Government was able to access monies from loan sources to finance major public works programs, including the building of roads, railways, and public buildings.[3] The physical nature of the city changed dramatically with the increase of population as a result of the gold rushes and the monies made available for land and building construction. Perth, prior to the gold rushes, consisted mainly of residences and low-lying shops and factories. By the turn of the century, the city was transformed by elaborately styled multi-storey buildings and was surrounded by developing suburbs.[4]

Among the immigrants who arrived in Western Australia during the gold rush period, were a group of experienced businessmen who had been associated with the building boom which had occurred in Victoria as a result of the discovery of gold there in the 1850s.[5] By the time of the gold rushes in the Eastern Goldfields in the 1890s, the Melbourne building boom had receded and inflated prices were beginning to affect the smaller building contractors.[6] For these men, the discovery of gold in Western Australia provided them with the opportunity to re-establish their businesses in a new colony. Two families soon began to dominate the building industry in Western Australia from the mid 1880s and 1890s. They were David Law and his son, Robert, the founder of Metropolitan Brick Holdings Pty Ltd, and brothers, Samuel, Edwin and Arthur, of Whittakers Ltd.[7]

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2 Stannage, C.T., *The People of Perth*, Perth City Council, Perth, 1979, pp. 193.

3 Moore, B., *From the ground up: Bristile, Whittakers and Metro Brick in Western Australian History*, UWA Press, 1987, pp. 11.

4 Stannage, C.T., op. cit, pp. 193-194.

5 Moore, B., op. cit., pp. 5-6.

6 Ibid, pp. 6-8.

7 Ibid, pp. 6-7.

The Perth metropolitan area was selected for a number of reasons, including its proximity to good quality clay deposits that could be used to manufacture building materials.[8] Originally, bricks were imported as ballast on ships however, the bulk and cost of these bricks proved to be expensive and the development of a local brick industry was deemed necessary.[9] East Perth was the centre of the Western Australian brick industry up to the turn of the century. From 1900, new brick and pottery works began to develop along the river flats in areas such as the Maylands and Belmont peninsulas.[10]

The vitrified clay pipe industry was established during the construction of the sewerage and drain system in Perth which began in 1906. Cement was considered to be the best material for the pipes however, at this time, Western Australia had no such industry. Similar concerns were raised regarding the supply and cost of roofing materials. The use of cement for the manufacture of tiles and pipes was discussed but the cost of importing the cement from overseas or the eastern states was considered to be prohibitive. The huge costs associated gave preference to locally manufactured materials, in this case salt-glazed earthenware products.[11]

One of the problems associated with the local clay industry was finding the skilled workers to manufacture the product.[12]

> Although by the turn of the century Perth had no shortage of expert brick-makers, there were few tradesmen with the skills in the more sophisticated fields of pottery and tile-making… The Staffordshire potteries, centred around the town of Stoke-on-Trent, and those of the Thames valley in Berkshire, are amongst the foremost clay-producing areas in the world, founded upon the clay deposits of remarkable purity and consistency, and dependent upon technology developed over centuries in a constant process of refinement and skills handed down from father to son over countless generations. The importation of those skills was vital to the development of the Western Australian industry, and any potters who emigrated could be assured of gainful employment.[13]

In 1873, Frederick Piercy, an experienced potter from Reading, Berkshire, arrived in Adelaide to join his brother in a pottery business. Piercy Brothers of Adelaide operated until 1890 when Piercy's brother William died. In 1894, Piercy arrived in Perth working at William Turton's Steam Brick and Pottery Works in East Guildford. In 1900, Piercy became Turton's partner and the firm was renamed Woodbridge Brick and Pottery Works.[14]

Richard Piercy, Frederick's nephew, had followed his uncle to Western Australia. Richard and his partner Frederick Pitman opened a pottery works on the flats at Belmont. In August 1905, the Department of Works and Labour informed Pitman, Piercy & Co. that their application to register a factory at Grandstand Road, Belmont

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8 Ibid, pp. 39; Margaret Pitt Morrison & John White, 'Builders and Buildings', in Stannage, C.T.(ed.), *A New History of Western Australia*, UWA Press, 1981, pp. 515.

9 Moore, B., op. cit., pp. 39.

10 Ibid, pp. 39.

11 Ibid, pp. 47 & 48.

12 Ibid, pp. 57.

13 Ibid, pp. 57-58.

14 Ibid, pp. 40, 58-59.

was successful.[15] By December of that year, the company employed seven people, including the directors, at the pottery works.

This was Western Australia's first specialised pottery works. Before this time, pottery works had only existed in association with brick works. As the building industry grew, the brick and the tile and pipe industries developed separately because of the specialised work required for the manufacture of tiles and pipes.[16]

On 11 February 1907, the site comprised one kiln with an associated chimney stack, two pug mills, an engine room and a press.[17] In 1908, Pitman, Piercy & Co. began trading as West Australian Pottery Co. Ltd. By this time, Frederick Piercy had joined his nephew and partner in the business and was named the Managing Director of the company.[18]

During the early twentieth century concerns regarding sanitation resulted in plans to improve Perth's metropolitan water supply and sewerage system, and by 1907-08, progress had been made towards the provision of deep sewerage and stormwater drainage at Perth and Fremantle. Various stormwater drains had been completed at Perth, and it was anticipated that more would be completed in 1908-09, along with some at Fremantle. In 1907-08, Claisebrook Main Sewer and Parry Street Branch, and the Interception with Claisebrook Drain were completed, and work began on the third section of Claisebrook Main Sewer, which was completed in October 1909. In 1909, the second section of the Claisebrook Main Sewer, Hyde Park Main and Sewer and Mount Eliza Main Sewer were completed, and work commenced on the Terrace Main Sewer and Mount Lawley Main Sewer.[19] These initiatives coincided with the increased activity at West Australian Pottery Co. Ltd., the *Bristile Kilns (fmr), Belmont* site.

On 27 March 1913, the Department of Works and Labour carried out an inspection of the pottery works and it was reported that additional drying sheds had been constructed on the site.[20]

In 1926, the company began trading as Westralian Potteries Ltd. A receipt from Westralian Potteries lists the work that the company produced:

> Chimney Pots, Garden Tiles, Drain and Sewerage Pipes, Ridges and Finals for Roofing, Partition Blocks, Storm Water Pipes, [and] Special work for Architects and Contractors made to any design.[21]

During 1926/1927, the number of people employed at the factory had reached a high of nineteen. It was during this period that the company expanded its premises with more drying rooms and several kilns being constructed. A contract was awarded to a bricklayer to construct the kilns as well as various other outbuildings on the site such as toilets.[22]

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15 Department of Works and Labour, 5091/1921, Public Records Office.

16 Moore, B., op. cit., pp. 59 & 62.

17 Department of Works and Labour, 5091/1921, Public Records Office.

18 Ibid. In 1922, it was reported that the Manager was living in a residence located across the road from the pottery.

19 State Heritage Office, Assessment Documentation. *P03298 Low Level Sewage Pumping Stations No.s 1 & 2, Perth*. pp. 7-8.

20 Department of Works and Labour, 5091/1921, Public Records Office.

21 Ibid.

22 Ibid.

In July 1927, Queenslander, Reginald Roy Long purchased a controlling interest in Westralian Potteries Ltd and installed Gordon Guy Humphries as company secretary. Fred Piercy remained at the Belmont factory as Managing Director.[23] It is Long who is said to have been responsible for 'luring' H. L. Brisbane away from the Wunderlich Patent Ceiling and Roofing Co. Ltd, where he had been employed since 1909[24], and encouraging him to branch into the building business on his own.[25]

On 1 June 1929, Westralian Potteries Ltd was taken over by H. Lance Brisbane. The new company traded under the name of H. L. Brisbane & Co. Ltd and established itself as the 'manufacturers of the Bristile product'.[26] Long and Humphries became Directors of the new company, with Brisbane as Chairman of the Board.[27]

Arthur Wright, an employee at the Belmont factory from 1929, recalled that circular downdraught kilns 5, 6 and 7 were built in 1928 to 1929. The kilns were constructed by Ernie Banks, who built kilns at Belmont and for other companies such as Wunderlich Ltd. Banks eventually became a permanent H. L. Brisbane & Co. Ltd employee and had two assistants.[28] Wright remembered:

> Ernie had no plans, he'd just drive a stick, a half inch rod, in the earth, attach a piece of string and scribe it out on the ground [in a circle]. The boys would dig it out, pick and shovel, take it out in the old dray, and then they'd smooth up the sides nicely and he'd lay the foundation bricks in the bottom. And then he'd sink the flue in another round hole a bit deeper and then build up from there and he'd supervise that. He used to do most of the first bricks himself and when it came to the walls – they were so thick – see about three foot thick – the inside brick, they call them the springer, would be to get the dome, the height of the dome to come in, he used to hand cut all those with the … crutchet hammer and smooth them down and lay those and then they could come off that and get it perfect. It was marvellous when they were making the dome, 'because this is the secret, the dome part' he used always to say. Once you put the slip on the brick, that was only mud and sand, once you put it on and slap it on, don't move the brick because you break the seal – you have to make sure you put it in the right position and just give it a tap and go on to the next. And you would finish up with a circle in the centre – perfect! The only way, because in those days we used to use salt for firing in the glaze, and that used to tighten the bricks up together – mould them together.[29]

It was under the direction of Brisbane that the pottery works at Belmont was extensively developed to concentrate on the manufacture of clay pipes and tiles. H. L. Brisbane & Co. Ltd was also one of the few companies in the building industry

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23 After Piercy retired, Alf Campbell was appointed as Managing Director.

24 Moore, B., op. cit., pp. 64 & 65. From 1914 to 1919, Brisbane served in the 10th Light Horse Regiment.

25 Ibid, pp. 66 & 67.

26 Department of Works and Labour, 5091/1921, Public Records Office.

27 H. L. Brisbane & Wunderlich Annual Report, 1952.

28 Stella, L., 'Belmont Clay Pipe and Tile Factory: Circular and Downdraught Kilns', Department of Planning and Urban development, August 1980; Lewis, M., 'Pipe and Tile Kilns, former Bristile Site, Ascot Fields, Belmont, Perth', prepared for the Department of Planning and Urban Development, September 1990, pp. 4 & 15.

29 Stella, L., op. cit.; Lewis, M., op. cit., pp. 15.

not only to survive the Depression years, but to expand during this period. Besides having 26 acres of freehold clay lands at Belmont, the tile and pipe factory at Belmont was almost the size of Wunderlich Ltd and was also matching this company's output.[30] On 20 September 1934, the inspector for the Department of Works and Labour reported that two new kilns had been constructed.[31] In that same year, the Directors of the company decided to go public, selling 15,000 ordinary shares to raise revenue to carry out further expansion. The 1935 development program was aimed specifically at modernising and increasing the capacity for the manufacture of vitrified clay pipes. Demand for the product had increased dramatically due to government contracts for the supply of sewerage pipes and connections for new inner suburbs.[32]

On 6 November 1935, it was reported that H. L. Brisbane & Co. Ltd Board of Directors and the Belmont Park Road Board inspected the tile and pipe factory at Belmont. Since 1934, £20,000 had been spent on the factory and construction was still being completed on four kilns, new clay extracting equipment and a 100ft brick chimney. By this time, the Belmont factory was employing 140 people and producing 2,000,000 tiles per year.[33]

Wunderlich Ltd was established in Sydney in 1887. The company imported Marseilles tiles from overseas and distributed the tiles throughout Australia. However, when supplies were cut off from Europe during World War One, the company decided to manufacture its own tiles and opened its first tile factory in Western Australia in 1918.[34] As H. L. Brisbane & Co. Ltd expanded, the company realised that it would be more beneficial to join its former employee rather than compete against him.[35]

On 15 September 1938, the *Weekly Trade Gazette* announced:

> H. L. BRISBANE & CO. LTD., Manufacturer of 'Bristile Tiles' Pipes etc., Belmont, and WUNDERLICH LTD., Stamped Metal Manufacturer, Roofing Tiles, Stoneware, Pipes, etc., Lord Street, East Perth – An agreement has been made between these two companies for the amalgamation of their joint interests in W.A… The amalgamation will take effect as from 1st October, 1938, and the name of the company will henceforth be known as H. L. Brisbane and Wunderlich Ltd.[36]

In the first decade of the twentieth century roofing tiles, particularly the Marseilles tiles mentioned above, had been largely imported into Western Australia and were therefore more commonly seen in the 'better class of house' in locations such as Claremont, Perth, West Perth and Mount Lawley.[37] However, architecture of the inter-war period in Perth, including the popular California Bungalow and Mediterranean styles, saw the increased popularity of clay roof tiles and the 1920s

30 Moore, B., op. cit., pp. 112-113.

31 Department of Works and Labour, 5091/1921, Public Records Office.

32 Moore, B., op. cit., p. 108.

33 *West Australian*, 6 November 1935. Arthur Wright recalled that beehive kilns 8, 9 and possibly 10 were most likely to have been built at this time by Ernie Banks. Stella, L., op. cit.; Lewis, M., op. cit., pp. 15.

34 Moore, B., op. cit., pp. 61 & 63.

35 Ibid, pp. 116-120.

36 *Weekly Trade Gazette*, 15 September 1938.

37 Lewis, M (2003) *Australian Building: A Cultural Investigation, Volume 6: Bricks & Tiles*. The Author, Melbourne. P.6.07.4.

marked the beginning of the age of brick and tile in Perth's suburbs. Moore suggests that the entry of a number of companies into the clay tile market at this time signalled the end of the widespread use of galvanised iron as a roofing material in Western Australia as the cost of roofing tiles plunged to well below that of iron.[38] Evidence for this can be clearly seen in the numerous extant examples across suburbs such as Bassendean, Inglewood, Nedlands, Coolbinia, and Menora to name but a few, and corresponds with the expansion of H. L. Brisbane & Co. Ltd. into this market.

During World War Two, the building industry suffered a decline and there was a shortage of labour due to the need for servicemen for the war effort. This is evidenced in the employment figures at the Belmont factory. After a high of 114 in 1937, by 1940 there were only 47 people employed and this fell to only nine people in 1942. The Department of Works and Labour reported that the Belmont premises were closed by 14 September 1942. They were not reopened until early 1945.[39]

Because of the location of the site on the river flats, and the high water table, the Belmont factory was occasionally subject to flooding. Over the years of 1946 and 1947, the flooding of the river disrupted Brisbane's development plans and work was forced to halt at the entire factory.[40]

In 1952, work was completed on the construction of H.L. Brisbane & Wunderlich's new clay tile factory at Caversham. From this time on, the Caversham Tile Factory became the centre of the company's manufacture of clay roofing tiles. The Belmont factory gradually discontinued its production of clay tiles and, as the years passed, became the company's main premises for the manufacture of clay pipes.[41]

In 1953, the demand for sewerage pipes for residential development and for Government projects made it necessary for H. L. Brisbane & Wunderlich to expand the factory at Belmont. The work included a new building extension to house two new kilns and an associated stack.[42] In 1955, improved clay grinding machinery was installed, and new clay sheds and a modern canteen for the workers were constructed.[43] It is likely that the brick administration building east of the premise was constructed at this time.[44]

As a part of the company's huge development program, it had built up an experienced team that specialised in the construction, lining and repairing of kilns, furnaces and boilers. The company's directors saw that they could benefit from other manufacturer's increasing need for this specialised work and began to contract the team out to undertake projects for other companies in the industry.[45]

By the late 1950s and early 1960s, the housing boom had consolidated. In 1959, the terracotta tile section of the Belmont factory was considered obsolete and was

38 Moore, B., op. cit., p. 63.

39 Department of Works and Labour, 5091/1921, Public Records Office. During its closure, the Army Department used the buildings for storage.

40 Ibid.

41 H. L. Brisbane & Wunderlich Annual Report, 1952.

42 H. L. Brisbane & Wunderlich Annual Report, 1953. Arthur Wright recalled that beehive kilns 11 and 12 had been built by this time. The kilns were built by Laurie Grisby, one of Banks former assistants. (Rectangular kilns E, F and G were built between 1930 and 1950.) Stella, L., op. cit.; Lewis, M., op. cit., pp. 4 & 15.

43 H. L. Brisbane & Wunderlich Annual Report, 1955.

44 Aerial photographs, 1953 and 1965, Landgate Mapviewer

45 H. L. Brisbane & Wunderlich Annual Report, 1958.

closed down. All usable equipment from this section was transferred to the clay tile factory at Caversham and the rest of the equipment was sold for scrap.[46]

Although the demand for building materials had declined, H.L. Brisbane & Wunderlich were still in the process of expanding their factories and diversifying into other areas. During the 1950s, the company began to manufacture stainless steel and was producing stainless steel sinks for houses. In 1960, Boucher Industries became its first subsidiary company as H.L. Brisbane & Wunderlich expanded into the manufacture of aluminium sidings.[47] The next year, the company recognised the increasing demand for plastic products and entered into this field by taking over two small businesses at Belmont, Lusterite Plastic Products Pty Ltd and Chemical Welding Co. Pty. Ltd.[48] In 1961, H. Lance Brisbane was honoured with a knighthood in the New Year's list.

In 1962, H. L. Brisbane & Wunderlich announced:

> Plans were now being prepared for the complete reconstruction and modernisation of this factory [Belmont] which would place the Company in a favourable position to handle expeditiously and economically the increased demand for sewerage pipes and fittings which must eventuate once finance is available to the Government for the development of deep sewerage mains.[49]

On 10 December 1963, the Minister for Industrial Development, Hon. C.W.M. Court, MLA opened the 'Earthenware Sewerage Pipe Factory' at Belmont.[50] The modernised factory was purported to be the 'most efficient plant available to the industry today'.[51]

By 1966, the Government contract for the deep sewerage work which the company had foreseen did not eventuate and it was left with a surplus of product. H.L. Brisbane & Wunderlich were hit with another blow when, on 4 February 1966, Managing Director H. Lance Brisbane died. Not only was Brisbane the founder of the company, he had been directing the ever growing Bristile empire. It was he who, through his contacts in the building industry and government, was able to develop and expand the company into the manufacture of various building materials.[52]

The mineral boom of the 1960s began to have a huge impact on the building industry by the late 1960s. Suburbanisation and construction projects for mining companies in the north west of the State increased the demand for all H.L. Brisbane & Wunderlich products, clay tiles and pipes, stainless steel sinks and aluminium sidings in particular. To meet the demand for its products, the company improved the efficiency of all of its factory sites including Belmont.

> Belmont sewer pipe plant has been expanded by the installation of a pipe extruder to produce pipe 5' in length and up to 24" in diameter, together with

46 H. L. Brisbane & Wunderlich Annual Report, 1959.
47 H. L. Brisbane & Wunderlich Annual Report, 1960.
48 H. L. Brisbane & Wunderlich Annual Report, 1961.
49 H. L. Brisbane & Wunderlich Annual Report, 1962.
50 H. L. Brisbane & Wunderlich Annual Report, 1964.
51 H. L. Brisbane & Wunderlich Annual Report, 1963.
52 H. L. Brisbane & Wunderlich Annual Report, 1966.

drying and handling equipment. Firing capacity has been provided by the reconstruction of existing rectangular kilns.[53]

The Belmont factory operated at full capacity over the next few years, hard pressed to keep up with the demand for the pipe product. In 1971, plans were prepared for the erection of a new factory at Belmont to produce smaller diameter pipes and fittings because of demand from housing estate developers and the development of mining towns. The construction of the plant centred on a 'Bickley' shuttle kiln, which was the latest advance in firing technology.[54] The work was completed at a cost of $1.5 million in 1972 and the new plant began manufacturing 4" and 6" diameter pipe in 4 foot lengths. The old plant at the Belmont site continued to manufacture large sewerage pipes from 9" to 24" in diameter.[55]

On 1 October 1973, H.L. Brisbane & Wunderlich took over Metropolitan Brick Holdings Pty Ltd, the company founded by Robert Law in 1922.[56] With Metro Brick as a subsidiary company of H.L. Brisbane & Wunderlich, it had consolidated its position as the leading provider of materials for the building industry.

In October 1978, with the celebration of the company's 50th year in the clay industry, H.L. Brisbane & Wunderlich Ltd changed its name trading to Bristile Ltd. Since 1929, the company had been known as the 'manufacturer of the Bristile product.' As the Directors believed that it was the product which had become a household name, it was felt that it was natural to take the name of the product as well as taking on the colour of the clay products for which the company had become so famous.[57]

In 1979, the public road system around the Belmont factory site was developed. This forced the company to construct an 'overpass and conveyor system to transport the clay from the southwest storage sheds across the roadway to the factory'.[58] This new road is now known as Resolution Drive. The clay pits at Belmont were located at the southwestern side of the Belmont factory, in the area which from 1999 was being developed as 'Ascot Waters'.

The mid to late 1970s brought another downturn in the building industry. Although the decline was offset somewhat by the taking over of the timber company, Whittakers, and reduced costs following the conversion of the Belmont kilns to natural gas, production of Bristile pipes was 'maintained at a level consistent with the reduced market'.[59]

From 1978, the vitrified pipe industry was fiercely competitive. Manufacturers in the eastern states were in a similar position to Bristile having surplus stock and, in an effort to dispose of their stock, exported the product to Western Australia, selling the pipes and fittings below cost price.[60] Besides the highly competitive conditions

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53 H. L. Brisbane & Wunderlich Annual Report, 1968. In 1968, the Belmont Council told the company that the factory area facing Grandstand Road was in a dilapidated condition which did not meet with local by-laws. This section was replaced by a new brick wall and roof.

54 H. L. Brisbane & Wunderlich Annual Report, 1971.

55 H. L. Brisbane & Wunderlich Annual Report, 1972.

56 H. L. Brisbane & Wunderlich Annual Report, 1974.

57 Bristile Ltd Annual Report, 1979.

58 Ibid.

59 H. L. Brisbane & Wunderlich Annual Report, 1977.

60 Bristile Ltd Annual Report, 1978.

and the downturn in the market, PVC piping was being introduced and from the late 1970s became the more accepted product to use in sewerage construction.[61]

In 1981, demand for clay pipes and fittings had become so low that Bristile relocated the surplus clay material to Caversham for the manufacture of terracotta roofing tiles.[62] By 1982, PVC pipe had all but replaced vitrified clay pipes and fittings as a building material. A Bristile market survey indicated that the manufacture of these products 'could not be viably maintained'. As a result, the Belmont factory was closed in August 1982.[63] To retain their interests in this field, Bristile became the agents for pipes and fittings produced by Victorian company, Vitclay Pipes Pty. Ltd.[64]

Bristile investigated the possibility of redeveloping the Belmont site, believing that its proximity to Perth would make it an attractive development prospect. However this plan did not eventuate and in 1985 Bristile sold the Belmont land.[65] The site was purchased by the Metropolitan Region and Planning Authority 'as a part of the acquisition of all of the former holdings of Bristile Ltd on the Belmont peninsula'. The property was transferred into the ownership of the State Planning Commission in 1985 and the entire Bristile holdings, totaling 110 hectares, were included within the boundary of Improvement Plan 20: the Ascot Fields Redevelopment Project.[66]

In 1990 and 1991, a number of studies were commissioned by the Department of Planning and Urban Development on behalf of the State Planning Commission. These studies included a local history and heritage assessment, a redevelopment plan that incorporated the retention of one stack, three rectangular kilns and five circular downdraught kilns, and a structural assessment with a detailed costing of restoring the kilns and stacks.

By 1991, the sheds at the site were in a great state of disrepair and concern was also raised about the hazardous materials used in the construction of various buildings, such as asbestos. In August 1991, work was completed on the demolition of the sheds and the removal of hazardous materials. The kilns and the chimney stacks were left intact. It was decided that no demolition of these structures would take place until 'redevelopment and road realignment options clearly indicated site usage requirements'.[67] Work also included retaining part of the factory structure and recladding the roof, protecting six of the circular downdraught kilns.

In 1991, the City of Belmont, the Western Australian Turf Club and the Department of Community began work on a beautification project for the site. Work included earthworks, landscaping and maintenance of the area.

On 1 July 1992, the interim listing of *Bristile Kilns (fmr), Belmont* was gazetted in the *West Australian*. In August 1992, the Department of Planning and Urban Development was granted an extension of the period for comment on the interim listing of the site. On 22 December 1992, the Heritage Council of Western Australia

61 Moore, B., op. cit., pp. 235; Bristile Ltd Annual Report, 1982.
62 Bristile Ltd Annual Report, 1981.
63 Bristile Ltd Annual Report, 1982.
64 Bristile Ltd Annual Report, 1984.
65 Bristile Ltd Annual Report, 1983, 1984 & 1985.
66 DPUD, 'Submission to the Heritage Council: Investigation of Old Bristile Kilns', 28 August 1992, pp. 1.
67 Ibid, pp. 2 & 3.

informed the Department that the place had been entered in the Register of Heritage Places on an interim basis.[68]

In December 1992, a development application was lodged for the disassembly and relocation of several kilns to Maylands Peninsula. In March 1993, the State Planning Commission submitted another application to the Heritage Council, regarding the disassembly and reconstruction of the rectangular kilns. On 16 July 1993, the Heritage Council was informed that the disassembly of the three rectangular kilns had been completed. One rectangular kiln was relocated and reconstructed at the Maylands Peninsula and the material from the other two kilns was stacked and stored within the circular downdraught kilns area.[69]

By this time, the area has been included in a Labor Government proposal to rehabilitate and revitalise the area under the State/Federal 'Building Better Cities' initiative.[70] Planning for the Ascot Waters Estate under the Building Better Cities policies highlighted the need for a rationalisation of the regional road network connecting Grandstand Road to the Great Eastern Highway.

Between 1994 and c.2000, there was continuing negotiation between the WAPC, the State Heritage Office, the City of Belmont and the developers of Ascot Waters regarding the partial demolition of the eight circular downdraught kilns and five chimney stacks. Most development proposals concerned the widening of Grandstand Road and all were based on the site's inclusion in Improvement Plan 20, the residential and commercial development of the immediate area.[71] The developers, Ascot Fields Nominees, took up an option to purchase the former Bristile land, subject to a satisfactory development plan being approved, but for many years no workable solution for the land could be found.[72]

In December 1996, the City of Belmont included *Bristile Kilns (fmr), Belmont* in its Municipal Inventory of Heritage Places.[73]

In December 1998, the State Heritage Office confirmed the high degree of significance of the place, and the requirement that a planning solution be found that retained all the kilns and stacks. Negotiations continued regarding the realignment of Resolution Drive and Grandstand Road and the impact it would have *on Bristile Kilns (fmr), Belmont*.

In 2002, an alternative road scheme was devised that allowed for the retention of all the kilns and stacks and did not compromise any of the heritage values of the adjacent Ascot Racecourse, which was another continuing concern. Roadwork commenced in 2006 and the developers of Ascot Waters began investigations to remediate the site. A southern section of concrete building pad was removed. The new road system brought Grandstand Road closer to the east end of the premises, within metres of the easternmost chimney stack. This was near to the road's pre-1980s alignment and separated from the site the c.1955 brick administration building, which was subsequently demolished in 2008.[74]

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68 SHO Files, P00868.

69 Ibid.

70 Other Perth metropolitan areas included East Perth and Subi Centro.

71 SHO Files, P00868.

72 SHO files P00868

73 SHO database entry, P00868

74 Aerial photographs, 1977, 1979, 1981, 2005, 2006, 2007, 2008, 2009, Landgate Mapviewer

In 2003, the National Trust of Australia (WA) placed *Bristile Kilns (fmr), Belmont* on the list of 'Western Australian Endangered Places'. 'Inappropriate development and deterioration through delay in management outcome' was cited as the threat to the place. Although the listing was reviewed in 2005 due to the outcome of the road scheme, *Bristile Kilns (fmr), Belmont* will remain on the Trust's Endangered List until a positive management outcome has been achieved.[75]

In 2006, the Belmont Historical Society received a commendation from the Heritage Council of WA (2006 Heritage Awards) for their work in lobbying to save *Bristile Kilns (fmr), Belmont* from inappropriate development.

After many years of negotiations and attempts to find a development plan that met both commercial and heritage requirements, Ascot Fields Nominees in 2015 relinquished their option of purchase on the former Bristile site, which was returned to full WAPC control.[76]

13. 2 PHYSICAL EVIDENCE

Bristile Kilns (fmr), Belmont, located at Grandstand Road, Ascot comprises eight brick circular downdraught kilns (often referred to as beehive kilns) and five tall brick chimneys within an area of 1.5 hectares. The site is currently disused.

Ascot is a suburb within the City of Belmont located on the Swan River approximately 5.8 kilometres from the Perth central business district. It has a population of around 30,000 people, covers 40 square kilometres and has 11 kilometres of river frontage. The City of Belmont is made up of the suburbs of Ascot, Belmont, Cloverdale, Kewdale, Redcliffe and Rivervale.

The suburb of Ascot is primarily residential, with other uses associated with the horse racing industry. Ascot was named after the Ascot Racecourse, a dominant feature in the area located adjacent to the *Bristile Kilns (fmr), Belmont*.

Bristile Kilns (fmr), Belmont is located to the south west of the Ascot racecourse, on the south west side of Grandstand Road. The Racecourse, Ascot Waters Marina and the *Bristile Kilns (fmr), Belmont* site are situated on the Belmont Peninsula with the Swan River to the north, south and west. To the south west of the *Bristile Kilns (fmr), Belmont* site is Resolution Drive with the relatively recent residential subdivision and Marina of Ascot Waters to the west and parklands and a major traffic roundabout to the south.

Portions of the site are fenced with high mesh link fencing and the remainder is unfenced and uncared for. The site is disused and has an abandoned appearance. Within the fenced area are eight brick circular downdraught kilns, six of which are under a timber and iron framed corrugated iron roofed shelter (the remains of the factory structure). Two of the kilns are uncovered and exposed to the elements. The site also contains five tall brick chimney stacks all of which are uncovered. The ground surrounding these elements is relatively flat with the remains of concrete floor slabs from buildings and structures since demolished, some bitumised areas, grassed areas and areas of bare earth.

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75 'Western Australian Endangered Places 2003: Bristile Kilns', www.ntwa.com.au; telephone conversation with NTWA officer, 10 March 2008.

76 SHO files P00868

As outlined in the documentary evidence section of this assessment, the factory buildings and equipment necessary for the extraction of clay and the manufacture of pipes and tiles have been entirely removed with the exception of the remaining eight circular downdraught kilns and five chimney stacks. The seven rectangular kilns have been demolished and the two stacks associated with these kilns stand alone to the south east corner of the site. Only eight, from a total of twelve circular downdraught kilns constructed on the site since 1905, still exist with the five extant stacks. Four of these original twelve kilns were part of the Westralian Potteries complex, but as with the rectangular kilns, these four were probably demolished between 1961 and 1985, though demolition of some may have occurred earlier. The remaining structures represent the 'firing' mode for the production of stoneware pipes and tiles.

As a result of expansion and movement, the circular downdraught kilns have at various times been patched and in some cases the domes have been replaced entirely. However, this is a typical result of the firing process and, throughout Australia, this kind of maintenance was undertaken. The flue system is original, although expanded upon when the factory went through its various phases of development. Concrete pads and ramps provide a footprint where the factory sheds once stood. Because of the location on the site of the river flats and the high water table, the Belmont factory was occasionally subject to flooding.

In summary, in 2019 the site comprises:

- two chimney stacks located on the eastern boundary of the site;
- circular downdraught kilns and three associated chimney stacks, towards the north of the site;
- an original timber and iron shed structure, with c.1993 corrugated roof covering in the north corner of the site, covering six kilns. Kilns 5 and 8 are not covered by this structure;
- extant cement factory floors and ramps that cover approximately the north-east half of the subject area;
- cyclone fencing that encloses the eight circular downdraught kilns and the three associated stacks, as well as the other two chimney stacks.

According to Miles Lewis, 'Pipe and Tile Kilns, former Bristile Site, Ascot Fields, Belmont, Perth', prepared for the Department of Planning and Urban Development, September 1990, it is understood that two types of kilns operated at the *Bristile Kilns (fmr), Belmont* site. Examples of only one of these types remain extant on the site in 2009. The processes of each are briefly described below.

Circular Downdraught Kilns (beehive kilns)

The circular downdraught kilns and associated chimneys located at *Bristile Kilns (fmr), Belmont* are of a design that was standard throughout Australia from the late nineteenth century until the 1950s and 1960s.

The circular kilns are what are commonly known as downdraught kilns.

In this design, the heat is introduced at the sides of the kilns, usually behind a baffle known as a flash wall or bag (fire hole) to keep it from direct contact with the adjoining contents. The hot gases rise to the vaulted or domed top of the kiln, and

are then sucked down through the stack to a perforated floor with a flue leading to a nearby stack.[77]

In Australia, the rectangular (tunnel) and the circular (beehive) downdraught kilns are the most common types found. Generally, the rectangular kilns were used for firing bricks, and the beehive ones for wares such as pipes and tiles. At Bristile, both circular and rectangular kilns were used for firing pipes and fittings.[78]

The form of the circular downdraught kilns is fairly standard throughout Australia, although there are variations of design. The kilns at the Bristile site are of a type that dates specifically to the 1920s-1950s period. *Bristile Kilns (fmr), Belmont* differs from other sites in Australia, in that, as the factory expanded, the chimney stack was associated with a number of kilns, not just one as was generally the case.[79]

The heat was moved continuously through a series of kilns with perforated floors, vaulted or domed tops and stacks. The kiln is heated from the sides with the heat rising to the top of the dome, it is then drawn through the stack through the perforated floor, and through an underground flue to the next stack. The exhausted gases are drawn over the bricks yet to be burnt, drying and preheating them, and the air to feed the kilns is drawn over the burnt bricks, cooling the bricks and preheating the air.

The circular kilns each had twelve fire holes and two wicket doors. The oldest surviving circular downdraught kilns are nos. 2-5.[80] These kilns were used for firing pipes. The basic dome construction had the bricks laid with their length in a radial pattern with the thickness of this part of the wall being about 135mm. These bricks are tightly locked together and covered with a slip (mud and sand). These bricks are then affected by the salt glazing which assisted in tightening the bricks together. The outer layer of bricks were laid 'flat'. This layer of bricks was not tightly locked together and were not affected by the salt glazing. As such they were easily dislodged and the outer layer often appears in a worse condition than the structural dome below. The stability of the walls is essentially maintained by the iron bands attached around the kilns. Initially the iron bands were located to the upper sections of the domes as the openings were to the lower sections. This resulted in the lower walls bursting out more than the upper dome walls. Later further bands were added to the lower sections, being separated when filling the kilns and being reconnected prior to firing. The firing process causes a great deal of movement in the walls.

A structural survey of the circular kilns in February 2016 has determined that the outer layer of masonry in these kilns is experiencing general collapse to varying degrees, that the internal walls (which were temporary structures replaced several times over historic use) have either collapsed or are in considerable disarray, the there is a widespread need for mortar repointing , which is related to high levels of

77 Lewis, M., 'Pipe and Tile Kilns, former Bristile Site, Ascot Fields, Belmont, Perth', prepared for the Department of Planning and Urban Development, September 1990, pp. 5-6.

78 Ibid, pp. 9.

79 Ibid, pp. 10.

80 The original numbers for these kilns were 5, 6, 7, 8, 9, 10, 11 and 12 from the original 12, however for ease of understanding and to co-ordinate with the TPG 2016 heritage assessment, the kilns are referred to in this document simply as 1-8.

salt efflorescence, and that the former gas pipes connected to the kilns are corroding which is causing localised expansion and masonry displacement.[81]

Rectangular Kilns (tunnel kilns)

An archaeological inspection of the *Bristile Kilns (fmr), Belmont* site was conducted on 5 February 1999. The inspection was non-invasive and resulted in no physical impact on the fabric of the place. The field inspection was intended to identify any physical (archaeological) features relating to the early phases of site use and to determine, where possible, the location of sub-surface archaeological structures or other cultural deposits. Another surface inspection was carried out in May 2019.

There was no clear surface evidence for earlier structures or activity areas, either in the form of foundations or scatters of building or other cultural material. However, given that much of the former factory floor was sealed beneath a substantial concrete pad, there is the potential that the foundations of some of the earliest kilns, associated infrastructure and possible cultural deposits relating to the industrial process are preserved beneath.

The general absence of cultural materials or construction debris across the remainder of the area is probably a function of demolition and landscaping activities across the site. Towards the south-western end of the site in particular, it is evident that the ground surface has been lowered by up to 0.9m, exposing remnant portions of flue pipes leading out of the surviving brick stacks. Given this, it is unlikely that any significant cultural or structural features (such as the former trolley line to the clay pits) have survived intact.

13. 3 COMPARATIVE INFORMATION

Kiln/Brickworks Complexes in Western Australia

A search of the Historic Heritage database for places with the use "INDUSTRIAL/MANUFACTURING" returns 526 entries, 77 of which are entered in the RHP. These places include mills, wineries, whaling stations, smelters, brickworks and lime/charcoal kilns. Refining this search to any place with the keyword "kiln" returns 57 places, 11 of which are entered in the RHP. The places most comparable to *Bristile Kilns (fmr), Belmont* as commercial manufacturing sites involving brick kilns include:

- *P02410 Maylands Brickworks* (RHP): Established on the Maylands Peninsula in 1927 by Atkins and Law, Maylands Brickworks comprises a Hoffman Kiln of brick construction, timber and iron drying sheds, the steel framed pug mill sheeted in galvanised iron, and the gate house and change rooms of brick construction. The Hoffman Kiln and chimney stack, 34 metres from ground level, are the most striking features of the site. The kiln is a two level brick structure the lower level consisting of brick walls and brick arched roof in which firing of the bricks occurred. In the internal kiln brick arches are of refractory brick which form the area where the bricks were stacked during firing. There are 18 openings around the perimeter of the kiln to allow the stacking and unloading of bricks from the kiln. The chimney stack is also of brick construction. Presented as a public interpretation site since 1990.

81 TPG, *Ascot Kilns (Bristile Kilns (fmr), Belmont), Heritage Strategy*, Department of Planning, 2016, pp. 19-24

- *P03698 Hassell's Cottage,* Toodyay (RHP): located in West Toodyay, ruinous remains extant, kiln type cannot be determined.
- P14465 *Australian Fine China, Subiaco* (RHP): Previously a complex of single and two-storey industrial buildings for the production of porcelain, the factory was established with government support in 1921 and from 1941, it was taken over by Brisbane and Wunderlich Ltd (later Bristile). The factory closed in 2006 and was demolished in 2008. Two tunnel kilns were present at the original site; in 2019 sections of the tunnel kiln are in storage for eventual reassembly as a public heritage interpretation.
- P04413 Site of Sugar's Brickworks (MI): located in Belmont, kiln no longer extant.
- P04545 Beverley Brick Kiln (MI): located in Beverley, kiln no longer extant.
- P07086 Katanning Brickworks (MI): located in Katanning, this complex of square brick kilns was extant in 2012.
- P08413 Corrigin Brickworks – Site (MI): located in Corrigin, kiln no longer extant.
- P08619 Brick Kilns (MI): located in Byford, kilns believed to be extant as part of redeveloped brickworks, current state unknown.
- P08640 Courtland Pottery (MI): located in Belmont, kiln no longer extant.
- P08817 Brickworks – Site of (MI): located in Brookton, kiln no longer extant.
- P10790 Brick Kiln – Site of (MI): located in Bruce Rock, kiln no longer extant.
- P10912 Clackline Refractory (MI): located in Clackline, complex of square kilns extant in 2016.
- P11229 Kondinin Brickyards & Kiln – Site of (MI): located in Kondinin, kiln no longer extant.
- P12264 Irwin Brickworks (MI): located in Irwin, ruinous remains of a possible bottle kiln extant in 2005.
- P12319 Sagger's Brickworks (Kilns with 3 fires) – Site (MI): located in Broomehill-Tambellup, kiln no longer extant.
- P24661 Canterbury Pool & Canterbury Brick Kiln, New Norcia (MI): located in New Norcia, it is unknown if this kiln is extant.

It is noted that the brick kilns are no longer extant at P15829 *Armadale State Brickworks Dust Room & Machinery Shed (fmr)* (RHP). A contemporary brick kiln manufacturer is Geraldton Brickworks (No P number), which operated a small brick kiln at their present manufacturing site when established in 1929.[82]

From this list, the only place comparable to *Bristile Kilns (fmr), Belmont* is P02410 *Maylands Brickworks, Bayswater* (RHP), which has a similarly intact and substantial kiln complex. However even this place is not directly comparable, as P02410 *Maylands Brickworks, Bayswater* (RHP) is an intact example of a Hoffman kiln rather than a circular downdraught kiln.

82 'History', Gerladton Brick website, accessed 17 July 2019, http://www.geraldtonbrick.com.au/history/

Kiln/Brickworks Complexes in Australia

The above establishes that *Bristile Kilns (fmr), Belmont* is rare within the State of Western Australia. However, the complex is also believed to be rare nationally and a search of the various state heritage databases in May 2019 returned the following results:

- Victoria: 224 places involving the keyword "kiln," most of which are lime and charcoal kilns, with small numbers of Hoffman kilns and bottle kilns. No circular, beehive or downdraught kilns described.
- New South Wales: 37 places involving variations of the kiln place type, most of which are brick kilns. Comparable beehive kilns include a group of four kilns at Potters' Brewery in Mulkaba, a "downdraught kilns" present at the Bexhill & Casino Bricks site in Lismore, and at the South Grafton Brickworks in Clarence Valley.
- Queensland: 2 places with the place type "manufacturing and processing: works – bricks/pottery," neither of which includes beehive or downdraught kilns.
- South Australia: 22 places with the keyword "kiln," which are mostly a mix of lime or brick kilns. Comparable places includes a single beehive kiln at Former James' Brickyard, Beverley.
- Tasmania: 11 places with the keyword "kiln" in the place name, however there is no available information to go with these place entries.
- ACT: no kilns were identified on the ACT heritage register.
- Northern Territory: no kilns were identified on the Northern Territory heritage register.

The national comparative list demonstrates that *Bristile Kilns (fmr), Belmont* is the largest known complex of circular downdraught kilns still existing in Australia, and one of only three beehive kiln places identified nationally.

Kiln/Brickworks Complexes Globally

A search for kilns and brickworks was also conducted in places outside of Australia, and while this is not considered a comprehensive list, the following beehive kilns were identified:[83]

- Archie Bray Foundation, Montata, US: historic group of beehive kilns restored and presented to the public as a tourism site connected to the ceramic industry.
- Loton Reformatory, Virginia, US: historic beehive kiln that was part of a former prison complex.
- Continental Clay Brick Plant, Virginia, US: beehive brick kiln, later used to dry sand.
- Porth Wen Brickworks, Isle of Anglesey, UK: complex of beehive kilns from a former industrial site.

83 Google search, 22 May 2019

- Henry Watson Pottery Complex, Suffolk, UK: includes a single beehive kiln.
- Old Brick Kilns in Great Linford, UK: includes two beehive kilns but no associated chimney stacks.
- Medalta Beehive Kilns, Alberta, Canada: a group of three restored beehive kilns.
- Te Horo Beehive Kiln, NZ; built and used by internationally regarded ceramic artist Mirek Smisek. Relocated in 2018.

Additionally two sites, appearing on a waymarking site search for 'kiln'[84], appear to contain a number of circular downdraught kilns, one of which is still in use:

- Belden Brick Ovens in Sugarcreek Ohio, USA[85] was originally founded in 1885. At one time there were hundreds of these factories across Ohio but this, it is suggested, is one of the only ones to survive. The brick firing ovens are still in use but have been converted to many different fuels over time and now utilise natural gas. At least three circular downdraught kilns (without stacks) are visible in the photograph on the website.
- Medalta Kilns in Medicine Hat Alberta, Canada[86] was at the centre of the clay products industry in Western Canada, which included the manufacturing of roof tiles, sewer pipes, and porcelain insulators. By the 1960s these plants had begun to shut down and by 1990 only bricks were being produced. The available photographs shows three extant circular downdraught kilns with stacks. The kilns do not appear to still be in use.

Finally, a handful of other somewhat comparable sites, accessed primarily through TICCH website links[87] and the waymarking site discussed above[88], were noted across Europe and the United States but all appear to be singular kilns, many of an earlier period than *Bristile Kilns (fmr), Belmont*, and the majority were brick kilns as opposed to tile/pipe kilns. Many are also not of the circular (beehive) kiln design.

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84 Waymarking – A Scavenger Hunt for Unique and Interesting Locations in the World. Accessed October 6 2009. http://www.waymarking.com/wm/search.aspx?f=1&kw=kiln

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13. 5 FURTHER RESEARCH

Further research may indicate when individual kilns were constructed and demolished.

Should any development of the site go ahead, it is recommended that an updated structural assessment of the extant kilns and stacks be undertaken before any work begins. Also, as a full survey of the kilns’ ventilation system has not been undertaken further investigation of its construction, function and rarity may be warranted.

Additionally, it is recommended that an appropriately qualified archaeologist be consulted prior to the planning stage to identify areas of potential archaeological significance and provide advice regarding further action.