



**HERITAGE
COUNCIL**
OF WESTERN AUSTRALIA

REGISTER OF HERITAGE PLACES

ASSESSMENT DOCUMENTATION

11. ASSESSMENT OF CULTURAL HERITAGE SIGNIFICANCE

The criteria adopted by the Heritage Council in November 1996 have been used to determine the cultural heritage significance of the place.

PRINCIPAL AUSTRALIAN HISTORIC THEME(S)

- 2.4.2 Migrating to seek opportunity
- 3.4.3 Mining
- 3.6 Recruiting labour
- 3.14.2 Using Australian materials in construction
- 4.1.5 Developing city centres

HERITAGE COUNCIL OF WESTERN AUSTRALIA THEME(S)

- 101 Immigration, emigration and refugees
- 107 Settlements
- 110 Resource exploitation and depletion
- 303 Mining (including mineral processing)

11.1 AESTHETIC VALUE*

The exposed sheer white/cream quarry faces at *A.T. Brine's Donnybrook Sandstone Quarries (fmr)* provide a striking contrast of the remains of a historical industrial process within a remnant native bush setting. (Criterion 1.3)

11.2 HISTORIC VALUE

A.T. Brine's Donnybrook Sandstone Quarries (fmr) was an important source of Donnybrook Sandstone, a distinctive and high quality building material that became popular in the early twentieth century. This material was Perth's premier building material at the time and was used in a number of high profile public buildings, making a significant contribution to the character of Perth. (Criterion 2.2)

A.T. Brine's Donnybrook Sandstone Quarries (fmr) is associated with prominent Western Australian builders A.T. Brine and Son and S.B. Alexander, who were

* 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Canberra, 1991, with additional reference to Richards, O. *Theoretical Framework for Designed Landscapes in WA*, unpublished report, 1997.

responsible for a number of high profile construction projects that helped shape the character of Perth in the early twentieth century. (Criterion 2.3)

A.T. Brine's Donnybrook Sandstone Quarries (fmr) is associated with the skilled quarrymen who migrated from Scotland to work at the quarry, and with the workers in other roles that facilitated quarry operations and the provision of services. (Criterion 2.2)

11. 3. SCIENTIFIC VALUE

A.T. Brine's Donnybrook Sandstone Quarries (fmr) has a high degree of potential, through the use of archaeological techniques, to provide information about the processes involved in quarrying sandstone in the early twentieth century, through remnant stone formations and remnant infrastructure that remains in-situ. (Criterion 3.1)

11. 4. SOCIAL VALUE

A.T. Brine's Donnybrook Sandstone Quarries (fmr) provided Donnybrook Sandstone to a number of prominent Perth building projects and its distinctive character has created places of great social value to the Western Australian community, and helped to define the city's sense of place. (Criterion 4.2)

A.T. Brine's Donnybrook Sandstone Quarries (fmr) holds a high degree of significance to the local community due to its instrumental role in the development of the region. (Criterion 4.2)

12. DEGREE OF SIGNIFICANCE

12. 1. RARITY

A.T. Brine's Donnybrook Sandstone Quarries (fmr), and its vast array of historical quarry workings as well as abandoned equipment, provides a rare and intact example of an important historical industrial process that is not found at any of the other sandstone quarries in the Donnybrook area. (Criterion 5.2)

A.T. Brine's Donnybrook Sandstone Quarries (fmr) is one of a small number of quarries opened up to exploit this resource in the later nineteenth to early twentieth century. (Criterion 5.2)

12. 2 REPRESENTATIVENESS

A.T. Brine's Donnybrook Sandstone Quarries (fmr) is an excellent representative example of the quarrying techniques used to extract Donnybrook Sandstone during the early twentieth century. (Criterion 6.1)

12. 3 CONDITION

A.T. Brine's Donnybrook Sandstone Quarries (fmr) is no longer in use as a quarry. The quarry faces remain as they were when last quarried. Equipment and other infrastructure remaining on site are largely ruinous and are in a poor condition. Overall the condition of the quarries is good.

In January 2015 a bushfire went through the region resulting in damage to the elements at Quarry 2. In particular, the lean-to shed has collapsed and, although the flatbed truck remains intact, fire damage is evident.

12. 4 INTEGRITY

A.T. Brine's Donnybrook Sandstone Quarries (fmr) has a high degree of integrity. The quarries do not appear to have been exploited since the mid twentieth century and the equipment and infrastructure remaining on site, largely dating to c.1930, appears to remain in the location in which it was last used.

12. 5 AUTHENTICITY

A.T. Brine's Donnybrook Sandstone Quarries (fmr) has a high degree of authenticity. Although no longer in use as quarries the former use of the place is still clearly distinguishable from the remaining fabric.

13. SUPPORTING EVIDENCE

The documentation for this place is based on the heritage assessment completed by Dr Kelly Fleming in March 2013, with amendments and/or additions by the State Heritage Office and the Register Committee. A survey of the quarries on Lot 3124 was completed by Senior Heritage Officers Kelly Fleming and Moss Wilson between 28 February and 1 March 2013. Additional comparative data was collected from other quarries in the area.

13. 1 DOCUMENTARY EVIDENCE

The first occupants of the Donnybrook area, collectively referred to as *Nyungar*, are from the Kaneang (Kaniyang) Nyungar language group.¹ Archaeological dating evidence suggests occupation of the wider South West region of Australia commenced at least 47,000 years before present.²

The first European settlers in the Donnybrook region were a group of Irish men and their servants who established a farm approximately one kilometre north of the present Donnybrook townsite in 1842.³ The endeavour was short-lived however, with failed attempts at breeding horses, cattle and sheep resulting in the settlement being abandoned by 1843.⁴ Other settlers moved into the area after 1850, with a focus on the Preston River and the region saw continuous occupation from this period.⁵

In 1893 the Boyanup-Donnybrook railway line was opened and in 1896-98 the line was extended to Bridgetown.⁶ The townsite of Donnybrook was gazetted on 12 October 1894.⁷ In 1897 gold was discovered at Nonneyup Creek resulting in a 'mini' gold rush in Donnybrook in 1899.⁸ However, by 1904 the mines had

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- 1 AusAnthrop: research. Resources & documentation. AusAnthrop Australian Aboriginal tribal database. Accessed 20 February 2013. http://www.ausanthrop.net/resources/ausanthrop_db/detail.php?id_search=204
 - 2 Goode, B & Harris, J. *An Aboriginal Heritage Survey of the Proposed Shotts Industrial Estate: Collie Western Australia*, 2009. p. 38.
 - 3 Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 1.
 - 4 Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 2.
 - 5 HCWA Assessment Documentation for P727 Donnybrook Post Office. p. 3.
 - 6 HCWA Assessment Documentation for P5012 Donnybrook Railway Precinct. p. 5.
 - 7 HCWA Assessment Documentation for P727 Donnybrook Post Office. p. 4.
 - 8 The Donnybrook Gold Rush, *About Australia's South West*, http://www.australiassouthwest.com/About_Australias_South_West/History/Explorers_and_Settlement/The_Donnybrook_Gold_Rush, accessed 27 March 2013.

closed.⁹ With the construction of the Donnybrook-Katanning line Donnybrook became a junction station with further extensions from Bridgetown to Jardee in 1911 and Pemberton in 1914.¹⁰ Donnybrook continued to develop with a number of timber mills established in the district. The rail network allowed access to more distant markets. The fruit growing industry in the Donnybrook region also expanded during this period.¹¹

The first investigation of Donnybrook Sandstone (originally referred to as Donnybrook Freestone) may have occurred in the mid-nineteenth century. However, it was not until 1899 that the extensive sandstone deposits in Donnybrook were officially noted in observations of the various shafts that had been cut for gold mining operations in the region.¹² The first Donnybrook Sandstone quarrying operation is believed to have occurred c.1900, in amongst the gold mining leases on what was previously known as Goldfields Road (now Upper Capel Road).¹³ However, the Heritage Council of Western Australia assessment for P16722 *Art Gallery of Western Australia Complex* notes that the Art Gallery Administration Building (1897) was constructed from Donnybrook Sandstone¹⁴ indicating that stone may have been quarried as early as the 1890s.

On 30 October 1900 a syndicate, headed by Alexander Forrest, is noted as having purchased Hislop and Company's freestone quarry¹⁵ and in 1901 at least one 'freestone quarry' in Donnybrook was being worked but the specific location of the quarry is unknown.¹⁶ In 1902 the Training College at Claremont [P482 *Claremont Teacher's College (fmr)*] was constructed using Donnybrook sandstone from Vincent's Quarry (P23662 Donnybrook Sandstone Quarry Vincent's), which is situated north of Donnybrook on McCutcheon Road, indicating this quarry was being exploited during this early period.¹⁷ Vincent's Quarry is believed to have been one of the first to be opened in the district,¹⁸ besides those amongst the gold mining leases south of the townsite. A report in the *Western Mail* on Saturday 18 May 1901 notes that the properties held by Mr John Twinem, and those held by the Donnybrook Freestone Company, had

⁹ HCWA Assessment Documentation for P5012 *Donnybrook Railway Precinct*. p. 5.

¹⁰ HCWA Assessment Documentation for P5012 *Donnybrook Railway Precinct*. p. 7; Gunzberg, Adrian & Austin, Jeff, *Rails Through the Bush*, Light Railway Research Society of Australia, Melbourne, 1997, pp. 206-207.

¹¹ HCWA Assessment Documentation for P727 *Donnybrook Post Office*. p. 4.

¹² Blatchford (1899) 'On the Development in Mining in the Locality of Donnybrook' in *Western Australia: Annual Progress Report of the Geological Survey for the year 1899*, Government Printer, Perth. P34-37; Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 91.

¹³ *WA Annual Progress Report No. 11 of Geological Survey for 1899*. p. 34-35; Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 94.

¹⁴ HCWA Assessment (Register Entry) P16722 *Art Gallery of Western Australia Complex*. p. 1.

¹⁵ *Western Mail*, Saturday 3 November 1900. p 26.

¹⁶ *Western Mail*, Saturday 2 March 1901. p 34.

¹⁷ Simpson, E. S. (1917) 67 – 'The chemical and Physical Properties of Some of the Donnybrook Sandstones' in *Geological Survey Bulletin WA 74*. p. 91.

¹⁸ Simpson, E. S. (1917) 67 – 'The chemical and Physical Properties of Some of the Donnybrook Sandstones' in *Geological Survey Bulletin WA 74*. p. 91.

recently been amalgamated.¹⁹ Although Frost refers to these as being on Goldfields Road it is possible this included Vincent's Quarry to the north.²⁰

In 1901, the tender for the construction of the new Law Courts called for dressings to the building to be in Donnybrook Freestone, by order of the Cabinet.²¹ The contract was awarded to Messrs. R.P. Vincent and Son in February 1901.²² However, during the contract period the amount of Donnybrook Freestone required was altered to include construction of the basement resulting in the contractor noting that to meet this requirement, and that for the external stone, more time would be required to quarry enough stone of uniform colour. The contract was subsequently altered to concrete stucco for the external dressing of the building.²³ The Law Courts (part of P1947 *Supreme Court Buildings and Gardens, Old Court House, Stirling Gardens*) were completed in 1903.²⁴ The Donnybrook freestone used in part of its construction also came from Vincent's Quarry.²⁵

The above events resulted in the appointment of a Royal Commission in 1902 to investigate the use of cement stucco in place of Donnybrook Freestone, and to explore the feasibility of using the stone for other public buildings.²⁶ The Commission considered various pieces of evidence including a deputation by Donnybrook residents, the quarry owners, the Operative Mason's Union, and the Trades and Labour Council which touted the quality of the stone and encouraged its use in public buildings.²⁷

The Commission's findings were that sufficient information had not been obtained by the Department for Works prior to requiring that Donnybrook Freestone be used, and that the alteration of the contract to cement stucco was probably unwarranted as the use of Donnybrook Freestone had been feasible and could have been pursued.²⁸ The Commission also found that the stone should be used in public buildings if the stone obtained continued to be of a high enough quality, and that the buildings could be designed to meet the character of the stone.²⁹

19 *Western Mail*, Saturday 18 May 1901. p 19.

20 Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 94.

21 *Report of the Royal Commission on Donnybrook Freestone*. 'Tabled Papers'. Cons 855 Item No. 1902/073, State Records Office WA.

22 *The West Australian* Friday 25 April 1902 'Erection of Public Buildings, Suitability of Local Stone'. p. 3.

23 *The West Australian* Friday 25 April 1902 'Erection of Public Buildings, Suitability of Local Stone'. p. 3.

24 HCWA Register Entry for P1947 *Supreme Court Buildings and Gardens, Old Court House, Stirling Gardens*. p. 1.

25 Simpson, E. S. (1917) 67 – 'The chemical and Physical Properties of Some of the Donnybrook Sandstones' in *Geological Survey Bulletin WA* 74. p. 91.

26 *Report of the Royal Commission on Donnybrook Freestone*. 'Tabled Papers'. Cons 855 Item No. 1902/073, State Records Office WA.

27 *The West Australian* Friday 7 February 1902. 'Donnybrook Freestone, Its use for Public Buildings, Deputation to the Minister for Works. p 2; *Report of the Royal Commission on Donnybrook Freestone*. 'Tabled Papers'. Cons 855 Item No. 1902/073, State Records Office WA.

28 *The West Australian* Friday 7 February 1902. 'Donnybrook Freestone, Its use for Public Buildings, Deputation to the Minister for Works. p 2; *Report of the Royal Commission on Donnybrook Freestone*. 'Tabled Papers'. Cons 855 Item No. 1902/073, State Records Office WA.

29 *The West Australian* Friday 25 April 1902 'Erection of Public Buildings, Suitability of Local Stone'. p. 3; *Report of the Royal Commission on Donnybrook Freestone*. 'Tabled Papers'. Cons 855 Item No. 1902/073, State Records Office WA.

Following the Royal Commission additional quarries were opened to exploit the resource.³⁰ Some of these are understood to have been owned by S.B. Alexander while others were leased to A.T. Brine and Son. Both of these companies were building contractors from Perth.³¹ The quarries on Goldfields Road remained in government ownership and became known as PWD 1 & 2. The stone for the Memorial Hall in Donnybrook is believed to have come from these quarries.³²

In 1905 the Police Courts (Centenary Galleries, a part of P16722 *Art Gallery of Western Australia Complex*) were constructed from Donnybrook Sandstone.³³ The stone for these works is understood to have come from No.3 Quarry (P23664 *A.T. Brine's Donnybrook Sandstone Quarries (fmr)*).³⁴

Due to the increased quarrying during the early nineteenth century there were calls for a tramline from the quarries to the railway. However, despite a deputation to the Minister for Works in September 1907, introduced by John Ewing MLA, the tramline did not eventuate.³⁵ Plans for the proposed tramway indicate that the intention was to connect with the railway at Ports Siding, just west of the Donnybrook townsite, with branches to three quarry sites to the north including *A.T. Brine's Donnybrook Sandstone Quarries (fmr)*.³⁶

A geological survey report outlining a visit to some of the Donnybrook quarries in October 1911 notes that 'the principal operations being carried out at the time of [the] visit....were the raising of blocks from the No.3 quarry (Mr Alexander's) on Location 48 (Bishop's property)'.³⁷ Certificate of Title details indicate that a James Bishop owned Wellington Location 3124 between 1917 and 1936³⁸ which covers the area of *A.T. Brine's Donnybrook Sandstone Quarries (fmr)*. The Geological survey report of 1917 refers to this as the north east corner of Loc. 48/1924.³⁹ The report also notes that 'when first opened the stone obtained from No.3 quarry was of little commercial value, being much flawed, but this unfavourable feature was absent from the stone being raised at the time of' the visit (1911).⁴⁰

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- 30 HCWA Assessment Documentation for *P5012 Donnybrook Railway Precinct*. p. 6; Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 94.
- 31 Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 94.
- 32 Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 94.
- 33 Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 99.
- 34 Simpson, E. S. (1917) 67 – 'The Chemical and Physical Properties of Some of the Donnybrook Sandstones' in *Geological Survey Bulletin WA* 74. p. 84 & 91.
- 35 Donnybrook Quarry – Reserve 2720, Transcription of a Deputation to the Minister for Works 17 September 1907, State Records Office WA, Cons 689 Item No. 1932/0509.
- 36 Donnybrook Quarry – Reserve 2720, Papers relating to proposed tramline, State Records Office WA, Cons 689 Item No. 1932/0509.
- 37 Saint Smith, E.C. (1912) *A Geological Reconnaissance Bulletin No. 44, South West Division*. 'Mesozoic (?)'. p. 20-21.
- 38 Certificate of Title Vol. C70 Fol. 154, Wellington Location 3124.
- 39 Simpson, E. S. (1917) 67 – 'The Chemical and Physical Properties of Some of the Donnybrook Sandstones' in *Geological Survey Bulletin WA* 74. p. 84.
- 40 Saint Smith, E.C. (1912) *A Geological Reconnaissance Bulletin No. 44, South West Division*. 'Mesozoic (?)'. p. 20-21.

With the increased quarrying operations at Donnybrook experienced quarrymen were brought from Scotland to develop the quarries. One recruit was John Walker who arrived with his family in 1911 while another was Andy Steele and his wife.⁴¹ Frost states that Walker found the scale of the quarrying operations surprising, expecting similar operations to those he had worked on in Scotland which employed upwards of 600 men. However, he found the Donnybrook operations were small, only employing 30 men at any one time. The living and working conditions were also found to be of a low standard with most of the quarry workforce living near the quarries, either in tents or humpies, or in a boarding house run by Andy Steele's wife.⁴²

Frost names a number of other quarrymen, foremen and carters; John Walker, Andy Steele, Dominic Keenan (quarry foreman), Billy Bancroft, Jack and George Millington, Glen Mitchell, Charles Wood, Charlie Cavill, Jim Edwards, Harry Wales, Thomas Alster, John Balminton, William Hamlin, John Keogh, Thomas Owen, Jack Crowley, Bungey Woods, John Sanford, and William Jordan.⁴³ However, the source of this information is unknown.

A review of a sample of post office directories for Donnybrook from 1904 through to 1946 found only two quarry managers, a William Dawes, who was listed in 1918 with this occupation, and a Henry Wales in 1924. Neither an Andrew Steele nor John Walker is listed in the 1912, 1914 or 1916 post office directories.⁴⁴ In 1918 a John Walker appears, but no occupation is given and he continues to be listed in the directories with no occupation until in 1930 he is noted as being a farmer.⁴⁵ In 1935 John Walker is again listed as a farmer, whilst a John Walker Jnr is identified as a dairyman and a Peter Walker appears with no occupation listed. The entries are the same for 1940 and 1946, but a W. Walker also appears in this latter year, but no occupation is noted.⁴⁶ An Andrew Steele is understood to have worked at the quarries c.1911, and a man of that name is listed in the 1920 and 1924 post office directories as a labourer.⁴⁷ By 1930 Andrew Steele is listed as a farmer and continues to be identified as such until at least 1946.⁴⁸ These details may suggest that, if Walker and Steele arrived c.1911, they may have initially lived at the quarry work camps which were possibly not recorded in the official directories. This may also explain the lack of 'quarrymen' appearing in the directories when it is known the quarries were being worked. However, many

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- 41 Convoy, A.H. (1967) *The Continuing History of Donnybrook*, interview with George Parke, 27th December 1967; Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 99.
- 42 Convoy, A.H. (1967) *The Continuing History of Donnybrook*, interview with George Parke, 27th December 1967; Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 99.
- 43 Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 100-101.
- 44 *The Western Australian Post Office Directories, 1912, 1914 & 1916*. Battye Online Resource. Accessed 27 March 2013. http://www.slwa.wa.gov.au/find/guides/wa_history/post_office_directories
- 45 *The Western Australian Post Office Directories, 1918-1930*. Battye Online Resource. Accessed 27 March 2013. http://www.slwa.wa.gov.au/find/guides/wa_history/post_office_directories
- 46 *The Western Australian Post Office Directories, 1935, 1940 & 1946*. Battye Online Resource. Accessed 27 March 2013. http://www.slwa.wa.gov.au/find/guides/wa_history/post_office_directories
- 47 *The Western Australian Post Office Directories, 1920 & 1924*. Battye Online Resource. Accessed 27 March 2013. http://www.slwa.wa.gov.au/find/guides/wa_history/post_office_directories
- 48 *The Western Australian Post Office Directories, 1930-1946*. Battye Online Resource. Accessed 27 March 2013. http://www.slwa.wa.gov.au/find/guides/wa_history/post_office_directories

of those listed do not have an occupation noted while it is also possible the quarries were worked on a seasonal or as needed basis and quarrymen had other primary occupations with work at the quarry being on a temporary basis.

The majority of the other names identified by Frost do not appear in any of the post office directories examined between 1904 and 1930.⁴⁹ However, a Charlie Cavill is listed in the 1916 and 1918 directories with no occupation, and then in 1920 as an orchardist, while a John Sanford is listed in 1918 and 1920 as an orchardist.⁵⁰ Again, as discussed above, many of these people may have lived in the quarry work camps so do not appear in the official directories.

Only limited information about sandstone quarrying processes specific to the Western Australian context has been located. The description below appears in Frost:

The freestone was found close to the surface and there was very little in the way of overburden to be removed. In quarrying the stone, it was the practice to cut with a pick a gutter up to 6 metres long and up to 6 metres in depth. This was then blasted out with gunpowder, which was preferred to gelignite, as the latter tended to shatter the stone. These blocks were then cut up, by means of hammers and wedges, to the sizes required and ordered from Perth. They were still in a very rough condition when they left Donnybrook, and it was the job of the stonemasons in Perth to do the finishing work.⁵¹

However, information on the methods used for quarrying sandstone in other parts of the world provides some further detail.

Due to the variability common to sandstones the 'workability' of the stone is also highly varied governing quarrying methods. Bowles notes that 'highly indurated [harder] sandstone cannot be channeled (sic) but must be blasted, with the probable result that much of it will be shattered and wasted, whereas soft rock may be cut into rectangular blocks with a channeling (sic) machine, and waste will be much less'.⁵² The different types of stone, and the quarrying methods employed, will influence the cost per cubic metre of stone.

Early sandstone quarrying saw channels cut with hand picks wide enough for a workman to fit inside. By the 1880s steam-driven channelling machines had become the norm in the US which allowed much smaller channels to be cut. Sandstone wears the steel of cutting tools very quickly and in the past this was done 'dry' as the use of water causes further abrasion. Wet cutting methods became more common in the early twentieth century.⁵³ Due to the expense involved, channelling is used only for wall cuts, separating key blocks, or other tasks necessary to prepare stone for wedging or blasting.⁵⁴

49 *The Western Australian Post Office Directories*, 1904-1930. Battye Online Resource. Accessed 27 March 2013. http://www.slwa.wa.gov.au/find/guides/wa_history/post_office_directories

50 *The Western Australian Post Office Directories*, 1916, 1918 & 1920. Battye Online Resource. Accessed 27 March 2013. http://www.slwa.wa.gov.au/find/guides/wa_history/post_office_directories

51 Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 99; A similar process is described by George Parke in Convey, A.H. (1967) *The Continuing History of Donnybrook*, interview with George Parke, 27th December 1967 but in this instance gelignite is used.

52 Bowles, Oliver (1939) *The Stone Industries: Dimension Stone, Crushed Stone, Geology, Technology, Distribution, Utilization*. McGraw-Hill Book Company Inc. New York. p. 80. Accessed online 18 June 2013. <http://archive.org/stream/stoneindustries032694mbp#page/n99/mode/2up>

53 *ibid.* p. 82-83.

54 *ibid.* p. 84.

Quarrying will also be greatly influenced by the nature of the bedding:

In massive, tight-bedded deposits floor breaks must be made by wedging, and in heavy-bedded deposits.....large masses are channelled and subsequent breaks made with black-powder shots. Channeling (sic) usually is required only for wall cuts in thin-bedded deposits, and wedging generally is better than blasting for further subdivision because straighter breaks may be made and less waste results.⁵⁵

According to Bowles, black powder was the preferred explosive for blasting in sandstone quarries due to the sudden and violent explosion that results from dynamite leading to much shattering of the rock. The amount of powder used was designed to fracture the rock and no more.⁵⁶

Softer Sandstones - Methods

For deposits such as these channelling machines may be used but the extent to which this is possible will be dependent on 'joints', or natural open seams in the stone. Where no joints are present all wall cuts may need to be 'channelled' while if they are present, and in a consistent parallel configuration, then channelling may only be required for additional wall cuts.⁵⁷

Indurated (Harder) Sandstone - Methods

As discussed above indurated sandstones are often too hard to be channelled economically so blasting and wedging is used which is more complex and expensive.⁵⁸ However, channelling machines may be used for wall cuts in some harder sandstone due to the shattering that may result from blasting. 'Larger masses are subdivided by separating along bed planes and making cross breaks by wedging in drill holes in directions of rift and run, if such are present'.⁵⁹

Once the sandstone had been cut into manageable sized blocks it was wedged out of the quarry floor and hoisted onto a suitable mode of transportation using various methods. Bowles refers to the transportation from the quarry to 'mills or finishing plants' or to transportation lines as 'Yard Service'. Transportation methods used included cars, trackage, train, cables, horses or mules.⁶⁰

Following the 1902 Royal Commission, and use of the stone in the Parliament Buildings (P2239 *Parliament House & Grounds*), Donnybrook Sandstone gained a wider acceptance for the construction of prominent buildings. In 1912 it was decided to use the stone in the construction of the Guildford Grammar School Chapel (P2487 *Guildford Grammar School Chapel*) which was completed in March 1914.⁶¹ The name Donnybrook Sandstone seems to have been given to the formation by 1912.⁶²

55 *ibid.* p. 82.

56 *ibid.* p. 85.

57 *ibid.* p. 82-83.

58 *ibid.* p. 82-83.

59 *ibid.* p. 82-83.

60 *ibid.* p. 91-92.

61 HCWA Assessment Documentation for P2487 *Guildford Grammar School Chapel*. p. 5; Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 94.

62 Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 93; Saint-Smith, E.C. (1912) 'A Geological Reconnaissance of a Portion of the South-West Division of Western Australia,' in the *Geological Survey Bulletin of Western Australia No. 44*. pp. 20-21; Maitland, G, *The Donnybrook Sandstone Formation and its Associates*.

Donnybrook Sandstone continued to be used to either construct or face some of Perth's most prominent buildings during the early twentieth century, and was used for a number of government projects, including the P1979 *Perth General Post Office* (c.1914-1923).⁶³ In addition, Donnybrook Sandstone was used in P2124 *St Mary's Roman Catholic Cathedral* (1865-1930),⁶⁴ P2094 *St George's House* (c.1891), the Australian Mutual Provident building (1915, demolished c.1980), as well as some of the University of Western Australia buildings.⁶⁵

It is unclear exactly when A.T. Brine began working the quarry, here referred to as P23664 *A.T. Brine's Donnybrook Sandstone Quarries (fmr)*, but it is believed to have been at some point between 1917 and 1958. However, as discussed above, A.T. Brine & Sons is believed to have been working quarries in the area since approximately 1902/4.

A.T. Brine & Sons Ltd, a construction company established in Perth in the late nineteenth century, was responsible for a number of prominent Western Australian buildings. Amongst these were the W.A. Trustees Building, Alliance Assurance Building, Padbury Building, St Mary's Cathedral, State War Memorial and the Gledden Building.⁶⁶ A.T. Brine & Sons Pty Ltd still operates today (2014) and their website notes that they are a 'family owned business for master builders since 1894'.⁶⁷

Maps and other documents associated with the 1907 deputation for a tramline, indicate that *A.T. Brine's Donnybrook Sandstone Quarries (fmr)* may have been known as Barry's or Alexander's Quarry at this time.⁶⁸ This would be consistent with the site visit report in 1911 which refers to No. 3 quarry (Mr Alexander's) on Location 48 being worked at that time⁶⁹ while the 1917 geological survey report also refers to it as No.3 Quarry.⁷⁰ It is not until 1958 that the quarry is referred to by the name A.T. Brine's Quarry and as further land subdivision has occurred it is noted as being on Location 3124⁷¹ (currently Lot 3124 P254012). Hence the quarry referred to here as P23664 *A.T. Brine's Donnybrook Sandstone Quarries (fmr)* appears to have also been associated with prominent Perth builder S.B. Alexander.

S.B. Alexander trained in Scotland as a carpenter before establishing himself as a builder in Australia during the late nineteenth century. Coming to Western Australia in 1897 during the gold rush era, he quickly created a thriving construction business being involved in numerous prominent building projects

63 HCWA Assessment Documentation P1979 *Perth General Post Office*. p.1.

64 HCWA Assessment Documentation P2124 *St Mary's Roman Catholic Cathedral*.

65 Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 95.

66 *Sunday Times*, 9 January 1938. p. 19.

67 A.T. Brine & Sons Pty Ltd website. <http://www.atbrine.com.au/#mailto:reception@atbrine.com>. Accessed 3/4/2013.

68 Donnybrook Quarry – Reserve 2720, Map showing proposed tramline and associated papers 19 April 1907, State Records Office WA, Cons 689 Item No. 1932/0509.

69 Saint Smith, E.C. (1912) *A Geological Reconnaissance Bulletin No. 44, South West Division*. 'Mesozoic (?)'. p. 20.

70 Simpson, E. S. (1917) 67 – 'The chemical and Physical Properties of Some of the Donnybrook Sandstones' in *Geological Survey Bulletin WA 74*. p. 84.

71 Wyatt, J.D. (1958) Annual Progress Report - Geological Survey WA. p. 18 & 19.

including the Fremantle Railway Station, the Police Court Buildings, and Perth Modern School.⁷²

A dispute between A.T. Brine and the Australian Worker's Union in 1928 provides some insight into conditions at the quarries in Donnybrook. However, the file does not provide information about the specific location Brine's company was working at the time. The papers refer to pay and working conditions being requested by the union, including sanitary conveniences and fresh drinking water, while also giving a brief description of how the stone was quarried observed during a visit by a representative from the arbitration board.⁷³ The description is similar to that provided by Frost (see above) and four men were working the quarry at the time of the visit. There is also a reference to Alexander's quarry being 'close by', and that three men were working there. A fourth man was employed in carting loose stone away from the quarry to clear a road for the removal of the quarried stone.⁷⁴ The reference to Alexander's Quarry could suggest that A.T. Brine was working Vincent's Quarry due to the close proximity of this to No. 1 Quarry Alexander's & No. 2 Quarry Alexander's. However, as noted previously the set of four quarries, here referred to as *A.T. Brine's Donnybrook Sandstone Quarries (fmr)*, was also possibly worked in part by S.B. Alexander during the early 1900s.

Records held by the State Records Office WA provide some insight into workings at the Government Quarries on Reserve 2720 & 21583 with various leases held over the area by building companies. From 1938 and 1956 A.T. Brine & Sons were the lessee of a portion of Reserve 2720 (referred to here as P23663 Donnybrook Sandstone Quarry Government [Arnott's No.2] – South Quarry). Brine's Company continued to operate the quarry for this entire period, albeit with only limited stone being removed during WWII.⁷⁵ Due to a royalty paid by Brine to the State Government, the file provides detailed information on the quantity of stone removed and transported via train to Perth or Fremantle. The contract was for the supply of stone to State Government building projects.⁷⁶ It is unknown who held the lease prior to Brine.

Only limited documentary evidence specifically relating to the activities at *A.T. Brine's Donnybrook Sandstone Quarries (fmr)* has been located. However, information suggests that quarrying was carried out across the area in a relatively similar fashion.⁷⁷ In 1917 samples from the Donnybrook quarries were submitted to the Geological Survey Laboratory by the Chief Architect Edward Simpson, and in a subsequent report No.3 Quarry, A.T. Brine's (P23664 *A.T. Brine's Donnybrook Sandstone Quarries (fmr)*), described as being in the northeast corner of Loc. 48/1924, North Donnybrook, was analysed for its various properties:

⁷² Battye, J.S. (1912) *The Cyclopaedia of Western Australia*, p. 649, cited in HCWA Assessment Documentation for P2023 18 & 20 *Howard Street*, Perth. p.4 .

⁷³ Australian Workers Union v A.T. Brine and Son (Donnybrook Quarry) – Arbitration of by Board. State Records Office Cons 1101 Item No. 1928/0030.

⁷⁴ Australian Workers Union v A.T. Brine and Son (Donnybrook Quarry) – Arbitration of by Board. State Records Office Cons 1101 Item No. 1928/0030.

⁷⁵ Donnybrook Quarry – royalty on stone. State Records Office WA, Cons 689 Item No. 1938/0614.

⁷⁶ Donnybrook Quarry – royalty on stone. State Records Office WA, Cons 689 Item No. 1938/0614.

⁷⁷ Wyatt, J.D. (1958) *Annual Progress Report - Geological Survey WA*. p. 20.

'the stone...is inferior to [specimens] from the No.1, Government, and Goldfields Quarries, having a much lower compressive strength, and a much greater porosity. It is somewhat fine grained, and consists mainly of quartz grains with some feldspar grains and a clay cement. The uneven iron-staining of the new rock is a slight disadvantage. This stone is moderately soft and in consequence works easily.

Stone from this quarry has been extensively used in Perth, and in the Police Courts has undergone exposure for twelve years. At present in this building all arrises above the reach of heavy traffic are quite sharp and unbroken, nor is there any sign of surface fretting, or of flaking or splitting. Even close to the pavement in a busy street the arrises are but little chipped or worn. Despite its high porosity, no signs of damp are to be discovered inside the building. This is evidently a very satisfactory building stone. It does not apparently darken greatly on exposure. Further, either the quarry yields but few faulty blocks, or these have been kept but of the building by careful inspection during erection. Two of the largest buildings in Perth, viz. the Australian Mutual Provident Society's offices and St George's House (Millars' Timber and Trading Co.), were built of this stone. Sand balls are not uncommon in the stone used in the latter, and in both small circular dark brown iron-stains have developed on exposure; they are, however, inconspicuous except on close scrutiny.⁷⁸

It is believed that quarrying was never carried out from one main source on a large scale. Instead stone was removed selectively from various locations throughout Donnybrook.⁷⁹ This would account for some of the overlap observed in the geological survey reports which refer to the buildings constructed from Donnybrook Sandstone as it is probable different quarries may have been exploited for one building project due to the varied qualities observed in the stone.

In the post-WWI period, farming and fruit growing expanded in the Donnybrook area.⁸⁰ Quarrying also continued, and in the 1930s what was said to have been the largest piece of Donnybrook Sandstone ever quarried was used for the lintel of P11595 *First Church of Christ, Scientist*, Perth. Another prominent building which incorporated Donnybrook Sandstone constructed during this period was P2064 *Commonwealth Bank Building* (1930-1933).⁸¹

A Geological Survey report in 1958 suggests the majority of the quarries were inactive at this time. In addition it concluded that the quarries were largely situated in 'low lying areas over outcropping stone which, although free of overburden, did not use the natural land slopes' or gravity to their advantage so working the quarries became 'uneconomical below a certain depth'⁸² which is probably why the quarries were abandoned. Furthermore the report notes that, 'the small scale of the operations in numerous localities and the accompanying selection of the best stone available with no consideration to the future [also] contribute[d] largely to the dwindling of the industry'.⁸³ The report makes suggestions as to how the stone may again be successfully exploited and notes that, if these recommendations were not acted upon, the industry would be

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- 78 Simpson, E. S. (1917) 67 – 'The chemical and Physical Properties of Some of the Donnybrook Sandstones' in *Geological Survey Bulletin WA* 74. p. 84.
- 79 Wyatt, J.D. (1958) Annual Progress Report - Geological Survey WA. p. 20.
- 80 HCWA Assessment Documentation for P727 *Donnybrook Post Office*. p. 5.
- 81 HCWA Database entry P2064 *Commonwealth Bank Building*; Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p.101.
- 82 Wyatt, J.D. (1958) Annual Progress Report - Geological Survey WA. p. 20.
- 83 Wyatt, J.D. (1958) Annual Progress Report - Geological Survey WA. p. 20.

unlikely to grow beyond a small-scale operation'.⁸⁴ Donnybrook Sandstone thus became an uneconomic material for construction during the mid-twentieth century.

In August 1961 material was extracted by Charlie Bennett for the extensions to P2239 *Parliament House & Grounds*,⁸⁵ while some small-scale quarrying may have taken place in the area during the 1970s and 1980s. The material extracted by Charlie Bennett apparently came from a quarry on private land but it is unknown which.⁸⁶ Local informants indicated that Charlie Bennett had been associated with both portions of P23663 Donnybrook Sandstone Quarry Government and P23664 *A.T. Brine's Donnybrook Sandstone Quarries (fmr)*.⁸⁷

Donnybrook Sandstone became a fashionable building material again c.2000 and the quarries became active, albeit in a limited fashion. Donnybrook Sandstone has been marketed with reference to its use in notable public buildings such as Parliament House, the Central Post Office and the Commonwealth Bank of Australia, noting 'these beautiful historic buildings highlight the stone's distinctive character, high quality, durability and working properties which made sandstone.....greatly sought after in Western Australia'.⁸⁸ The majority of recent quarrying activity has taken place at P23663 Donnybrook Sandstone Quarry Government, other quarries further north of this location, and at P23666 Donnybrook Sandstone Quarry Goldfield's. P23664 *A.T. Brine's Donnybrook Sandstone Quarries (fmr)* does not appear to have been quarried since at least the mid twentieth century, and perhaps the 1930s. In 2011 the State Heritage Office were informally advised that the likelihood that P23664 *A.T. Brine's Donnybrook Sandstone Quarries (fmr)* will be subjected to future quarrying operations is low due to the site's proximity to a water source.⁸⁹

13. 2 PHYSICAL EVIDENCE

The quarries are situated in the northeast corner of Lot 3124, and centrally, and just north of the easternmost water sources on Lot 3124. They run in a northeast-southeast alignment within areas of native vegetation. The environment comprises primarily *Eucalyptus*, *Acacia*, and *Melaleuca* species ranging from low shrub to medium sized trees.

In total four distinct quarries were recorded within the area identified as *A.T. Brine's Donnybrook Sandstone Quarries (fmr)*, and have been named Quarry 1-3 & Quarry 5. However, the close proximity of Quarries 2 & 3 could suggest these were actually one quarrying area. Quarries 1-3 run south to north. However, Quarry 5 is directly north of Quarry 1 as this was not recorded until the other three quarries had already been named. Each quarry is quite different and will be described separately below.

⁸⁴ Wyatt, J.D. (1958) Annual Progress Report - Geological Survey WA. p. 20.

⁸⁵ Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 102.

⁸⁶ Frost, A.C. (1976) *Green Gold: A History of Donnybrook WA, 1842 to 1974*. Donnybrook Balingup Shire Council, Donnybrook Western Australia. p. 102.

⁸⁷ Information provided by representatives from Cosmic Resources during a site tour, 28 February 2013.

⁸⁸ *Irishtown Sandstone Pty Ltd*, 'Project Gallery, Donnybrook Stone Western Australia'. Accessed 27 March 2013. http://www.irishtown.com.au/project_gal.html

⁸⁹ Personal Communication Warren Ormsby, Manager – Land Use Geoscience, Geological Survey of WA, Department of Mines & Petroleum, 12 October 2011.

Quarry 1

Quarry 1 is situated at the southernmost end of the recorded quarries within Lot 3124. The quarry floor and its associated faces covers an area of approximately 1300 square metres with some associated land formations adjacent, mainly eroded creek beds. The quarry comprises two distinct areas. The western part of the quarry has steep quarried faces which remain exposed to a maximum of approximately 4-5 metres in height stepped up in 1-2 metre increments. The quarry floor in this area is largely cleared, albeit with a few small trees across the area, and the exposed faces exhibit evidence for cutting tool and drill marks as well as cavities or grooves cut through the stone in preparation for the removal of the blocks. The stone exposed to the air is a creamy yellow colour with black discolouration, probably lichen or other growth. The steps and faces have largely been cut at right angles. The top or outer edge of the quarry comprises the natural ground surface which drops steeply down 1-3 metres to the unquarried sandstone cap.

A second area of Quarry 1 continues, and is contiguous with, the east end of the above area. This area is quite different with a large flat area of exposed sandstone which exhibits multiple grooves cut into the stone dividing the area into blocks approximately 2 metres x 1.2 metres and covers an area of approximately 126 square metres. The blocks exhibit evidence for drill marks and other cutting tools. The stone is again creamy yellow colour though in some areas it is lighter, and a pink band is visible in south face.

There is limited evidence for artefactual or structural elements at Quarry 1, besides some rusted ferrous items industrial in nature and a small amount of amber bottle glass. However, a small timber-framed building (1.5 x 2.5 metres in floor area), with a corrugated iron roof and a concrete floor pad, is situated on a rise to the southwest of the quarry. The structure has been stripped of cladding, which may have been asbestos, though the timber door remains intact, and a maker's mark is visible on the underside of the standard orb corrugated iron roof which reads BRITISH MAKE/RAVEN. Just west of the structure is a timber electricity pole which has snapped off at ground level and is now lying horizontally. Small tubular metal pipes attached to the roof of the timber-framed structure, and embedded in the ground to the west, would suggest it was once connected to electrical or other services.

Quarry 2

Quarry 2 is situated 250 metres northeast of Quarry 1, in the northeast corner of Lot 3124, and covers an area of approximately 9000 square metres. This is the deepest of the quarries with the height from the ground surface to the bottom of the quarry measuring 7 metres at some points. To the west is a large gully for which floor depth was not measured but it appears to be approximately 10-15 metres in depth at its highest point. Quarry 2 is virtually continuous with Quarry 3 to its north, with a narrow quarried channel leading to its neighbour. Quarry 2 is well wooded, with little evidence of any recent clearing and numerous small trees within and around the quarrying area.

Quarry 2 exhibits a random array of quarry faces of various depths and surfaces. Centrally, and to the north, shallow quarry faces step up in one metre increments. In other parts of the quarry faces are rounded and appear to have been cut at random intervals, in various shapes/sizes, with some faces sheer and vertical to a

height of almost 4 metres, and others stepping up in 0.5 metre increments with angled cuts. A narrow (1 metre) channel has been cut in a north-south direction at the south end of the quarry. Evidence for historical cutting tool and drill marks are present in a number of faces. The stone exposed to the air is white through to dark creamy yellow with black discolouration. Some modern graffiti (c.1995) has been carved in a few sections of the exposed faces. The top or outer edge of the quarry comprises the natural ground surface.

Visible artefactual material was again limited. However, leaf cover was very thick across the site resulting in visibility being 0%-10% at best. In March 2013 when the site survey was undertaken, some larger 'artefacts' were present with a c.1930 flatbed truck abandoned on the ridge to the southeast of the quarry, a SULLIVAN engine (which appears to date to the same time period) 20 metres to the northeast, and a makeshift timber framed standard orb corrugated iron clad shed on the south ridge overlooking the quarry. The shed comprised one small room at its south with timber floorboards, a window in its west wall, and a doorway leading to an open-ended 'garage' lean to adjacent. A partially collapsed verandah was attached to the lean-to at its north end. The shed was in a fairly poor condition with deterioration of the timber apparent, the corrugated iron was rusted in parts and appeared to have been 'patched' over time with a variety of pieces, and some of the roof iron had rusted through. A small desk and some miscellaneous metal items were situated inside the shed. In January 2015 a bushfire went through the region resulting in some damage to the elements described above. The lean-to shed has now collapsed and, although the flatbed truck remains intact, fire damage is evident.

Quarry 3

Quarry 3 is largely contiguous with Quarry 2's northern edge, with evidence for quarrying activities, including abandoned equipment, distributed in the area between the two quarries. The northernmost portion of Quarry 3 is situated just south of Lot 3124's boundary with the adjacent lot (Lot 52). Quarry 3 is quite small and shallow compared to the latter however, covering only 1184 square metres and with the quarried faces being only 40-50cm high. To the east of the quarried area the ground rises to a low ridge. The site was relatively clear from vegetation in the central quarry area but the surrounding area and ridge are covered with small trees. There are a number of dry creek beds around and adjacent to the quarry. Historical cutting tool marks are present on a number of faces. The stone exposed to the air is dark creamy yellow with black discolouration and some pink bands. Some modern graffiti has been carved in a few sections of the exposed faces.

Quarrying equipment remaining on site includes an iron winch, or similar hoisting machine, the timber struts once attached to the machine, and two large piles of boulders, one with a long thin log still wedged at a 45 degree angle, presumably as a lever for lifting quarried stone. There was little else in the way of other artefactual material visible on the ground surface but the leaf litter was again very thick resulting in ground visibility being 0-10%.

Quarry 5

Quarry 5 is situated 50 metres north of Quarry 1 (centrally located within the eastern quadrant of Lot 3124) and covers an area of approximately 2000 square metres. Quarry 5 is less visible than the other quarries with thick vegetation

across the site but the visible quarried area is roughly rectangular with further evidence of cuttings and eroded channels surrounding it. Quarry faces step up in approximately 1 metre increments but it is difficult to determine the total depth of the quarry as the quarry floor is filled with water. From the sections exposed the quarry appears to be relatively shallow, approximately 2-3 metres deep, though the surrounding ground level, which has been excavated out to reach the sandstone, slopes up a further 4-5 metres.

The stone exposed to the air is dark creamy yellow with black discolouration. Some iron staining or similar is visible along the lower rim showing where the water level reaches. A pile of small boulders with a log wedged inside it appears to mirror the lifting mechanism seen at Quarry 3. No other evidence for artefactual material or quarrying equipment was present at Quarry 5.

13.3 COMPARATIVE INFORMATION

Donnybrook Sandstone Quarries

Donnybrook is the only identified source of 'Donnybrook Sandstone' in Western Australia, thus the other quarries in this region are the only places that are directly comparable to *A.T. Brine's Donnybrook Sandstone Quarries (fmr)*. It was not possible to complete a full survey of all quarries in the Donnybrook area for this assessment. However, a sample of these quarries was subjected to a site visit in March 2013 with the information gathered presented here. Comparative information on the other quarries in Donnybrook, based on geological survey reports and other available sources, is also provided.

P23660 Donnybrook Sandstone Quarry No.1 (No. 1 Quarry Alexander's)

The stone at this quarry has been described as fine grained and pure white in colour, taking on a cream colour when exposed to the air for approximately twelve months, darkening to a light to medium brown over time. Crushing tests in 1917 indicated it was 'amongst the best freestones the world over' with its chief defect being its porosity. However, absorption of water was not found to be a major issue and did not cause dampness or surface fretting. Furthermore the stone was found to be devoid of hard patches of silica taking a fine edge when cut which remained sharp over time. It was assessed as 'excellent stone for building purposes'.⁹⁰ Buildings believed to have used stone from No.1 Quarry (Alexander's) include:⁹¹

- P2116 Perth Technical College (1910 - RHP, part of P2112 *Newspaper House Group & Perth Technical College*)
- P2239 *Parliament House & Grounds*
- P977 *Customs House (fmr)* [Phillimore Chambers]
- P974 *Fremantle Railway Station*
- P2511 *Midland Court House (fmr)*
- Bunbury Court House (demolished, P352 Bunbury Court House site)

⁹⁰ Simpson, E. S. (1917) 67 – The chemical and Physical Properties of Some of the Donnybrook Sandstones in 'Geological Survey Bulletin WA 74'. p. 82-83.

⁹¹ Simpson, E. S. (1917) 67 – The chemical and Physical Properties of Some of the Donnybrook Sandstones in 'Geological Survey Bulletin WA 74'. p. 82-83.

The State Heritage Office has no current information on the condition and status of this quarry but it is believed to remain inactive. It is unknown whether the quarry contains extant physical evidence associated with historical quarrying activities.

P23661 Donnybrook Sandstone Quarry No.2 (No. 2 Quarry Alexander's)

The stone was noted as closely resembling that at No.1 Quarry (Alexander's), that is uniformly fine grained, and white on fracture which darkens with exposure. It is a 'hard stone capable of a fine finish' with little observable fretting and edges remaining sharp with time. Buildings made using stone from this quarry include:⁹²

- P2077 Telephone Exchange, Murray Street

The State Heritage Office has no current information on the condition and status of this quarry but it is believed to remain inactive. It is unknown whether the quarry contains extant physical evidence associated with historical quarrying activities.

P23662 Donnybrook Sandstone Quarry Vincent's (Vincent's Quarry)

This is understood to have been one of the first quarries opened in the district. The stone is coarser and more irregular grained than the two above quarries. Observations in 1917 indicated that the stone was still fairly hard and showed little in the way of deterioration but that it is not capable of a fine finish. The stone's primary defect is its irregularity of colour being iron stained with streaks and blotches of yellow and brown.⁹³ Buildings made using stone from this quarry include:

- Supreme Court basement (c.1903, RHP part of P1947 *Supreme Court Buildings and Gardens, Old Court House, Stirling Gardens*)

The State Heritage Office has no current information on the condition and status of this quarry but it is believed to remain inactive. It is unknown whether the quarry contains extant physical evidence associated with historical quarrying activities.

P23668 Donnybrook Sandstone Quarry Armstrong's Outcrop

Exhibiting medium-grained stone which is cream in colour with white mottling, the stone from this quarry was noted as resembling, in grain, porosity etc. that from *A.T. Brine's Donnybrook Sandstone Quarries (fmr)* when dry. However, the stone loses coherence when wet. No buildings had been constructed from this stone in 1917 and the geologist assessed it as 'unsuited for important public buildings'.⁹⁴

The State Heritage Office has no current information on the condition and status of this quarry but it is believed to remain inactive. It is unknown whether the quarry contains extant physical evidence associated with historical quarrying activities.

P23663 Donnybrook Sandstone Quarry Government (Arnott's No.2)

⁹² Simpson, E. S. (1917) 67 – The chemical and Physical Properties of Some of the Donnybrook Sandstones in 'Geological Survey Bulletin WA 74'. p. 83.

⁹³ Simpson, E. S. (1917) 67 – The chemical and Physical Properties of Some of the Donnybrook Sandstones in 'Geological Survey Bulletin WA 74'. p. 84.

⁹⁴ *ibid.* p. 86.

Stone from this quarry is described as similar in appearance and quality to that from No.1 Quarry Alexander's (P23660 Donnybrook Sandstone Quarry No.1). That is, largely pure white with, albeit rare and inconspicuous, cream or light brown blotches. The stone darkens on exposure, the grain is fine and even, and the stone is hard, dense and suited to fine carving. Buildings made using stone from this quarry include:⁹⁵

- P1979 *Perth General Post Office*

In March 2013 officers from the State Heritage Office visited P23663 Donnybrook Sandstone Quarry Government to collect some photographs and data for comparative purposes. The site comprises five quarried areas which are described below:

- South Quarry is situated at the southernmost end of Reserve 2720 and covers an area of approximately 26,400 square metres. As described above the stone is very white in appearance when freshly cut and exhibiting a cream colour when exposed. Some pink bands or iron staining is apparent in areas. Although there are some faces which exhibit evidence for historical quarrying tool marks, the largest of these has been subjected to modern graffiti with a large image of an angel carved into the north facing quarry face. Drill marks, cutting tool marks, and blocks prepared for removal are in evidence in the north, west, and south facing quarry walls. However, little other evidence for historical quarrying activities remains at the quarry.
- Central Quarry [& Central Quarry adjacent], is situated centrally within Reserve 21583 and covers an area of approximately 4050 square metres with a second quarry area (Central Quarry adjacent) to the northwest covering approximately 2015 square metres. The Central Quarry has been recently worked and there is little evidence for historical quarrying activities or equipment. Central Quarry adjacent appears older and retains some evidence for cut and drill marks from an earlier quarrying period. It is unclear what period these date to but marks are consistent with a circular saw type of tool indicating they may be relatively recent. Little other evidence for historical quarrying activities remains at these quarry areas.
- North Quarry is situated at the northern end of Reserve 21583 and covers an area of approximately 14,400 square metres. The quarry has been recently worked and there is little evidence for historical quarrying activities or equipment.
- Bennett's Quarry is a small area, just south east of the main central quarry, and covers an area of 900 square metres. Evidence indicates the quarry has not been worked for some time and faces provide some evidence for historical cutting and drill tool marks. Little other evidence for historical quarrying activities was observed.

P23665 Donnybrook Sandstone Quarry Arnott's No.1

This is noted as being a small quarry with stone of a very irregular grain and colour having irregular staining and an uneven texture. Buildings made using stone from this quarry include part of the basement of:

⁹⁵ *ibid.* p. 84.

- P1979 *Perth General Post Office*.⁹⁶

The State Heritage Office has no current information on the condition and status of this quarry but it is believed to remain inactive. It is unknown whether the quarry contains extant physical evidence associated with historical quarrying activities.

P23666 Donnybrook Sandstone Quarry Goldfield's

The heaviest and coarsest stone of those listed here, it is also less porous. The stone is from a deep to light buff colour and is devoid of irregularities in the grain. Crushing strength of the stone was assessed as being inferior to that at No.1 Quarry (Alexander's) and Government Quarry but the geologist suggested it is probably not inferior when it comes to durability. He also suggested it would be cheaper to dress but would be unlikely to yield as sharp outlines. Buildings made using stone from this quarry include the lower portion of P2056 *Perth Government Stores (fmr)*, in Murray Street (1911).⁹⁷

In March 2013 officers from the State Heritage Office visited P23666 Donnybrook Sandstone Quarry Goldfield's to collect some photographs for comparative purposes. Although officers were unable to enter the site, it was visible from the perimeter fence. The quarry has been recently worked and little evidence for historical quarrying activities or equipment could be seen.

P23667 Donnybrook Sandstone Quarry Pink

This quarry yielded two different classes of stone, 'one from the surface and the other from a depth of eight feet'. The deeper stone is an evenly distributed rich pink colour which is likely to be permanent due to the fully oxidised properties of the stone. Small black blotches do appear but are only visible on close inspection. Though having a moderately high compressive strength when dry, it loses some coherence when wet largely excluding it from exterior work on 'prominent' buildings but the report suggests it could be used on other less prominent buildings where this would not be as much of an issue. It is not known whether and buildings were made using stone from this quarry.⁹⁸

The State Heritage Office has no current information on the condition and status of this quarry but it is believed to remain inactive. It is unknown whether the quarry contains extant physical evidence associated with historical quarrying activities.

Quarry 4 (Lot 52)

In March 2013 officers from the State Heritage Office visited Quarry 4 (Lot 52) to photograph and record the quarry. Quarry 4 is situated in the southeast corner of Lot 52. A measurement from the outer boundary of the quarry indicates it covers approximately 5250 square metres. There is limited evidence for clean cut vertical stone faces at Quarry 4 (Lot 52), with the quarried faces having an appearance that would be more consistent with stone that had fractured along naturally occurring faults or fissures as opposed to that cut with tools. The track leading into the quarry is lined with large sized boulders which are also roughly shaped rather than squared blocks. There are some areas of the quarry face

⁹⁶ *ibid.* p. 87.

⁹⁷ *ibid.* p. 87.

⁹⁸ *ibid.* p. 87.

which exhibit evidence for drill and tool cut marks, one of which the local informant who accompanied us on site confirmed had been recently cut by him to determine the nature of the stone. Others appear older and have weathered considerably. No evidence for artefactual material or quarrying equipment was present at Quarry 4 (Lot 52). The quarry is currently inactive. It is unknown which, if any, buildings used stone from this quarry.

Conclusion

The above information indicates that *A.T. Brine's Donnybrook Sandstone Quarries (fmr)* is not necessarily rare as a sandstone quarry in this area. However, the evidence collected to date from this and the other quarries visited suggests that *A.T. Brine's Donnybrook Sandstone Quarries (fmr)* is rare for its concentration of extant evidence relating to historical quarrying activities.

Other Quarries

It is difficult to produce an exact figure but there are approximately 36 quarries listed in the State Heritage Office database, three of which are entered in the State Register of Heritage Places.

- P16788 *Government Quarries (fmr)*, Boya is a granite and diorite quarry comprising six quarry faces, the remains of two concrete crushing plants (pre-1912 and 1912) and associated concrete engine beds, the remains of a concrete and stone compressor building together with associated concrete engine beds, a short stretch of railway track and the formation for the main spur line which served the quarries. The quarry was opened by the State Government in 1901 to provide granite for the construction of the North Mole during the Fremantle Inner Harbour works. It ceased operating in 1942. *Government Quarries (fmr)* is unusual in that it is one of the few stone quarries to survive with physical evidence of the manufacturing process intact and it was the only quarry to be established under the *Government Trading Concerns Act of 1912*, which attempted to boost Western Australia's underdeveloped economy during the pre-WWI era and the inter-war period.⁹⁹
- P10570 *Statham's Quarry*, comprising a single quarry face, the remains of a stone crushing plant, water tanks, a concrete magazine and several concrete foundations and floors, was established by Thomas Statham in c.1894 and later refurbished by the Perth City Council in the 1920s. In 1920, Statham's Quarry was purchased by the Perth City Council to replace Clifton Quarry as the Council's own municipal quarry to supply stone for the ongoing construction and maintenance of its road network. The quarry was operated by the Perth Council to c.1939.¹⁰⁰
- P15743 *Armadale Brickworks Quarry (fmr)* is located on Marsh Road, near the corner with Harrison Road in a residential area. The quarry is an elongated lozenge shape which runs in a north south direction. Evidence of quarrying activity is restricted to the large hole in the ground, the remains of the tram track to the northern eastern face of the quarry and the entry point into the quarry. *Armadale Brickworks Quarry (fmr)* provided

⁹⁹ HCWA Assessment P16788 *Government Quarries (fmr)*, Boya.

¹⁰⁰ HCWA Assessment P10570 *Statham's Quarry*.

shale for the first brickworks in Western Australia to make pressed shale blend bricks, which was one of few in the State to specialise in this form of brickmaking. Prior to the establishment of the *Armadale Brickworks Quarry (fmr)* bricks in the Perth district were made of clay from pits located along the Swan River. A substantial proportion of the characteristic red brick houses constructed in Perth's western and southern suburbs during this period were built of bricks originating from this factory. The shale quarry and its fringe of natural vegetation have seen little change since it was abandoned c.1930.¹⁰¹

While the above quarries are comparable to the Donnybrook Sandstone Quarries in terms of showing evidence of previous quarrying activity, they differ in the type of resource extracted. There are no sandstone quarries, or more specifically Donnybrook Sandstone quarries, on the database. The nature of quarrying sandstone differs to the above materials and the remnant infrastructure (if any) would be different to that at the above places.

Government Quarries (fmr) and *Statham's Quarry* are similar to Donnybrook Sandstone Quarries in terms of the material extracted being used for public works but Armadale is different in terms of extracting a material that was then used to manufacture bricks for domestic use.

The remaining registered places are less comparable as they contain quarries within them, but are not necessarily significant as quarries:

- P6344 *Wellington Dam*
- P4558 *Lime Kiln's - Cooper's (12&12a)*
- P1900 *Warribanno Smelter Complex Ruin*
- P13523 *Railway Dam Merredin*

Four quarries have been assessed by HCWA and found to be below threshold:

- P16617 *Greenmount Quarry (granite and dolerite)*
- P16618 *Mahogany Creek Quarry (granite)*
- P16787 *Mountain Quarry, Boya (granite and dolorite)*
- P9191 *Clifton Quarry, Parkerville (granite and dolorite)*

Mahogany Creek is potentially the most comparable quarry, as the stone from that quarry was cut in blocks and used in the construction of buildings, where as at the other quarries it was crushed and used for works such as roads, however the physical evidence at this site relates to current quarry operations, not those from earlier in the twentieth century.

Buildings Constructed from Donnybrook Sandstone

There are 65 places on the State Heritage Office database constructed at least in part in Donnybrook Sandstone, 34 of these are entered in the State Register of Heritage Places. Among the best known are:

- P2239 *Parliament House & Grounds*
- P1979 *Perth General Post Office*
- P4575 *Commonwealth Bank Building*

¹⁰¹ HCWA Assessment P15743 *Armadale Brickworks Quarry (fmr)*

- P 977 *Customs House (fmr)* [Phillimore Chambers]
- P1002 *Sail and Anchor Hotel*
- P974 *Fremantle Railway Station*

A.T. Brine & Sons

Builders A.T Brine & Sons Pty Ltd, who are believed to have worked *A.T. Brine's Donnybrook Sandstone Quarries (fmr)*, are associated with four registered places:

- P3363 *Port of Fremantle Passenger Terminal*
- P8094 *ANZAC Cottage, Claremont*
- P9186 *Wandana Apartment Block*
- P11595 *First Church of Christ, Scientist, Perth*

S.B. Alexander

A search of the State Heritage Office database returned three places associated with S.B. Alexander. All three are entered in the State Register of Heritage Places:

- P981 *P & O Buildings, Phillimore Street, Fremantle*
- P2023 *18 & 20 Howard Street, Perth*
- P2053 *Chief Secretary/Public Health Department (fmr), Perth*

However, this is unlikely to be a true reflection of the number he was actually responsible for as a number of others are known, some of which are discussed above.

13. 4 KEY REFERENCES

No key references.

13. 5 FURTHER RESEARCH

Further information about quarrying operations at *A.T. Brine's Donnybrook Sandstone Quarries (fmr)* may be located with further research. The site of the boarding house, and/or other accommodation areas associated with quarry workers, may be located with further research and archaeological surveys.