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 September 1991, have been used to determine the cultural heritage significance of the place.

11. 1 AESTHETIC VALUE

Maylands Brickworks is a landmark in the Maylands Peninsula. The dominant features are the Hoffman Kiln and the 34 metre high chimney stack which are dominant forms in the landscape. (Criterion 1. 3)

The kiln, chimney, drying sheds and pug mill and clay pits provide an explanation for the existing landscape. The flooded clay pit lakes are valued by the local community as an aesthetically pleasing landscape. (Criteria 1.1, 1.4)

11. 2. HISTORIC VALUE

Maylands Brickworks and nearby clay pits illustrate the utilisation of the clay deposits in the period between 1927 and 1983 and demonstrate the industrial development of the area. (Criterion 2. 2)

Maylands Brickworks illustrates the prevailing working conditions of employees in the brick making industry based on the technology of the period 1927 - 1983. (Criterion 2.2)

Maylands Brickworks has a close association with Mr R. O. Law and Mr K. Atkins who established the Metropolitan Brick Company in 1906. Both men were significant in the development of State as industrialists and contractors carrying out numerous works throughout the State. (Criterion 2. 3)

Maylands Brickworks demonstrates a high degree of technical achievement. (Criterion 2. 4)

11. 3. SCIENTIFIC VALUE

The brick making technology used at *Maylands Brickworks* demonstrates a process which enabled continuous brick production through the kiln and this, together with the associated mechanical handling and clay extrusion equipment, resulted in the brickworks being considered an innovative and efficient producer. (Criterion 3.1)

Although the brick making technology used at Maylands has been superseded in almost every respect, *Maylands Brickworks* is important in

demonstrating the historical development of brickworks technology. (Criterion 3.1)

The remaining sections of the plant provide an unique opportunity to demonstrate a significant example of the technology used for brick making in all aspects of clay excavation, clay mixing and extrusion, drying and kiln firing. (Criterion 3.2)

11. 4. SOCIAL VALUE

Maylands Brickworks is held in high regard by the local community as one of the former industries in the district providing employment. The retention and restoration of the place by the local community further illustrates the high regard in which it is held. (Criterion 4.1)

Maylands Brickworks is able to demonstrate the conditions of work applicable in the period in which it operated from 1927 to 1983 and as such demonstrates the changes that have occurred with the advancement of technology. (Criterion 4.1)

The lakes formed by the clay pits are highly regarded by the local community as a place of recreational and environmental value. (Criterion 4.2)

12. DEGREE OF SIGNIFICANCE

12. 1. RARITY

Maylands Brickworks is significant in demonstrating technology development in the brick making industry. There is little remaining evidence of this early brick making technology available elsewhere in the State. (Criteria 5. 1, 52)

Maylands Brickworks has the only Hoffman kiln remaining in Western Australia, with the possibility of there being only one other in Australia. The brick making machinery indicates the technology of clay mixing, extrusion, and clay wire cutting into the brick size. (Criterion 5.1)

12. 2 REPRESENTATIVENESS

Maylands Brickworks is representative of the development of brick making technology in Western Australia. *Maylands Brickworks* demonstrates the brick making technology of the era 1900 to 1983. Although mechanical handling techniques were developed at the site, these were still governed and restricted by the nature of the plant, resulting in the necessity for a large workforce, the duties of which are well illustrated at the site. (Criterion 6. 1)

Maylands Brickworks demonstrates past industrial use of the area, and the size of the clay pits excavated to provide clay for brick making demonstrates the large brick production which occurred at Maylands. (Criterion 6. 2)

12. 3 CONDITION

Maylands Brickworks is generally in good condition:

the chimney stack is in good condition and structurally stable;

sixty percent of the internal brick arches in the fire section of the Hoffman Kiln are in good condition. The remaining arches are in need of repair. The external brickwork of the kiln is in good condition together with the kiln roof and structure;

the section of drying sheds is in good condition;

the pug mill and adjacent extruded brick handling section is in good condition including the pug mill extruder and wire cutting machinery;

the change room and gate house is in good condition;

the workshop building is secure and structurally stable; and,

the surrounding precinct is in good condition, secure and well drained.

12. 4 INTEGRITY

Maylands Brickworks, when in maximum production, comprised two Hoffman Kilns, two Pug Mills, extensive drying sheds and a lunch room. At the time of closure, in 1983, one of the Hoffman Kilns and one of the Pug Mills was removed (circa 1970). A large expanse of drying sheds was also removed with only a representative section (eight percent) between the Hoffman Kiln and Pug Mill retained. The lunch room was also removed after closure.

Despite the removal of the above items, the remaining sections of the Brickworks namely the Hoffman Kiln, retained section of drying sheds, pug mill, gate house, change rooms, and workshop are the original structures, and give a clear indication of the process and technology associated with the site. The replacement of the Bedischi Pug Mill machinery, which was removed in 1983, would add to the integrity of the place.

The place is an industrial archaeology site. The values of the place are sustainable in the long term and the restoration work maintains the original integrity. *Maylands Brickworks* has a high degree of integrity.

12. 5 AUTHENTICITY

Maylands Brickworks has a high degree of authenticity.

The restoration work on the kiln arches used kiln arch bricks found in situ at the place.

The Pug Mill machinery is original and has been restored to remove rust and allow painting. The protective sheeting to the pug mill and kiln roof has been replaced but is of similar corrugated iron to that originally used.

The Hoffman Kiln chimney stack is the original chimney and has been strengthened by the replacement of the original steel bonds around the chimney brickwork.

13. SUPPORTING EVIDENCE

13. 1 DOCUMENTARY EVIDENCE

Maylands Brickworks is a brickworks established on the Maylands Peninsula, in 1927, by Messrs. Atkins and Law.

Mr Robert O. Law was prominent in the history of the brick making and contracting industry in Western Australia. He constructed his first jetty at twenty years of age and, in 1886, constructed the Fremantle Pier, having also constructed many other jetties around the Western Australia coast as well as Warrnambool Breakwater and Princes Pier in Port Melbourne. In addition, he was contracted for much of Perth's early drainage and sewerage system.[1] Mr King Atkins, is also prominent in the history of the brick making, tile and pipe manufacturing and contracting industries. He constructed the railway for Millers Timber and Trading Company from Jarrahdale to Rockingham in addition to many other works in the state. He also established the Stoneware Tile and Pipe Company at East Perth.

Law and Atkins were in partnership as building contractors and were experiencing difficulties in obtaining bricks in sufficient quantities for their building contracts. They purchased Todd's old brickworks at Bushmead, Helena Vale and built five down draught kilns and subsequently, in 1910, built a Hoffman Kiln there. Some time later Atkins retired from the partnership and Law carried on the brick making process building another Hoffman Kiln at Bushmead in 1919.[2]

In 1922, Law found extensive clay deposits, formed by a meandering section of the Swan River, closer to Perth at the Maylands Peninsula and he purchased land there.[3]

Five years later, in 1927, Law established a complete brickworks at Maylands with the construction of a Hoffman Kiln, drying sheds, pug mill and brick making extruder. Between 1927 - 1936, there was one single chimney, 19 chamber 15 ft diameter Hoffman Kiln, with a 7 million per year brick producing capacity. The kiln worked on a principal of rotating firing from above. The kiln was stacked full and powdered coal was poured into the kiln from roof holes, thus causing a fire to burn in between the bricks.

The bricks were not moved throughout the kiln drying process until they had gone through several processes and were fully dry. The first stage was smoking and drying, then on down the line to being fully fired, cooled and finally removed.

The method of kiln drying was continuous, that is to say, the kiln was worked at 24 hours a day, 7 days a week. One section of the kiln was being fired while another was being filled with clay bricks, and another, emptied. To take advantage of the better quality clay and easier deliveries to Perth, a Hoffman Kiln at the Helena Vale works was dismantled and re-erected at

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1 S. A. Abraham - *History of Metropolitan Brick Holdings Ltd*

2 *ibid.*

3 *ibid*

Maylands. A second pug mill and more drying sheds were constructed with the second plant coming into production in 1936.[4]

At the time of installing the second Hoffman Kiln further land was purchased on the south eastern side of Johnson Road and the clay pits were extended into this area. A new drying shed method was introduced at this time using a Cornish wood fired boiler and electric and diesel powered shovels were introduced to the clay pits.

In this period the brick process was also further refined with the raw materials being rolled and passed through a Bedischi Pug Mill and through high speed rollers to the extruder.

Clays were first dug from the Maylands pits using picks and shovel. The raw material was loaded into skips on trolleys. These were then hand-pushed along rails to a section of large cable that continually rotated taking material from the pit to the pug mill. The skips or buckets, were attached to the cable by means of a large hook and emptied at the feeder bin in the Brickworks. This cable system was known as the Endless Loop.[5]

A McCormick Dearing Motor Steam Shovel replaced the hand digging in the pit thus increasing mechanisation.[6]

At the feeder bin, the raw materials went through a process of hammering and rolling until the particles were small enough to be fed through an extruder which remains. From this, a line of wet clay was pushed through a seven wire cutter which cut 6 bricks at a time. From here, the wet bricks were hand loaded onto timber pallets that sat on small trolleys. When fully loaded with "green" (wet) bricks, the small trolley, of which one remains, was hand pushed along the rails till it reached a larger transfer trolley.[7]

These larger transporters were employed to move bricks stacked on the smaller trolleys from the extruder to a part of the drying shed, and later from there to the kiln. The transfer trolleys moved in an east west direction only. Two of these trolleys were used, one near the extruder side of the drying shed, the other near the kiln side of the drying shed.[8]

In the shed, the pallets of bricks were placed elevated from the ground, on long timber rails which still remain. The bricks were bagged or sacked and left to dry for about two weeks. In winter, or periods of cold weather, buckets of ignited coal were placed under the bricks to aid the slow drying process.

Once the bricks had sufficiently dried, one of the small trolleys was brought in from the kiln side of the shed to transport the bricks to the kiln. This involved another run on the transfer trolley.

The bricks were stacked into bunks for maximum placement inside the kiln. These bunks were transferred along the side of the kiln on one of the

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4 *ibid.*

5 G B Hill & Partners Pty Ltd - 'Maylands Brickworks Conservation and Management Plan' (City of Stirling, June 1990)

6 *ibid.*

7 *ibid.*

8 *ibid.*

smaller trolleys. At each entrance to the kiln was a rail roundabout. This enabled the movement of the bricks into the kiln entrance. From here, they were picked up by a 4 directional hand kiln trolley, using a wheel system, four wheels being used for north - south travel, and another set of four being used for east - west travel. As a result, the bricks could be placed closely together in the kiln.

By 1946, the plant at Maylands was described as the most highly technical plant in Australia. The transfer, and the transfer trucks, were described as a masterpiece of ingenuity which enabled bricks to be transferred from the brick making extruder to the drying sheds and then to the kiln without being handled.[9]

The Hoffman Kilns operated on powdered coal until 1967 when they were changed to an oil fired system.[10]

When the Maylands plant was in full production it employed in excess of 130 employees, most of whom lived in the vicinity of the works. It became one the main industries providing employment in the area and as such has played an important part in the history of Maylands.[11]

The location of the brickworks within five kilometres of central Perth resulted in the bricks being utilised in a wide range of buildings constructed in the metropolitan area during the sixty years the brickworks remained in production.

The Maylands Peninsula is a significant historic precinct particularly that of an industrial nature. In addition to the brickworks, Perth's first airport was established there of which the aircraft hangar buildings still remain. Also located in the precinct was the first major electric power generating station and coal gas works supplying Perth. Although further distant the pipe making works established by Mephan Ferguson to supply steel pipes for the construction of the Goldfields pipeline to Kalgoorlie was located at Maylands. The structures of the brickworks provides a focal point in the area whilst at the same time demonstrating the industrial past of the area.

Although, Hoffman Kiln technology was developed in the mid 1850s, and in use in a number of locations, the Hoffman Kiln at Maylands is the only one of its type remaining in existence in Western Australia. The kiln remained viable because of the production efficiency achieved at the works which remained in production until 1983.

A second Hoffman Kiln at Maylands was demolished after sustaining damage in the 'Meckering' earthquake of 1968.

By the time the brickworks had ceased production, the significance of the *Maylands Brickworks* as a unique structure was appreciated and steps were taken to prevent it being completely demolished on closure.[12] The City of Stirling had originally proposed to fill in the clay pits for residential use

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9 R. Hallet - *Brick Empire S. A.*

10 *ibid.*

11 Students Department of Surveying and Mapping, Curtin University - 'Maylands Brickworks Preservation and Restoration Study, 1984'

12 G B Hill & Partners Pty Ltd - 'Maylands Brickworks Conservation and Management Plan' (City of Stirling, June 1990)

but a public outcry ensued and the area was preserved as a series of man made lakes.

The City of Stirling subsequently allocated money to the place for maintenance and conservation, and several studies were commissioned for this purpose. See G B Hill & Partners Pty Ltd: 'Maylands Brickworks Conservation and Management Plan' (June 1990); Michael Tooby: 'Brick Kilns Master Plan' (February 1993); and, Hocking Planning and Architecture: 'Maylands Claypits Structure Plan' (for the whole of the Maylands Peninsular, December 1994), for further details.

13. 2 PHYSICAL EVIDENCE

Originally, *Maylands Brickworks* comprised two Hoffman Kilns, two Pug Mills, extensive drying sheds, gate house, office and change rooms, lunch room and also a cornish boiler providing heating to the drying sheds.

Today, *Maylands Brickworks* comprises the 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.

Hoffman Kiln

The Hoffman Kiln and chimney stack 34 metres in height from ground level are the most dominant aspects 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. The brick in the internal kiln brick arches were of refractory brick. The refractory brick arches 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.

Earth was packed around the outside and top of the kiln arches to maintain the arches under compressive stress and also retain the heat within the kiln. The earth packed around the outside of the brick arches also provided the floor for the upper working level of the kiln.

The upper level of the kiln is surrounded by an external brick wall with a number of window openings. The equipment for the injection of the firing fuel into the kiln is located on this level together with the equipment for the control of draught air through the air tunnels connecting to the kiln and the chimney stack.

The upper level roof is made of corrugated iron supported on steel and wooden roof trusses spanning the full width of the upper level.

A walkway extends from the mid section of the upper level to the fuel store at ground level on the eastern side.

The chimney stack is also of brick construction.

Pug Mill

The Pug Mill and machinery demonstrates the technology to prepare the clay for extrusion, extrusion and cutting the extruded clay into brick size with the wire cutter.

Drying Sheds

The drying sheds provided a key element in the technology of brick making for the era represented at Maylands.

The methods used in the drying sheds for stacking the bricks and the control of the drying process with the use of hessian screens, bucket coal burners, and a Cornish wood fired boiler were fundamental to the production of good quality bricks.

The conditions under which employees worked is also illustrated by the remaining sections of the drying sheds which also provide the link in illustrating the brick making process, between brick extrusion, drying and the kiln.

The retained sections of the drying sheds comprising in the order of eight percent of the original quantity are of timber and iron construction illustrating the usual type of construction.

Workshop

This original steel and corrugated iron building remains serviceable and is equipped with doors and a concrete floor and is currently storing bricks for a dismantled kiln from the Ascot Fields pipe factory.

Gate House

This is a single storey brick building with a clay tile roof (7 metres x 6 metres), which has been restored for current use.

Office

This is also a brick and tile single storey building 16 metres x 6 metres which has been restored for current use.

Paving

The area around the kiln was paved with clay bricks in 1993. The paved area includes the area on the east side of the Hoffman Kiln in which the fuel store, and lunch room were situated and also the Cornish Boiler.

Fencing

The place is enclosed in a surrounding fence. The section facing Swan Bank Road is constructed of a recently manufactured steel strut type.

Demolished Sections of the Brickworks

With the economic recession circa 1970 and the reduction in building activity one of the kilns was dismantled.

With the total shut down of production at *Maylands Brickworks*, in 1983, the property was sold to the City of Stirling on the basis that all the brickworks installation would be removed by the Metropolitan Brick Company.

Negotiations with the City of Stirling resulted in the retention of the Pug Mill, Hoffman Kiln, the connecting section of the Drying Sheds, Change Rooms, Gate House and Workshop Building.

The items removed for the site at the time of closure included eight percent of the fuel store, Cornish Boiler, the supplementary steel chimney of the kiln and the office building located between the change rooms and gate house.

After the closure of the *Maylands Brickworks*, the cooling of the kiln caused a contraction of the bricks which resulted in the loosening of the brick arches. Maintenance work carried out in the intervening period since the kiln ceased operating has been almost entirely concentrated on these arches to prevent further deterioration.

Adaptation

The area surrounding the Hoffman Kiln has been landscaped and paved. A steel stairway has been constructed on the Eastern side of the Hoffman Kiln to the second level to enable viewing by the public.

Security gates are fitted to the Hoffman Kiln openings to prevent access.

Restoration work on the Hoffman Kiln and drying sheds concluded in November 1994.

13. 3 REFERENCES

History of Metropolitan Brick Holdings Ltd - Mr S. A. Abraham

Brick Empire SA - R. Hallet

Maylands Brickworks Conservation and Management Plan - June 1990 - G B Hill & Partners Pty Ltd

Maylands Brickworks Preservation and Restoration study 1984 - Prepared by students of the Department of Surveying and Mapping Curtin University.