



**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)

- 3.8.6 Building and maintaining railways
- 3.14 Developing an Australian engineering and construction industry
- 7.7.3 Going to war

HERITAGE COUNCIL OF WESTERN AUSTRALIA THEME(S)

- 108 Government Policy
- 112 Technology and technological change
- 202 Rail and light rail transport
- 501 World wars and other wars
- 507 Water, power, major transport routes

11.1 AESTHETIC VALUE*

Midland Railway Workshops has significant aesthetic value because of the impressive scale of the development and orderly functional organisation of the site, consistency and quality of materials, building forms and architectural detailing. The early brick buildings constructed c.1904 and extended c.1912 are particularly significant for their form, proportions and general design qualities reflecting a style typical of late-Victorian industrial buildings. The style relates to the design of similar workshops in the UK and in eastern Australia, and is a unique example in the Western Australian context. (Criterion 1.2)

The buildings, structures, plant and equipment, roads, railways tracks, and open spaces which separate and link buildings and elements of natural and

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Canberra, 1991, with additional reference to Richards, O. *Theoretical Framework for Designed Landscapes in WA*, unpublished report, 1997.

introduced planting, together create a precinct which is significant both for the industrial landscape created within the boundaries of the site and for its landmark quality on the edge of Midland town centre. (Criteria 1.3 & 1.4)

11. 2. HISTORIC VALUE

Midland Railway Workshops is important as an industrial complex for the scale and diversity of operations which have been carried out on the site for the greater part of this century, including all the workshop functions, administrative operations, stores, testing, trade education, commemorative services, etc. (Criterion 2.1)

Midland Railway Workshops is important as the largest of the WAGR workshops responsible for statewide operations and as such central to the development of the State Government's rail system, which facilitated the development of agricultural and rural industrial areas and assisted the economy of the state, particularly in the early years of the 20th century. The workshops are also important for their contribution to the development of metropolitan transport services including manufacture, repair and maintenance of all trams and trolley buses, as well as trains, all of which contributed to the expansion of the metropolitan area in the early years of the 20th century by providing transport services for the community. (Criterion 2.2)

Midland Railway Workshops is important for its role in the manufacture of munitions, and other defence equipment. Retooling for the war effort involved major changes to the Foundry and the Flanging Shop. In addition, the Workshops are significant for the number of women employed to manufacture munitions after 1942. (Criterion 2.2)

The presence of *Midland Railway Workshops* strongly contributed to the development of the suburb of Midland Junction. In particular, the commercial district was built as a direct response to the promise of the Workshops being located in the area. (Criterion 2.2)

Midland Railway Workshops is important for association with individuals, including C. Y. O'Connor, Pietro (Peter) Porcelli sculptor for the war memorial, and the various Chief Mechanical Engineers, including R. T. Rotherham (1900-03), who prepared designs for and was involved in the early planning of the workshops and F. Mills (1940-49). Another notable person associated with the place is John Forrest. (Criterion 2.3)

Midland Railway Workshops generally, and individual buildings and site features in particular, exhibit a high standard of technical as well as artistic achievement. This includes the layout of the site, early brick industrial buildings, the CME's office, the Railway Institute and the war memorial sculpture. (Criterion 2.4)

11. 3. SCIENTIFIC VALUE

The workshops are important as an indication of the level of technological development in Western Australia in the period around the turn of the century, reflected in both the construction of the buildings and workshop equipment. Examples include the provision of electrical lighting to the workshops.

The workshops provide evidence of the developing technological processes associated with the fabrication and repair of railway rolling stock in Western

Australia from the early 1900s to the closure of the workshops in 1994. (Criterion 3.2)

During World War II the workshops played an important role in the manufacture of armaments and equipment. The war service of workshop personnel was significant in both World Wars. During World War II women played a prominent role at the workshops. (Criterion 3.2)

The site is important for its potential to yield information about the industrial history of WA and of the WAGR operations in particular. It has potential as a teaching site for the study of: industrial archaeology; traditional and contemporary trade skills; social and cultural history relating to 20th-century Western Australian development; architectural and building technology and history; heritage conservation theory and practice (buildings, plant and equipment); environmental pollution, contamination and rehabilitation; impact of industrial processes on the natural environment. (Criterion 3.1)

There are potential historical archaeological sites i.e., former stationmaster's house and other cottages on the site; workshop buildings and structures now removed or demolished. (Criterion 3.1)

The following are examples of technical innovation or achievement associated with the building, plant and equipment, trade skills and practices etc.

a) Septic system and remaining filter beds are important as evidence of the earliest phase of development of this new technology for sewerage disposal in Western Australia. The septic system on the workshops site was the third to be installed in WA and was used to test the effectiveness of the design as a forerunner for the installation of the metropolitan system installed at Claisebrook and Burswood.

b) The underwater coal storage dam is important as evidence of technology developed to overcome the particular problems associated with the storage of large quantities of the local Collie coal for use by the WAGR. (Criterion 3.3)

c) The design and construction of the structural steel frames supporting the main workshop blocks represents the transition to the use of rolled steel sections from the earlier use of iron structural elements.

11. 4. SOCIAL VALUE

The Workshops' labour force, spanning a period of ninety years, represents a specific group of Western Australian industrial workers, tradesmen, technicians, engineers, drafts people, designers, planners and administrators whose collective skills and labour have made a significant contribution to the development of the State's transport systems. The Workshops have provided over time, through cadetships and apprenticeships, skilled workers for the State's industrial workforce. (Criterion 4.1)

The physical presence of the workshops in the townsite and the impact of its activities on the town have contributed to a strong sense of local identity of Midland as a railway town. (Criterion 4.2)

12. DEGREE OF SIGNIFICANCE

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12. 1. RARITY

Midland Railway Workshops was the main workshop site servicing and manufacturing locomotives and rolling stock for the WAGR for almost a century. It is the only major railway workshop in Western Australia and one of the few early 20th century industrial sites in the State. (Criterion 5.1)

Midland Railway Workshops demonstrates the period when large numbers of people were employed in industrial processes. In the post-industrial present, this is a rapidly disappearing way of life. (Criterion 5.2)

12. 2 REPRESENTATIVENESS

Midland Railway Workshops was the focus of railway activity in Western Australia for almost a century. It is representative of a period when railways were essential for both freight and passenger transportation, and of workshops once associated with all major railway networks to service and repair locomotives, rolling stock, permanent way and railway equipment generally. (Criterion 6.1)

Midland Railway Workshops is representative of major sites of railway construction and maintenance. Each State in Australia having its own railway workshops. (Criteria 6.1 & 6.2)

12. 3 CONDITION

The buildings and site features are generally in good condition although there is evidence of the need for general repairs and maintenance. There are for instance, a number of windows with broken glass and other signs of deterioration.

Brickwork is generally sound although there is considerable discolouration due to industrial pollution. This, however, contributes to the industrial character and general ambience of the place.

Structural steel work, iron window frames and other elements of construction generally appear sound.

The site contains a number of asbestos cement clad buildings and roofs which have been replaced with asbestos. These require either treatment or removal.

For the condition of individual components of the site, see Physical Evidence.

12. 4 INTEGRITY

The integrity of the site is high although the continuation of this is dependent upon future use and development after the closure of the workshops. Appropriate adaptation and development of the site are possible however without loss of identified significance.

For integrity of individual components of site, see Physical Evidence.

12. 5 AUTHENTICITY

Midland Railway Workshop buildings, site features and equipment have been adapted over the history of the workshops to accommodate the changing requirements of the state's railway system and changes and developments in technology. Nevertheless, the original buildings constructed in 1904 and extensions to these dating from 1911 to 1914 remain largely intact and retain

a high proportion of original fabric. Many site features also remain unaltered giving the site a high level of authenticity.

For authenticity of individual components of site, see Physical Evidence.

13. SUPPORTING EVIDENCE

The following has been adapted from 'Conservation Policy: Midland Railway Workshops, Midland WA' prepared by Rosemary Rosario and Philip McAllister, Heritage Architects, with Wendy Brady, Historian, and Oline Richards, Research and Heritage Conservation Consultant, for the Central Midland Planning Taskforce in March 1994 with amendments and/or additions by HCWA staff.

13.1 DOCUMENTARY EVIDENCE

The first West Australian Government Railway (WAGR) Workshop opened at Fremantle in 1886, five years after the commencement of the Fremantle to Guildford line. However, the site was only 3.5 acres (1.4ha), too small for its intended function, even though the December 1896 takeover of Great Southern Railway gave WAGR access to the GSR workshops in Albany.¹ Nonetheless, by July 1891, C. Y. O'Connor had recommended to the State Legislative Assembly that the workshops be relocated. Although the Assembly initially resisted, the newly discovered Goldfields provided impetus for change. The selected site at East Guildford (later renamed Midland Junction, and finally Midland) was originally part of James Stirling's 4 000 acre estate. Henry Brockman, who had purchased it in 1886, offered 226 acres of land (known locally as the 'picnic ground'), fronting the Helena River, to the Government for £2,000. In 1892, Allison Smith, Locomotive Superintendent at Newport Workshops in Victoria, was appointed to report on the needs of the WAGR,² and in 1893, the State purchased the parcel of land for use by the government and it was gazetted, as Reserve 2299, for public purposes.³

Smith anticipated 4 acres (15,800sqm) of workshops, a plan swiftly rejected by the Assembly as too costly when resources were required in the Goldfields and ports.⁴ During the 1890s the proposed development raised considerable controversy and debate. O'Connor, as General Manager of the railways, raised the subject again in 1893, and the Assembly debated it again in 1894. There were a number of Royal Commissions to investigate the issue and advice was sought from experts both in eastern Australia and overseas into the projected requirements and likely costs of the workshop project.⁵ Although the Assembly agreed in 1895 to move the workshops from Fremantle to Midland Junction, this move was bitterly opposed by residents of Fremantle, who feared the loss of employment, thus ensuring the continuation of the controversy.⁶

¹ Watson, Lindsay, *The Railway History of Midland Junction* (Swan View, WA: L & S Drafting in conjunction with the Shire of Swan and the WA Light Railway Preservation Association, c. 1995), p. 73

² Smith, Allison D., *Report on Workshops and Locomotive Branch of the Railways of WA* (Perth, 1892)

³ Palassis Architects, 'Midland Railway Workshops, Foundry: Conservation Plan' (2005), p. 7; the present site covers only 198 acres (80ha), land having been excised at different times for roads, a school site, and the abattoirs and saleyards at the east end.

⁴ Wallis, Bob, 'Midland Railway Workshops: A Short History', copy available at www.machinerypreservationclub.com.au

⁵ Campbell, R. B., McDonald, John A., and Quirk, W. M., *Report of the Committee appointed to enquire into the Design and Requirements of the New Railway Workshops proposed to be erected at Midland Junction* (Perth, 1897)

⁶ Wallis, op. cit.

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In the years following the establishment of the area, the population of Midland Junction began to decline. By 1898, many newly-built houses stood empty. In spite of efforts to attract private industry, little was achieved. Much now rested with the promised Government railway workshops to arrest the decline of the area. The announcement in 1900 that the workshops would be constructed led to an increase in commercial activity around Midland Junction. Among the signs of this was the establishment of a foundry to manufacture steel pipes for the Goldfields water scheme.⁷ The *Swan Express* excitedly announced in its opening issue:

We have arrived. The time is opportune. Change and progress are the order of the day in these districts. The general improvement in trade has given a new lease of life all round. Local industries are getting well under way. The pipe works are making things industrial hum. The erection of the railway workshops in the near future is now practically assured. Some events are prolific of results. This will be. An increase in population must inevitably occur as a result.⁸

Following the industrial expansion came commercial premises in Midland Junction. Although, by 1909, 1,200 men were employed in the Workshops, the population of Midland Junction was only 4,500. The majority of workers chose to live in Guildford, and the new suburbs of West Guildford and Bayswater, where land was cheaper. It was easy to travel to work, since the train stopped outside the workshops. The result was that Midland Junction had a commercial centre in excess of the needs of its residents.⁹

The earliest development at the Workshops site was the construction of an earth-wall reservoir with a capacity of 11 million gallons (50 million litres) to supply water for locomotives. After World War II, this reservoir was developed as the storage dam for Collie coal. However, by 1895, the number of bores providing water to the site attracted squatters, although the police subsequently evicted them. In August 1904, a septic sewerage system was installed, which was pioneering work in WA, only two others having been tried: at Government House and North Fremantle. The satisfactory operation of the system led to the adoption of the scheme on a large scale for the metropolitan area.¹⁰

Midland Junction Railway Station opened in 1895 facing onto Railway Parade and served both the Government Eastern Railway line and the Midland Railway Company line. An 1896 inquiry into the design of the Workshops concluded that the best position for the main buildings would be immediately opposite the entrance to the Railway Station. Midland Junction Station was demolished in 1968, and the date of the first overhead footbridge linking the Station to Workshops has not been established. The existing footbridge dates from 1966 and was constructed a few metres to the east of the older bridge it replaced. The development of the Station, the Workshops and the footbridge are closely linked as part of the context of the site as a whole.¹¹

7 Bourke, Michael J., *On the Swan: A History of The Swan District in Western Australia* (Nedlands: UWA Press for Swan Shire Council, 1987), pp. 268-69

8 *Swan Express*, 1 December 1900, quoted in Bourke, op. cit., pp. 269-70

9 Bourke, op. cit., pp. 271-72

10 Heritage and Conservation Professionals, 'Conservation Policy: Midland Railway Workshops, WA' (1994), pp. 21-22

11 *ibid.*, p. 22

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A new plan for the Workshops was produced by Campbell, McDonald and Quirk. With a floor area of 7 acres, it was nearly twice that of Smith's rejected design. After O'Connor rejected the plan as having no provision for electric lighting, he travelled abroad to consult with an English expert, J. A. F. Aspinall, Chief Mechanical Engineer of Lancashire and Yorkshire Railways. Fremantle, though, continued to oppose the move and so little was changed for a number of years. Finally, in June 1900, the new Chief Mechanical Engineer, T. F. Rotheram, put forward the seventh workshop plan since O'Connor suggested relocation, and this time it was accepted. It was almost identical to Aspinall's.

Although some rolling stock was deteriorating due to lack of repairs, Rotheram was asked to scale down his requirements and submit a revised plan. In effect, before the workshops were even started the government halved the size of the buildings.¹² By late 1902, more than ten years after the project was proposed, and a few months after O'Connor's tragic death, building commenced at Midland Junction. Possibly owing to the continuing debate surrounding the project, building work progressed on site with few prepared plans. Decisions were made on site and the Public Works Department's plans showed finished buildings. Bricks were manufactured from local clay, from the banks of the Helena River, and laid by German labourers contracted for the job, while structural steel sections to support roofs were imported from the UK. The abridged scheme was complete enough by 4 January 1904 for 399 employees to be transferred from the Fremantle site, with the remaining staff, drawn from the GSR workshops at Albany, transferred a year later in April 1905. In a 1905 WAGR report, the success of the new site was measured by the fact that while 400 wagons had been waiting repair at Fremantle, Midland was averaging just 150.¹³

The WAGR Stores Branch, which supplied requirements for the whole of the railway system, transferred from Fremantle to the Workshop's site about the same time. It was a Branch in its own right, headed by the Comptroller of Stores and run independently of the Workshops management, which was headed by the Chief Mechanical Engineer.¹⁴

Although new buildings were erected, some older buildings were relocated from the Fremantle site. One such was the 200ft by 100ft (60m by 30m) Paint Shop, an iron-framed, timber and corrugated iron clad structure. Although fire-safety precautions were taken with this building, on 10 December 1909 a fire started and spread so quickly it was out of control before fire fighters arrived. Twenty-one timber-bodied coaches inside were destroyed and, because the site's insurance policy had been allowed to lapse, the total bill exceeded £42,000.¹⁵

The workshops were centred around three large saw-toothed brick masonry buildings. In 1904, the workshops were divided into: Block 1 – carriage and

¹² George, W. J., *Report of the Select Committee of the Legislative Assembly appointed to consider and report upon the Equipment of the Proposed Railway Workshops at Midland Junction* (Perth, 1902)

¹³ Wallis, op. cit.; Godden Mackay, 'Midland Railway Workshops, Perth: Heritage Assessment and Conservation Strategy' (Surry Hills, NSW, 1992), p. 10

¹⁴ Information supplied by Hon Ron Davies, 25 August 2006

¹⁵ Watson, op. cit., pp. 75-76

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wagon shop, and saw mill; Block 2 – boiler shop and blacksmith’s shop; and Block 3 – machine and fitting, and erecting shop.¹⁶ Even before these works were complete, it was realised that half-size workshops were inadequate.¹⁷ So, between 1910 and 1913 a second stage of building doubled the size of the workshop facilities, effectively completing the workshops as originally proposed. 1911 extensions expanded Blocks 2 and 3, and by 1913 these extensions were almost complete, so work had commenced on Block 1, the Powerhouse and the Foundry. This time, roof trusses were fabricated on site, rather than importing prefabricated ones from Britain again.¹⁸

Initially the works were operated by a combination of steam and electricity. The Powerhouse was erected in 1904, housing eight Babcock and Wilcox coal-fired boilers¹⁹ and two Lancashire (horizontal cylindrical) boilers. The steam produced from these provided electricity for the workshops’ light and power, as well as the Administrative building and the Institute building. The equipment mounted in the engine room included two 60kW engine generator sets, three 200kW engine generator sets, one surface condenser, one condenser and pump. In 1910, a new stack was built to service newly installed Lancashire boilers and so increase output. In addition, pressurised steam was sent to various locations within the three Blocks via a service tunnel which divided into smaller service tunnels within each Block. These tunnels would later be used to deliver compressed air after steam was discarded. There was, though, air from the start with two 3-cylinder blowers, one of which is still located within the Powerhouse. These supplied a large volume of low-pressure air to the Foundry cupola furnaces, but were often criticised by employees for supplying ‘wet air’.²⁰

Coal was delivered by rail wagon into an in-ground hopper at the northern end of the Boiler House, then carried by a bucket conveyor to steel coalbunkers mounted near the roof of the Boiler House. From there, chutes gradually fed the coal into the various boilers. Advantage was taken of this system by loading cinders into the same wagons that brought the coal. An under-floor system raked the cinders into the bucket conveyor and the empty wagon could be filled with ash to be dumped on the banks of the river.²¹

In 1906, three steam-driven drop hammers were installed in the blacksmith’s shop. The forge shop, which was most likely adjacent to the blacksmith’s had its forge fitted with producer gas. Hence it is known that gas was produced on site, at least for a while. As far as known, the producer gas was the only gas made on site and Midland did not have a town gas or coal gas facility.²²

When the move to Midland took place, most, if not all, of the equipment at Albany and Fremantle was relocated. As was expected, much of this had to be replaced or supplemented in the first few years of operation. In 1907, a tenoning machine, a morticing machine and a sandpapering machine were

16 Mackay, op. cit., p. 11

17 Railways Department Annual Reports, 1903 and 1910-13

18 *ibid.*

19 These boilers were also purchased for the Goldfields Pipeline project, and examples can still be seen at Mundaring Weir Museum.

20 Willis, op. cit.

21 *ibid.*

22 Godden McKay, op. cit., p. 10

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installed. In addition, an engine and boiler were commissioned to operate the breakdown saw, which must have been some distance from the original boiler house, otherwise steam could have been piped to the engine.²³

By 1908, new equipment was being introduced at a rapid rate and fourteen major items were installed including a cutter and grinder, a pipe-bending machine, a steam striker and 10cwt steam hammer. It appears from the list of machinery that an emphasis was being placed on forging and foundry work, which indicates that steel was replacing timber as the main chassis material for rolling stock.²⁴

By 1914, all the major brick buildings on the site were completed and the industrial processes they contained established. Some of the equipment for the shops had been transferred from Fremantle and some imported directly from the UK. Initially the workshops were equipped to maintain and repair steam locomotives, carriages and wagons. They were also equipped to make timber bodied goods wagons (excluding the steel underframe) and passenger carriages. Manufacture of locomotives or steel undercarriages were not originally envisaged. However, by 1908 carriages and wagons were being built at Midland and complete locomotives by the mid-1920s.²⁵

Midland generated its own power from 1904 to 1918, when the state owned East Perth Power Station came on line. On 1 July 1913, WAGR took control of Perth Electric Tramways, thus gaining control of the significant power stations in the Perth area. By the end of the year, the State Government had agreed with Perth City Council to construct a new power station at East Perth.²⁶ The railways began making provision for the connection of the supply from East Perth and no upgrading of their own internal system took place until this changeover occurred.²⁷ However, World War I slowed progress and the Midland Powerhouse continued to supply power until the end of hostilities. By 1918, the workshop's generators had been removed and sold, leaving no trace other than some steampipe support brackets. However, the East Perth supply arrived at 40Hz, which did not match the original Midland frequency, making motors run at a different speed. Consequently, some machines were fitted with new 40Hz motors and some motors had pulleys fitted to compensate for the change in speed.²⁸

Each of the main workshops was originally placed under the control of the Superintendents of the individual departments housed in them. This managerial system became progressively unworkable so, in 1919, the whole organization was merged and placed under the control of the Chief Mechanical Engineer. This major reorganisation was completed by 1921.²⁹

During the 1920s a policy of expansion of the shops to manufacture previously imported industrial items led to considerable modernisation and

23 ibid.

24 ibid.

25 ibid., p. 1

26 For information on Perth power supply see HCWA Assessment 03318 *East Perth Power Station*.

27 Godden McKay, op. cit., p. 11

28 Doring, C and MJ, *Midland Workshops, Industrial Archaeology Study Vol. 1*, prepared for Central Midland Planning Taskforce (1994), vol. 1, p. 236

29 Godden McKay, op. cit., p. 11

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the introduction of new machinery and equipment.³⁰ In 1921, it was decided that all steam plant would be replaced by electrically powered plant. The boiler house stack, which was only eleven years old, already needed major rebuilding, and, as the new wave of machinery, which became available after WWI, was more economical to operate than the older steam driven equipment, the latter was gradually phased out. It would appear that initially much of the equipment throughout the complex was run from overhead line shafts, which were powered by reciprocating steam engines. As the changeover took place, the steam engines were replaced by electric motors and disruption to work would have been minimal.³¹

Additions of plant enabled an increased output of both locomotives and rolling stock, so that by 1928 the output consisted of:

- 4 locomotives class 'P' – heavy expressed engines
- 2 carriages class 'AY' – second class suburban saloon type
- 3 corridor cars for the Midland Railway Company – two-berth sleepers
- 10 brake vans class 'Zb' – with passenger accommodation
- 8 water tanks class 'Ja' – capacity 2 800 gallons (12,600 litres)
- 25 sheep wagons class 'Cx' – capacity 85 sheep
- 250 high side steel wagons class 'K' – capacity 14 tons
- 12 bogie petrol tanks – 5 000 gallons (22,500 litres) for Shell Oil Co.
- 10 bogie tram cars³²

The 'Workshops Fallen Soldiers Memorial Committee' commissioned a Memorial by sculptor Pietro Porcelli, for a total cost of £950. Porcelli was responsible for a number of war memorials in WA, the Workshop's being his final public work. His works include the statue of C. Y. O'Connor in Fremantle Harbour and the Alexander Forrest statue in St. George's Terrace.

The unveiling and dedication ceremony, carried out by WA's Governor and the Archbishop of Perth, was held on 20 December 1925. The official programme noted that the column was:

... after the Grecian Ionic order of architecture, consisting of a chamfered plinth, die and cap, square base moulding, shaft and Ionic cap, mounted upon three rock faced granite steps. Western Australian granite ... has been used for this work. The bronze draped female figure standing upon a sphere that surmounts the granite column is represented as calling upon the world, the right hand raised demanding silence, and the left one holding a palm leaf; the head is crowned with a wreath of laurel, and the left foot is trampling upon a sword. The pose and attitude of the whole figure represents 'Peace'. A special feature has been made of the bronzed name and inscription tablets, which are secured to three faces of the die stone; they have been specially designed for this monument.

'Peace' was cast in bronze in Naples, and local legend has it that the model was a typist from the railway office. To commemorate the fallen workers of WWII a fourth tablet was later added.³³ The use of a female figure in war memorials in Australia is unusual, and Porcelli's design and its symbolism are considered to be unique. With the exception of the statue, all the work on the

30 Stead, G W, *Report of the Royal Commission Appointed to Inquire into the System of State Railways* (Perth, 1922)

31 Godden Mackay, op. cit., p. 11

32 ibid., p. 12

33 <http://www.warmemorials.net/memorials/perth/midwshops/midwshop.htm>

memorial was carried out in the workshops, and all tools used in the work were made and regularly sharpened on site. The siting of the memorial required the reorganisation of existing facilities, including the removal of the timekeeper's and pay offices, flagstaff and laboratory, and the erection of new buildings to house these facilities. The design also called for the removal of a 6ft corrugated iron fence along the street boundary and its replacement with an ornamental wrought iron fence with brick piers and plinth. None of the original planting of the gardens surrounding the memorial now exists, although the layout remains intact.³⁴

In 1923/24, new equipment was introduced into the building to accommodate conversion to compressed air. Compressed air was used to operate various small tools such as chipping hammers and riveting guns, to drive pistons, and to open and close furnace doors. In later years, compressed air was used to drive large blacksmith's hammers, which had originally been powered by steam. The later compressors (a Sentinel and a Crossley-Reavell) are still in place. It seems probable that the Crossley compressor originated from the Lake View and Star Goldmine in Kalgoorlie, and was transported to Midland during WWII.³⁵

During the 1930s staff reductions at the workshops reflected the economic situation. In 1931 the West Midland workshop, which had operated alongside Midland Workshops, closed and staff and machinery were transferred to the main workshops. By 1934 the economic situation was improving and some work was undertaken for the State Steamship Services and the Tramway Branch. Contracts for private companies were also permitted but only if private engineering firms could not undertake the work. By 1938 another program for upgrading and replacing obsolete machinery was being undertaken, as well as an upgrading of staff facilities including a canteen.³⁶

Around 1930, the Boiler Room was slowly converted to the Coppersmith's Shop, with the transfer of fifteen personnel. This building was extremely hot, especially during the summer months with the heat from the boilers, oil-fired furnaces, a number of coke fires, and a white-metal bench where the metal was poured, in addition to the sun. Prior to moving to the Boiler Room, the staff had previously been housed in an annexe adjoining the south side of Block 3. Slow phasing out of the Babcock and Wilcox boilers meant that the coppersmiths had to work alongside the still commissioned boilers until December 1930 when the new boiler room and coal bins commenced at the east end of the Blacksmiths Shop. By the end of 1931, all coppersmith staff were now located in the Boiler Room, renamed the Copper Shop. By the end of WWII, the Copper Shop employed 80 people: twenty-one coppersmiths, seventeen apprentices, eleven sheet metal workers with three apprentices, three plumbers and one apprentice, two galvanisers, and office staff.³⁷

The 1940s was a period of considerable change and development, due largely to World War II. A number of buildings were extended and new buildings constructed to enable the workshops to fulfil contracts for munitions supply. After Japan entered the war, the Workshops were required to make

34 Heritage and Conservation Professionals, op. cit., p. 25

35 Wallis, op. cit.

36 Railways Department Annual Reports, 1930s and 1940s

37 Wallis, op. cit.

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25 pound artillery shells. Lathes required for turning the munitions were impossible to get, so the workshops dismantled an existing one, took specifications and built 83 new lathes in three months. Over 2,000,000 shells were produced by a special section largely comprised of women, based in the specially-constructed Shell Annexe. The Annexe was important as a symbol of the contribution of women to the war effort.³⁸

Steam propulsion units and propellers for naval vessels were cast in the Foundry, along with tooling for other armaments manufacturers.³⁹ To enable these substantial castings, extensive alterations were carried out to the Foundry, including a 41m extension to the eastern end and the raising of the roof by 2m to conform to the new section. Other work included the installation of a 2-ton and a 3¼-ton furnace and strengthening of existing gantry girders and columns to take a new 20-ton crane.⁴⁰ In addition, a Tool Room was constructed as part of the war effort.⁴¹ The Flanging Shop also underwent major alterations in 1942 to facilitate munitions manufacture. The roof of the building was raised for overhead cranes, galvanised iron sheet added to the western end, and changes made internally to accommodate its new use.⁴²

After cessation of hostilities, the buildings constructed for munitions purposes were converted to general use.

In early 1941, a small-scale test was conducted to determine the effects of storing Collie coal underwater. Collie coal deteriorates rapidly with exposure to air, disintegrating into dust. Interest in finding a solution to stockpiling local coal had been triggered by threats of industrial stoppage and the War. The Railways Department continued testing during 1942 at the Workshops, and a decision was made in 1944 to proceed with a 20,000 ton storage dam. The reservoir at the western end of the site was no longer being used, so it was extended and a mechanical grab and transporter was installed over it. With the final phasing out of steam in 1971, the coal dam was no longer required, so the remaining coal stocks were removed and the dam was utilised to take effluent wastes from the workshops.⁴³

As the needs of the workshops changed in response to technological, social and economic changes, the functions of the various buildings were reassigned, old buildings were demolished, and new ones erected.⁴⁴ A 1948 Royal Commission recommended extensive reorganisation of the shops and administration.⁴⁵ Some of the measures taken included: the removal of retyring plant and housing in Block 3; new planting and polishing shop; erection of new paint shop; conversion of existing paint shop to a press shop; extension and reorganisation of the Foundry; and a general regrouping of machines and plant.⁴⁶ The conversion of Perth's electric power supply from

38 <http://www.mcc.murdoch.edu.au/midland/>

39 Godden Mackay, op. cit., p. 12

40 Watson, op. cit., p. 77

41 Palassis, op. cit., p. 7

42 Heritage and Conservation Professionals, op. cit., p. 82

43 Heritage & Conservation Professionals, op. cit., pp. 23-24

44 Godden Mackay, op. cit., p. 10

45 Gibson, Alex J, *First Interim Report of the Royal Commission appointed to inquire into the Midland Junction Workshops of the Western Australian Government Railways* (1947)

46 Heritage & Conservation Professionals, op. cit., p. 35

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40Hz to 50Hz had the effect of enabling the workshop to do away with the old overhead line shafts powered by 40Hz motors and introduce more flexible electric cable power supply.⁴⁷

The last locomotive produced at Midland ran from the workshops in 1949. During the 1950s and 1960s, technological changes had an impact on the Workshops' activities and equipment. Steam locomotives were replaced by diesel, resulting in a drastic reduction in boiler making activities and the establishment of facilities for the repair of large diesel engines. Wooden bodies on carriages and wagons gave way to steel bodies, then aluminium. Electric welding replaced riveting as the means of joining steel components, and oxy-cutting largely replaced traditional methods of cutting shapes from steel. Finally, computers took over routine clerical tasks, and some aspects of machine control.⁴⁸

During the 1960s the workshops were converted to accommodate the wider standard-gauge locomotive and rolling stock. In 1963, Block 3 was altered to allow for the extra width required by demolishing the southern section of the western façade and being rebuilt in timber and asbestos. Widening of access to Block 1 was achieved by altering the existing brick openings.⁴⁹ The 'Railway Standardisation Agreement of 1961' provided for a standard gauge link between Kwinana, Fremantle and Kalgoorlie connecting with the Commonwealth Railways. *Midland Workshops* then engaged in the manufacture and supply of rolling stock and Permanent Way for the project. Multiple shifts were organised in both the Flanging and Boiler Shops as 1,205 new standard-gauge wagons were built. This was besides the normal maintenance requirements for railway operation.⁵⁰

In the 1970s, the private Midland Railway Company workshops – located north-west of the main site – were closed and some timber structures relocated to the main site, including the large asbestos clad building located to the south of the Track Equipment Shop.⁵¹ The 1970s also saw the further manufacture of specialised bulk-haulage wagons for mineral ores, cement, wheat, coal and oil. The rising value of this work further reduced staff numbers required for maintenance. However, in 1974, a number of derailments attributable to rail failure necessitated a \$42 million re-railing project known as the 'Kwinana Koolyanoobing Rail Rehabilitation Project'. Consequently, the Blacksmith and Track Equipment Shops were once again engaged in a major project. In 1984, though, the Commissioner for Railways, W. I. McCullough, announced the end of WAGR's association with light railways. From then on, demand for Midland Railway Workshops' facilities declined and a series of redundancy packages offered to staff.⁵²

From then on, until its closure, Midland specialised in the manufacture of wagons for the bulk haulage trade and maintenance of freight wagons and the diesel-electric locomotive fleet of Westrail.⁵³ In 1991, the Workshops

47 Doring, op. cit., p. 2

48 *ibid.*

49 Heritage & Conservation Professionals, op. cit., p. 36

50 Watson, op. cit., p. 87

51 Heritage & Conservation Professionals, op. cit., p. 36

52 *ibid.*, pp. 87-88

53 Godden Mackay, op. cit., p. 12

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embarked on a Quality Assurance (QA) programme, which was meant to modernise the site. A large number of machines and dies, which could not meet the QA standards, were scrapped. Six days after passing their QA accreditation audit, supervised by Lloyds Register, the decision to close the Midland Workshops was announced on 28 April 1993 and the doors closed on 3 March 1994.

Midland Redevelopment Authority is currently redeveloping the site. The Midland Saleyards at the eastern end of the Railway Workshop site and all related businesses and properties have been relocated. Parts of *Midland Railway Workshops* are now home to a campus of Edith Cowan University and a large Western Australian Police Operations Centre, as well as other projects. A Harvey Norman store opened in 2005 on the corner of Clayton and Lloyd Streets. The Coal Storage dam at the western side of the Workshops has become an ornamental lake adjacent to residential redevelopment called 'Woodbridge Lakes'. According to the MRA website:

Woodbridge Lakes, at the western end of the Railway Workshops site around the former coal dam, will be an environmentally friendly, medium-density residential neighbourhood. Home designs will be compatible with the area's heritage character and incorporate ecologically sustainable design and crime prevention principles. A boardwalk around the dam, nearby parklands along the Helena River bed and public open spaces featuring distinctive artworks will add to the area's amenity.

The Workshops Village provides a unique mix of cultural and built heritage character. The Railway Workshops buildings will be adapted for residential and commercial uses, with Block 1 housing the proposed rail heritage centre. The Power House, Copper Shop and Pattern Shop will have heritage activities of interest to visitors. A walk trail will link buildings, equipment and sites, interpreting the former use of the area and recognising the heritage value of the Workshops.

Landscaping and design will reinforce the heritage spaces and buildings and highlight the vistas from Woodbridge Lakes in the west to the Darling Range escarpment in the east. The Heritage Green, located south of the Foundry and including other heritage buildings such as the Power House, will bring together the activities of the Workshops Village and provide a common link between the heritage, education and residential uses to create a sense of place and community within the village area.

Bushland along the Helena River and the adaptive reuse of several of the large heritage buildings provides a unique setting for the Workshops Village main residential area. Pedestrian and bike paths provide easy access to all nearby areas. Creative verge sculptures along Yelverton Drive and the impressive Workers' Wall near Block 1 celebrate the precinct's history. The old railway shunting yards will become an open piazza, with landscaped public places complementing the proposed cultural and social uses.⁵⁴

In December 2004, the Centenary year of the Workshops, it was announced that *Midland Railway Workshops* had been included in the list of Western Australian Heritage Icons. This award recognised that the site was the most important engineering establishment in the State, which in its heyday had employed more than 3 200 people, including 600 apprentices.⁵⁵

54 <http://www.mra.wa.gov.au/planning/helena.phtml>

55 Palassis, op. cit., p. 8

In November 2005, the State Government announced plans to construct a 326-bed hospital on the site. Located on Clayton Street, the estimated \$183 million hospital will be constructed by around 2010-11 and will replace the old Swan Districts Hospital.⁵⁶

13.2 PHYSICAL EVIDENCE

For a detailed discussion of physical evidence see:

‘Conservation Policy: Midland Railway Workshops, Midland WA’ prepared by Rosemary Rosario and Philip McAllister, Heritage Architects, with Wendy Brady, Historian, and Oline Richards, Research and Heritage Conservation Consultant, for the Central Midland Planning Taskforce in March 1994, pp. 59-126;

‘Heritage Strategy: Midland Central Redevelopment Area’ (draft), prepared for Midland Redevelopment Authority by Heritage and Conservation Professionals, in November 2001, adopted March 2003, updated November 2004;

‘Midland Railway Workshops Foundry: Conservation Plan’ prepared by Nerida Moredoundt and Julie de Jong, Palassis Architects, with Wayne Moredoundt, Historian, and Godden Mackay Logan, Industrial Archaeologist, for Midland Redevelopment Authority in March 2005, pp. 13-22;

‘Midland Railway Workshops, Perth: Heritage Assessment and Conservation Strategy’ prepared by Don Godden of Godden Mackay for Australian Railway Historical Society (WA) in December 1992, pp. 10-12;

‘Railway Institute, Midland Railway Workshops: Conservation Plan’, prepared by Heritage and Conservation Professionals for Midland Redevelopment Authority, in July 2000, pp. 37-62; and,

Doring, C and M J, *Midland Workshops, Industrial Archaeology Study*, 3 vols., prepared for Central Midland Planning Taskforce (1994).

Midland Railway Workshops occupies a site of about 68 hectares, roughly rectangular in form, three times as long as wide and orientated east-west. It is adjacent to the Midland Railway Terminal and accessed by Montreal Road East, which forms its north boundary. The coal storage dam is at the western end of the site, the salvage depot at the east, and the southern boundary is the Swan River.

The site was once serviced by a large number of spurlines, which brought materials to the various buildings and allowed access for locomotives and rolling stock undergoing repairs. Many of the tracks are still extant.

Altogether, there were once in excess of 70 buildings and structures on the site. Some of these are large masonry workshop buildings such as the powerhouse and former boiler house; some are steel-framed and corrugated iron, such as the paint shop; and others are small to very small and built from a variety of materials.

⁵⁶ http://en.wikipedia.org/wiki/Midland,_Western_Australia

One of the more interesting structures is the coal storage dam, which is a concrete walled dam once fitted with an overhead travelling crane, which loaded tenders and trucks with Collie coal. Collie coal disintegrates when in contact with air for a period of more than two months, so it needed to be stored underwater if it was to be stockpiled.⁵⁷

At the time of a 1993 assessment the workshops were found to be substantially intact and to contain numerous aspects of potential significance including items representing all stages in the history of the development of the site.

The main workshop buildings constructed in 1904 and extended in 1910-14 remain largely as constructed. Generally they are fine examples of early 20th century industrial buildings constructed of brick, steel and glass. Some have been extended and altered to meet the requirements of changing technology. The significant buildings include not only the workshops but also the administrative buildings on the site including the Chief Mechanical Engineer's Office, dating from 1904 and the Railway Institute built in 1914. Both provide an important link between the workshop site and the business centre of Midland as they occupy prominent locations on Montreal Street.

Along with the major brick buildings on the site, there are a number of smaller buildings including timber-framed buildings dating from various periods of the site's history. The timber store for instance dating from 1902 was one of the earliest structures constructed on the site and was used for workshop purposes whilst the brick buildings were under construction. More recent buildings on the site are not of the same quality as the early buildings and not considered to be of the same level of significance. Exceptions to this are the buildings constructed in the 1940s for the war effort which represent an important phase in the history and development of the state and are therefore of significance.

At the time of assessment the workshops contained a comprehensive and operating collection of railway workshops machinery and equipment. The assessment by C. and M. J. Doring covered over 2 000 items and identified 600 of them as significant.

The site contains significant machinery and equipment from a number of periods of the workshop's development. There are some original items dating from 1904 including some of the equipment remaining in the Powerhouse and in the woodworking area in Block 1. There are also remnants of the electric overhead travelling cranes installed in 1904 in several locations including the Powerhouse. There are a number of machines dating from the 1920s, 30s and 40s including perhaps the oldest electric arc furnaces in Australia in the Foundry which has significant equipment representative of iron and steel foundry technology of the 1940s and 50s. There are a number of rare items including for example, the locomotive weighbridge, the high-pressure water hydraulic system with pump, accumulator, presses, and pipe-work, and the dog-spike machinery.⁵⁸

As well as mechanical items, the Workshops contain other features that have contributed to the story of the site and the lives of the people who have

57 Godden Mackay, *op. cit.*, p.13

58 Doring, *op. cit.*, pp. 13, 14

worked there. For example, the War Memorial, designed by Pietro Porcelli, stands as testament to the men from the shops who were killed in WWI. Smaller memorials were found located on the walls of individual shops throughout the site.

The site also contains an important collection of documents relating to the site and the operations undertaken in the workshops.

Chief Mechanical Engineer's Office (1904, 1963)

Substantial rectangular brick building with rendered bands and a gabled roof and elaborate timber detail to the gable ends. Timber-framed window awnings to the north and south elevations, timber-framed gallery to the eastern end supported on rendered masonry columns. Similar detail to the western end has been removed. The building comprises two floors of accommodation. A fireproof room at first floor originally housed working machinery drawings for use on site. A 1963 extension is brick walled, corrugated asbestos cement roofed, single-storey structure, added to the west of the CME's Office. Internally, a central passage linked the CME's Office with the adjacent Laboratory, and various staff and administrative areas could be accessed from the passage.

The Chief Mechanical Engineer's Office was the administrative centre of the Workshops. This office contained, apart from the CME and his assistants, the clerical offices, the pay office, the production office, the drawing office, the Works Manager's office, the engineers and other administration staff. The building is a fine example of a turn of the century government administrative centre. The exterior is the most elaborate of the buildings on the site. The interior has been remodelled several times as staffing levels and administrative processes changed.

The CME's Office is in good condition, showing evidence of regular maintenance. Its integrity is moderate, since the building can no longer be the CME's Office, but does have the potential to function as an administrative building. The building has a fair degree of authenticity despite the loss of some original fabric in 1963.

Railway Institute (1913/14)

For details on the Railway Institute, see 'Railway Institute, Midland Railway Workshops: Conservation Plan', prepared by Heritage and Conservation Professionals for Midland Redevelopment Authority, in July 2000.

Midland Railway Institute is a two-storey building designed in the Federation Free style. The building is designed as a simple rectangular structure with a symmetrical façade. It is highly visible from all elevations and is a prominent landmark both from within and without the workshops site. The building is designed with greater attention to detail on the eastern and northern elevations, which are intended to present the public face of the building. The eastern elevation is symmetrical with the main entrance in the centre.

Constructed of brick with timber roof structures and terracotta Marseilles pattern roof tiles, the building has galvanised iron gutters and downpipes. Original timber doors and windows remain. There is also evidence of original benchtops and timber partitioning to the librarian's room.

In December 2000, a fire at the Railway Institute caused major damage, including the destruction of the original timber staircase. Nonetheless, the building was modified and restored in 2001 to house the Midland Redevelopment Authority offices.

The Railway Institute is in very good condition, but requires regular maintenance. The building has a high degree of integrity and authenticity.

Pattern Shop (1904)

Rectangular brick building with a gabled roof. The building comprises a single volume with a timber balcony at first-floor level with shelves for storing patterns. Door to the west leads to the pattern store addition. Manufactured and stored timber patterns for casting metal objects in the Foundry, of which the collection is substantially intact. Supervisor's Office contains an important collection of patterns and pattern-making machinery.

The Pattern Shop is in good condition, but requires regular maintenance. Continued integrity requires the retention of the significant collection of original patterns, equipment, tools and fittings. The building has a high degree of authenticity in the remaining original fabric, equipment and function.

Powerhouse and Boiler House (1904, 1911, 1923/24)

The majority of buildings at *Midland Railway Workshops* were designed by the Public Works Department. However, the Powerhouse buildings and equipment were designed in Britain. The Powerhouse, constructed of brick with steel roof truss structure, originally consisted of a boiler room and an engine room. The buildings were erected abutting each other, as is common with power stations. Both are brick masonry gabled roof buildings with exceptionally well articulated facades. The original section was completed in 1904, with a substation extension added in 1911 at the eastern end. The facades have engaged piers, arched window heads and door lintels and complex brick detailing above the spandrels. Original galvanised iron roof has been replaced with asbestos cement roof, but original Jarrah ceiling lining remains intact. Timber doors and iron window frames are original. Internally, the floors are concrete with original iron grating over floor channels. There was a mezzanine floor, which was accessed by a stairway with turned cedar balustrade and newel posts, supported on cast-iron columns that held the 30ft (9m) long switchboard. The original timber switchboard platform remains, although modified from 1911, as does the timber balustrade and stair details, along with the original access to the service conduit constructed in 1904 for the purpose of distributing services to the site.

Little of this original equipment remains, but the structure and layout of the building – including the steel frame which supported the coal bunkers, the chimney base, the economiser chamber, and the coal/ash conveyor opening in the north wall – provide evidence of past usage.

In 1917/18 *Midland Railway Workshops* began receiving high-voltage power from East Perth Power Station, and the generators were removed from the Powerhouse in 1918. In 1923/24, new equipment was introduced into the building to accommodate conversion to compressed air. The compressors (a Sentinel and a Crossley-Reavell) are still in place. It was around this time that the Boiler House was converted into a Copper Shop.

The Powerhouse is in very good condition, showing evidence of regular maintenance. The Boiler Room/Copper Shop requires maintenance. The Powerhouse has a high degree of integrity in remaining original fabric and highly intact 1920s equipment. The Boiler Room/Copper Shop does not retain sufficient original fabric to contain its original use. The Powerhouse has a very high degree of authenticity in original fabric and function. The Boiler Room/Copper Shop retains little evidence of its original function, but does reflect changes in use and technology over time.

Electrical Shop (fmr Tarpaulin Shop) (1904)

Medium sized rectangular brick building with a gabled roof. Extensive original detail including louvres to window openings and timber doors. Finely detailed interior with balcony. Framed lean-to additions to the south. Originally used for the manufacture of tarpaulins for covering open wagons. Later used for manufacture and maintenance of electrical items.

The remaining original fabric is in good condition, but requires regular maintenance. The building has a good degree of integrity in its remaining original fabric. The building has a high degree of authenticity in the remaining original fabric.

Block 1 (1904, 1912)

Originally built as the carriage shop, wagon shop, and saw mill. However, there have been many changes in equipment and basic layout. Rectangular brick structure with a steel structural frame supporting a sawtooth roof structure with glazed roof lights. The building is orientated east-west with access for the trains from the west. The northern bays contain inspection pits for working on locomotives, while the south bay has a timber floor with underfloor extraction system. The Carriage Shop occupied most of the building with the Woodworking Shop and Saw Doctor located in the southern bay. Original galvanised iron sheeted roof remains in part of 1904 section with remainder replaced with asbestos cement roof.

In the west elevation there are three large double doors (4.8m high, 3m wide) in the three north bays, and a further one in the south bay. There are two pedestrian doors adjacent to each engaged pier in each bay. The north elevation has five doors, and each spandrel contains a two-section window surmounted by an arched head. The steel-framed window has three six-pane panels in the lower section, all of which can pivot around a central point, while the upper section, which is fixed, has 36 panes. The remaining timber doors and iron window frames show interesting detail typically found in earlier buildings on the site.

The original concrete pits in bays 1-3 remain unaltered. An original overhead crane remains in bay 3; other bays have more recent examples. The sawmill contains examples of early workbenches and equipment for working.

The condition is generally good, but requires some repair and regular maintenance. The place has a high degree of integrity, for both original fabric and significant equipment. Authenticity is high for both original fabric and original function.

Block 2 (1904, 1910, 1946)

Block 2 has retained its original use as boiler and blacksmith shop. It was extended east in 1910 to double its original size. This extension incorporated the Forge, which was constructed in 1904 as a separate building. The direction of saw-tooth roof glazing was changed from east to south facing in the 1910 extension. The original galvanised-iron sheeted roof was replaced with asbestos cement roof with ventilated ridges over the smith area in 1946. Alterations to foreman's offices, equipment and flues have been made since this time. Internally, there are recent concrete floors throughout, although sand remains in the smith area.

Constructed of brick with steel column and roof truss structure, when constructed, Block 2 had a riveting room with a gable roof raised some four metres above the saw-tooth roof. This allowed the massive cast iron framed riveting machine to be installed and operated.

Block 2 originally housed the hydraulic machinery in bay 1, the boiler shop in bay 2, while bays 3 and 4 contained the blacksmith shop. The hydraulic machinery has since been removed, and both the boiler shop and blacksmith shop now occupy two bays. Some of the hydraulic machinery was reinstalled in the flanging shop. An external boiler in the 1904 building presumably supplied a local source of steam to the arch hammer, rather than piping steam from the Powerhouse. However the single-sided, clear-space steam hammers, introduced 1911-13, appear to have been installed to run on steam piped from the Powerhouse boilers. Possibly the original boiler could not produce enough steam for all the hammers. After the Powerhouse generators shut down in 1917/18, the Powerhouse boilers were kept going for several years to supply the hammers. Later, some of the boilers were relocated to outside the east end of the Blacksmith's Shop to provide steam for the hammers. There are large round holes in the east wall, presumably for steam pipes from boiler to hammer. Later still, the boilers were removed, and the hammers were modified slightly to run on compressed air from the Powerhouse compressors.

Bays 3 and 4 of Block 2 were originally planned as a Smithy to hold 54 (later 68) blacksmith's hearths or forges. There, blacksmiths would heat pieces of steel in coke fires and shape the hot metal on anvils by traditional manual techniques using hand-held hammers. By 1993, all but one of the 68 blacksmiths' hearths had been removed. Most of the traditional blacksmiths' hand tools had also been scrapped, although a few remained in 1993.

In February 2006, work was underway to replace the asbestos sheet roof with corrugated iron, and to make a number of other minor additional repairs.

Block 2 contains other significant large equipment, as detailed in the Doring report.

The condition of the original fabric and later additions is good, but requires repair and regular maintenance. The building has a high degree of integrity, retaining both much original fabric and significant equipment. There is a high degree of authenticity in original fabric, equipment and original function.

Block 3 (1904, 1910, 1940, 1956, 1965)

Similar to Block 2, constructed of brick with steel columns and roof truss structure, supporting a sawtooth roof with glazed roof lights. Original building included a brick copper shop annexe on the south wall, and has retained its

original use as machine and erecting shop. Original galvanised-iron sheeted roof was replaced with asbestos cement roof. The 1910 extension, which doubled the size of Block 3, is largely intact except for the east wall. Further extensions were made to the east in 1940 and additions along south wall for diesel locomotive repairs in 1956. There is evidence of the original south wall viewed from the 1956 annexe of the original copper shop and rumbler shed rooflines. Alterations for dual gauge occurred in 1965. Internally, there are concrete floors throughout but original inspection pits remain. Original overhead cranes remain in bays 1 and 2, and Block 3 contains various large pieces of equipment as detailed in Doring report.

Remaining original fabric and later additions are in good condition, but require some repair and regular maintenance. There is a high degree of integrity in remaining original fabric and equipment. There is a high degree of authenticity in original fabric, equipment, original function, and evidence of changes of demand and technology.

Weighbridge (1904)

Constructed of timber stud framing with timber roof truss structure and a ventilated ridge. Weighed, checked and adjusted axle load distribution of locomotives, to ensure proper traction. The Weighbridge contains the original Fairbanks Locomotive Weighbridge relocated from Fremantle to Midland when the Workshops opened here in 1904. Was used until 1950s when diesel locomotives were introduced. The pit containing the weighbridge was subsequently boarded over and the building used as a carpentry shop.

The Weighbridge is in good condition, but requires regular maintenance. The retention of the original machinery is essential to retain the integrity of the building. The building has a high degree of authenticity in the remaining original fabric and function.

Main Conduit (1904)

Underground tunnel running north-south from the entrance to the river with an access point in the Powerhouse, where the Conduit is reached from a flight of brick steps located in the centre of that building. Contains hydraulic, electrical and pneumatic mains servicing the Workshops.

Flanging Shop (fmr Paint Shop) (1910)

The building is constructed of brick with a steel roof truss structure. The original galvanised iron roof sheeting has been replaced with an asbestos cement roof. Some remaining iron window frames from the 1910 building are typical of the window opening details found in earlier buildings on the site. Internally, the floors are concrete with some areas of more recently laid concrete slabs. Walls of fair face brick work are largely as originally constructed.

Evidence of the raising of the original roof in 1942 to accommodate overhead cranes can be observed. The fabric also retains evidence of all of the periods of construction from the 1910 building to post-WWII alterations.

MRW Personnel Peace Memorial and Garden (1925)

Consisting of a symbolic bronze female figure surmounting a classical stone column (Grecian Ionic, consisting of a chamfered plinth, die and cap, square

base moulding, shaft and Ionic cap) on a granite base consisting of three steps, the Memorial is a large stone obelisk on a four-tiered base with bronze statue affixed to the top. The draped female figure stands upon a sphere, which surmounts the granite column; the right hand is raised, the left one holds a palm leaf; the head is crowned with a wreath of laurel, and the left foot is trampling upon a sword.

A flagpole and rose beds are located on either side of the memorial. However, none of the original planting of the gardens surrounding the memorial now exists, although the layout remains intact. The wrought iron fence around the memorial is intact and is an integral part of the memorial site. A round marble plaque is situated on the northern side of the base of the memorial. Bronze plaques, which include the names of the fallen, are affixed to all four faces of the memorial, reading:

- In enduring commemoration of the loyalty, devotion and sacrifice of Workshop comrades who fell in the Great War 1914 to 1918. 'These our glorious dead'. Erected by their fellow employees;
- World War II. 1939 to 1945; and,
- In memory of our fallen comrades from Railway Workshops Sub-branch RSSAILA [Returned Sailors, Soldiers and Airmen's Imperial League of Australia].

Porcelli's design and its symbolism – the use of a female figure standing on a globe to represent Peace – is unique in Australian war memorials.

The site is still used for ANZAC Day services, despite a short let-up in the late 1990s.

Flagpole (1916, 1924)

Approximately twenty metres high, it was originally installed in 1916 outside the CME's Office but was moved to the western end of Block 1 in 1924. The flagpole was used to fly the national flag and other significant flags for ceremonial purposes. It was lowered to half-mast to recognise the passing of former workers with an explanatory note placed in a display case erected for this purpose near the base of the pole.

The area in front of the flagpole is an open space suitable for large assemblies of people and was used for union stop-work meetings, significant announcements and political rallies. These meetings were referred to as 'Flagpole Meetings'. The announcement of the closure of the Workshops was made at a flagpole meeting on 28 April 1993.

Gatekeeper's Office (fmr Receiving Shop) (1924)

Timber framed, weatherboard clad, rectangular building with a corrugated iron gabled roof. Formerly the Receiving Shop, it was relocated in 1924 from the eastern side of the main entrance, to the northern access point.

Time Keeper's Office (1924, c.1950)

Timber framed, weatherboard clad, rectangular building with a tiled hipped and gabled roof. Built to replace the Receiving Shop, it contained the staff time clocks and was extended c.1950. The original time office was located east of the CME's and was relocated, along with the Laboratory, to make way for the Peace Memorial and Gardens in 1924. A new Time Keeper's Office

was built further east and, later, a second Time Office No 2 was built even further to the east.

The key feature of the Time Keeper's Office was a number of docket boards with rows of numbers and hooks. Each employee was assigned a number which was stamped on a metal docket, the principal one of which was a circular brass disc about 25mm in diameter. The disc was hung on the hook corresponding to the number. On arrival, the employee took his docket and placed it on a sub-board in his shop. At the end of the day, the process was reversed with the docket going back on the hook in the Time Office.

In 2005, the Time Keeper's Office was converted into the site's public Interpretation Centre.

Foundry (1904, 1912, 1941-42, 1958, 1964)

For detailed analysis of the Foundry, see 'Midland Railway Workshops Foundry: Conservation Plan' prepared by Nerida Moredoundt and Julie de Jong, Palassis Architects, with Wayne Moredoundt, Historian, and Godden Mackay Logan, Industrial Archaeologists, for Midland Redevelopment Authority in March 2005.

The Foundry, a large single-storey brick and asbestos industrial building, in the Federation Warehouse style, has a long rectangular form, with gabled roof and curved roof monitor. It was originally a brick masonry building to house the cupolas and casting floors. It had a gabled roof sheaved in corrugated iron, which was penetrated with skylights and fitted with metal louvres for ventilation. The east end of the Foundry was not completed with brick as it was planned to extend in that direction as the need arose. However, the Foundry has been greatly altered and added to over time to allow the installation of larger machinery and for the removal of redundant pieces. The building has been changed more than any other on site, and the original 1904 fabric comprises only a proportion of the present building.

The Foundry is generally in good condition, although there is a need for general repairs and maintenance. The equipment and machinery is generally in good condition, although again lacks maintenance. The operating capacity of the machinery is unknown. The Foundry has a high degree of integrity, functioning as a workshop from its construction in 1904 to closure in 1994. The majority of the equipment associated with its function is still in situ. The Foundry has a moderate degree of authenticity, being the most altered of the original buildings on the *Midland Railway Workshops* site. The earlier brick sections are generally intact beneath accretions, but former openings have been bricked in, the roof and walls have been raised, timber doors replaced with roller-shutters, galvanised iron roof has been replaced with corrugated asbestos, and earth floors sealed with concrete. The machinery has a high degree of authenticity.

Pattern Store (fmr Tank Building, Electrical Shop) (1904, 1923)

Tank Building is constructed of brick with simple detailing. Electrical Shop addition is constructed of timber stud framing with timber roof truss structure. Used as Electrical Store from 1923 and Pattern Store from 1942. A framed structure linking the building to the Pattern Shop was constructed in the 1950s.

The remaining original fabric is in fair condition. The building has a low degree of integrity, having lost its original function and having been adapted to alternative uses. The tank building retains original fabric and detail, but the timber building has suffered loss of both fabric and function.

Main Store (1904)

Narrow rectangular building parallel to Block 3. Brick structure with gabled roof. Steel framed extension on the southern side. Previously linked to Oil Store, a smaller brick building located to the east. Used for storage of items manufactured on site.

Ambulance Building (fmr Timer Keeper's Office) (1924)

Timber framed, weatherboard clad, rectangular building with a corrugated galvanised iron roof with timber finials. Weatherboard extension on the north side and fibro extension on the west. Located at the eastern end of the Pattern Shop, it came into being in 1924, constructed from the materials from the original Timekeeper's Office, which was removed to make way for the Memorial to Fallen Soldiers. It contained reasonably well equipped first aid rooms and specialised technology for hearing and vision testing. The first aid station was staffed by a qualified nursing sister from 1924 until 1950 when Workshops staff took over responsibility.

Elevated Tank (1904)

Constructed of steel railway rails riveted together to form columns and preformed iron plates riveted to form the sides of the tank. It provided water for steam locomotives, then storage of diesel fuel from the 1960s.

The Tank is in fair condition, but there is evidence of rust and leakage. The Tank has the potential to retain its integrity if appropriate interpretation is used in any new development. The Tank has a high degree of authenticity in the remaining original fabric and function.

Compressed Air Tanks (c.1920)

Erected in current position in 1920, but may have been relocated from the Boiler House. Used for storing compressed air for power.

Hot and Cold Wells (1904)

Large concrete lined wells, with steel safety rails and associated machinery. Provided a cooling system for condensers serving the generators in the Power House. Later used for cooling the air compressors.

Underwater Coal Storage Dam (1895, 1944, 1947)

Substantial water body with remnant timber structures related to the former coal storage use. These structures are evident above ground and around the perimeter of the dam.

The dam and relics of previous uses can be seen above ground, but no parts are in operating condition. One of the first structures on the site, it has been adapted to different functions in response to changing technology and the phasing out of former uses. Recently, it has had a number of interpretative pieces installed in and around the dam. The Underwater Coal Storage Dam has become an ornamental lake adjacent to residential redevelopment.

Laboratory (1925, 1942)

Constructed of brick with timber roof truss structure and terracotta Marseilles pattern roof tiles. Used for metal and chemical testing, including testing of Collie coal. The original laboratory was a timber building to the east of the CME's building which was removed in 1924 to make way for the Peace Memorial and gardens. It was replaced by the brick building to the west of the CME's Office and doubled in size in 1942 because of the amount of work being carried out for the war effort.

The Laboratory is in fair condition, but requires regular maintenance. The building has a high degree of integrity. Capable of being retained and adapted without loss of significance. The building has a high degree of authenticity, despite alterations.

Elements Shop (fmr Copper Shop) (c.1910)

Rectangular structure clad with timber weatherboards to the north, east and west elevations and corrugated iron to the east. Corrugated iron roof with lantern roof light along the roof ridge line. Timber framed windows, some of which have been replaced.

Old Plating Shop (1946)

Timber structure with timber roof trusses, linked by a covered way to the New Plating Shop. Roof has ridge roof light. Skillion roofed section links the building to the Old Tarpaulin Shop.

Supply Shed 1 (c.1971)

Corrugated galvanised iron shed with concrete floor and ventilated roof, steel curved frame. Some panels are white translucent sheeting. Suspended lights. Used for storing supplies.

Supply Shed 2 (1940s)

Rectangular corrugated galvanised iron-clad shed with gabled roof. There are sliding corrugated galvanised iron doors to the west end of the north elevation, and a small timber-framed enclosure on the north-eastern side. The rear (south) side of the shed is an earlier construction, with a timber frame, timber posts and timber roof trusses. There are timber framed windows with small paned sashes and pendant light fittings. This section of the shed is probably relocated from somewhere else.

Overhead Bridge (c.1966)

Steel-framed pedestrian walkway located immediately north of Block 1, providing access across the railway to link the Workshops with Midland town centre.

Apprenticeship Buildings

Four attached timber-framed buildings, constructed of half timber and half flat asbestos sheeting. Corrugated asbestos gabled roof and timber-framed windows. There is also a small brick toilet.

Safety Building

Single-storey timber-framed, weatherboard-clad building with gabled roof clad with corrugated galvanised iron sheet with a roof vent. Windows have timber shutter and vents to top sections. Some windows have been replaced. A small building west of Block 1, situated adjacent to the Recreation Hall and the Canteen. It housed the Safety Officer and a small classroom for first aid training. The role of the Safety Officer was to implement safety policies and to investigate issues raised by the workforce about a particular machine or practice and could recommend changes.

Ambulance Garage

A rectangular gabled-roofed garage with recent weatherboard profile wall cladding, Colorbond roof and roller shutter door.

Workers' Wall (2003)

A wall built of bricks carrying the names of Railway Workshops workers, located at the entry to the site, near the former Time Keeper's Office.

Verge Sculptures (2002)

Commissioned by the MRA, executed by Kath Wheatley, these are a series of figures, in twos and threes, made of recycled material from the Workshops combined with new steel, and are sandblasted and galvanised. The figures are installed on the verges of Yelverton Drive, linking the Amherst Road roundabout to the Lloyd Street intersection.

Buildings not retained (for information only):

Works Management Centre (fmr Tool Room) (1942, 1980s): Timber framed, asbestos flat sheet and timber weatherboard clad, corrugated asbestos roofed, single-storey building with timber framed window awnings and prominent vents to the roof ridge. The Tool Room was built in 1942 to service the increased need for tools for the munitions annex during WWII. After the war, it continued to manufacture tools and gauges that would not be sourced elsewhere, not only for the railways but also for other government enterprises. In the 1980s it was converted to office accommodation for the Works Manager and staff.

Recreation Hall (1941): Staff dining room, originally linked to the 1937 canteen, which is also no longer extant. Single-storey, timber framed, corrugated iron clad, gabled roofed building. Internally, walls are lined with tongue and groove timber panelling to dado height with plasterboard above. Windows are double-hung sash and doors are kedged and braced timber.

Canteen (1950): Brick and tiled, single-storey building with timber framed double-hung sash windows with horizontal mullions, and render to entry porches. Original covered link to dining room has been removed. The Canteen was opened in 1953, replacing a small canteen built in 1939. Full meals, tobacco and drinks as well as takeaway food were available from the Canteen. It closed in 1993, some months before the Workshops.

Panel Shop (1970s): Timber-framed, corrugated iron and asbestos cement sheet clad, gabled roofed shed with recent steel-framed open section to the eastern end. A place of light metalworking as an extension of the copper

shop, the building is believed to have been relocated from the former Midland Railway Company, which was located north of the Workshops. The Midland Railway Company was a private company that operated the railway line from Midland to Geraldton until 1964 when the Government acquired it. The MRC site became a shopping centre in 1971.

Annealing Furnace: Steel framed, asbestos clad shed with open ends.

Store near Foundry: Corrugated asbestos cement clad shed with asbestos roof, timber window frames and doors.

Old Sand Shed: Open timber-framed structure with corrugated galvanised iron roof, timber trusses and timber lining to the east end.

Toilets: Located north-east of Pattern Shop, west of Block 2. Brick toilet block with flat metal roof with deep matching fascia.

Blacksmiths' Tools Shed: Steel and timber-framed enclosure with cyclone mesh sides and a corrugated galvanised iron hipped roof.

Radiator Shop: Timber-framed asbestos flat sheet and corrugated galvanised iron clad structure with a hipped corrugated galvanised iron roof. The building resembled a small house in form and proportions.

Fuel Shed: Steel-framed shed open on three sides. Concrete floor with railway track.

Electrical Store: Steel framed and clad shed with flat roof and deep fascia.

Electrical Shop: Single-storey steel framed and clad shed with flat roof and deep fascia.

New Plating Shop: Corrugated asbestos clad sawtooth roof shed, with a steel and timber frame.

Supply Shed 3: Rectangular shed with gabled roof and skillion section on the western side. Corrugated galvanised iron clad walls and corrugated galvanised iron double doors to the north and south side. The frame comprised of steel circular posts with a timber frame to the skillion lean-to.

Supply Shed 4: Rectangular corrugated galvanised iron-clad shed with gabled roof and concrete floor. The north elevation had a pair of sliding, flat sheet iron doors. There were timber-framed windows with various styles of obscure glass to the south, east and west elevations.

Supply Shed 5: Rectangular corrugated galvanised iron clad shed with gabled roof and concrete floor. There were pairs of casement windows to the east and west elevations. The south elevation had a pair of timber doors.

Supply Shed 6: Four bay, steel framed, corrugated galvanised iron-clad shed with a sawtooth roof, wired glass skylights facing south and a concrete floor. There was a timber ledged and braced door to the south elevation, a brick enclosure in the south-east corner, a timber and glass office enclosure in the north-west corner, and timber panelled doors in the north elevation.

Supply Shed 7: Steel framed, corrugated galvanised iron-clad shed with a sawtooth corrugated galvanised iron roof with fibreglass skylights facing south. There were three bays and a concrete slab floor.

Annexe to Main Store: Timber-framed rectangular structure clad with corrugated asbestos cement sheet. Hipped shallow pitched roof.

Old Wash Shed: Steel framed with metal cladding to walls and roof. Rail access through building for cleaning locomotives.

Old Sandblasting Shed: Steel framed open-ended structure with corrugated galvanised iron wall cladding to sides and roof. Rail access through building.

Water Treatment Plant: Various structures including asbestos cement clad elevated building with skillion roof and various concrete tanks behind a cyclone mesh fence.

Loco Test Building: Steel-framed open-ended structure with corrugated galvanised iron wall cladding to sides and roof. Rail access through building.

Asbestos Building: Part of Water Treatment Plant group. Rectangular asbestos cement sheet clad building with gabled corrugated asbestos cement roof, which had two vents.

Bike Shed: Timber-framed weatherboard and asbestos flat sheet clad bike store, with hipped corrugated asbestos clad roof and concrete floor. Prior to the 1950s, the ownership of a car was uncommon among blue-collar workers. Those that didn't travel to work by train frequently rode bicycles. Such were the numbers of bikes that purpose built sheds were provided to store them. When motorbikes became popular, these also occupied the bike sheds.

A story circulated among employees regarding the bike sheds: A young coppersmith complained that pushbikes in the bike shed were damaging his new motorbike and asked permission to bring it inside for minor repairs. When the motorbike left that afternoon, it had the addition, unknown to management, of a brand new sidecar.⁵⁹

Sheds A, B, C, D, E, F, & G: Various sheds, constructed of asbestos, corrugated iron, and various cladding materials.

Toilets A, B, C, & D: Brick buildings with metal roofs. From inception until 1986 the toilets in the Workshops were staffed and toilet visits timed. In each toilet was a small office where the attendant sat. Upon entering, the employee would give his number to the attendant and the time noted. If the toilet visit took longer than eight minutes, pay would be docked. The attendants were mostly disabled workers who supplemented their income by selling lottery tickets, cigarettes and sweets.⁶⁰

Steel Awning: Located at the south-eastern corner of Foundry, a steel frame with open sides and a flat steel roof.

Supply Division Receiving Section Depot: Timber-framed shed with a skillion roof structure and a concrete slab floor. There were three, nine-pane timber-framed windows to the south elevation and asbestos cladding to walls and roof.

Brick Building: Located on the northern side of Montreal Road, opposite entrance to site. A rectangular brick building with hipped tiled roof, timber-framed window and timber doors. Stored telecommunications equipment.

59 <http://www.mcc.murdoch.edu.au/midland/>

60 <http://www.mcc.murdoch.edu.au/midland/>

Concrete Structure: Located east of Store near Foundry, used for storage of gas bottles.

Old Tarpaulin Shop Shed: Rectangular corrugated-iron shed with flat roof.

Sewerage System (1904): Third Sewerage system constructed in WA, after Government House and North Fremantle.

Hydraulic Accumulator (1949): Operated hydraulic system in Flanging Shop.

Shunting Yard (1904): Main area for manoeuvring locomotives.

Assessment of significance⁶¹

The following provides a summary of the significance levels and appropriate recommendations for conservation for buildings and site elements.

Generally buildings of exceptional significance not only are of exceptional aesthetic or architectural value but also contain items of significant equipment. Buildings of considerable significance do not contain significant equipment and have undergone greater adaptation over the time span of the workshops. Buildings of some significance may not be of great architectural value but have contributed in some way to the development of the workshops either through social, historic or scientific associations. Buildings of little significance have little heritage value but formed an integral part of the developing workshop site. For this reason no items have been assessed as intrusive as all have contributed to the working site.

The site has been altered over time with the introduction of new structures which relate to the industrial process but which in most cases individually are not of the same aesthetic value as the earlier buildings. Whilst together they represent the evolution of the site over time, the removal of some of these structures would not reduce the significance of the place.

Exceptional Significance: CME's Office (1904); Railway Institute (1912); Pattern Shop (1904); Powerhouse (1904, 1912); Electrical Shop (fmr Tarpaulin Shop, 1904); Block 1 (1904, 1912); Block 2 including Forge (1904, 1913); Block 3 (1904, 1913); Weighbridge (1904); Main Conduit (1904); Flanging Shop (fmr Paint Shop, 1910); War Memorial & Garden (1925)

Considerable significance: Gatekeeper's Office (fmr Receiving Shop, 1924); Time Keeper's Office (1924); Foundry (1904, 1912); Pattern Store Shop (fmr Tank Building & Electrical, 1904, 1922); Copper Shop (fmr Boiler House, 1904); Main Store (1904); Ambulance Room (fmr Receiving Office, 1904); Flagpole (WWI); Elevated Tank (1904); Compressed Air Tanks (1920s); Hot and Cold Wells; Underwater Coal Storage Dam (1895, 1947)

Some Significance: Extension to CME's Office (1963); Laboratory (1924); Works Management Centre (fmr Tools Shop, 1942); Canteen (1950); Recreation Hall (fmr Dining Room, 1941); Elements Shop (fmr Copper Shop, c.1910); Old Plating Shop (1946); Overhead Bridge (c.1966)

Little Significance: Apprenticeship Buildings; Safety Building; Panel Shop (former MRC Building); Ambulance Garage

⁶¹ Levels of significance taken from *Heritage Strategy for the Midland Central Redevelopment Area* (August 2004)

Intrusive: Nil

13.3 COMPARATIVE INFORMATION

Midland Railway Workshops were created to maintain and construct steam locomotives, carriages, wagons, tracks, signals and station furniture for the Western Australian Government Railways. All States had railway workshops to construct and maintain their rail systems. These included: Eveleigh Workshops, Sydney; Ipswich Workshops, Queensland; Launceston Railway Workshops, Tasmania; Newport Workshops, Melbourne; and Islington Workshops, Adelaide.

As steam locomotive technology was phased out, many of the workshops established to build and maintain the locomotives became redundant. Most were closed or redeveloped in the 1970s and 1980s. Eveleigh and Launceston were completely shut down; the heavy industrial operations for Ipswich were moved to Redbank Workshops, Queensland; foundry operations were discontinued at Islington; and Newport underwent substantial alteration for electric and diesel operations, with the original sections closed.

Eveleigh Railway Workshops, the oldest intact large operating railway complex in NSW, contains fine examples of late 19th and early 20th century industrial building. Originally conceived in 1872, the site shows industrial development from the 1880s to the present day. The 19th century buildings display precisely detailed brickwork, strong period character and elegantly defined facades. The steel trussed roofs resting on cast iron columns in the locomotive and carriage workshops form two of the largest continuously covered 19th century industrial spaces in Australia. Eveleigh Workshops contain the last surviving 19th century technology relics such as the steam powered pumps which operate the hydraulic system in the locomotive shops, the massive guillotine, the steam powered air compressors and the massive Davey press. Individual machines such as rollers, stampers, the electric cams and early woodworking machinery are unique in a single industrial complex.

Ipswich Railway Workshop Complex, was the largest railway workshop in Queensland. It also possesses what is believed to be the last operating carriage/locomotive traverser in eastern Australia. The Complex dates from the late 19th and early 20th centuries and consists of a 22ha area containing an array of industrial structures such as workshops and a powerhouse. It is important as an example of an early 20th century railway workshop, which was regarded in its time as a model for the smaller decentralised workshops throughout Queensland. As a complex of several industrial brick buildings, the place has an aesthetic value due to the homogeneity of architectural style and building fabric, and the rhythm of the high wide arches aligned on either side of the central traverser tracks.

Launceston Railway Workshops contains individual buildings and groups of buildings developed from 1875 to the 1950s. The Tramways Workshops group of buildings provide evidence of the operations of the Launceston Municipal Tramways Workshops and the group of WWII Industrial Annexes provide evidence of the establishment of wartime industries in Launceston. The Main Workshop group, Diesel Workshops group and Traverser Alleyway are significant for providing evidence of a wide range of railway engineering techniques. The Carpenters Shop group, Blacksmith/Forge Shop, Paint Shop group, Fibreglass Shop group, Sheet, Panel and Wheel Shop group of

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buildings, and the Foundry, are significant for providing evidence of early railway trades including blacksmithing, carpentry, boiler making, carriage and wagon construction and maintenance which are now rare. The Diesel Workshops group was Australia's first facility for the conversion of railways to diesel power. The Main Workshops (1923) construction of reinforced concrete is indicative of a high level of technical innovation at the Launceston Railway Workshops.

Newport Railway Workshops is a sprawling complex of buildings that served as the principal construction and maintenance workshops for the Victorian railway system for a century. The original workshops were built in 1888, and modelled on the best British railway workshops. Flanking a central Italianate clock tower, the two main wings had masonry external walls and a primary internal structure of steel and cast iron. Timber was used only in well-detailed trussed roof purlins and rafters. Coincident with this central complex, a large tarpaulin shop was constructed. As the tarpaulins had to be hung inside the shop, the roof of the building is high and the internal timber construction lavish. Most extensions were south lit sawtooth buildings, constructed to an apparently standard design. These had large open workspaces, good working light and were built extensively until at least the 1930s. Railway maintenance at Newport is now restricted to the newest buildings on the site and the bulk of the complex has been turned over to other uses.

Islington Railway Workshops was one of the most important industrial complexes in South Australia during the late 19th century. A major upgrade of equipment and processes in 1925-27 resulted in the Islington Railway Workshops being reinstated as one of the major engineering workshops in the Southern Hemisphere and one of South Australia's most significant industrial complexes. The Workshops Group is significant for its continuity of use as a railway engineering complex from 1891 to the present. The six buildings in the Workshops Group reflect a relatively uniform architectural style and method of construction, including sandstone and brick quoins and dressings, gabled galvanised iron roof and windows featuring arched heads with a keystone. The workshop buildings in particular illustrate a utilitarian style of construction typical of engineering workshops of the period, with brick pilasters to provide relief to the external walls, double timber doors, large open internal spaces and exposed timber trusses.

Railway Workshops, Rockhampton, Qld includes the roundhouse, workshop buildings, tracks and other buildings, spread over a large area. The Rockhampton Roundhouse is significant as the only example of a full circle roundhouse constructed in Queensland, and, as one of only two examples still extant in Australia, it is significant as a rare example of this type of structure. The building consists of stalls in a covered environment, inspection pits, centrally located locomotive turning facility, storage roads radiating from a central point, and boiler washout facility. With steel frames, concrete floors and corrugated iron cladding, the former machine shop and the former electricians' shop are significant as examples of standard Queensland Railway designs. The former carriage repair shop and the former paint shop have timber columns, steel roof trusses, corrugated galvanised iron cladding and concrete floor.

Each State in Australia had its own railway workshops, and *Midland Railway Workshops* is representative of Australian major sites of railway construction and maintenance.

13. 4 KEY REFERENCES

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13. 5 FURTHER RESEARCH
