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)

- 3.2 Constructing capital city economies
- 3.13 Developing an Australian manufacturing capacity
- 3.14 Developing and engineering and construction industry
- 4.1 Planning urban settlements
- 4.2 Supplying urban services (power)
- 5 Working
- 7.6 Administering Australia
- 7.8 Establishing regional and local identity

HERITAGE COUNCIL OF WESTERN AUSTRALIA THEME(S)

- 108 Government policy
- 112 Technology and technological change
- 308 Commercial services and industries
- 310 Manufacturing and processing
- 401 Government and politics
- 402 Education and science
- 404 Community services and utilities
- 507 Water, power , major transport routes

11. 1 AESTHETIC VALUE*

No. 2 Substation, Murray Street is a good example of a utilitarian building designed in the Federation Free Classical style to fit within a city streetscape. (Criteria 1.1 & 1.3)

The J & E Ledger cast iron staircase at *No. 2 Substation, Murray Street* is a good example of decorative ironwork for an industrial purpose. (Criterion 1.1)

---

* For consistency, all references to architectural style are taken from Apperly, R., Irving, R., Reynolds, P. *A Pictorial Guide to Identifying Australian Architecture. Styles and Terms from 1788 to the Present,* Angus and Robertson, North Ryde, 1989.

For consistency, all references to garden and landscape types and styles are taken from Ramsay, J. *Parks, Gardens and Special Trees: A Classification and Assessment Method for the Register of the National Estate,* Australian Government Publishing Service, Canberra, 1991, with additional reference to Richards, O. *Theoretical Framework for Designed Landscapes in WA*, unpublished report, 1997.

No. 2 Substation, Murray Street contributes to the historic King Street Precinct, a highly intact city street of predominantly multi-storey brick commercial buildings in Federation-era architectural styles, dating from the late nineteenth and early twentieth centuries. (Criterion 1.4)

11. 2. HISTORIC VALUE

No. 2 Substation, Murray Street was constructed in 1914 as part of changes to the electricity system of Perth in response to its rapidly increasing population. (Criterion 2.1)

No. 2 Substation, Murray Street was one of four electricity substations constructed by Perth City Council to operate in conjunction with the new East Perth Power Station (1916), the first centralised electricity supply in Perth, and continued to operate as an electricity substation into the twenty-first century. (Criterion 2.2)

The Perth City Council's unwillingness to completely relinquish control of electricity production and distribution for their locality is illustrated in the physical fabric of *No. 2 Substation, Murray Street*, which originally featured the name Perth City Council in the entablature, despite having been built as part of a State Government centralised electricity scheme. (Criterion 2.2)

The erection of *No. 2 Substation, Murray Street* and installation of the plant was supervised by Merz & McLellan. Merz & McLellan, particularly Charles McLellan, were advisers to the City of Perth and the State Government regarding electricity production and were significant in the decision to centralise and change to alternating rather than direct current. (Criterion 2.3)

11. 3. SCIENTIFIC VALUE

Although the machinery has been entirely removed, the interior layout of the place and its history have potential to inform an understanding of electricity production in this State. (Criterion 3.2)

11. 4. SOCIAL VALUE

No. 2 Substation, Murray Street contributes to the community's sense of place as part of the historic King Street Precinct, as recognised by the heritage listings of this precinct. (Criterion 4.2)

12. DEGREE OF SIGNIFICANCE

12. 1. RARITY

No. 2 Substation, Murray Street demonstrates the practice of constructing attractive industrial buildings to be situated amongst commercial and other public spaces, which is no longer common practice. (Criterion 5.2)

12. 2 REPRESENTATIVENESS

No. 2 Substation, Murray Street is a good representative example of substations constructed in the early twentieth century, particularly those associated with the 1916 East Perth Power Station. (Criterion 6.1)

The J & E Ledger spiral staircase at *No. 2 Substation, Murray Street* appears to be a good example of a formerly common internal building feature, with a high level of detailing in the ironwork. (Criterion 6.1)

12. 3 CONDITION

No. 2 Substation, Murray Street building fabric is in sound structural condition. Internal finishes are deteriorating and the building has suffered some vandalism since being vacated.

12. 4 INTEGRITY

All plant and equipment has been removed from *No. 2 Substation, Murray Street*, but the layout of the substation remains. Internal physical fabric retains characteristics demonstrating use as an electricity substation. Although some changes from the original 1914 layout are evident, these are presumed to have been in relation to its only active use, that of a substation. Overall the integrity of the place is moderate.

12.5 AUTHENTICITY

The external fabric of *No. 2 Substation, Murray Street* largely retains its original form and detail, although windows have been bricked in (ground floor) or replaced (first floor) and the first floor balcony enclosed. No plant or equipment remains within the building and some internal openings have been altered. Overall the authenticity of the place is moderate.

13. SUPPORTING EVIDENCE

The documentary evidence was completed by Clare Menck, Historian, in November 2008, with amendments and/or additions by State Heritage Office staff and the Register Committee.

The physical evidence has been extracted from the heritage assessment for *No. 2 Electric Light Sub-Station 1914 and Murray Mews,* completed by Ronald Bodycoat, Heritage Architect, in March 2008, with amendments and/or additions by State Heritage Office staff and the Register Committee.

13. 1 DOCUMENTARY EVIDENCE

The following contextual sections in italics have been taken from the heritage assessment completed by Ronald Bodycoat, Heritage Architect, in March 2008, and draw on research undertaken for the Central Perth Precinct in 2002 prepared by Kristy Bizzaca.

Brief Historical Overview of Perth

The development of Perth was hugely impacted by the discovery of gold in the Kimberley, Murchison and Kalgoorlie regions in the 1880s and 1890s, and the concurrent granting of Responsible Government to Western Australia in 1890.[1] *The physical nature of the city changed dramatically with economic prosperity and the increase of population as a result of gold rush immigration.*

---

1 Stannage, C. T., *The People of Perth: A Social History of Western Australia's Capital City, City of Perth* (Perth, 1979), p. 193; Seddon, G., & D. Ravine, *A City and its Setting* (Fremantle, 1986), pp. 146-47

By the turn of the twentieth century, Perth was totally transformed. Its streets became lined with elaborately styled multi-storey buildings, many of which were the design of a now large architectural profession, and developing suburbs surrounded the city.[2]

Due to the completion of the Fremantle to Guildford railway in 1881 and the later construction of the tramway system extending to the outer suburbs in 1899, Perth become the focus of the growing metropolitan area.[3] *With the central railway station to the north of the town site and the Government domain to the south, the area in between was consolidated as the commercial and retail centre of Perth.*[4] *Banks, insurance buildings, and professional and commercial offices were constructed along St. Georges Terrace, and businesses, shops and warehouses were established in Murray, Hay and Wellington Streets.*[5] *A number of hotels and theatres were built in this central area and large emporiums such as Foy & Gibson's and Sandover's emerged along the tram route and the existing shopping strip of Hay Street.*[6]

Development of Murray Street

Historically, Murray Street has developed in two distinguishable parts. The first of these being the central retail and commercial district bounded by Hay and Murray Streets and William and Barrack Streets and to the east to Pier Street, which underwent major building activity in the Gold Boom period. Older buildings in this section date from the Federation/Late Gold Boom period through to the early 21st Century. Here the redevelopment since the Post World War II period is more evident and much of this work has happened since the establishment of the Murray Street and Forrest Place Malls in the late 1980s, with Forrest Chase (1989), Central City (2002), and David Jones (2001/2002) to name a few.

The second part of Murray Street is on the fringes of the central area with the built fabric indicative of the Gold Boom through to the Inter War periods of development with its warehouses, showrooms and office buildings. These warehouses are especially evident on both sides of Murray Street in the former residential area to the west of Milligan Street (W. D. & H. O. Wills Building (fmr) (1927), and Commercial Building at 497-501 Murray Street (1930s)).

Similar to Wellington Street, it is in this outer fringe of Murray Street, primarily to the west of the central area, that the recent trend for the renovation and conversion of existing building stock is evident; see Kings Street Arts Centre

---

2 Stannage, *People of Perth*, pp. 193-94; Seddon & Ravine, *City and its Setting*, p. 147. Seddon and Ravine state that: 'In 1904, 10 per cent of central Perth was still vacant land, but by 1911, there was no vacant land left.' (p. 152)

3 Seddon & Ravine, *City and its Setting*, pp. 148-49; Battye, J. S. (ed.), *The Cyclopedia of Western Australia* (Vol. 1, Hesperian Press 1985 [1912]), p. 359; Stannage, *People of Perth*, p. 194

4 Hocking, I., 'Growth and Change in Central Perth', in Pitt Morison, M., & J. White, *Western Towns and Buildings* (UWA Press, 1979), pp. 266-67

5 Seddon & Ravine, *City and its Setting*, p. 156

6 Hocking, 'Growth and Change', pp. 266-68; see also 'Perth Central Area Heritage Survey - Final Report', prepared for the Heritage Council of Western Australia and the City of Perth as part of NEGP 1991/1992, May 2001, Volume 1, pp. 409-11

(1929), Murray Mews (c. 1900), J. & W. Bateman Buildings (fmr) (1910), and Town and Country Bank Building (fmr) (1968).

Electricity was first generated in Western Australia when the Western Australia Electric Light and Power Company began production in 1888. The company was not long-lived. In 1893, Perth Gas Company, which had been distributing gas to the city for ten years, acquired the right to produce electricity and became the City of Perth's main supplier. Electricity at the time was primarily used for lighting, and for electric tramways. Tramways generally had their own electricity plants.[7]

In 1911, after a five-year legal battle over the sale price, Perth City Council purchased the Perth Gas Company. The final price was £419,312, a significant increase from the £158,866 the Council originally offered in 1906. As a consequence of the sale, Perth City Council acquired three power stations, a gas plant and the electricity distribution system.[8] The three stations were at Wellington Street (900kW), Marquis Street (1500kW) and Ferguson Street, Maylands (110kW).[9]

Perth City Council had not long been owners of the Gas Company when they were informed that the land in East Perth on which the largest of the three power plants was situated, in Marquis Street, was to be resumed for railway purposes.[10] The cost of relocating the 1500kW plant was estimated at £24,500. Two reports on the Council's options differed significantly, one recommending changing the entire system to alternating current, and the other urging the Council to remain with the existing system of direct current. However, both reports recommended centralising electricity production. Subsequent advice from a Sydney expert supported the move to alternating current, as direct current was not suitable for an expanding city, as it required close proximity between power production and consumption.[11]

In the same period the new Labor Government, led by John Scaddan, implemented the *Government Trading Concerns Act* (1912) and purchased Perth Electric Tramways Ltd, the other main producer of electricity in the Perth central area.[12] The Government approached Perth City Council proposing an agreement under which one central power station, owned by the Government, would produce sufficient power for all local requirements, as well as outlying suburbs. Under this proposal, Perth City Council would purchase electricity from the government to on-sell to its residents. The Council initially rejected the proposal, due to concerns that they would not be granted reliable and affordable electricity as a result. A major sticking point was agreement on

---

7 Edmonds, Leigh, *Cathedrals of Power: A Short History of the Power Generating Infrastructure in Western Australia 1912-1999* (UWA Press, 2000), pp. 15-18

8 Boylen, Louise, & John McIlwraith, *Power for the People: A History of Gas and Electricity in Western Australia* (Perth, 1994), pp. 32-35

9 Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 item 1912/0137A

10 This plant was at the time known as 'No. 2 Substation'. It was situated at Perth Building Lots V86 and part V87, and is not to be confused with the substation that is the subject of this assessment.

11 Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 item 1912/0137A

12 Draft State Heritage Office assessment documentation, 03318 *East Perth Power Station*, August 2004, State Heritage Office file 03318

fixing a price for supplying the outer municipalities. After some amendments, an agreement was finally signed in October 1913, although it took over two months to be ratified by parliament.[13] The Western Australian Government was the first state government to take on public production of electricity.[14]

The terms of the Council's agreement included the Government building a 9,000kW power station, with potential to expand as demand increased. To distribute this high-tension power to the City of Perth, the Government would provide a 'ring or main cable' through the municipality, with 'high-tension switchgear and meter panel points (not exceeding four) on the said ring main'.[15] The Council would provide substations at these meter panel points. The ring main was to begin at No. 1 Substation, the site of the Council Electric Power House in Wellington Street. It was then to be laid through central Perth along Murray Street, from Pier Street running west 'as far as the end, passing on its way the proposed position of No. 2 Substation', before reaching No.3 Substation at the corner of Thomas Street and returning north of the railway line with a zigzag route along Aberdeen, Palmerston, Brisbane, Padbury, Bulwer and Summers Streets and back along the river. No. 4 Substation was to be on Palmerston Street.[16] In proposing this route, and the location of substations, the Railways department noted of No. 3 that 'as this Substation is located in a good residential district, it is essential that the building you design should be of sightly appearance'.[17] Extant physical evidence indicates that the designs of Nos. 1, 3 and 4 were the same, while No. 2 is a modified version of the design to fit within a tighter land area. In 1913, there was not exact location proposed for No. 2 Substation, and the Town Clerk noted to the Council's consultant engineers that 'our chief difficulty is obtaining a site for No. 2 station'.[18] It is likely that a site suitable for the free-standing design used for 1, 3 and 4 could not be found, and thus the design was altered for *No. 2 Substation, Murray Street,* to suit the available land of the present site.

Following the conflicting reports from local experts received in 1911, Perth City Council had been advised to secure the services of an international engineering firm, as there was no one locally at the time with knowledge of electrical production on the scale being proposed.[19] A London-based

---

13 Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 Item 1912/0137B&C

14 Draft State Heritage Office assessment documentation, 03318 *East Perth Power Station* (2004)

15 Proposed Agreement between Perth City Council and the Government, August 1913, on Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 Item 1912/0137C

16 19 December 1913 letter from WA Government Railways to Merz & McLellan, London, on Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 Item 1912/0137C

17 19 December 1913 letter from WA Government Railways to Merz & McLellan, London, on Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 Item 1912/0137C

18 24 December 1913 letter from W.E. Bold to Merz & McLellan, London, on Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 Item 1912/0137C. There is no further information on this file to indicate how the present site was determined.

19 Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 Item 1912/0137A.

engineering firm, Merz & McLellan, was appointed to oversee the project, as one of the senior partners of the firm, Charles Merz, was in Australia at the time advising the Victorian Government regarding electricity production in Melbourne.[20] Merz & McLellan sent C. T. Briggs to Perth to supervise the erection of all buildings and plant associated with the new power station. Merz & McLellan were to be responsible for all four substations on the ring main, including *No. 2 Substation, Murray Street*.[21]

At the end of 1913 Perth City Council's electrical engineer, Herbert Broadbent, went to London with authorisation to enter and sign contracts for the machinery required for the new electrical system, which he arranged as soon as the Western Australian Parliament ratified the Government's agreement with Perth City Council on 22 December 1913. Merz & McLellan recommended using Allgemeine Elektricitats Gesellshaft, of Berlin, for the substation machinery, as they were far cheaper than any British company, and, having won the Western Australian Government's contract to provide plant for the new East Perth Power Station, would be able to reduce costs further with bulk orders. The only perceived disadvantage was the 'German name' of the company, but the Council agreed to use the company anyway. Subsidiary machinery, particularly 'step-down transformers', was commissioned from Willians [sic] & Robinson Ltd, who distributed British Westinghouse-designed machinery.[22] The contract with the German firm had to be terminated once World War I began, and it is presumed that British Westinghouse, who took over the equivalent contract for the power station, most likely also took on the contract for the substations.[23]

Presumably *No. 2 Substation, Murray Street* was constructed as planned the following year, as the physical evidence shows moulded stucco lettering in the place's entablature, reading 'No. 2 Electricity Light Sub-Station – 1914'. Certainly it was ready, and fully equipped, in time for the beginning of power generation from East Perth Power Station on 3 December 1916.[24]

A c.1920 photograph of the Murray Street façade of *No. 2 Substation, Murray Street* shows the brickwork unrendered, but the effect of light moulding features against red brick is similar to the 2008 presentation of white painted stucco features against red painted brickwork. The entablature has raised letters reading 'Perth City Council – No. 2 Electricity Light Sub-Station – 1914'. The upstairs balcony has not yet been enclosed, and has a heavy grid-pattern stucco railing with two central columns to the roof. Upstairs windows are twelve panes each, and appear to be single-hung sashes. At street level

---

20 Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 Item 1912/0137A; Edmonds, *Cathedrals of Power,* p. 124

21 Correspondence between Merz & McLellan and W. H. Bold, Town Clerk, Perth City Council, Aug-Dec 1913, on Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 Item 1912/0137C

22 Electricity and Gas Department file 'Electric Station – Reports, Correspondence &c, re System Site; Resumption of No. 2 Station: Agreement with Government', SROWA Cons 3054 Item 1912/0137C

23 Boylen & McIlwraith, *Power for the People,* p. 124

24 Draft State Heritage Office assessment documentation, 03318 *East Perth Power Station*, August 2004, State Heritage Office file 03318

there are two large picture windows (now bricked in), each of which has five small panes across the top. Both picture windows have 'Perth City Council' stencilled across them. There does not appear to be a front door, although this may be recessed and therefore not discernible in the shadow. Where a door might be expected are instead two low timber gates with the appearance of a picket fence.[25]

In March 1925, the Tramway and Electricity Supply Department called for tenders for alterations and additions at Murray Street, Perth.[26] Presumably this was for changes to *No. 2 Substation, Murray Street*. It is not known what changes were made at this time, but this may have been the extensions to the southern switch room that are evident in the fabric.

The 1913 agreement between the Government and Perth City Council was intended to apply for fifty years. By the late 1930s, there was conflict over the agreement between the head of East Perth Power Station, William Taylor, and the general manager of Perth City Council, F.C. Edmondson, as the agreed price at which the government sold power to the Council, set at 3/4d in 1913, was so low that it was frequently below production cost.[27] It was one of many ad hoc arrangements for electricity supply across the state, with 143 power stations (not counting substations) listed in the state in 1938.[28] The arrangement continued until after World War II. In 1946, the State Electricity Commission was established to take responsibility for all electricity production in the State. The Commission purchased the City of Perth Electricity and Gas Department as a going concern in December 1948.[29]

In November 1940, Prime Minister Menzies circulated a memorandum to state premiers outlining a commonwealth initiative to protect power stations and substations from potential air raid attacks. The federal government was still developing 'definite plans' for protecting, fire-fighting and alternative power supply if necessary. The memo also addressed matters of camouflage and the need for caution in sandbagging to ensure no sand could escape into the machinery. There was concern arising from experiences in Britain where 'bomb splinters' had pierced metal doors and damaged electrical equipment.[30] A circular a year later suggests that not a great deal had been done in response to the first memo, and urged construction of bomb shelters for staff and shields to protect machinery against incendiary bombs.[31] Subsequent complaints from staff at East Perth Power Station, that no shelter provisions had been made for them, which was dismissed with advice to shelter in the

25 Reproduced in Boylen & McIlwraith, *Power for the People,* p. 22

26 *The West Australian Mining, Building and Engineering Journal,* W. B. Shaw, Perth, 28 March 1925

27 Edmonds, *Cathedrals of Power,* p. 24

28 February 1938 Government listing of Electricity Supply Stations in WA, on Premier's Department file 'Civil Defence: Air Raid Precautions - Electricity & Gas Department – protection Electric Power Stations & Gas Works', SROWA Cons 1005 Item 1939/585

29 Draft State Heritage Office assessment documentation, 03318 *East Perth Power Station*, August 2004, State Heritage Office file 03318

30 23 November 1940, Memo from the Prime Minister, on Premier's Department file 'Civil Defence: Air Raid Precautions – Electricity & Gas Department – protection Electric Power Stations & Gas Works', SROWA Cons 1005 Item 1939/585

31 24 December 1941 Memo from the Prime Minister, on Premier's Department file 'Civil Defence: Air Raid Precautions – Electricity & Gas Department – protection Electric Power Stations & Gas Works', SROWA Cons 1005 Item 1939/585

basement below the generators, suggest that little if anything was likely to have been done at substations to address the wartime federal requirements.[32]

Throughout the late 1940s, power cuts were the norm in Perth, with suburbs blacked out on a rotation basis, trams used only at peak times, and businesses asked to turn off unnecessary lights. The extreme power shortages during this period slowed the development of electrical goods in the State, with electricity suppliers deliberately stalling the introduction of new products, and the population reluctant to purchase appliances they were unable to have reliable use of.[33]

The power supply from East Perth had been established to produce current at 40Hz. By the post-war period this was non-standard, and the new power station at South Fremantle (opened 1951) was fitted for 50Hz production. The SEC undertook an extensive program to convert households for 50Hz current, transferring suburbs one at a time from 1950 to 1959. Once all households in an area had been visited and checked for compliance with 50Hz current, the substation for the area switched off the 40Hz current, waited ten minutes to ensure residents were aware the change had been made, then switched on the 50Hz current.[34]

Domestic use of electricity boomed from the 1950s. When conversion of electrical appliances from 40Hz to 50Hz began in 1950, only 50% of homes required any conversion work (lighting and radios did not need to be converted). By 1956, 94% of homes needed work, indicating the steep increase in the use of domestic electrical appliances during this period.[35]

It is not known when the changes evident in the physical fabric, particularly the bricking up of openings and extension of the southern Switch Room, were made to *No. 2 Substation, Murray Street.* Western Power has not retained files relating to this work, and it is likely that it was undertaken either before 1946, when the place was managed by Perth City Council, or in the early years of State Energy Commission ownership (c.1950s), when record keeping at SECWA was minimal. The place was decommissioned in the 1980s, but the machinery was left in situ.[36]

No. 2 Substation, Murray Street was included in the 1981 National Trust classification of King Street Precinct, and subsequently this precinct, including *No. 2 Substation, Murray Street*, was also permanently listed in the Register of the National Estate, in 1986.

In the early twenty-first century, safety concerns about possible leakage from the transformers led to the place being stripped of its plant. A special Sunday

---

32 Premier's Department file 'Civil Defence: Air Raid Precautions – Electricity & Gas Department – protection Electric Power Stations & Gas Works', SROWA Cons 1005 Item 1939/585.

33 Edmonds, *Cathedrals of Power,* pp. 25-27

34 Edmonds, *Cathedrals of Power,* pp. 28-31

35 'Annual Report of the State Electricity Commission Western Australia for the year ended 1956', in Edmonds, *Cathedrals of Power,* p. 31

36 Warren Stuber, Western Power, conversation with Clare Menck, 25 November 2008

operation using low-loaders was required to get the machinery out of the building.[37]

In 2012 *No. 2 Substation, Murray Street* is vacant.

13. 2 PHYSICAL EVIDENCE

No. 2 Substation, Murray Street, built in 1914 is located at No. 325 Murray Street, in the West End of the City of Perth. The building is located in the King Street Heritage Precinct. *No. 2 Substation, Murray Street* is currently vacant (2012) and stripped of plant and equipment.

The Substation is a high-volume building constructed in red face brickwork with the facade up to the Murray Street boundary of the lot and decorated with stucco detailing in a Classical derivative style. The building incorporates high-volume ground floor areas for the housing of electrical equipment in a number of transformer cubicles off a central access way into the building from an arched opening in the Murray Street facade. Larger spaces are provided beyond the transformer cubicles and cableways.

A cast iron spiral stair in the northeast corner of the access way, stamped with 'J & E LEDGER PERTH WA', provides access to the upper level of the building, formerly in use as Regulator Rooms, Operators Office and a covered area onto the south wall. Beyond the covered area a later addition formerly accommodated a Low Tension (LT) Switch Room. A hoist remains in place, between the three levels of the rear section of the Substation and located against the north wall of the southern addition. A stairway extends down from the first floor level covered area to an introduced chamber (a mezzanine floor LT Switch Room) into the high volume of the ceiling above the middle area of the ground floor plan. A second floor High Tension (HT) Switch Room as a later addition exists above the southern section first floor LT Switch Room of the Substation, accessed by the hoist and a steel stairway from the first floor LT Switch Room. A toilet and stainless steel washing trough are located at the western end of the first floor covered area.

The ground floor level incorporates cable tunnels beneath the concrete floor, and trenches and pits with steel covers, for the distribution of cables into and from a main cable tunnel under the pavement at Murray Street.

The Substation is constructed with reinforced concrete (presumably) columns, beams and floor slabs, and incorporates steel section columns in the rear sections, encased in concrete, and steel lifting beams at ceiling level on the ground floor.

Internal face brick walls are bagged and painted. Floors are concrete throughout. The floors to the transformer cubicles at ground floor level are broken stone between steel rails for the movement of the transformers. A fibrous plaster ceiling is in place to the first floor level Regulator Rooms and Operators Office. The ceiling over the first floor LT Switch Room is suspended fibrocement sheeting. The ceiling over the second floor HT Switch Room is reinforced concrete.

---

37 Warren Stuber, Western Power, conversation with Clare Menck, 25 November 2008; information provided by Graham Horne, Manager, Western Power's World of Energy, October 2006

The Murray Street facade is parapeted and conceals a pitched roof clad in corrugated metal sheeting. The roof over the covered area at first floor level is a lean-to corrugated metal roof. The entablature has raised letters reading 'No. 2 Electricity Light Sub-Station – 1914'. Where the lettering 'Perth City Council' was formerly in place is now blank and smooth rendered.

Lighting throughout is fluorescent. A fire service remains intact throughout the building.

Windows throughout the building and doors have steel frames. The main arched doorway off Murray Street has a fixed arched panel with internal cladding behind a wrought iron decorative grill, above a pair of steel-framed doors clad externally in metal sheeting.

Modifications to the Substation

The following modifications have been carried out since 1914:

- southern Switch Rooms added and extended later;
- original tuck-pointing to brickwork to the street facade is painted;
- two large openings, both sides of the arched doorway to the street facade, have been bricked up;
- the main entry doors are replacements;
- stucco detailing to the street facade is painted in bright coloured paint finish;
- window openings have been bricked up externally in whole or in part to the east and west sides of the ground floor southern area;
- former openings are bricked up at the southeast and southwest corners of the first floor covered area;
- a window opening is bricked up in the north wall of the LT Switch Room at first floor level;
- the entire interior of the Substation is stripped of plant and equipment.

No. 2 Substation, Murray Street is now in a sound but cosmetically deteriorated condition.

A plaque has been mounted on the street facades of the buildings. The wording is recorded as follows:

> **Sub-Station (No. 333)**
>
> 1914 Electrical Sub-Station (early use)
> Original owner – City of Perth
> Architect – J. L. Ochiltree
> Builder – Todd Bros
>
> Essentially a utilitarian structure modulated with Classical dressing.
> The building contains one of the first and tallest iron spiral staircases in the City, similar to the one found in the GPO.
>
> City of Perth Plaque. October 1995.

13. 3 COMPARATIVE INFORMATION

Substations

The following comparative information has been taken from a report prepared by Helena Waldmann, in February 2007,[38] with amendments and/or additions by State Heritage Office staff and the Register Committee.

17707 No. 1 Substation, in Wellington Street (1913) was acquired by Royal Perth Hospital in 1974.[39] The building was extended westwards in c.1930 as an engineering complex.[40] It has been painted and minor modifications are visible from the exterior, such as the infill of circular windows and the western balcony, and the construction of a small pedestrian bridge to the adjacent block. However, it still retains its overall form and much design detailing is evident. To the rear is a saw-tooth roofed former garage and vehicle maintenance area, now also part of the hospital.

02233 No. 3 Substation (1914) in Colin Street, West Perth was sold by SECWA in the 1980s and converted to apartments. It still retains its overall form and design detailing, although the balcony has been bricked up. It is listed on the City of Perth draft MI (1999).

17629 No. 4 Substation (1915), in Palmerston Street, Highgate still operates as a substation. It is in excellent condition and exhibits a high degree of authenticity. It has retained, and still operates with, its original equipment from the same period of construction as the East Perth Power Station, and features evidence of its original installation at 40Hz. Minor changes include infill of the circular windows to prevent vandalism and removal of the second storey (66,000 volt) equipment. Unlike other comparable substations, it has not been rendered, painted or converted to other uses, and still features the distinctive 'blood and bandages' detailing. The entrance is on the Palmerston Street (east) side, and leads to a small vestibule. Off the vestibule is the staircase to the upper floor (currently barricaded) and a WC. The ground floor features two long rooms parallel to one another and a third room to the rear. Accessible from a gate on the Stuart Street (north) side are two c.1970s transformers. It is adjacent to the Union Maltings, and shares some design characteristics with the portion of the Maltings on Stuart Street.

No. 5 Substation was in Maylands, but as there is no readily available information about the place, it is likely that it has been demolished.[41]

04663 *No. 6 Electricity Sub Station* (fmr) East Perth (registered) was from a slightly later phase, constructed from 1924. It was built for the City of Perth in 1924 to cater for the increased demand for electricity in East Perth, in particular for the new Gas Works and Glass Works nearby. It was expanded in 1930 and 1945, and transferred to the State Electricity Commission in 1950.

---

38 Helena Waldmann, 'Electricity Generation, Transmission and Distribution in Western Australia: Representation on the Register of Heritage Places', report to Register Committee of the Heritage Council of Western Australia, Item 4i, meeting no. 183, February 2007

39 Considine and Griffiths Architects (1995) *Royal Perth Hospital Precinct Conservation Plan*, p. 69

40 Ron Bodycoat, 'Heritage Assessment for *No. 2 Electric Light Sub-Station 1914 and Murray Mews*' (March 2008)

41 It is not known if this is the same place as the No. 3 substation in Maylands that was operated by the Perth Gas Company and taken over the Perth City Council in 1911.

It was decommissioned in the 1960s, was vacant for a while, and has since been transformed into apartments.

05424 *Electricity Substation, Hay Street, Subiaco* (registered), is a single storey, brick and tile, single room building built in 1923. It was built by the Municipality of Subiaco, to facilitate the distribution of electricity purchased in bulk from the City of Perth, after the Municipality ceased generating its own electricity at this time. In the 1950s it was compulsory acquired by the State Electricity Commission. It still functions as an electricity distribution substation.[42]

15760 Electrical Substation, Keightley Street, Shenton Park, is very similar to Electricity Substation, Hay Street in terms of design and scale. Its original form is a one room, domestically scaled, brick building with a medium pitched gable roof. As with *Electricity Substation, Hay Street, Subiaco*, its front door is central to the front façade. It has windows on the side elevation that mimic the proportion of the panels of roughcast render at *Electricity Substation, Hay Street, Subiaco*. While this form is still highly visible, it no longer operates as a substation and has been converted to a residence, featuring block like extensions to two sides.

17708 Subiaco Museum was built as offices in 1911 and converted to a substation in 1923. After being decommissioned in the 1950s, it was converted for community use by the Rotary Club in 1959, and by 1985 it was converted to a museum.[43] Little evidence remains of its use as a substation aside from the insulators on the front elevation, a sign reading '6,000 volts' and ceiling vent holes identical to those at *Electricity Substation, Hay Street, Subiaco*. The concrete floor of the room behind the insulators has been covered with jarrah floorboards, although some concrete sections remain in the wooden floors of other rooms, which may be associated with its former use.[44]

Aside from Subiaco, the Municipalities of Fremantle, Claremont, Midland, Nedlands, Bassendean, Cottesloe and South Perth each had their own electricity networks in the early twentieth century. In Western Australia electricity supply was centralised as much as possible when the East Perth Power Station was built and municipal power supplies were phased out. Fremantle and Midland surrendered theirs willingly, but the remainder resisted until compulsory acquisition occurred.[45]

Little is known about which remnant buildings may exist from the era of municipal power generation and distribution. The State Heritage Office database has files for several substations which are on their respective Municipal Inventories but very little information is available on each. Most have been converted for other uses, and have little connection left to electricity distribution:

---

42 State Heritage Office assessment documentation 05424 *Electricity Substation, Hay Street, Subiaco*

43 Spillman, K. (1985) *Identity prized: a history of Subiaco*. University of Western Australia Press, Western Australia, pp. 301, 357

44 Conversation, State Heritage Office staff and Christobel Bennett, curator Subiaco Museum, October 2006

45 SECWA file No. 1/651/200 volume 1

00494 Claremont Municipal Council Electricity Substation at 280 Stirling Hwy was built 1923/24. The Claremont Electric Light Co. originally provided electricity to the area, the official switching on of the first light occurring in November 1900 at the power station in Gugeri Street, but the company's existence was short lived and it was taken over by the Municipality in 1904. In 1905 a substation was built at the corner of Davies and Shenton Roads. The Gugeri Street power house operated until 1924, after which the Municipality purchased electricity from East Perth. The Stirling Hwy substation was extended in 1943, and would have been taken over by the State Electricity Commission in 1951. It was sold in 1985 and converted for commercial use as a Car Service Centre.[46]

04811 Roma at 182 Canning Highway, Como, was built as a substation (date unknown) and converted to three flats c.1963. It has since been converted to a single residence and is included in the Municipal Inventory for being a notable example of a late Twentieth Century Immigrants' Nostalgic style residence.[47]

15932 Bants at 496 Stirling Highway, Peppermint Grove, was used as a substation from the 1940s and purchased in 1963 for commercial purposes by W. H. and J. E. Bants for £5,000.[48]

03711 *Electricity Substation, Fremantle (fmr),* (registered) constructed in 1932-34 to service the expansion of the tramways and to cope with increased electricity demand in the Fremantle district. The place operated as a municipal substation until it was taken over by the State Electricity Commission in 1952, after which it was converted to other uses. In 1989, it was adapted for use as an energy museum (World of Energy), which operated for 20 years and closed in 2009. The place was permanently registered in February 2012.

There are two small brick substations extant in Fremantle. In North Fremantle, behind the North Fremantle Town Hall (fmr), there is a small building with a pyramidal roof, believed to be associated with the Fremantle Electric Tramways and Electric Lighting Board. It has an unusual ventilation feature on the roof, but no further information is available about it. There is also a small, hexagonal shaped brick building adjacent to the Fremantle train station, believed to be a former substation. It is highly unlikely either is still in use.[49]

In Cottesloe, a small 1930s substation remains at 496 Stirling Highway. It has a parapeted facade in a 1930s style, distinctly different from the early twentieth-century Substations but still a deliberately imposing edifice. It is now in use as a commercial showroom.[50]

The substation at 03273 *Midland Railway Workshops* is still intact and contains some equipment from c.1970s, but has ceased operation c.2005.

---

46 de Burgh, Jim, 'First Light: The Development of a State Government Electricity and Gas Supply in Western Australia' (unpublished, c.1955); Bodycoat, R., & G. Nayton, 'Heritage Assessment: 208 Stirling Hwy, Claremont' (2006)

47 Heritage Today, 'City of South Perth Municipal Inventory' (2000)

48 O'Brien Planning Consultants (1999) Peppermint Grove MI. Information provided by Graham Horne of Western Power

49 Information provided by Graham Horne, Manager, Western Power's World of Energy, October 2006

50 Ron Bodycoat, '*No. 2 Electric Light Sub-Station 1914 and Murray Mews*'

The Power House was built in 1904, and the substation extension added in 1911. It generated electricity until it became available from East Perth, and distributed electricity to the wider Midland Community until the 1920s.[51]

Substations known to have previously existed but now demolished include:

- 04832 Coode Street Power Station (site of), South Perth. The Hanton Quadrangle of Wesley College is now in this location.[52] It is recognised as a site on the Municipal Inventory.
- Cook Street Tramways substation, West Perth. The original substation was demolished, but an upgraded modern substation still operates in this location.
- Tramways Power Station, Wittenoom Street, East Perth.
- Perth Gas Co, Wellington Street (West Perth end).
- Tramways Power Station, corner of Kensington St and Claisebrook Road, East Perth.
- Municipal Power Plant, near Axon Street Station, Subiaco. Generated power for the Municipality of Subiaco from 1903 to 1923.

In more recent years, electricity substations have been provided as underground installations or incorporated into new commercial/office developments.[53]

No. 2 Substation, Murray Street is a good representative example of substations constructed in the early twentieth century, particularly those associated with the 1916 East Perth Power Station.

Cast Iron/ Spiral Staircases

Although spiral iron staircases were once common, especially in utilitarian buildings such as *No. 2 Substation, Murray Street,* or to provide staff access to areas within buildings where wide timber staircases were provided for the general public (e.g. hotels, department stores), many have not survived. The State Heritage Office database notes spiral or iron staircases at the following places:

- 01071 *Mission to Seamen Building, Geraldton,* retains a cast iron staircase made of prefabricated sections fixed together, believed to have been relocated in 1934 from the 1892 original building at 01046 *Masonic Lodge, Geraldton*.
- 02463 *Guildford Hotel* (1886-1915) had an iron spiral staircase to access the belvedere. The staircase survived the fire at this place in 2008, as evidenced by photographs held by the State Heritage Office.
- 02051 *No. 1 Fire Station (fmr)*, Murray Street, Perth, had a cast iron staircase when it was constructed c.1900, for the Chief Officer to access the rear yard from his quarters. This was relocated to 02664 *Claremont*

51 Midland Redevelopment Authority brochure, *The History and Heritage of the Midland Railway Workshops*

52 Wesley College heritage trail, available at http://www.wesley.wa.edu.au/

53 Ron Bodycoat, '*No. 2 Electric Light Sub-Station 1914*'

Fire Station (1914), but when Claremont closed it was returned to Murray Street to be part of the Fire Station Museum. It is a rare remaining example associated with a fire station.[54] The staircase was manufactured by J & E Ledger and photographic evidence suggests this staircase is identical to the one at *No. 2 Substation, Murray Street.*

It is likely that many other staircases are not specifically noted in the database. One known example of a place for which the database record does not mention its iron staircases is 02026 Hackett Hall (registered as part of 01962 *Art Gallery and Museum Buildings*). The place retains four two-storey cast iron spiral staircases in its main gallery. Three are comprised of a single flight extending two storeys. The fourth is two separate single-storey flights set approximately three metres from each other. All four have identical balustrades to both *No. 2 Substation, Murray Street* and *No. 1 Fire Station (fmr),* but have a more simple utilitarian grid pattern for the treads and kickboards. No maker's mark is identifiable on them.[55]

The spiral staircase at *No. 2 Substation, Murray Street* appears to be a good representative example of a formerly common internal building feature, with a high level of detailing in the ironwork.

J & E Ledger

J & E Ledger was a Western Australian foundry established in the nineteenth century that produced cast iron products such as letter boxes, verandah posts and wood-fired stoves with Metters & Co.[56] By the time the company was sold out of the Ledger family in 1970, it was a significant Perth business.[57]

The only other place in the State Heritage Office database associated with J & E Ledger is 02535 Post Box, Kings Cottage, which is registered as part of 00339 *Kings Cottage*, Bunbury. The municipal inventory describes it as a 'functionally designed, red cast-iron letter receiver embossed VR 1897'.[58]

In addition to the staircase at *No. 1 Fire Station (fmr),* cast iron balcony components at the place are also produced by J & E Ledger.[59] It is likely that the staircases at Hackett Hall are also J & E Ledger pieces, due to their design similarity to the Ledger stairs at *No. 2 Substation, Murray Street*.

There is insufficient evidence to determine whether the staircase is a rare or representative example of the work of J & E Ledger.

13. 4 KEY REFERENCES

---

13. 5 FURTHER RESEARCH

54 Information provided by Su Ferreira, Fire Safety Education Centre & Museum, 11 November 2008

55 C. Menck, site visit, 11 November 2008

56 Information provided by John Stephens, 11 November 2008

57 Paige Taylor, 'The history of Ledger's bottom line', *The Australian,* 15 March 2008 www.theaustralian.news.com.au/story/0,25197,23377604-2702,00.html, accessed 7 November 2008

58 State Heritage Office database 02535.

59 Information provided by Su Ferreira, Fire Safety Education Centre & Museum, 20 November 2008

Research in SECWA records may reveal information regarding additions to the building. SECWA records have not been deposited at the State Records Office. Western Power officers were unable to locate historic files relating to *No. 2 Substation, Murray Street*.