HERITAGE COUNCIL
OF WESTERN AUSTRALIA

REGISTER OF HERITAGE PLACES

DRAFT – *Register Entry*

1. DATA BASE No. 3381

2. NAME *South Fremantle Power Station* (1951)

3. LOCATION Robb Street, Coogee

4. DESCRIPTION OF PLACE INCLUDED IN THIS ENTRY

1. Portion of Lot 1 on Plan 17373 being part of the land contained in Certificate of Title Volume 1878 Folio 135
2. Lot 2 on Plan 17373 being the whole of the land contained in Certificate of Title Volume 1878 Folio 136 and Lot 3 on Plan 17373 being the whole of the land comprised in Certificate of Title Volume 1878 Folio 137
3. Portion of Lot 2161 on Deposited Plan 35641 and being part of the land contained in Crown Lease J012739 and part of the land contained in Crown Land Title Volume 3130 Folio 821
4. Lot 2167 on Deposited Plan 37890 being Reserve 43701 and the whole of the land contained in Crown Land Title Volume LR3131 Folio 896

together as shown in HC Curtilage Map P3381-1

5. LOCAL GOVERNMENT AREA City of Cockburn

6 CURRENT OWNER

1. Electricity Networks Corporation (Western Power)
2. Electricity Generation & Retail Corporation (Synergy)
3. State of Western Australia
   (Lease to State Electricity Commission of Western Australia)
4. State of Western Australia
   (Management Order to City of Cockburn)

6b. OWNER AT TIME OF DECISION

(leave for Land Information Officer to fill in)

6c. OWNER AT REGISTRATION

(leave for Land Information Officer to fill in)

7. HERITAGE LISTINGS

- Register of Heritage Places: 28/10/1997
- National Trust Classification: ----------
- Town Planning Scheme: 14/07/2011
- Municipal Inventory: 10/04/2014
- Register of the National Estate: ----------
- Aboriginal Sites Register ----------

8. ORDERS UNDER SECTION OF THE ACT

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9. HERITAGE AGREEMENT

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10. STATEMENT OF SIGNIFICANCE

South Fremantle Power Station, a high volume steel frame and concrete former coal-fired electric power station (1951), exhibiting a complementary mix of Art Deco, Inter War Functionalist and Stripped Classical stylistic elements, containing a former Boiler House, Turbine Room, Administration Offices and Laboratories, and Switch House, Coal Storage area, Groynes and Water Basin, has cultural heritage significance for the following reasons:

the place was the second and largest purpose-built thermal power station in Western Australia, a crucial element in the progressive development of Government-sponsored electric power generation in the State, and contributed to the establishment of the interconnected power grid of the South West Power Scheme;

the place is the only extant 1950s power station in Western Australia, and one of only two power stations of masonry construction in the State designed with such compelling architectural intent;

the place is a unique and finely designed large industrial building demonstrating a complementary mix of Art Deco, Inter War Functionalist and Stripped Classical stylistic elements that are characterised through its symmetry, windows, expansive light-filled interior spaces, expressive reinforced concrete structure, and broad horizontal skyline;

the place, by virtue of its size and rectilinear bulk in a sparse marine landscape, is a landmark viewed from both on and offshore, with its prominence further emphasized by the clearing away of other structures and trees to the north;

the place, which operated from the start at 50 cycles generation, facilitated the upgrading of power generation in Western Australia from 40

to 50 cycles, and was a significant technical achievement in the supply of electricity in Western Australia; and,

the place contributed to Western Australia's post-World War II reconstruction as a major employer of post war European migrants.

Some significant elements have been removed including the plant and equipment, precipitators, conveyors and coal crushing plant, and in particular the landmark smoke stacks. All the remaining elements are significant, as elements of little or no significance have been removed from the site.

11. ASSESSMENT OF CULTURAL HERITAGE SIGNIFICANCE

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

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

PRINCIPAL AUSTRALIAN HISTORIC THEME(S)

- 4.2 Supplying urban services
- 5.2 Organising workers and workplaces

HERITAGE COUNCIL OF WESTERN AUSTRALIA THEME(S)

- 101 Immigration, Emigration and refugees
- 110 Resource exploitation and depletion
- 308 Commercial services and industries
- 309 Technology and technological change
- 404 Community services and utilities
- 507 Water, power and major transport routes

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

South Fremantle Power Station was a crucial element in the progressive development of Government-sponsored electric power generation in Western Australia, which had begun substantially at East Perth in 1916.

South Fremantle Power Station was constructed between 1946 and 1951 as the second and largest purpose-built thermal power station in Western Australia, and contributed to the establishment of the interconnected power grid of the South West Power Scheme.

South Fremantle Power Station contributed to Western Australia's post-World War II reconstruction as a major employer of post war European migrants.

The location of *South Fremantle Power Station* was an important influence in the development of the Kwinana Industrial area and the residential suburb of Hilton Park.

South Fremantle Power Station was constructed in the immediate post-World War Two period, and facilitated the cultural shift towards ever increasing use of domestic electrical appliances from the 1950s, improving the lifestyle and standard of living of the community in general.

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

South Fremantle Power Station is the only extant 1950s power station in Western Australia and was the second and last power station in the State to be constructed as a steel and concrete structure with extensive glazing.

South Fremantle Power Station is the largest Art Deco, Inter War Functionalist and Stripped Classical influenced building to be constructed in the State, and is one of only two power stations in the State designed with such compelling architectural intent, the other being East Perth Power Station.

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

South Fremantle Power Station is a good representative example of the many power stations built around Australia in the early 1950s and demonstrates the process and improvements in power generation in the post World War II period.

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

South Fremantle Power Station is a unique and finely designed large industrial building demonstrating a complementary mix of Art Deco, Inter War Functionalist and Stripped Classical stylistic elements that are characterised through its symmetry, windows, expansive interior spaces, monolithic block appearance, expressive reinforced concrete structure, and broad horizontal skyline.

South Fremantle Power Station, by virtue of its size and rectilinear bulk in a sparse marine landscape, is a striking landmark structure. Viewed from all directions, its prominence is further emphasised by the absence of any immediate built form or notable landscaping.

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

South Fremantle Power Station demonstrated the influence of W.H. Taylor, General Manager of the Western Australian Government Electricity Supply at the

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

time of its construction, who contributed to the design of both the Station building and the generating plant which it housed.

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

The construction and operation of *South Fremantle Power Station* represented a significant technical achievement in the supply of electricity in Western Australia, and facilitated the upgrading of power generation in Western Australia from 40 to 50 cycles.

12. DEGREE OF SIGNIFICANCE

12. 1 CONDITION

South Fremantle Power Station is in a very poor and deteriorating condition. The steelwork structure is severely corroded and the concrete is failing in numerous areas due to widespread concrete cancer. All glazing to windows has been destroyed through vandalism. Steel window frames and glazing bars are corroded, warped and in some cases removed from their openings which has created areas of weakness allowing concrete to crumble away from reveals and exposure of reinforcement bars.

There is evidence of extensive vandalism throughout with debris scattered across all floors and graffiti to the majority of wall surfaces. The building is not watertight with the condition of what is left of the building fabric is inevitably susceptible to further deterioration.

In 2020, the Water Basin is substantially silted up.

12. 2 INTEGRITY

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

Despite vandalism and deterioration, *South Fremantle Power Station* has a high degree of integrity with the building's original form, structure and openings still extant, allowing a clear expression of the original design intent. What remains of the original fabric is simply a shell with minimal changes made during the power station's operational life.

Some operational elements have been removed however, including smoke stacks and precipitators, conveyors and coal crushing plant. New openings have been formed in the external walls for removal of plant and equipment, and floor pits to the former Turbine Room have been infilled. All plant and equipment, with the exception of the overhead crane and its associated framework has been removed. Separate subsidiary buildings have also been removed from the site. Notwithstanding removal of these items and minor alterations, the place still embraces a high level of integrity due to the primary building fabric still remaining in its raw original state.

12. 3 AUTHENTICITY

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

South Fremantle Power Station has a moderate degree of authenticity due to the place's closure in 1985 and subsequent removal of ancillary operational structures such as the smoke stacks and all the plant and equipment. Some separate buildings have also removed with minor internal alterations undertaken. Despite alterations and removal of fabric and equipment, the uniqueness of the building's primary structure still remains, which allows the original design intent as an industrial building to be readily apparent. The original use as a power station would easily be discernible through interpretation.

13. SUPPORTING EVIDENCE

The documentation for this place is based on the heritage assessment completed by the Department of Planning, Lands and Heritage in July 1997[2], and amended in May 2004, with later amendments and/or additions by the Heritage Council and the Department. For a more detailed account of the evidence, refer to 'South Fremantle Power Station Conservation Plan', prepared by Ronald Bodycoat architect for Western Power Corporation in November 2003.

All indented paragraphs are quoted directly from South Fremantle Power Station Conservation Plan', Volume one and Volume two prepared by Ronald Bodycoat architect for Western Power Corporation in June 2003, and amended in November 2003.

13. 1 DOCUMENTARY EVIDENCE

Aboriginal History

The Fremantle region has always been a significant place for the Whadjuk Nyoongar people. The area that is now present day Cockburn was known as Beeliar and was home to the Beeliar Nyoongar people, a sub group of the Whadjuk who lived alongside the chain of wetlands that provided a reliable supply of natural resources. These resources enabled the Beeliar people to sustain their traditional way of life for thousands of years until it was disrupted in 1829, with the arrival of Europeans in Fremantle and the subsequent establishment of the Swan River Colony. [3]

In the first half of the 20th century, Nyoongar people were prohibited from entering Fremantle with the exception of a few men working on the wharf who lived in camps on the fringes of the city. This attitude of exclusion continued until the 1960s when many Nyoongar people migrated to the metropolitan area following the introduction of the Native Welfare Departments housing program in the 1960s.[4]

South Fremantle Power Station

Work commenced on the construction of the power station at East Perth in 1913, followed by power generation from the first unit in 1916.[5]

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2 Where information contained in the Documentary Evidence is as presented in the 1997 assessment documentation, specific footnotes have not been included, as they were not part of the 1997 report. This assessment was prefaced with the following general reference for the entire Documentary Evidence section:
Records relating to the power station are held at Western Power head office, library and archives, Wellington Street, Perth and at the SECWA Energy Museum, Fremantle. It is possible that records exist in the archive storage building at the East Perth Power Station site, but this resource has not been accessed. Public records include photographs at the Battye Library and the historic photos collection of West Australian Newspapers. Drawings for the construction of the building and its plant have not been discovered. No approach has been made to former engineers or workers who operated the power station to record oral history of the place. .

3 Beeliar Boodjar: An introduction to the Aboriginal History of the City of Cockburn based on existing literature. City of Cockburn. Available at: http://azelialeymuseum.com.au/wp-content/uploads/2016/11/BeeliarBoodjar.pdf

4 City of Fremantle Aboriginal History. Available at: https://www.fremantle.wa.gov.au/council/about-city-fremantle/aboriginal-history [accessed 5/11/2020].

5 The history of the establishment of the Western Australian Government Electricity Supply, the degree of standardisation which came with the one supply system for Perth and the adoption of 40 cycle frequency are recorded in the Conservation Plan for the East Perth Power Station.

A number of suburban and country town power stations were in operation for local electricity requirements and continued, together with the upgraded P3318 *East Perth Power Station* (RHP), beyond the commencement of discussion in 1932 concerning the requirement for a power station at South Fremantle.

Electricity supply for the metropolitan area in the 1940s relied heavily on a single 25 MW generator at *East Perth Power Station,* which even with the back-up of early, smaller and less efficient generators at East Perth could not meet the demand for electricity. 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 resulted in electricity suppliers deliberately stalling the introduction of new products, and the population reluctant to purchase appliances they were unable to have reliable use of.[6]

A Royal Commission completed its investigation into a proposed South West Power Scheme in 1940. The proposal was rejected. In 1943 the Government asked the Electricity Advisory Committee to undertake a further much broader inquiry into the proposal to establish the South West Power Scheme, under the chairmanship of Russell Dumas. V.J.F. Brain, Chief Electrical Engineer of the PWD in NSW was commissioned to advise on the feasibility of converting power supply from 40 to 50 cycles. His report *Standardisation of Electricity Supply in Western Australia - 1943* recommended immediate conversion to 50 cycles. [7]

The Dumas report was completed in 1945, to be followed by the letting in September 1945 of a contract for the first two 25,000 kW (50 Hertz) power generating units at a new power station at South Fremantle.

> When the decision was made to build a new power station at South Fremantle with a greater capacity than that of East Perth Power Station, the question of continuing with 40 cycle frequency came under scrutiny. By the early 1940s, 40 Hertz was non-standard in Australia as well as overseas. In England and on the east coast of Australian the standard was 50 cycle; in the USA 60 cycles. The cost to convert all existing electrical equipment and appliances to operate on the higher frequency would entail a huge cost beyond the resources of the State.[8]

When the Federal Government agreed to contribute to the cost in order to achieve a national standard, the new frequency was adopted with the commissioning of the power station at South Fremantle.

> The South Fremantle site was chosen for its relatively close metropolitan population, its proximity to nearby railway facilities for the delivery of coal and the ease with which sea-water could be utilised for the cooling system.[9]

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6 Edmonds, Leigh, *Cathedrals of power: a short history of the power-generating infrastructure in Western Australia 1912-1999*, Nedlands, W.A: University of Western Australia Press, 2000, pp.25-27.

7 Edmonds, L., Cathedrals of power: a short history of the power-generating infrastructure in Western Australia, 2000, pp. 28-31, in Bodycoat, R., '*South Fremantle Power Station: Conservation Management Plan*' prepared for Western Power Corporation, June 2003.

8 Bodycoat, R., *'South Fremantle Power Station: Heritage Assessment'*, commissioned by the Department of Commerce and Trade, August 1994, p.5.

9 Reid, S, (ed), *Power Station Lives: a multimedia exhibition on the South Fremantle Powerhouse*, State Energy Commission, Municipal Officers Association in conjunction with the Trades and Labour Council,

Planning for a new power station had begun as early as 1943, but construction did not begin at South Fremantle until January 1946. Post war shortages slowed construction, necessitating some creative solutions to the lack of materials. It took 6 years to obtain the necessary pipes and valves for the new station, and cement for the walls was in such short supply that it was padded out with fly-ash, a waste product from *East Perth Power Station*.[10]

> The main building was designed specified and the construction supervised by the State Electricity Commission of WA. The foundation was designed by the SEC and constructed by the Public Works Department. Steelwork for the main building was designed and constructed by Structural Engineering Co. Ltd., Welshpool; and the concrete constructed by W. Fairweather & Son, Perth.[11]

The opening plaque records W. H. Taylor (MIEE., MIE. Aust.) as the General Manager of the WA Government Electricity Supply (1914-1946) and General Manager of the Metropolitan Systems of the State Electricity Commission (SEC) (1946 to 1948).[12]

The four boilers 1, 2, 3 & 4 of Station A were fired up in January 1951; the first 25 MW turbo-alternator came on line in May of that year prior to the official opening of the Power Station on 27 June 1951 by the Hon. David Brand, Minister for Electricity. [13]

Station A housed two Metropolitan Vickers steam turbines powering two 25 MW direct coupling alternators. An overhead crane serviced the full length of the Turbine Room, and was a product of the Perry Overhead Engineering Crane Co., Adelaide, with a 70 ton load capacity and 10 tons auxiliary. The turbo alternators and condensing plant, were designed and produced by Metropolitan Vickers Electrical Export Co. Manchester, together with the 22 kV switchgear, 66 kV switchgear and main transformers.[14]

The 3000V switchgear was designed and constructed by Ferguson Pailin Ltd, Manchester and the 440V switchgear by Australian General Electric Pty Ltd. The condensing plant was designed and constructed by CA Parsons, England and Morts Dock and Engineering Pty, Sydney. [15]

The facility worked by burning coal in a boiler to produce steam, which under high pressure then flowed into a turbine to spin a generator to create electricity. The steam was then cooled, condensed back into water and returned to the boiler to start the process over again. [16]

In September 1951, the second 25 MW turbo alternator came on line.

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funded by the Commonwealth Arts Board, the Visual Arts Board and the State Electricity Commission, 1985, p. 1.

10 Ibid. pp.25 & 34.

11 Bodycoat, R., 'South Fremantle Power Station: Conservation Management Plan' Volume One, prepared for Western Power Corporation, June 2003, Amended November 2003 p 34.

12 Ibid, p.19.

13 Ibid, p 19

14 Ibid, p 33.

15 Ibid, p.33

16 Ibid, p.20.

A frequency changer unit was installed in a specially constructed building at East Perth to allow the two stations to operate in conjunction in supplying the metropolitan area. The new frequency changer building at East Perth was designed in the same mode as the power station at South Fremantle. It was constructed simultaneously and also completed in 1951. The conversion of the existing Metropolitan electricity system from 40 to 50 cycles and the task of adapting appliances and equipment was undertaken by the SEC until completion in 1960.

All metropolitan supplies were generated at the *East Perth Power Station* until 1951 when the power station at South Fremantle came on load. The No. 3 turbo alternator came on load in Station B at South Fremantle in January 1954, and the No. 4 turbo alternator in December 1954. The station at South Fremantle was then complete with a total capacity of 100 MW.[17]

Both stations A and B each formerly housed four 125/150,000 lb. per hour coal-fired boilers designed and constructed by International Combustion Ltd, London and Derby. Combustion gases were released through two chimneys on the roof of the Boiler House, with dust being cleaned by four electro static precipitators also housed on the roof. [18]

Domestic use of electricity boomed from the 1950s. When conversion of electrical appliances from 40 to 50 cycles began in 1950, only 50% of homes required any conversion work. (Lighting and radios did not need to be converted.) By 1956, three years before the conversion was completed, 94% of homes needed work, indicating the steep increase in the use of domestic electrical appliances during this period.[19]

As much of the plant at *South Fremantle Power Station* was designed and manufactured in England, with skilled contractors sent out from England to assemble the plant on site. Many of these contractors, and their families, stayed in Western Australia and were employed by the State Electricity Commission. Other workers at the Station were ex-goldfields men seeking post-war employment. The first SEC men at *South Fremantle Power Station* were volunteers from the East Perth Station - these arrived on site in late 1948 and formed the nucleus of the tradesmen. The SEC encouraged the recruitment of staff by providing housing in the Hilton Park area, and the new suburb soon had many community amenities. A bus service from the Power Station to Hilton and Fremantle provided a welcome service for shift workers. Over 250 workers were employed at South Fremantle during the 1950s, the majority of whom were men. The female minority were employed in the canteen or on the switchboard. [20]

The workers were represented by various trade unions and there were generally good trade relations at South Fremantle. Only one strike came directly out of

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17 Register of Heritage Places - Interim Assessment documentation for P3381 *South Fremantle Power Station*, 28/10/1997, p7.

18 Op cit., Bodycoat, 2003 p.33

19 Annual Report of the State Electricity Commission Western Australia for the year ended 1956, p.19, in Edmonds op.cit. p.31.

20 *Fremantle Gazette*, 20 February 1985, p. 11.

South Fremantle Power Station. This occurred in April 1971 when workers walked out over wages.[21]

There was excellent camaraderie and a strong team spirit amongst the workers at South Fremantle. A quick game of soccer or water polo at lunchtime was not uncommon; others fished or swam. The SEC had the State's first local credit union, which was started at *South Fremantle Power Station* in 1962. Staffed by volunteers, the credit union provided great assistance for workers in financial trouble. There was also a strong social club and the monthly special events were usually well attended; the Christmas parties were a social highlight. After retirement, many workers continued to meet and socialise at the Hilton Park Bowling Club or at the Point Walter Golf Club.[22]

In 1954, a major fire at South Fremantle in the coal conveyor from the crusher house caused structural damage and resulted in a switch to oil fuel for the boilers. A photograph dated 1980 (previously held at the Energy Museum in Fremantle which no is longer in operation)) shows coal on site at South Fremantle. Conversion back to coal, as happened at *East Perth Power Station*, also occurred at South Fremantle in the mid-1970s and coal then fueled this station until its closure in 1985.[23]

In 1956 the Wellington Dam Hydro-electric Generating Station was commissioned and Collie Power Station interconnected with East Perth and South Fremantle. With the start of the development of the South West Power Scheme, the building of an interconnected power grid became necessary. Due to the high cost of transporting coal from the Collie coalfields to the Metropolitan area, considerable savings could be effected by building the next major power station at Bunbury, where an adequate supply of seawater was also available for cooling. In May 1957, the new Bunbury Power Station commenced operation with one 30 MW-turbine and two 15 MW boilers, and the metropolitan and south west power systems were connected in the same year with first of two the Bunbury to Cannington 132 kV lines. Bunbury, Collie, South Fremantle and East Perth power stations were thus linked to form the interconnected grid.[24]

The second and third 30 MW units came on line in Bunbury in 1959 and 1960, and the fourth in 1961.

Later, when an alternative method of cooling became available with considerably reduced requirements of cooling water, the third major power station was built at Muja on the Collie coalfields. The location of this station, alongside the major open-cut coal seam, again greatly reduced the cost of conveying coal from the mine to the face of the station bunkers. The decision to construct Muja power station stage A with two 60 MW coal fired generating units was taken in 1960; the second stage B at Muja was decided in 1963. The first unit came into operation in 1965 with interconnection into the Bunbury grid. The second unit

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21 Reid, S., op. cit., pp. 1-2.

22 ibid, p. 2

23 Register of Heritage Places - Interim Assessment documentation for P3381 *South Fremantle Power Station*, 28/10/1997, p 8.

24 Ibid, p.8.

came into operation in 1966 when the Muja Power Station was opened by the Premier David Brand. Muja units 3 & 4 came into operation in 1968 and 1969. [25]

At Kwinana in September 1970, the first 120 MW unit of a new oil-fired power station came on line, prior to the official opening by Sir David Brand in November of that year. In November 1971, the second 120 MW at Kwinana came on line; the No. 3 120 MW and gas turbine in October 1972; and the No. 4 unit in December 1973. In that year, the Power System Control Centre at East Perth Power Station became operational.[26]

The new power stations predominantly used oil-burning generators. When the political situation in the Middle East in the early 1970s sparked international oil price hikes, it became uneconomical for power supply to the south-west of the State to depend so heavily on burning oil. In 1974 the almost non-operational coal-burning plants at East Perth, South Fremantle and Bunbury were pressed back into full-time service to reduce the electricity grid's dependence on oil. Increased awareness of environmental concerns meant that the thick black smoke and ash fallout from the coal burning stations was no longer acceptable, and measures were taken, including the installation of precipitators, so that by 1977 the stations were meeting emission standards.[27]

The No. 5 unit, 200 MW turbine at Kwinana Power Station came on line in March 1976, and the No. 6 in April 1978. Conversion of Kwinana to coal commenced in 1978 and was completed in 1979.

Each new power station with its larger machines operating at higher steam pressures and temperatures, together with a reduction of operating and maintenance staff per kilowatt hour generated, resulted in higher generation efficiencies which gradually phased out the operation of the older stations as 'base load stations'. [28]

Further extensions to Muja Power Station were completed in 1980 and 1982. Power generation ceased at East Perth in December 1981, bringing to an end 65 years of continuous power generation at that station. Further stages at Muja Power station were officially opened in 1985, and in September that year, the *South Fremantle Power Station* was closed and approximately 70 workers were laid off. The production of electricity at South Fremantle had become uneconomical.[29] The interconnected grid then was supplied from the power stations with more up-to-date machinery and closer to the coal source at Collie - Bunbury, Kwinana and Muja.[30]

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25 Ibid, p.8.

26 Ibid, p. 9.

27 Edmonds op.cit. pp.75-76.

28 Register of Heritage Places - Interim Assessment documentation for P3381 *South Fremantle Power Station*, 28/10/1997,in Bodycoat, R., 'South Fremantle Power Station: Conservation Management Plan' Volume Two, prepared for Western Power Corporation, June 2003, amended November 2003, p. 6..

29 *Fremantle Gazette*, 20 February 1985, p. 11.

30 Register of Heritage Places - Interim Assessment documentation for P3381 *South Fremantle Power Station*, 28/10/1997, in Bodycoat, R.,'South Fremantle Power Station: Conservation Management Plan' Volume Two, prepared for Western Power Corporation, June 2003, amended November 2003, p 9.

Between 1994 and 1997, action on the site included the documentation, contracting and completion of asbestos removal, the clearing out of all plant and equipment from the entire building and the complete removal of the Workshops and Stores, Amenities Building, Canteen and Ash Pump Chamber and associated structures and services.

The place has been unused since its closure, and in 2020 is vacant and vandalised.

13. 2 PHYSICAL EVIDENCE

The following physical evidence is based on the 1997 assessment documentation for this place and was updated in October 2020 by Nisar Dar, Dar Studio, Architecture & Heritage. For a detailed account of the physical evidence, refer to 'South Fremantle Power Station Conservation Plan', prepared by Ronald Bodycoat Architect for Western Power Corporation in November 2003.

South Fremantle Power Station was built between 1946 and 1951 on coastal dunes on the foreshore of Cockburn Sound. The main power station is a high volume steel frame and concrete industrial building designed specifically for the function of power generation.

The place has a strong monumental presence in the locality due to its scale, isolation in the surrounding landscape and imposing industrial aesthetic demonstrating a complementary mix of Art Deco, Inter War Functionalist and Stripped Classical architectural styles. The use of Art Deco is characterised though the emphatic vertical window openings and slender piers to the north and south elevations, and the building's generally strong vertical and horizontal symmetry. The Inter War Functionalist influence is displayed through the use of steel and reinforced concrete to achieve wide spans and high rise construction, and the extensive use of steel framed windows. The Stripped Classical style is recognised through the symmetry of regular bays with height exceeding width, and the broad horizontal skyline echoing a classical entablature.

It has been derelict since its closure in 1985, which has led to widespread deterioration, vandalism and graffiti.

Siting

South Fremantle Power Station is located on the shoreline at Owen Anchorage in Cockburn Sound to the west of Robb Road, Coogee. The surrounding context comprises of Cockburn Road to the east, the coastal suburb of Coogee to the south and C Y O'Connor Reserve to the north. The Indian Ocean is directly to the west.

The building sits on a relatively flat landscape and with the absence of any other immediate built form makes the place particularly striking as a landmark. Moving further away, views are retained in all directions. From the east, the place is clearly visible when travelling in both north and south directions along Cockburn Road. From the south, the new residential development of Coogee Marina has created vistas of the building within its layout of access roads and streets. From the north at C Y O'Connor Reserve, the view is obscured to some extent by an operational switchyard but nevertheless in the main it is still visible. When viewed from the west seawards, the place is visible as far as the eye can see.

The main bulk of the building contains the former Boiler House and Turbine Rooms. A slender built form that is lower in height extends to the north that accommodates the former Administration Offices, Laboratories and Switch House. There are a number of small additions scattered around the edge of the main structure, with the largest being the Pump House to the west. Separate smaller buildings to the south, which have now been removed, housed workshops, stores, amenities and canteen. A former coal storage area is contained by concrete walling at the top of the bank adjacent to the eastern side of the building and was serviced by rail on the eastern flank. An operational switchyard is located immediately north of the power station and two rock groins project westwards into Cockburn Sound that formed part of the seawater cooling system.

In summary, the place can be categorised into the following key physical components that are readily defined by the form and structure of the building complex. A detailed physical description is provided for each:

- Boiler House for Stations A and B
- Turbine Room for Stations A and B
- Administration Offices and Laboratories
- Switch House (Control Room and Transformers)
- Groynes and Water Basin
- Coal Storage Area

The following structures have been removed but a brief physical description is provided to enable a full understanding into the functioning of the power station and also because they were located within the curtilage of the place:

- Coal Handling Crusher Plant & Equipment
- Amenities Building
- Ash Disposal
- Workshop and Stores
- Canteen

Boiler House for Stations A and B

This is the highest volume structure of the power station that previously accommodated boilers for both stations known as A and B. It is of simple rectangular form aligned in a north to south direction adjacent to the former coal store to the east. It is a substantial open volume steel frame structure of approximately 25m in height with reinforced concrete external walls rendered with paint finish. A strong system of columns and beams express the structural frame of the building on its three external facades incorporating numerous openings of different size and proportion. There is a deep roof parapet to the perimeter of this part of the building that helps to define its built form. The roof is a flat concrete structure with eight square penetrations remaining from where the smoke stacks for the boilers have been removed. Windows are steel frame with glazing bars throughout with the majority of the glazing now broken or destroyed.

The east elevation is approximately 120m in length and consists of 24 repetitive structural bays. These are 5m in width and clearly defined by the vertical expression of the columns. The fenestration of each bay is divided into three windows of equal width that vary in height and position as they are distributed between each of the horizontal beams. There is also a noticeable section of blank wall to each bay towards the top of the building. This elevation treatment turns the corner to both the north and south elevations with use of one structural bay of the same fenestration. Both these end elevations are then dramatically characterised with huge elongated windows set in a bank of three structural bays. There are three windows of equal width to each bay spanning the majority of both these north and south façades. The sheer amount of windows allow light to fill the internal of the building creating a cathedral like space with the contrast of light and dark becoming a key physical characteristic.

Internal steel framing is exposed with a mezzanine walkway floor running along the length of the space. The flooring of the mezzanine is concrete with ceramic tile finish supported on a secondary steel framing system.

The precipitators and chimneys and all plant and equipment have now been removed.

Turbine Room for Stations A and B

Located directly adjacent to the west of the Boiler House is the Turbine Room for both stations A and B. Similar to the Boiler House it is of simple rectangular form aligned in a north to south direction. It is approximately 22m in height making it slightly less than the Boiler House with a series of clerestory windows bridging the gap between the two roof levels. The height of this part of the building then steps down further in a westwards direction by approximately 7.5m with the difference in roof levels again separated by a series of clerestory windows. The Pump House for the power station is expressed as a small rectangular addition to the west of the Turbine Room being of a reduced height but of the same architectural detail.

The materiality and general architectural expression of the Turbine Room is the same as that of the Boiler House with a strong system of columns and beams expressing the structural frame of the building and the external walls being of reinforced concrete with a rendered paint finish. The roof and window detailing is also the same.

The west elevation has its massing generally reduced in comparison to the east by the stepping down in height towards the ocean. The 5m structural grid as per the Boiler House is utilised in the Turbine Room with each bay having three windows of equal width, which then vary in height across the façade. The north and south elevations are similar to that of the Boiler House with elongated window fenestration within the structural bays.

Internally the Turbine Room is an open, high volume, two-level steel framed structure free of intermediate columns, with a concrete roof supported on an exposed parallel chord steel truss system. A mezzanine floor is located to the western side of the space with a series of gantries spanning over the main volume. Floors were formerly finished in quarry tiles or open-mesh steel flooring with walls finished to dado height in glazed ceramic tiles. A full height concrete wall with a series of openings at ground level separates the Turbine Room from the adjacent Boiler House.

Station A housed two Metropolitan Vickers steam turbines powering two 25 MW direct coupling alternators, now completely removed. An overhead crane remains in place that serviced the full length of the Turbine Room. The former turbo alternators, switchgear and condensing plant have been removed entirely.

Administration Offices and Laboratories

The connection between the Turbine Room and the Switch House is a 2/3 level administration building of approximately 9m in height, and also of similar construction and design to the remainder of the building complex. The main visible difference is the window fenestration to the east and west elevations where there is a combination of one and two windows per structural bay as opposed to three that is used in the Boiler House and Turbine Room. This reduction in the amount of windows to wall area creates a noticeable contrast in architectural expression between the adjoining structures.

The main entrance Hall is a single high-volume chamber housing an impressive, grand, surviving terrazzo staircase which rises in a single flight towards the western wall, then divides each side to the main and intermediary floors. The design of the staircase, balustrading and lighting fittings are characteristic of the immediate post-war period, reflecting the carry-over of design motifs from the 1930s.

Switch House, Control Room, and Transformers

These functions were housed in a two-level extension located at the most northern extremity of the power station, again of similar construction and design as the adjacent structures. The height of this part of the building is the lowest part of the complex at approximately 7.5m, which is similar to that of the Pump House. Like the Administration Offices and Laboratories component, the window fenestration is different to that of the Boiler House and Turbine Room with the use of one window opening per structural bay. This architectural treatment is considered to present itself as the most resolved element of the power station. Its symmetrical composition and strong, confident expression of the structural frame epitomises its function as the control centre for the generation of power. All plant and equipment has now been removed.

Groynes and Water Basin

Two stone groynes extend from the shoreline on the western side of the station building into Cockburn Sound that formed a Water Basin for cooling water used in the power generating process. A trash rack or filter survives at the seaward extremity of the groynes. Circulating seawater intake plant survives at the shoreline, connected into the pump wells onto the western edge of the Station building. The Water Basin is silted up and the trash rack and plant are now in a deteriorated condition.

The following components of *South Fremantle Power Station* have been removed:

Coal Handling Plant & Equipment (No Longer Extant)

Collie coal was transported to the eastern boundary of the site by railway. Trucks passed through a rotary tippler, which emptied coal into a hopper beneath to be

elevated by means of a skip to the top of the crushing house where the coal passed over screens to separate small and large coal. Inclined conveyors fed from the crusher across to the Boiler House. Coal was stockpiled in a large yard capable of holding 25,000 tons at a higher level than the Power Station on the eastern side and contained within a concrete perimeter wall. The tippler, crusher house and coal conveyor system have been removed. Only the coal storage area remains extant.

Ash Disposal (No Longer Extant)

At the southern end of the Boiler House, a steel framed Ash Pump Chamber, clad in corrugated asbestos cement sheeting. This collected ash carried from the boilers in underground sluice channels and pipework, to be pumped to the southern end of the site to settling pits. The ash disposal plant has been removed.

Workshops and Stores (No Longer Extant)

A separate steel framed workshop and store building was formerly located immediately south of the Turbine Room. This was a single-storied industrial building of 5 bays of saw-tooth steel trussed roofing clad in corrugated asbestos cement sheeting. The walls and floor of the building were reinforced concrete. The building, formerly in a deteriorated condition due directly to vandalism and lack of maintenance, has been completely removed.

Amenities Building (No Longer Extant)

A separate single storied timber-framed amenities building with masonry dado was formerly located south of the Boiler House and east of the Workshops. The seven-bay building had a hipped roof clad in asbestos cement sheeting. The building formerly in a deteriorated and heavily vandalised condition has been completely removed.

Canteen (No Longer Extant)

Located south from the Amenities Building, the Canteen was formerly a single storied timber-framed building sheeted externally with weatherboarding, over a masonry dado. The gable ended pitched roof is clad in corrugated asbestos cement sheeting. The building formerly heavily vandalised, has been completely removed.

Part of the operational switchyard is within the curtilage but is not considered to be of heritage significance.

13. 3 COMPARATIVE INFORMATION

Power Stations in Western Australia

South Fremantle Power Station is one of only two power stations in the State which express a strong architectural character in their buildings, achieved through the use of masonry walls with large areas of glazing, the other being P3318 *East Perth Power Station* (1913-1973) RHP. Both were designed as prominent, impressive buildings whose visual presence demonstrated the importance of electric power and the industrial process of power generation, and were intended to set the standard for subsequent power generating installations. Some of the contemporary building forms at *South Fremantle Power Station*

were applied to the subsequent Frequency Changer building at *East Perth Power Station*.

Subsequent power stations (Collie, Bunbury, Muja and Kwinana) were constructed as framed buildings clad in lightweight materials with limited glazed walling and are therefore not comparable.

Other Power Stations on the Historic Heritage Database are not comparable in terms of scale, design or period of construction, as they either generated power on a local level or acted as electricity substations.

There are four other large 1950s thermal power stations in Australia entered on heritage lists or the former Register of the National Estate. These are:

- Howard Power Station, Harvey Bay, Qld, a Functionalist style power station that operated from 1951 to 1980;
- Museum of Fire, Penrith, NSW, a Post-War International style power station that operated from 1953 to 1970;
- Wangi Power Station Complex, Lake Macquarie, NSW, which operated from 1958 to 1986 and was for a time the largest operating power station in New South Wales; and,
- White Bay Power Station, Leichhardt, NSW, a 1912 power station extended 1927 and 1958, with the 1958 extensions being a steel-framed Boiler Room with extensive glazed curtain walling. This is the only non-operational power station in New South Wales to retain its plant and equipment.

It is likely that a number of working power stations from this era remain around the country but have not been entered onto heritage lists, such as Port Augusta's Playford Power Station, which has operated since 1954 (stage one) and 1960 (stage two) and, together with the newer adjacent Northern Power Station, supplies approximately 40% of electricity used in South Australia's grid.[31]

The technology of *South Fremantle Power Station* was typical of post-war large thermal power stations. It is important as the first station to be built as part of an interconnection scheme for the southwest of the State.

South Fremantle Power Station is a good representative example of the many power stations built around Australia in the early 1950s, and a rare extant example of a finely designed masonry power station in Western Australia.

13. 3 REFERENCES

Bodycoat, R., 'South Fremantle Power Station: Heritage Assessment', commissioned by the Department of Commerce and Trade, August 1994.

Bodycoat, R., 'South Fremantle Power Station, Heritage Assessment Review' prepared for the Heritage Council of Western Australia, July 1997.

Bodycoat, R., 'South Fremantle Power Station: Conservation Management Plan' prepared for Western Power Corporation, June 2003, Amended November 2003.

31 http://www.littlehills.com/travel_information/sa.portaugusta.shtml, 31 March 2004.

13.4 FURTHER RESEARCH

Oral histories of former Station engineers and staff.

GOVERNMENT OF WESTERN AUSTRALIA

HERITAGE COUNCIL

HC CURTILAGE MAP P3381-1
South Fremantle Power Station

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