Conservation Management Plan
KINGSTON POWERHOUSE HISTORIC PRECINCT

VOLUME A

OCTOBER 2023

Prepared for

Suburban Land Agency

ACT Government

Prepared by

PLA
PHILIP
LEESON
ARCHITECTS

Report Issue Register

Issue	Date	Issued to
Draft for Client Review	16 October 2020	artsACT, SLA
Draft for Client Review	02 November 20220	artsACT, SLA
ACT Heritage Council Approval	05 November 2020	ACT Heritage
Revised CMP for Client Review (addressing ACT Heritage Council advice 12 January 2021)	31 March 2021	artsACT, SLA
ACT Heritage Council Approval	13 April 2021	ACT Heritage
Revised CMP for Client Review (addressing ACT Heritage Council advice 19 July 2021 and incorporating Fitters' Workshop)	12 July 2022	SLA
Revised CMP for Client Review	12 August 2022	SLA, artsACT
ACT Heritage Council Approval	17 August 2022	ACT Heritage
Final	9 October 2023	ACT Heritage, artsACT, SLA, ACT Heritage Library

Quality Assurance

This report has been reviewed and approved for issue in accordance with the Philip Leeson Architects Procedures Manual.

Acknowledgement of Country

PLA respect and acknowledge past, present, and future traditional custodians and elders of the lands on which we live and work. We acknowledge and extend our respect to all Australia's Indigenous peoples.

Cover image: *Kingston Powerhouse (1926)*
(Source: National Archives of Australia, A3560, 150)

ACT Heritage Council

Notice of Approval of Conservation Management Plan under Section 61K of the *Heritage Act 2004*

The ACT Heritage Council (the Council) has approved the "*Conservation Management Plan Kingston Powerhouse Historic Precinct*" (Philip Leeson Architects, 2022) for the Kingston Powerhouse Historic Precinct on 12 September 2023.

In approving this Conservation Management Plan, the Council is satisfied on reasonable grounds that the conservation policies and actions contained therein will ensure the conservation and responsible management of the Kingston Powerhouse Historic Precinct, subject to the following conditions:

1. The CMP is approved for a maximum period of five years.

2. The heritage view corridors from East Lake and Bowen Park as identified in Conservation Policies 8.1 and 8.2 of the CMP are to remain open and unconstrained, to allow for high quality views to the Powerhouse building.

3. Implementation of conservation policies and maintenance actions described in this CMP are the responsibility of the owner/manager of the place;

4. Within 12 months of this decision, a draft Interpretation Strategy for the Precinct is to be submitted to the Council for review.

5. This Notice of Approval is to be inserted after the cover page of the CMP, and the CMP circulated to any user or other interested party, and also submitted to the ACT Heritage Library for public reference.

Duncan Marshall
Chair (as delegate for),
ACT Heritage Council
12 September 2023

GPO Box 158 CANBERRA ACT 2601
heritage@act.gov.au

1 Executive Summary

This Conservation Management Plan (CMP) has been prepared to guide future conservation, change and management of the Kingston Powerhouse Historic Precinct. The Precinct is included on the ACT Heritage Register (H48).

A Conservation and Management Plan was initially prepared for the Kingston Powerhouse Precinct in 1993 and was updated in 2001. A separate CMP was prepared for the Fitters' Workshop and approved by the ACT Heritage Council in April 2019. This plan focused on the Fitters' Workshop and did not cover other parts of the listed heritage place.

The Kingston Powerhouse Historic Precinct has undergone a substantial amount of change since the last update 20 years ago with several buildings on the site demolished during the intervening time. Rejuvenation of the surrounding industrial area has also been undertaken with the Kingston Foreshore transformed into a mixed-use waterfront development. The Powerhouse building has also been adaptively reused to house the Canberra Glassworks. In addition, it is also noted that both planning and heritage legislation in the ACT has changed since the previous CMP was prepared. This includes the adoption of the HERCON (Heritage Convention) criteria by the ACT Heritage Council.

The Kingston Powerhouse Historic Precinct is owned by the ACT Government with several agencies responsible for different parts of the precinct. Currently, the land and landscaping are managed by the Suburban Land Agency and the revenue from public parking is collected by Access Canberra. The facilities management responsibilities for two of the buildings (the Powerhouse and the Switch Room) lies with artsACT whilst the third building, the Fitters' Workshop, is managed by ACT Property Group. Each of these buildings, as well as several early trees and remnant industrial infrastructure such as the railway corridor, are part of the Kingston Powerhouse Historic Precinct.

The Historic Precinct includes the Fitters' Workshop in the south-east and the Switch Room to the north-west. It also includes the remnants of the railway embankment to the north-east and extends to Wentworth Avenue in the south-west. The southern portion of the Historic Precinct extends to the intersection of Wentworth Avenue and Eastlake Parade to capture the remaining trees from the 1920s wind break.

Historic Development

The Powerhouse, which was amongst the first permanent buildings erected for the Federal Capital, was completed in 1915 and commenced generating power in that same year. The Powerhouse operated on and off over a 42-year period, though initially operated for only 14 years after which Canberra was connected to the NSW electricity grid and power was supplied by the Burrinjuck Hydro Electric Power Station.

A review of contemporaneous power stations in Australia (Analysis and Statement of Significance chapter) confirms that power generation technology was rapidly developing at the time the Kingston Powerhouse was constructed and meant that the equipment at Kingston quickly became outdated. At this time, the remote location of Canberra and the small population meant the power generation from other sources was also more economically viable. Many of the power stations that remain from this period in Australia are now an assemblage of buildings and structures with numerous additions owing to the pressure to continue increase production capacity. This means that the buildings are generally less intact than the Kingston Powerhouse, though it is noted that some examples, unlike Kingston, do retain power generating machinery.

The Fitters' Workshop was completed in 1916, the year after the completion of the Powerhouse. A substantial windbreak, of which only several trees remain at the corner of Wentworth Avenue and Eastlake Parade, was planted to the south of the Kingston Powerhouse Historic Precinct in 1919-20. These plantings were incorporated into the median strip of Wentworth Avenue when it was duplicated in 1928. They include Blue Gums (*Eucalyptus bicostata),* River Peppermints (*Eucalyptus elata)* and Monterey Pines (*Pinus radiata*).

The Powerhouse was brought back into service on three occasions, the first of which was in the late 1930s when supply from the Burrinjuck Power Station was impacted by the need to strengthen the dam wall. In the early 1940s it was again made partially operational to supply the Belconnen Naval Station,

and between the late 1940s and early 1950s it operated to ease supply when there were shortages in the NSW grid. As part of this last phase of reactivation a new Switch Room building was constructed in 1948 and a new chimney erected to the rear of the economiser annex in the late 1940s.

The ACT Electricity Authority occupied the Powerhouse site following the cessation of power generation from the original Powerhouse in 1957. By the early 1980s the heritage value of the Kingston Powerhouse Historic Precinct was beginning to be recognised. Since the late 1990s the ACT Government has undertaken various studies relating to the establishment of a unique arts precinct which involves the conservation and adaptation of the Kingston Powerhouse Historic Precinct. In 2003 the ACT Electricity Authority vacated the site and in 2007 the Powerhouse was adapted into the now renowned Canberra Glassworks, forming the first stage of the arts precinct in Kingston.

Significance

The significance of the Kingston Powerhouse Historic Precinct has been reviewed against the criteria for heritage significance as established by the ACT Heritage Council and based on the HERCON criteria. These criteria differ to those previously used to assess the Precinct. The statement of significance has been updated to reflect the adoption of these new criteria and incorporate additional information that has come to light during the preparation of this CMP. It has been confirmed that the Kingston Powerhouse Historic Precinct is significant to the ACT for the following reasons:

- The Precinct is historically significant as the Powerhouse and Fitters' Workshop were amongst the first permanent buildings constructed for the new Federal Capital. The construction of the Powerhouse was fundamental to the development and establishment of Canberra as it provided power to various essential services including the Cotter Pumping Station, which supplied Canberra with water.

  The selection of this Powerhouse site was driven by the need to have access to cold water (to cool condensing steam) and a railway line to transport coal (to fire the boilers). The railway that serviced the Powerhouse was also used by passenger services whilst the railway line to the south of the Powerhouse extended to the Yarralumla brickworks to transport bricks that were used to construct prominent Canberra buildings in the mid-1920s.

  The whistle located on the roof of the main Powerhouse building is significant as it was an important soundscape feature throughout Kingston. The World War II air raid siren is also significant and a rare example that remains in its original location.

  The surviving trees at the corner of Wentworth Avenue and Eastlake Parade are significant as remnants of Thomas Charles Weston's 1920s windbreak plantation along Interlake (now Wentworth) Avenue and relate to the first phase of development in the new Capital.

  The 1948 Switch Room building provides evidence of the last period of reactivation of the power station which occurred between 1948 and the mid-1950s, as does the chimney base to the rear of the Powerhouse which was also erected in the late-1940s. (Criterion A)
- As the only centralised power station constructed for the Federal Capital, the Kingston Powerhouse is significant to the ACT. The Kingston Powerhouse Historic Precinct is associated with Canberra's early engineering history and is relatively rare as a surviving part of the initial civil infrastructure that was put in place to facilitate the development of the Federal Capital. (Criterion B)
- The extant buildings at the Kingston Powerhouse Historic Precinct are of representative significance as structures constructed for the manufacture and distribution of power and the surviving fabric demonstrates various aspects of how power was generated using coal.

  The Kingston Powerhouse and Fitters' Workshop are good examples of early 20th century industrial architecture. The substantial Powerhouse building and Fitters' Workshop with distinctive industrial aesthetic retain landmark qualities when viewed from the surrounding streets.

  Both the Powerhouse and the Fitters' Workshop, which are related stylistically, are of representative (aesthetic) significance. Designed by noted architect John Smith Murdoch, they

are early examples of his stripped classical mode which became known as the Federal Capital style. (Criterion D)

Condition

Whilst the Powerhouse, associated chimney, Fitters' Workshop and the 1948 Switch Room are mostly in good condition, there are several areas where significant fabric has deteriorated. The main defects relate to the deterioration of elements located on the upper parts of the buildings, such as fascia boards and flashings, that are difficult to access. A number of ongoing issues with damp were also noted, including falling damp to the chimney base and possible rising damp to some of the concrete walls of the Powerhouse and Fitters' Workshop. A condition assessment of the Powerhouse and 1948 Switch Room has been appended to this CMP (Appendix E).

Policy

A series of opportunities and constraints have been examined as a precursor to the ensuing conservation policy section of this Conservation Management Plan. These relate to the significance of the Precinct, statutory requirements, management context and stakeholders including the ACT Governments vision for the site and proposed Kingston Arts Precinct, as well as the current condition.

The conservation policy has been developed according to the attributed significance of the place. The ongoing management of the place and proposals for change shall be considered with respect to this policy. Policies have been formulated relating to this Conservation Management Plan, statutory authorities, maintenance, building conservation, use, setting, views and vistas, future development, interpretation and archaeology.

Noting the ongoing ACT Government commitment to the establishment of a visual arts precinct that is associated with the Kingston Powerhouse Historic Precinct and completion of the Kingston Foreshore estate, conservation policy has been developed to guide the management of the Historic Precinct leading up to the establishment, implementation and operation of the Kingston Arts Precinct and development of Section 49 as Stage 5 of the Kingston Foreshore estate. The purpose of this policy is to minimise impacts on the significance of the Precinct, particularly by retaining key visual links, both from within and outside the Precinct, as well as maintaining the dominance and primacy of the Powerhouse.

In addition to the conservation of significant structures and trees, the spatial relationship between the various significant elements including the Powerhouse, Fitters' Workshop and former Powerhouse railway sidings is key to understanding the former use of the site and must remain evident. The conservation policy also includes provisions for implementation of an interpretation strategy and facilitating public access as a way of improving awareness of the heritage significance of the place.

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3 Introduction

3.1 Overview

This Conservation Management Plan (CMP) update for the Kingston Powerhouse Historic Precinct was initially commissioned by artsACT and has been continued by the Suburban Land Agency (SLA). artsACT will be responsible for the management of all buildings located in the Kingston Powerhouse Historic Precinct (subject site). These buildings are the Powerhouse, the Fitters' Workshop and the 1948 Switch Room. The Powerhouse and the 1948 Switch Room are both currently used by the Canberra Glassworks whilst the Fitters' Workshop is available for event hire. This CMP includes these three buildings as well as the associated landscape elements and remaining industrial infrastructure.

3.2 Location

The Kingston Powerhouse Historic Precinct (H48) is located in Section 49, Kingston. The main Powerhouse building is located on Block 12 and the remainder of the Kingston Powerhouse Historic Precinct is located on Block 15. Section 49 is bound by Wentworth Avenue to the south-west and Eastlake Parade to the north-east with sections 45 and 52 adjoining the south-east end. The former Transport Depo,t which is included separately on the ACT Heritage Register, is located adjacent (south) to the Kinston Powerhouse Historic Precinct. The formal ACT Heritage Register boundary is shown on the plan included at Section 3.5.

Survey showing the Kingston Powerhouse Historic Precinct (yellow shaded area). The main Powerhouse building is located in the central part of the Historic Precinct, the Fitters' Workshop is positioned at the south-east end and the 1948 Switch Room is located on the north part (red arrow).
(Source: Survey prepared by Veris for the SLA)

3.3 Previous reports

The following Conservation Management Plans have previously been prepared for the Kingston Powerhouse Historic Precinct.

- Kingston Power House Precinct Conservation Management Plan Review, Peter Freeman Pty Ltd, 2001
- Kingston Power House Precinct Conservation and Management Plan, Freeman Collett & Partners Pty Ltd, 1993
- Fitters' Workshop Conservation Management Plan, updated Duncan Marshall, 2018 (approved by ACT Heritage Council, April 2019). The 2018 CMP is an update of a 2011 CMP prepared by Duncan Marshall, Keith Baker, Navin Office Heritage Consultants and Brendan O'Keefe.

Both the 1993 and 2001 management plans prepared for the Kingston Powerhouse Historic Precinct covered the full extent of the area covered by the ACT Heritage Register entry. As the title suggests, the Fitters' Workshop Conservation Management Plan focussed on the Fitters' Workshop.

3.4 Background

This Conservation Management Plan (CMP) has been prepared to guide future conservation, change and management of the registered Kingston Powerhouse Historic Precinct. An up-to-date CMP that reflects the current heritage status and extant physical fabric of the Historic Precinct is required for the reasons outlined below.

- Whilst the impact of new works in the Historic Precinct (including change in land use and changes to the existing buildings) can be managed through other available heritage and planning processes, specific conservation policy can be provided in a CMP that has been approved by the ACT Heritage Council.[1] The policy in an approved CMP meets the requirements of the ACT Heritage Council and assists to conserve the heritage place and provide greater certainty to owners and place managers.
- The Precinct has undergone a substantial amount of change since the last precinct-wide CMP update was completed about 20 years ago. This includes the demolition of several buildings within the Historic Precinct and the adaptive reuse of the Powerhouse building. In this time, the rejuvenation of much of the surrounding industrial area has also been undertaken with the Kingston Foreshore transformed into a mixed-use waterfront development. The provision of an arts centre within the Kingston Powerhouse Historic Precinct has been a key element in the design of the Kingston Foreshore since planning for the transformation of the waterfront began in the late 1990s. The ACT Government is committed to delivering the Kingston Arts Precinct in a manner that is sensitive to its surroundings, its cultural heritage and future sustainable living.
- The ACT *Heritage Act 2004* was introduced since the previous CMP was prepared. Whilst the place was included on ACT Heritage Places Register in June 2000, heritage legislation in the ACT has been amended and has included the adoption of the HERCON (Heritage Convention) criteria which differ to the criteria used in previous assessments of the Historic Precinct (the previous CMP and the ACT Heritage Register Entry).

3.5 Heritage status

The Kingston Powerhouse Historic Precinct (H48) has been recognised as having heritage value by the relevant authorities/organisations as outlined in the table below. There are statutory implications associated with the first listing only. Whilst the National Trust Register is a non-statutory list, classification by the National Trust is widely regarded as an authoritative statement of the heritage significance of a place (they were the first organisation to identify its heritage significance). The Register of the National Estate is maintained as an archive only.

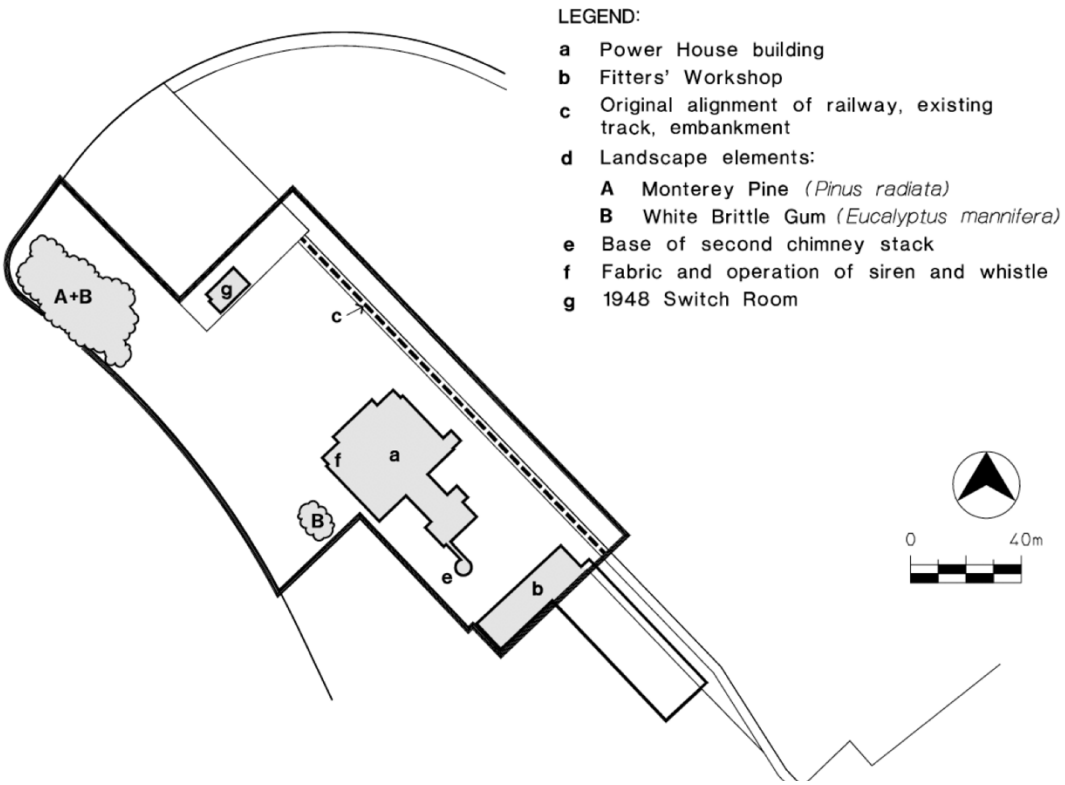
[1] Other approval processes include an Environmental Impact Statement (ESI), an Environmental Significance Opinion (ESO) and Statement of Heritage Effects (SHE).

Listing Type	Organisation	Heritage List	Item	Listing Identification
Statutory	ACT Heritage Council	ACT Heritage Register	Kingston Powerhouse Historic Precinct	H48
Non-statutory	National Trust of Australia (ACT)	Register of Classified Places	Kingston Powerhouse	R012
Non-statutory (archive)	Australian Heritage Council	Register of the National Estate	Kingston Power House	Place ID 13364
Non-statutory	Australian Institute Architects (ACT chapter)	ACT Chapter Register of Significant Architecture	Canberra Glassworks (Kingston Power House)	-

ACT Heritage Register

The Kingston Powerhouse Historic Precinct consists of the following significant features which are identified on the diagram below:

- Power House building together with significant internal fabric identified at Schedule 1 and Figure 48B.
- Fitters Workshop (Bulk Supply Store).
- Original alignment of the railway and existing railway track and embankment.
- Landscape element: Monterey pine (*Pinus radiata* – A), White brittle gum (*Eucalyptus mannifera* – B) [identified as different species in 2020 inspection].
- Base of the second chimney stack.
- Fabric and operation of the siren and whistle.
- 1948 Switch Room.



Kingston Powerhouse Historic Precinct, Significant Features
(Source: ACT Heritage Council citation)

The Kingston Powerhouse Historic Precinct includes the Fitters' Workshop in the south-east and the Switch Room to the north-west. It also includes the railway embankment to the north-east and extends to Wentworth Avenue to the south-east. The south-east portion of the Precinct extends to the intersection of Wentworth Avenue and Eastlake Parade to include the remaining trees from the 1920s wind break. The boundary of the Historic Precinct appears to relate to the boundary of Block 14, Section 8 as shown on Deposited Plan 7238 (8 June 1988). This Block no longer exists.

The study area for this CMP (the subject site) is the area shown in the diagram above as well as significant visual links that are identified in the ACT Heritage Register Entry. It is noted than an additional area to the south-west of the Fitters' Workshop was included in the study area for the approved Fitters' Workshop CMP (2018), though has not been covered by the policy in this CMP as it located outside the boundary of the Historic Precinct.

3.6 Methodology

The methodology adopted in formulating this Conservation Management Plan is in accordance with the guide published by the ACT Heritage Council, *Conservation Management Plans – Guiding Principles*, February 2015. It has also been prepared in accordance with the Australian ICOMOS Charter for the Conservation of Places of Cultural Significance, known as the *Burra Charter* (refer to Appendix A) and informed by James Semple Kerr's *The Conservation Plan,* 7th ed., 2013.

In preparing this document, which covers the full extent of the Kingston Powerhouse Historic Precinct, the following has been undertaken:

- Preparation of a summary history for the site based on the extensive history prepared in previous reports;
- Analysis of the historic operation of the Powerhouse and the infrastructure that was required for power generation (as requested by the ACT Heritage Council);
- Additional historical research, including a summary of the development that has occurred since 2001;

- Review of other CMPs that are relevant to the Kingston Powerhouse Historic Precinct, including those for the Canberra Brickworks Precinct (including the railway remnants) and the John Fowler Locomotive;
- A review of the extant physical fabric, including an assessment of the condition of the fabric;
- A preliminary desktop review of the archaeological potential of the Historic Precinct (as requested by the ACT Heritage Council);
- A review of the heritage significance of the place;
- A review of opportunities and constraints, with regard to the potential redevelopment within the Kingston Powerhouse Historic Precinct;
- A review of existing policy and formulation of updated conservation policies to guide future conservation, management and development of the Kingston Powerhouse Historic Precinct.

3.7 Limitations

Our inspection of the of the Powerhouse and 1948 Switch Room was limited to a visual inspection from ground level and accessible internal areas. No structural or on site archaeological assessments were undertaken.

An assessment of the social values associated with the Kingston Powerhouse Historic Precinct was not part of the scope of this CMP and has not been subject to detailed research for the purpose of establishing the social significance of the Historic Precinct (including aspects related to the broader appreciation of design and aesthetic qualities by the ACT community). It is however noted that engagement with the community and stakeholders has been undertaken on behalf of the ACT Government over an extended period of time as part of planning for the Kingston Arts Precinct (the Historic Precinct would be located within this). Building on previous engagement, further consultation with the community was undertaken in 2022. This process has contributed to understanding aspects of the place that are valued by the community and has informed the Kingston Arts Precinct Place Brief, which provides a series of guiding principles to inform future urban design, management and activation of the Kingston Arts Precinct as a place.

3.8 Authorship

This Conservation Management Plan has been prepared by Philip Leeson Architects, specifically Katrina Keller (Heritage Architect) and Alanna King (Architect, Associate Director). The following subconsultants have also assisted in the preparation of this document:

- Hayley Crossing of Canopy Tree Experts has completed an assessment of the trees and prepared a Preliminary Arboricultural Report (Appendix B).
- Keith Baker (Engineering and Heritage Management Consultant) has prepared a detail historical analysis on the operation of the Powerhouse and the infrastructure associated with power generation.
- Nicola Hayes (Principal Archaeologists) of Navin Officer Heritage Consultants has undertaken a desktop review to identify areas of potential archaeological sensitivity and assist with the development of conservation policy for the Precinct.

3.9 Acknowledgements

The authors wish to acknowledge artsACT and the Suburban Land Agency (SLA) who facilitated the preparation of this CMP as well as Tom Rowney of Canberra Glassworks who provided access to the Powerhouse and the 1948 Switch Room.

It is also important to acknowledge the wealth of existing information about the place provided in pre-existing reports, including the earlier Conservation Plans prepared by Peter Freeman Pty Ltd (2001) and Freeman Collett & Partners Pty Ltd (1993) as well as the Kingston Foreshore Site, Cultural Mapping Study (1996) also prepared by Freeman Collett & Partners Pty Ltd.

4 History

4.1 Introduction

A comprehensive historical analysis for the Kingston Powerhouse Historic Precinct was prepared for the 1993 Conservation and Management Plan (Freeman Collett & Partners Pty Ltd) and was updated in the 2001 Conservation Management Plan Review (Peter Freeman Pty Ltd). A more detailed history of the Fitters' Workshop was also prepared for the Fitters' Workshop CMP (updated Duncan Marshall, 2018). A chronological summary of the documented history is included below and derives largely from the previous CMPs unless referenced otherwise.

In addition to the historical summary, a more detailed historical analysis relating to the operation of the Powerhouse, including the machinery, has been prepared by Keith Baker. A description of events that have occurred since the 2001 CMP is also included as is a brief overview of the work of the Powerhouse and Fitters' Workshop architect John Smith Murdoch.

The information included in this chapter has assisted in reviewing the heritage significance of the former Kingston Powerhouse and subsequently in the review of the conservation policy for the site. The full history from the 2001 CMP Review is included in Appendix C. Original drawings, which were reproduced in the 1993 CMP, are included in Appendix D.

4.2 Historical summary

The Kingston Powerhouse operated on and off over a 42 year period, since it first commenced operations in 1915. With technology rapidly advancing during the early 20th century, the power station quickly became outdated and was less cost effective than larger power plants. This led to it being put on standby after only 14 years of operation. It was subsequently brought back into service on another three occasions the first of which was in the late 1930s when supply from the Burrinjuck Hydro Electric Power Station was impacted by the need to strengthen the dam wall. In the early 1940s, it was again made partially operational to supply the Belconnen Naval Station, and between the late 1940s and mid-1950s it operated to ease supply when there were shortages in the NSW grid.

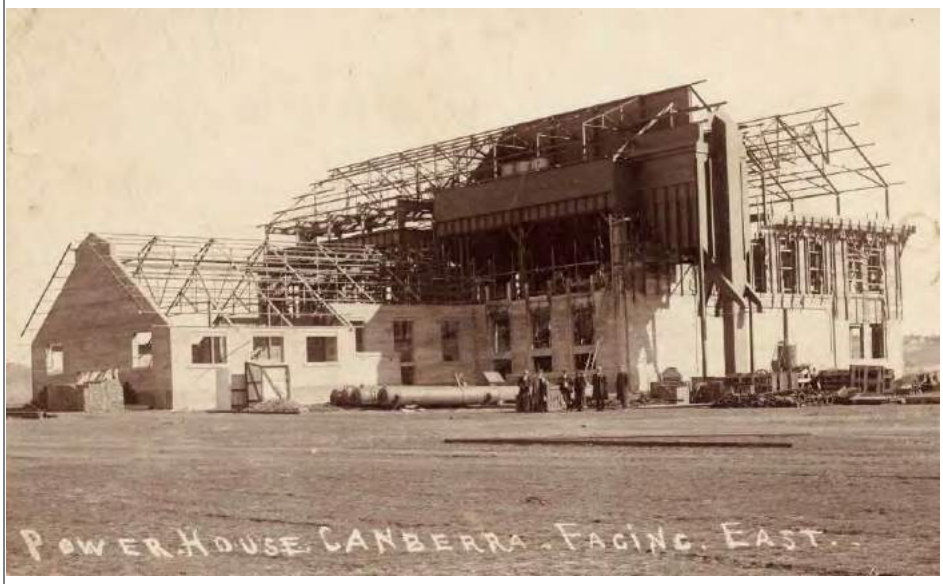
It should also be noted that though the Fitters' Workshop is located within the Kingston Powerhouse Historic Precinct, its function was wider than supporting the operation of the Powerhouse. It formed a key part of a wider industrial complex by enabling maintenance of government owned plant and equipment which was used in the construction of Canberra.

Date	Details
Establishment	
1908	The Yass-Canberra district was selected as the site for the Federal Capital. Leading up to the selection of this site, the possibility of using hydro-electricity to power the Capital was being considered. Whilst gas was also being contemplated, it was decided that one centralised electrical power supply system would be set up and operated by the Federal Government for reasons of reliability and economy. Charles Robert Scrivener together with Percy Owen recommended the site of Canberra and eventually the site of the Powerhouse.
February 1911	Approval was granted to construct a gauging weir across the Molonglo River, close to the intersection with Jerrabomberra Creek. The weir was required to measure the flow of the river as part of a broader assessment of water resources for the new Federal Territory.
April 1911	The competition to design the Federal Capital was announced, with the deadline for submissions initially set for January the following year. In the interim, the Government wished to progress the establishment of the city's foundations, including the provision of power supply.

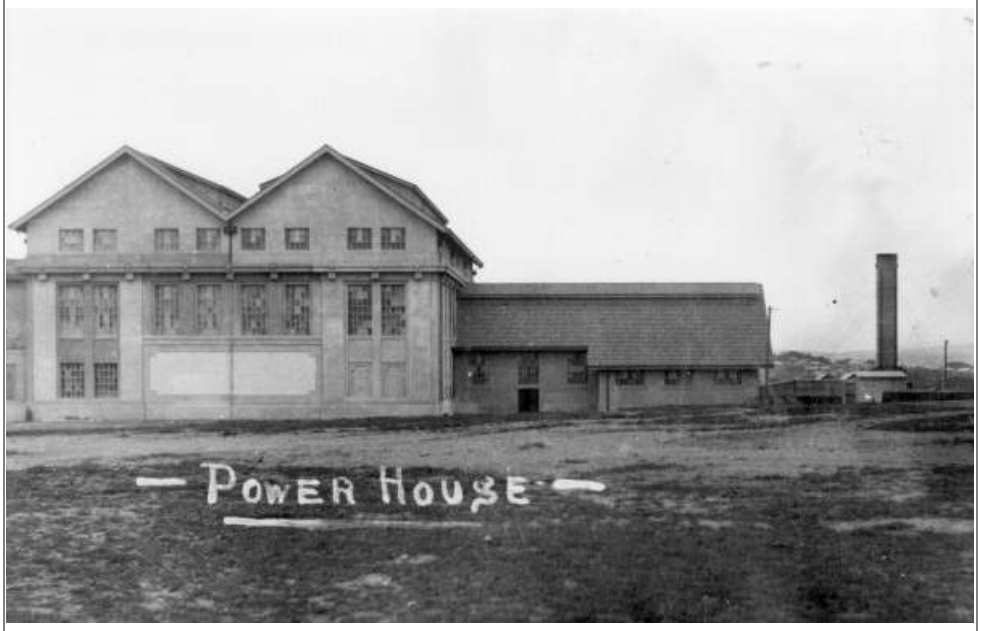
Date	Details
July 1911	A temporary site that was part of Yarralumla Station was selected for a temporary power station. It was located on the south bank of the Molonglo River near the proposed gauging weir which it was hoped would provide a reliable water supply for the power station's condensers. Government officials decided that no permanent structure should be erected before the winning design for the Federal Capital was announced. After being commissioned by the Department of Home Affairs, F W Clements, Chief Engineer and General Manager of the Melbourne Electric Supply Company outlined the equipment required to cater for a population of 25,000 by 1932. Tenders were called for the supply of the generating equipment which included a Bellis and Morcom triple expansion engine and three Babcock and Wilcox boilers. A Greens Economiser (for capturing waste heat from the boiler flues to pre-heat water feeding into the boilers) and a 600kW brush alternator were later added to the list.
1912	Work on the design of the Powerhouse commenced. This was undertaken by John Smith Murdoch who at that time, was Chief Assistant to Percy T Owen, Director-General of the Commonwealth Public Works Branch.[2] Initially, this structure was intended to be temporary and was to be clad in corrugated metal sheeting. The size of the Powerhouse was designed to accommodate the equipment specified by F W Clements. As the most senior engineer in the Department of Home Affairs, Percy Owen was responsible for the Powerhouse project overall, including the generating plant and all external services as well as the Cotter Dam and Pumping Station.
May 1912	It was announced that the favoured design for the city of Canberra was that prepared by the Chicago Architect Walter Burley Griffin and wife Marion Mahony. The temporary site selected for the power station was shown as residential development in the winning scheme. The Departmental Board tasked with implementing the planning of Canberra, revised the Griffins' scheme. In November 1912, they presented their plan with a power station shown on the previously approved temporary site. A railway line was to be constructed from Queanbeyan to Canberra with sidings extending to the power station. This would facilitate the transportation of coal to the power station.
July 1912	The Government acquired the site for the power station.
November 1912	Preliminary work commenced on the Powerhouse site.
January 1913	Construction of the Powerhouse building commenced. Originally intended to be temporary steel-clad structure, it was later decided to construct the walls with bricks from the Yarralumla brickworks, likely reflecting the decision at this point to construct a permanent building. The bricks from the Yarralumla brickworks were however of poor quality, resulting in the decision to enclose the steel frame with unreinforced concrete, which should have been a cheaper material owing to the ready availability of sand and gravel. The drawings for both the brick and concrete designs incorporated projecting bays to the front (north-west) elevation.

[2] Australian Dictionary of Biography Database, entry for Murdoch, John Smith, accessed 27 August 2020

Date	Details
	 *1914 side and front elevations of Powerhouse with concrete walls* *(Source: Kingston Power House Precinct Conservation and Management Plan, Freeman Collett & Partners Pty Ltd)* Plans were also prepared for a decorative brick chimney with a cornice and panelling to match the Powerhouse. Historic photographs however indicate a more utilitarian chimney was erected. In addition to the Powerhouse, workshops and storage buildings were to be erected to the south-east of the main building. By January 1913, the plans showed these were to be constructed in a line running south-east from the Powerhouse.
February 1913	The Departmental Board's revised plan of Canberra was ratified by the Federal Cabinet. This confirmed the site for the Powerhouse.
June 1913	Construction of the section of railway from Queanbeyan to Canberra commenced. Construction of subsidiary structures to the south-east were likely to be well advanced by this time. This included a large engineers' workshop clad in corrugated metal sheeting and three other sheds (a blacksmith's shop, an electrical store and workshop, and a joiners' shop).

Date	Details
	 *Power House, Canberra, facing east, partially constructed (T Channon, circa 1913)* *Note the steel coal hoppers and gantries were installed before the concrete walls* *(Source: National Library of Australia)*
May 1914	The railway branch line from Queanbeyan to Canberra commenced operation with the first train arriving at the Kingston Powerhouse on 25 May. The materials needed for the construction of the Federal Capital were hauled to Kingston and then disseminated throughout Canberra.
By March 1915	Design work for the permanent Fitters' Workshop (extant) had commenced.[3]
Mid-1915	Construction of the Powerhouse building, including installation of the generating equipment, was completed. The Kingston Powerhouse was amongst the first permanent buildings erected in the National Capital. Whilst the power station was considered at the time of the opening to be 'the most modern in Australia', the rapid developments in technology at the time meant that more advanced equipment was soon available.[4] The building was oriented parallel with the railway lines and faced north-west with the front of the building, which incorporates the entry porch, oriented towards the future centre of the Federal Capital.
Operational years	
July 1915	The first electricity was generated at the Kingston Powerhouse.

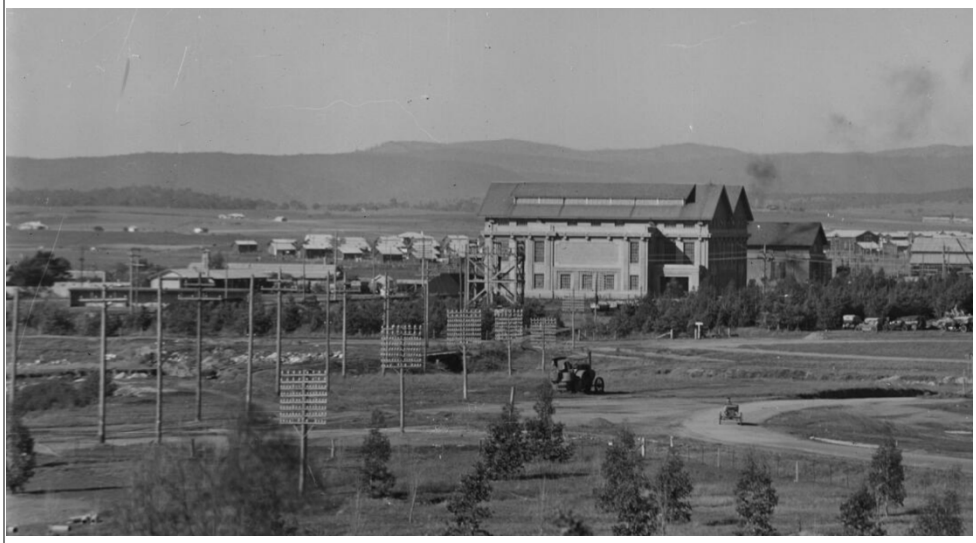
[3] Fitters' Workshop Conservation Management Plan, Updated by Duncan Marshall, 2018, p25
[4] H A Jones, 'Electricity', in *Canberra's Engineering Heritage,* Institution of Engineers, Canberra Division, 1990, p129

Date	Details
	 *'Kingston Power House', Canberra (circa 1916)* *Note that there was no railway line to the south of the Powerhouse at this time* *(Source: ACT Heritage Library, 003674)*
1916	Construction of the Fitters' Workshop was completed.[5] This building was used to service the Territory's plant and construction equipment. The railway line to the south of the Powerhouse was yet to be constructed (refer to image above).  *Powerhouse, Eastlake (circa 1920s, Mildenhall)* *The entry porch to the front of the Powerhouse is indicated. The Fitters' Workshop is evident to the rear of the Powerhouse. A road between the Powerhouse and Fitters' Workshop crossed the railway, where there was limited, if any, embankment* *(Source: National Library of Australia, 2303723)*

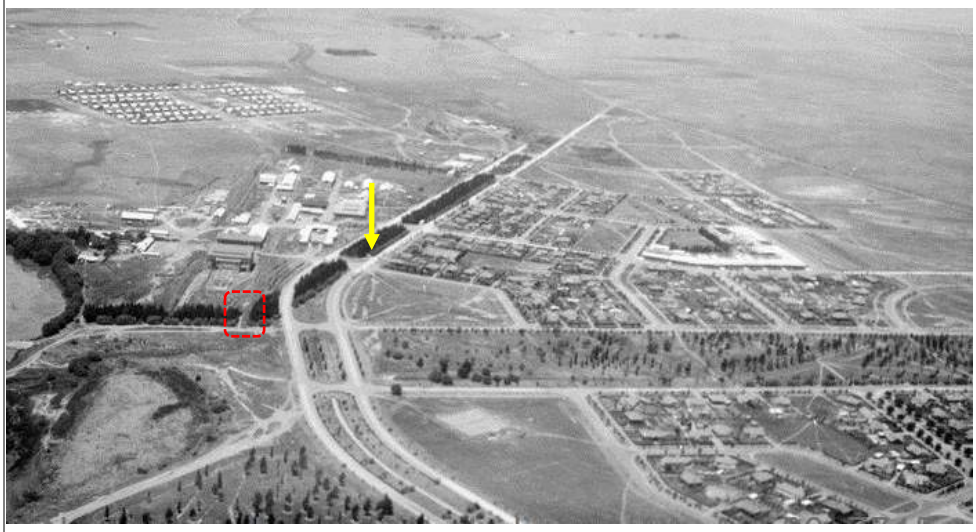
[5] Fitters' Workshop Conservation Management Plan, Updated by Duncan Marshall, 2018, p25

Date	Details
1919-1920	A windbreak was planted along Interlake (now Wentworth) Avenue and what is now an extension of Dawes Street. Thomas Weston was officer in charge of afforestation in Canberra between 1913 and 1926 and is noted to have hated the cold weather, particularly the 'howling wind'. The windbreak consisted of an outer row of acacias, an inner row of eucalypts and four rows of *Radiata pines*.[6] The plantings were also established for the purpose of 'screening less sightly works from higher view-points in the neighbourhood' of the Powerhouse and Stores Depot.[7]  *Aerial of Kingston looking north-west to the Powerhouse (1924). Note the recently planted windbreak* *(Source: National Archives Australia, A3560, 1163)*
1917	A small building had been constructed to the south-east of the Fitters' Workshop and may have been the Blacksmiths' Shop.
By 1922	A flat-roofed addition was constructed to north-east of the Fitters' Workshop. At this time, the machine, fitting and other metal-working shops were reported to have been continuously engaged in repairs, maintenance and renewal of plant used in the Territory, including Powerhouse equipment, Brickworks machinery, traction engines and wagons, steam-roller, portable steam engines, pumps, motor cars etc. In the early 1920s, a small extension was constructed to the Blacksmiths' Shop which was located to the south-east of the Fitters' Workshop. By this time, a traction engine-shed had been erected, with coal staging for easy coaling, together with boiler washing-out appliances.[8] This was presumably located in the roads and sewerage section of the Kingston industrial area which was located to the north-east of the Fitters' Workshop (outside the boundary of the Kingston Powerhouse Historic Precinct).[9]
Circa 1924	The Powerhouse was equipped with a whistle from the HMAS Australia (though a steam whistle had been present earlier).

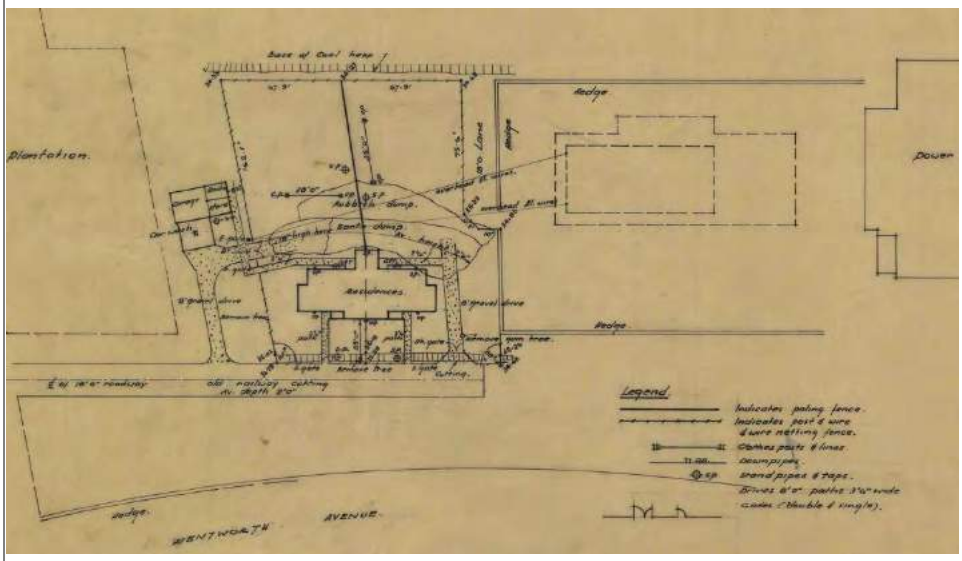
[6] Kingston Foreshore Site Cultural Mapping Study: Volume 1 Cultural Mapping, Freeman Collett & Partners, 1996, p15
[7] Federal Capital Advisory Committee 1st, 2nd and final reports, second report, 1922, p22, National Archives of Australia, A199, FC1926/215
[8] Federal Capital Advisory Committee 1st, 2nd and final reports, second report, p12
[9] Kingston Foreshore Site Cultural Mapping Study

Date	Details
	 *Powerhouse and surrounding fields with bridge for brickwork railway in foreground (circa 1925) (Source: National Library of Australia, 6303951)*
1926-27	Design and construction of the transport (including buses) depot adjacent to the Powerhouse site.[10] The nearby Government Printing Office was also completed at this time,[11] and a sawmill had been established further to the east. By 1927, additions were constructed to the south-east of the Fitters' Workshop, involving partial replacement of earlier structures in this location. The north-east wing was used as Electrical Workshops whilst the south-east wing accommodated a foundry, a repair shop for motor vehicles and a Plumbers' Workshop. After the completion of the additions, the Fitters' Workshop reached its peak activity, with the volume of work decreasing in the years following. With the increase in population resulting from the transfer of Parliament to Canberra, a 1500kW BTH turb-alternator was installed to double the generating capacity of the Powerhouse.
1928	Work commenced on the construction of another roadway on Wentworth Avenue to abolish the 'bottleneck' at the junction of Wentworth and Brisbane avenues. This involved the introduction of a one way traffic route from the Railway Station to State Circuit to alleviate the narrow roadway through Kingston.[12]

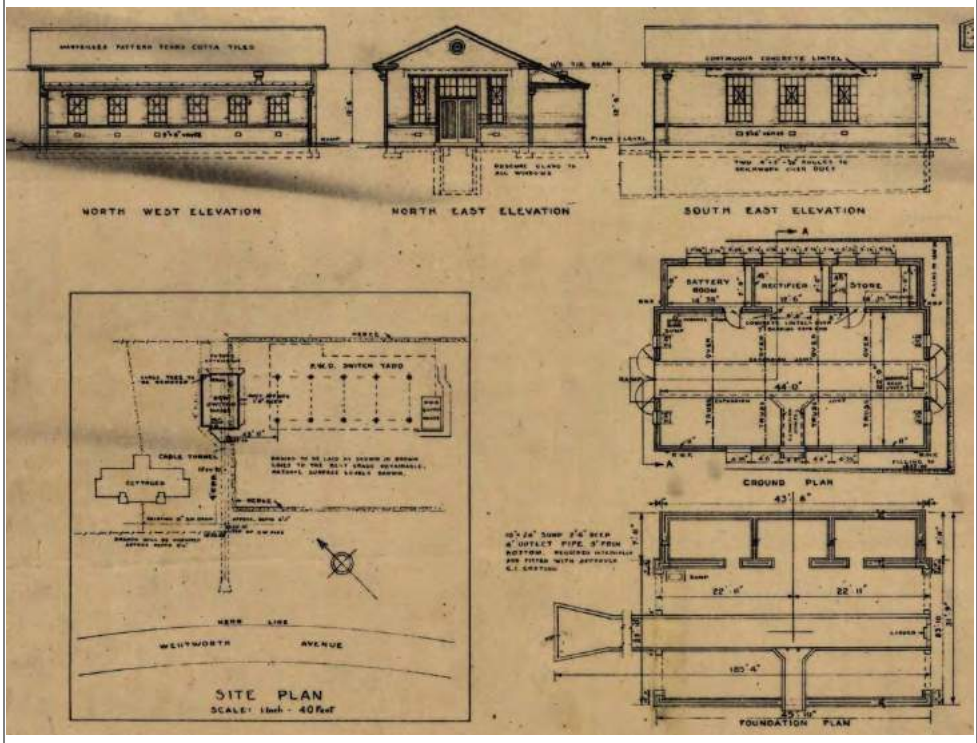
[10] Former Transport Depot Conservation Management Plan, Philip Leeson Architects, 2011, p12
[11] Canberra, Federal Capital Commission, Annual Report, 1925-26
[12] 'Work on Wentworth Avenue' *The Canberra Times,* 17 February 1928, p1

Date	Details
	 *Aerial View Wentworth Avenue and the Kingston Power Station (circa 1928).* *Note the road has been duplicated. The windbreak is largely located on the median strip (arrow)* *The brickworks railway line created a break in the windbreak to the north-west of the site (circled)* *(Source: National Archives of Australia, A3560, 7715)* Other facilities associated with the Federal Capital Commission's Engineering activities that had been established by this time in the vicinity include a garage repair shop, plant yard, cement pipe factory and general store yard. The plant yard was located to the north of the area and was used for the parking of various road making machines when they were not in use. At this time, it was also recorded that the Fitters' Workshop contained 6 lathes, 3 drilling machines, 1 Universal milling machine, 1 Universal grinding machine, planning machine and shaping machine and the usual assortment of hacksaws, emery wheels, etc. The wings to the rear (south-east) of the building contained the Blacksmiths Shop, with 6 forges with mechanical blowers, and 30 cwt. steam hammer, a small foundry and a motor repair shop of 5,000 square feet.[13]
September 1929	Canberra was connected to the power supply from the Burrinjuck hydroelectric scheme, which provided cheaper electricity than that generated at Kingston. After only 14 years in operation, the Kingston Powerhouse was largely closed down, remaining only on standby. A bulk substation, located to the north-west of the Powerhouse building, was constructed to distribute electricity to Canberra.
1933	Canberra Technical College classes moved to the workshops in Kingston, east of the power station site.[14]
June 1936	The Kingston Powerhouse began operating at full capacity again due to works at Burrinjuck dam. The previous year, concerns had been expressed about the strength of the dam wall and subsequently works to strengthen the structure were undertaken. During this time, the Kingston Powerhouse was connected into the NSW electricity grid.

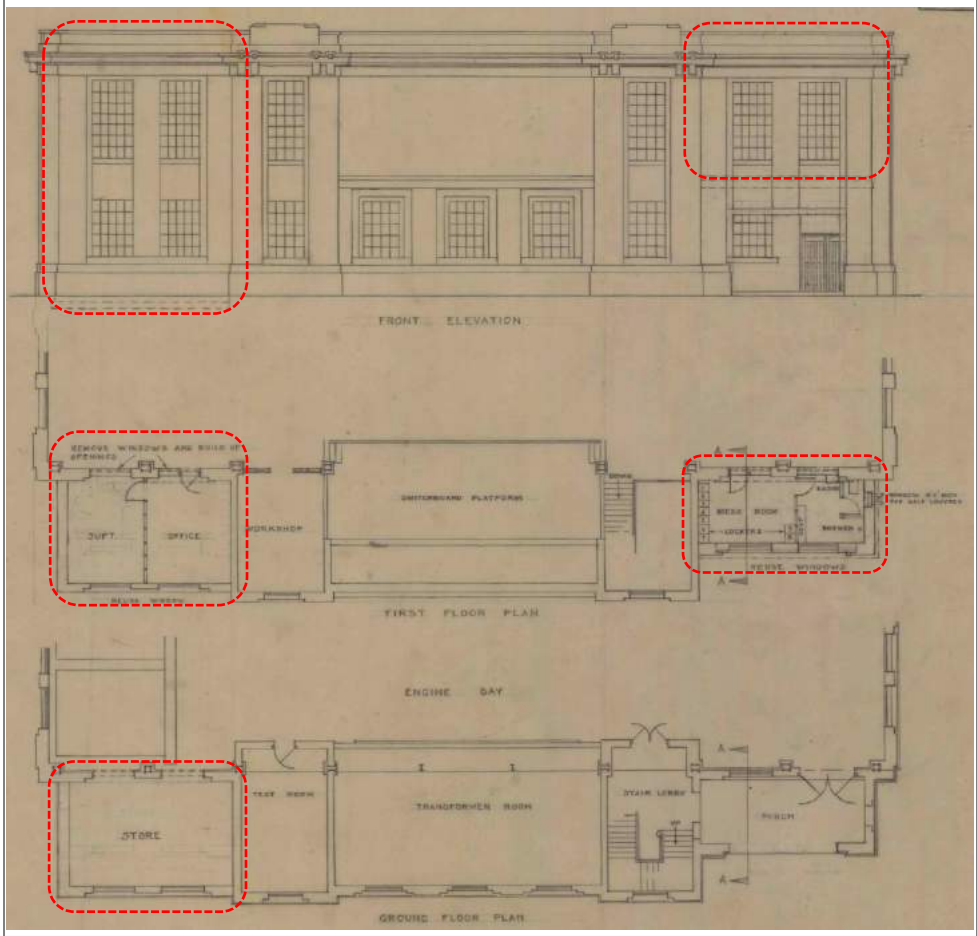
[13] Institution of Engineers, Australia 1928, p128. The description was prepared for a site visit associated with an Institution of Engineers Australia conference convened in 1928 by Colonel Percy Owen, Director General of Works.
[14] *Towards 80 years serving the community,* Canberra Institute of Technology, p6

Date	Details
1938	A new switchboard building was erected to the north-west of the Powerhouse building. Improvements in the NSW grid, including the connection of the Port Kembla power station, gradually reduced the importance of the Kingston Powerhouse. Over the next few years, it began to operate only intermittently on an as needed basis.
1940	A new building for the plumbers' and electrical fitters' workshops was constructed.
1941	Plans were prepared for a pair of patrolman's residences (semi-detached) to the west of the Powerhouse with separate garage. The old brickworks railway cutting was used as the accessway.  *Site Plan Patrolman's Residences (1941)* *(Source: National Archives of Australia A2617, Section 59/13802)* At this time, the different functions of the Kingston industrial area were acknowledged to lack appropriate segregation and it was noted there was a 'multitude of tracks leading any and everywhere'. In January, officers responsible for the various industrial functions held a conference to consider the future development of the area. The conference agreed that a strip of land at least 150 yards wide should be reserved along the riverbank for a lakeside boulevard and a belt of trees to screen the area from the gaze of the general public.
1942	The extant, electrically operated air raid siren located on the ridge of the engine room was installed beside the steam whistle as part of the Canberra Air Raid Precautions program to warn residents during World War II to take shelter if an enemy plane was spotted. The siren was not unique, with others placed in strategic locations around Canberra, though is rare in that it has remained in its original location for almost 80 years. A similar siren, believed to have been on the Ainslie Bus Depot, is held by the Australian War Memorial.[15] Although Canberra never came under an air raid attack, regular air raid tests and drills were carried out throughout the city during World War II. The siren had an average sound range of 8 kilometres and could make two distinct signals: the Raid Imminent Signal and the All Clear Signal.

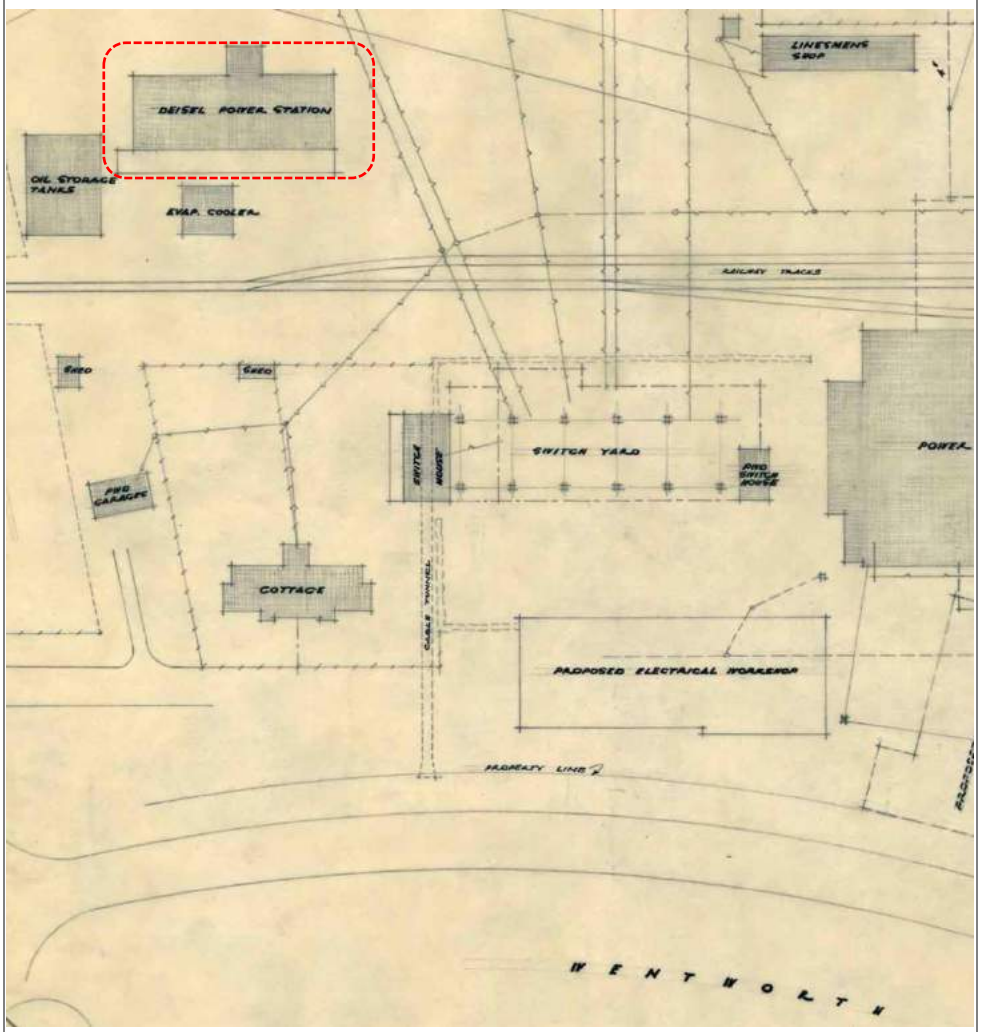
[15] 'Air raid siren: Ainslie Bus Depot Canberra', Australian War Memorial webpage, REL/20179

Date	Details
	Testing of air raid sirens was carried out twice a week until August 1943 and once a week after that until 1945. The last time the sirens sounded was on 15 August 1945 to celebrate the end of the war against Japan.[16]
Early 1942	The Powerhouse was shut down as it was no longer required for electricity production.
May 1942	Only a short time after its closure, the Kingston Powerhouse was partially brought back into service to supply power to the Belconnen Naval Station using the 1500kW turbo-alternator. The Belconnen Naval Station had one of the most powerful transmitters in the world at that time.
1943	The economiser room in the Powerhouse was modified to accommodate employees' showers and dressing rooms.
1946	After four years of supplying power to the Belconnen Naval Station, the Powerhouse was again shut down. The construction of a small amenities block addition to the Electrical Fitters' Shop (north-east wing to Fitters' Workshop) was completed.
1947	Plans were prepared for a new Switch House (known as the Switch Room), including the skillion section to the north-west side which was to contain a battery room, rectifier and store. Extending under the floor, for the length of the building, was to be a tunnel for cables. This cable tunnel extended to the Wentworth Avenue boundary.  *'ACTEA Electricity Supply Power Station, Kingston, New Switch House'* *(Source: National Archives Australia: A2617, 131/17235)*
1948	After being shut down for only a couple years, the power station at Kingston was once again brought back into service to relieve the severe strain on the NSW grid which had been subject to a sustained rise in demand. Two 1500kW turbo-alternators and associated

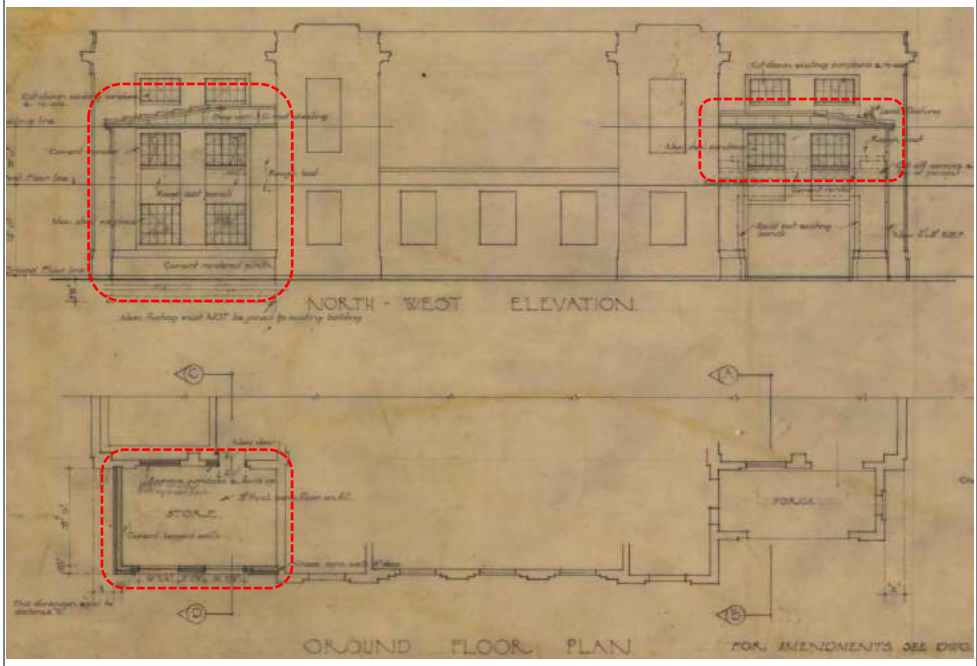
[16] Australian War Memorial webpage, 'Air raid siren: Ainslie Bus Depot, Canberra, https://www.awm.gov.au/collection/C119728

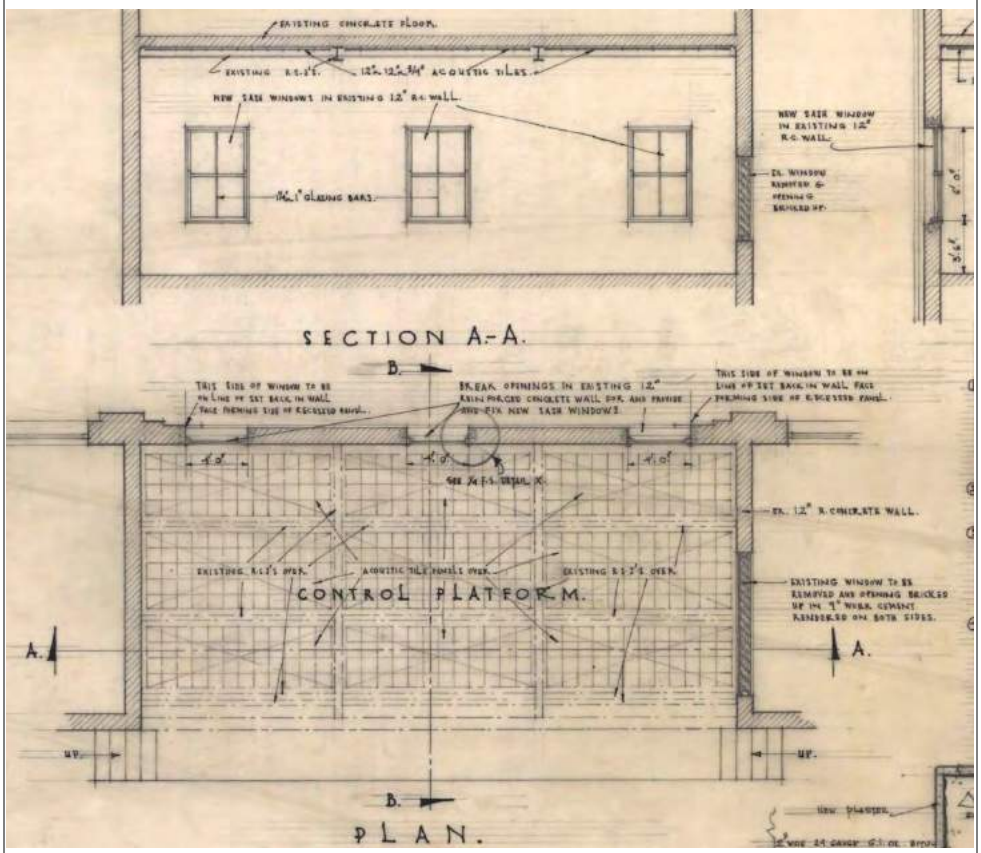
Date	Details
	boilers were transferred from Port Kembla to Kingston at this time to double the generating capacity in Canberra. During the late-1940s, a new mechanical workshop was constructed at the site and a new chimney was constructed to the rear of the economiser annex.[17] The original chimney remained until the 1960s. New coal bins were constructed to reduce coal dust. In November, a proposal for the replacement of pine trees on Wentworth Avenue, between Giles and Gosse streets, was being considered by the Minister for the Interior to provide a parking area for departmental vehicles and omnibuses.[18]
1950	Plans were prepared for an addition to the Economiser Annex. This addition (now demolished) was located to the north-east side of the building and was to include toilets, lockers and showers.[19] In the same year, plans were also prepared for additions to the front of the Powerhouse, though were not constructed at this time. This included a two storey addition to the north corner and a single storey addition above the entry porch.  *Proposed additions to Powerhouse (1950)* *(Source: National Archives Australia: A2617, Section 59/22381)*

[17] Drawings for the chimney were prepared in 1947, National Archives of Australia, A2445, M9179K
[18] 'Replacing Trees on Wentworth Avenue' *The Canberra Times,* 11 November 1948, p2
[19] National Archives of Australia, A26147, Section 59/21746

Date	Details
	The additions were to include a mess/locker room and shower on top of the original porch and a two storey addition to the other end with store to the ground floor and offices to the first floor. Details of the original building, including the parapet and projecting cornice, were to be replicated on the additions and the original windows removed from the existing openings and installed to the front of the additions[20]
1953	The NSW Electricity Commission established an additional power station (diesel operated) at Kingston as a way of relieving the hard-pressed NSW grid. Both the new and existing power stations operated on a regular basis in the years following this.  *Site plan showing the diesel power station (1954)* *The 1948 Switch Room,1938 switch house and patrolman's residences are also shown* *(Source: National Archives Australia: A2617, Section 175/22462)*
1954	Plans were again prepared for additions to the front of the Powerhouse. Like the previous plans, the two storey addition was to consist of a store on the ground floor and offices to the first floor. The addition on top of the porch was to house a mess room, toilet and shower. Whilst these additions were designed to have wall materials matching the original material, unlike the earlier design, they were to be capped by simple hipped roofs clad in fibre cement sheeting. In the second set of plans (and as constructed), the original

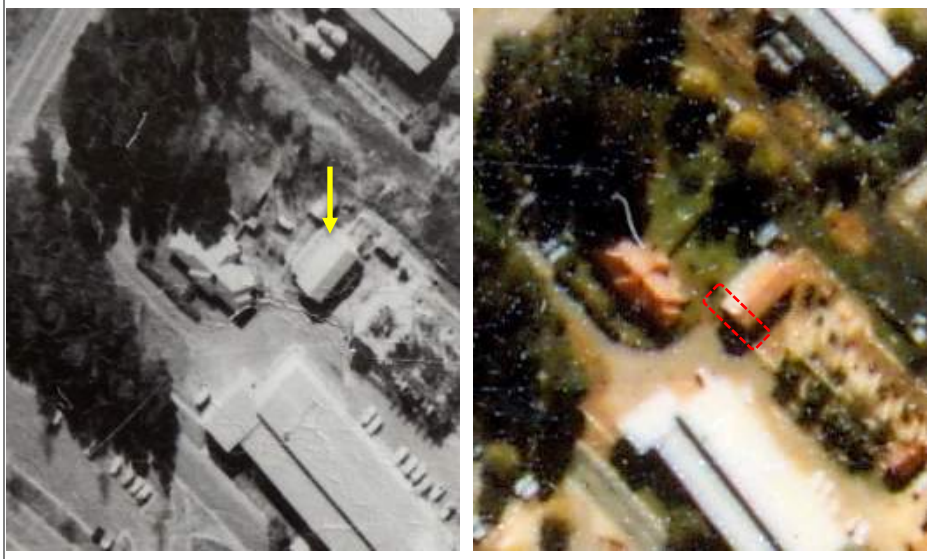
[20] National Archives of Australia, A2617, Section 59/21703

Date	Details
	windows to the front of the Powerhouse were truncated with new steel framed windows specified for installation in the additions.  *Addition to Powerhouse (indicated), north-west elevation (top) and ground floor plan (bottom), 1954 (Source: National Archives Australia: A2617, Section 59/22381)*
1955-1957	With increasing supply available to the NSW grid, both power stations at Kingston were used only intermittently (as required) during this period. The additions to the front of the Powerhouse were constructed during this period.  *Aerial photograph showing the Kingston Powerhouse (1955)* *Note the additions to the front of the Powerhouse are yet to be constructed* *(Source: National Archives Australia: M1570, 16)*
1957	Power generation at the original Kingston Powerhouse ceased for the final time. The diesel power station at Kingston was maintained into the 1980s to act as an emergency power source, particularly for Parliament House.

Date	Details
Post-electricity generation	
1955	A Senate Select Committee was appointed to investigate the future development of Canberra. This Committee was of the opinion that the Kingston area, which was noted to be located close to the city centre, should revert to the use that the Griffins had originally intended for it (residential development). They recommended industries be progressively relocated to the new industrial area at Fyshwick.
1958	A large electrical workshop was constructed close to the Powerhouse building and near the intersection of Wentworth Avenue and Mundaring Drive.[21]
1959	Plans were prepared for alterations to the control platform (switch room) on the first floor of the Powerhouse. This included the creation of new openings and installation of three sash windows to the façade as well as the installation of acoustic ceiling tiles and the bricking up of a window to the north-east wall of the projecting bay.  SECTION A-A. CONTROL PLATFORM. PLAN. *'ACTEA proposed alterations to control platform, Kingston power station'* *(Source: National Archives Australia: A2617, 13/26417)*
1960	The 11 kilovolt switchgear for the 1948 Switch Room was designed and installed. At this time, a gradual changeover of 11 kilovolt feeders occurred until the former outdoor 11 kilovolt busbar was eliminated [22]

[21] 'A new electrical workshop for the Kingston Powerhouse', Archives ACT webpage, https://www.archives.act.gov.au/find_of_the_month/2015/august/previous-find-of-the-month-82015-page-2, accessed 30 October 2020

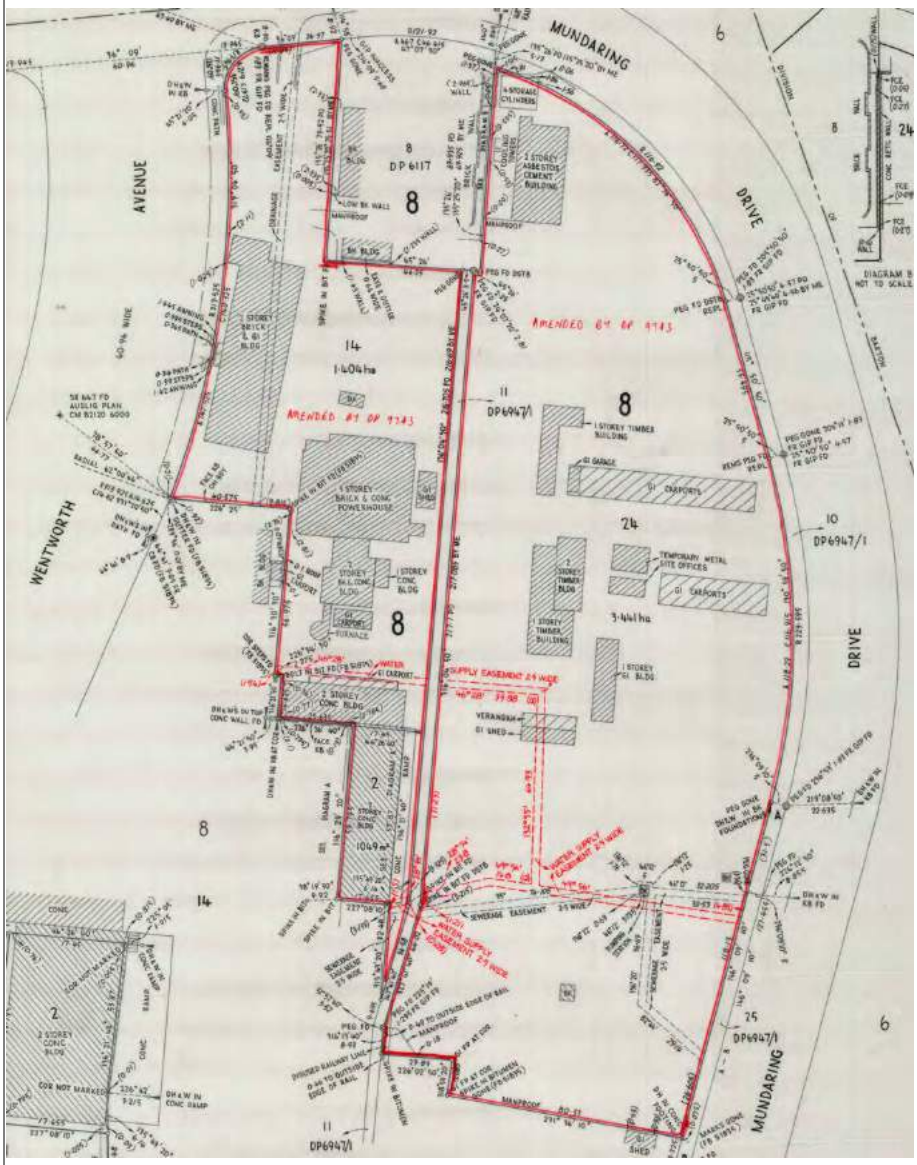
[22] H A Jones, 'Electricity', in *Canberra's Engineering Heritage,* Institution of Engineers, Canberra Division, 1990, p133

Date	Details
Between 1961 and 1968	The 1948 Switch Room was extended at the south-west end (refer to aerial photographs). The building was extended to accommodate additional 11 kilovolt switchgear.[23]  *Left: 1961 aerial showing 1948 Switch Room. Right: 1968 aerial showing addition to 1948 Switch Room* *(*Source: *'A new electrical workshop for the Kingston Powerhouse', Archives ACT webpage)*
July 1963	The ACT Electricity Authority (ACTEA) was formed. They inherited the Kingston Powerhouse site from the Department of the Interior. At this time the site included some 25 buildings.
April 1964	The National Capital Development Commission (NCDC) prepared a set of plans for the 'Kingston Government Services Area', acknowledging that government industries would continue to operate in Kingston for the next couple of decades.
1965-1968	Most of the generating equipment from the Powerhouse was sold as scrap. The former economiser annex was converted into ACTEA's mechanical workshop. At this time, the upper floor of the generator section housed the control centre for electricity supplies to the whole of Canberra. The roof of the Powerhouse was repaired (multiple times) and the chequer plate floor was removed and replaced with a concrete slab.
Early 1970s	The NCDC made a renewed attempt to initiate changes to the Kingston industrial area and pressed ACTEA to agree to clear the land between the railway embankment and the shore of the lake for the development of housing which was considered more appropriate for the important lakeside setting. Whilst this development did not proceed, ACTEA demolished many of the smaller rundown structures and replaced them with a large store building.
1976	ACTEA commissioned a feasibility study regarding the use of the Powerhouse building as a maintenance and repair facility for household appliances and traffic lights. While the building was found to be generally structurally sound, some deemed it barely suitable as a maintenance facility and favoured demolition to make way for a purpose-built structure. A hoist and monorail were installed in the Powerhouse building to facilitate storage and some limited maintenance works.

[23] *Ibid*

Date	Details
Late-1970s	Several studies were undertaken to investigate uses for the Powerhouse building. It was employed as a store, a back-up control centre for the electricity supply of south Canberra and for vehicle maintenance. At this time, it was however considered to be unutilised.
1980	The NCDC began to press ACTEA once again to relocate from the Kingston site. This time, both agencies set about finding an alternative depot site. Two roller doors were installed to the economiser annex at about this time to allow it to be used for fleet mechanical workshops.
July 1981	The Powerhouse was listed on the Register of the National Trust of Australia (ACT). This was the first formal recognition of the heritage significance of the Powerhouse.
1983	Whilst ACTEA relocated some of its functions to two district depots in north and south Canberra, it maintained the Kingston site as the head depot, though agreed to hand over to the NCDC the strip of land between the railway embankment and the lake for redevelopment.
1983	The Powerhouse was entered on the Register of the National Estate and listed on the Royal Australian Institute of Architects Register of Significant Twentieth Century Buildings.
1985	A development proposal was put forward by the Jerrabomberra Cultural Centre who envisioned a cultural centre for the site that would include a museum for the ACT. Following the release of the proposal, ACTEA was in agreement with NCDC and the Department of Territories that alternate uses for the Powerhouse should be considered. The initial proposal did not proceed due to a lack of funding.
1986	The extant Telopea Park Substation, with three transformers, was constructed. With the commissioning of this 132/11kV substation, the adjacent 66/11kV substation was withdrawn from service.[24]
Circa 1985	The 1948 Switch Room was converted to office space with doors installed to the north-east elevation and a porch constructed at the south-west end. The building became the Engineering Services Chief Engineer's Office for the site.
1988	The Federal Parliament passed the *Australian Capital Territory (Self-Government) Act 1988.* This Act, along with other related legislation, established self-government in the ACT. The following year, the National Capital Authority (initially called the National Capital Planning Authority) was established to represent the Commonwealth's interest in the planning and development of the National Capital. The ACT Government issued a brochure to the public requesting ideas for the development of the 'Kingston Foreshores Tourist Area'. Whilst ACTEA were not informed of this, they committed to not impacting on its heritage values. A separate Block containing the Powerhouse and Fitters Workshop was created (refer to DP 7238). This Block appears to largely correlate with the boundary of the Kingston Powerhouse Historic Precinct, though it did not include the 1948 Switch Room or the railway embankment to the north-east of the Powerhouse. It also covered a building located to the south-east of the Fitters' Workshop which has since been demolished.

[24] ACT Electricity Authority Annua Report, 30 June 1987, p16

Date	Details
	 *Part of Deposited Plan 7238 showing the footprint of the Powerhouse on Block 14*
1990	ACT Electricity and Water (ACTEW), who were the successors of ACTEA, cleared the Powerhouse building of asbestos insulation and lagging.
1991	The ACT Assembly initiated a preliminary inquiry into the future of the Kingston Foreshore area and invited public comment. ACTEW responded by acknowledging that its vacation of the site would be of benefit to Canberra. They proposed to move out within three to five years and suggested that the cost of their relocation be treated as a basic cost of the development of the site.
1993	A Conservation and Management Plan was prepared for the 'Kingston Power Hose Precinct' (Freeman Collett & Partners, Brendan O'Keefe, Roger Hobbs, Vivid Histories).
1995	An agreement was proposed that the ACT Government acquire the 37 hectare Kingston Foreshore site from the Commonwealth in exchange for land on the Acton Peninsula. In September, the ACT Government established the Interim Kingston Foreshore Development Authority (KFDA) to advise on the future redevelopment of the acquired land into a mixed-use waterfront precinct.

Date	Details
February 1997	A two-stage national competition for the Kingston redevelopment was launched. The entry by Colin Stewart Architects became the basis for the future planning of Kingston Foreshore as well as subsequent studies for the Kingston Arts Precinct which were prepared for the ACT Government.
April 1998	The Kingston Powerhouse Historic Precinct was entered on the ACT Interim Heritage Places Register. The Canberra Division of the Institution of Engineers Australia unveiled the Historic Engineering marker under the Institutions' Australian Historic Engineering Plaquing Programme.[25]
December 1999	Under the *Land (Planning and Environment) Act 1991*, a Variation to the ACT Territory Plan (no. 113) was gazetted for the Kingston Foreshore. This, combined with the *KFDA Act 1999,* formally established the Kingston Foreshore Development Authority. In preparation for management by the KFDA, the interior of the Powerhouse was cleaned and conservation works relating to waterproofing and drainage were undertaken with funds from ACTEW/AGL, KFDA and the Commonwealth Heritage Project Program.
2000	In April the 'Designated Area' and 'National Land' status was removed from the Kingston Foreshore. A seven metre strip of publicly accessible land along the Lake edge was retained as a 'Designated Area' whilst Special Requirements were introduced in the National Capital Plan to ensure that any future development accorded with the National Significance of the Kingston Foreshore area.[26] On the 8 June, the Kingston Powerhouse Historic Precinct was added to the Heritage Places Register. The current features intrinsic list, statement of significance and specific requirements applied to the listing.
2001	A Conservation Management Plan Review was prepared for the 'Kingston Power House Precinct' (Peter Freeman Pty Ltd).
2002	The Kingston Foreshore Development Control Plan (Revision 2) came into effect.
2004	The ACT Heritage Council was established under the *ACT Heritage Act 2004* as the ACT's principal heritage body. Under this Act, the Council is responsible for keeping a register of places and objects in the ACT which have heritage significance at the Territory level.
2007	The Canberra Glassworks opened in the Powerhouse. The 1948 Switch Room was converted to residential use with a new internal fit-out.
2009	The café addition to the Powerhouse was constructed. The Fitters' Workshop was first used as a concert venue.
2010	The Kingston Structure Plan came into effect.
2015	Minor alterations were made to improve the Fitters' Workshop as a function venue. Since this time, it has been used as a venue for events, including the annual Canberra International Music Festival.

[25] Australian Historic Engineering Plaquing Program, Report on Unveiling Ceremony of the Kingston Power Station Historic Engineering Marker, The Institution of Engineers Australia, Canberra Division, 4 April 1998
[26] Australia Parliament, Joint Standing Committee on the National Capital and External Territories, Inquiry into the role of the National Capital Authority, 2004, p122

4.3 Operation of the Kingston Powerhouse

This section focuses on the technical aspects of power generation at the Kingston Powerhouse Historic Precinct and has largely been prepared by Keith Baker (BE, M App Sc., MIEAust), Engineering and Heritage Management Consultant. It covers the generation capacity of the Kingston Powerhouse, its connection to the Canberra electricity grid, the railway and the Molonglo River as well as the operation and plant that were integral to power generation. The location of past infrastructure located outside the Powerhouse is shown on the plans contained in the Archaeological Potential chapter.

The research and analysis contained in this section is a continuation of the research undertaken by Keith Baker for the 2002 Kingston Powerhouse Interpretation Plan, which was prepared in conjunction with the Kingston Powerhouse Precinct Conservation Management Plan Review (2001, Peter Freeman Pty Ltd.). The primary source of information has been the electricity chapter of Canberra's Engineering Heritage (Chapter 6) by electrical engineer Alan Jones, who was directly involved in all phases of electrical supply in Canberra from joining the Federal Capital Commission in 1928 until his retirement as Chairman of the ACT Electricity Authority in 1963. This information was supplemented by a series of oral history recordings undertaken for Engineers Australia in 1997, additional archival research records (including drawings and photographs), consultation of contemporaneous engineering texts and from the author's training and experiences as an electrical engineer.

Power Generation Capacity

The Kingston steam power station was designed for expanding installed capacity, but when it opened in August 1915 it had two 600 kilowatt (kW) reciprocating Bellis and Morcom generating sets. The demand for coal fired power and its capacity to deliver varied dramatically over the years until steam powered electricity ceased to be produced for the final time in 1957.

The electrical load of Canberra was so small initially that the Powerhouse was uneconomic to run, particularly at night. In response, tenders were promptly called for installation of a smaller generator. A 150kW second hand Robey Hall set was added, and while increasing the installed capacity to1350kW, it was primarily used when the required load was less than 150kW.

As the growth of Canberra increased in the lead up to the transfer of Parliament from Melbourne in 1927, a 1500kW British Thompson Houston turbo alternator was installed at the Kingston Powerhouse and the small Robey set was taken out of service. The installation of the new alternator doubled the generating capacity to 2700kW.

The installed capacity was sufficient to provide for load growth, but lower cost electricity became available in NSW from hydro power. Subsequently, a high voltage line was installed from Burrinjuck in 1929 and the load transferred to this source. The Kingston Power station was only used to provide backup supply for the next six years.

In 1935, remedial work on Burrinjuck dam meant that supply was reduced from that source placing a strain on the NSW system. Kingston returned to full output, supplying Canberra with electricity at this time. A second high voltage connection to the NSW grid was also installed from Goulburn in 1938, allowing supply for Canberra from Port Kembla. In 1939, two 1500kW Brush Ljungstrom turbo alternators were relocated from Port Kembla Power Station, increasing the generating capacity at Kingston to 5,100kW to meet demand, with one of the original 600kW sets decommissioned. Kingston then continued at full capacity until 1942 when increased hydro generation became available again from Burrinjuck at lower cost and the Kingston Powerhouse reverted to standby when needed.

In 1945, the British Thompson Houston turbo alternator was brought back into full time service to provide dedicated supply to the Belconnen Naval Transmitting Station. After World War II, with power shortages in NSW, the Kingston power station was pressed into service from 1948 until 1957when it was shut down and all existing machinery was sold for scrap in 1965.

Further electricity shortages in the 1950s prompted NSW to install a diesel power station in a temporary building at Kingston close to the former steam power station. This had four 1,000kW Harland & Wolfe diesel generators which operated from 1952 until 1956. Electricity from the Snowy Mountains scheme

started to become available at that time removing the need for expensive diesel generation. By the time of it closure in 1957, Canberra's demand for electricity, with a population of around 45,000 people, had grown to 25,000kW compared with the steam power station's capacity of 5,100kW during its final years of operation.[27]

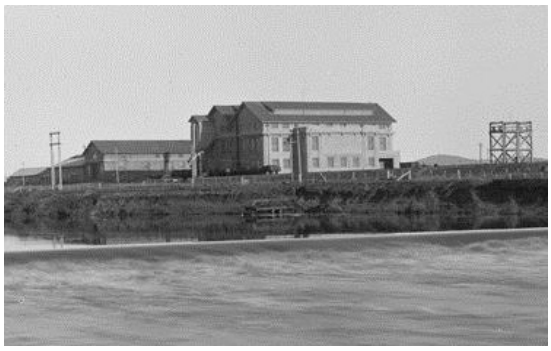
Canberra Power Grid

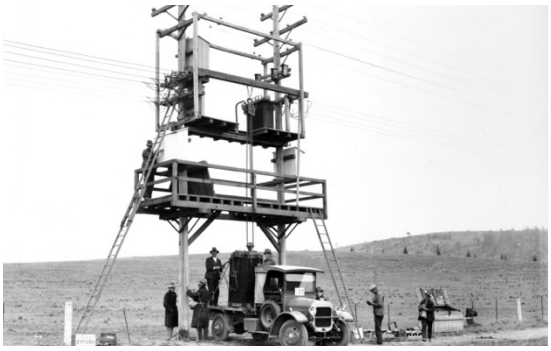
Initially, the Canberra electricity supply was designed to be an isolated grid serving the immediate area, without any expectation of it being connected to a larger network in NSW. On the advice of F W Clements,[28] Chief Engineer of the Melbourne Electricity Supply Co., electricity would be alternating current, 50 Hertz (cycles per second) three phase, generated at 5,500 volts and reticulated at 415/240 volts. The latter choice, which was not yet standardised across Australia, was to match with Sydney where Canberrans would be likely to purchase domestic appliances.

The distribution around Canberra was to be at the generated voltage of 5,500V where it would be stepped down with substations closer to the points of consumption to 415V (phase to phase) for motors and 240V single phase (phase to neutral) for lighting and general use. The exception to this was for supply to the Cotter Pumping Station, where distribution was to be at 11,000V to reduce losses over the greater distance involved.

From information provided by the Director General of Works in 1914,[29] distribution was underway initially to the Royal Military College, Duntroon, Cement Mills at Queanbeyan, the administrative area at Acton, and subsequently to the Brickworks, construction works on sewer outfall, sewers and storm water channels as well as to power houses and the workshops and the like nearby.

The distribution system emanated from a 5,500V switchboard inside the machine hall of the Powerhouse on an elevated platform. The switchboard contained circuit breakers to isolate or protect the machines feeding into it and the outgoing circuits to avoid overloading and damage from short circuit. It also contained synchronising equipment to enable the separate generators (alternators) to be connected safely to each other without a break in continuity of supply and to share the load when more than one machine was connected.





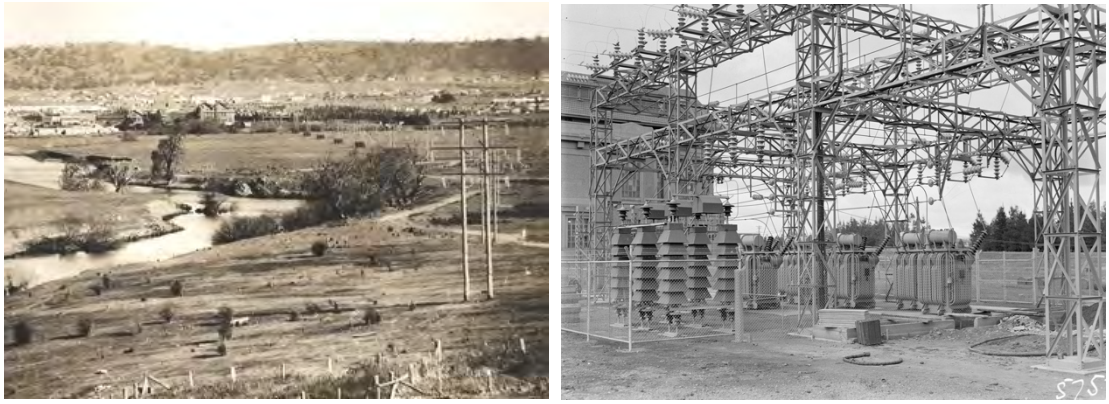
Left: Powerhouse with timber tower on right and 5.5kV Duntroon line on left (circa 1921-29)
Right: A two pole substation being constructed (1929)
(Source: National Archives of Australia A3560, 234 and A3560, 5602)

Distribution outside the Powerhouse was originally achieved with overhead lines on timber poles and a three wire system of aluminium cables supported on swan neck porcelain insulators. Since the designed means of feeders exiting from the Powerhouse was underground, they fed through ducts from the ground floor to a substantial timber tower clear of the building, and from there either north or south to their desired destination (see image above) such as Cotter or Duntroon. Local power was distributed from a house transformer feeding the Powerhouse auxiliaries and building services.

[27] H A Jones, 'Electricity', in *Canberra's Engineering Heritage,* Institute of Engineers, Canberra Division, 1990
[28] *Ibid,* p127
[29] National Archives of Australia, A1, 1919/8647 pages 204 to 214

Distribution was extended without any fundamental change to the system to supply new facilities such as Parliament House and CSIR Laboratories. Major changes did however become necessary to accept high voltage supply from Burrinjuck in 1929 (see switchyard image below). Control of the expanding high voltage distribution in Canberra transferred at that time from the Commonwealth Works organisation to the Public Works Department of NSW.[30]

A steel switchyard was constructed between the Powerhouse and the timber distribution tower by the Public Works Department of NSW to allow twin 66,000V overhead conductors to be connected. At this voltage, greater spacing was required between live conductors than for the existing 5,500V, and much larger insulators were need for isolation from earth. There was also need for safe connection and isolation of the incoming feeders, and metering of the NSW energy consumed in Canberra, and at times for supply from Canberra into NSW. The switchyard consisted of lightning protection on the feeders, transformers to step the voltage down from 66kV to 5.5kV and busbars and isolators at the various voltages to allow connection as required. The 5.5kV switchboard inside was extended to allow synchronising when switching between local and NSW supply, or running sources of supply together in parallel.



Left: 66KV feeder line from Burrinjuck (1929). Right: 66kV switchyard to north-west of Powerhouse. The incoming feeders are at the top left and the transformer to the rear (centre right).
(Source: National Archives of Australia, A3560, 5624 and A3560, 5757)

The addition of the two Brush Ljungstrom turbo alternators to the power station in 1938 required connection to the expanding grid and brought about the construction of a new brick switch house adjacent to the 66kV switchyard, replacing the timber distribution tower. The new switchboard allowed the distribution voltage to be upgraded to a more conventional 11kV. At that time a second 66kV feed from Goulburn increased the extent and complexity of operation of the grid by allowing connection of Burrinjuck and Port Kembla via Canberra.

As demand for electricity increased, supply was taken in 1957 from a new NSW Zone Substation at Oakes Estate which fed into a major substation at Kingston.[31] A new era emerged with cessation of generation at Kingston and the development of a ring of Zone substations around Canberra, including a 330/132kV intake station at Charnwood, and raising the sub-transmission voltage within Canberra to 132kV, a far cry from the initial 5.5 kV distribution.

Changing Technology

All power stations operate by changing one form of energy to another. Thermal power stations release the energy contained in a fuel (like coal) by burning it in a boiler to produce steam. The pressure of the steam then is used to drive an engine or turbine, which in turn spins a generator to produce electrical energy. The electricity is usually distributed at high voltage to reduce losses, and stepped down in voltage where it is to be used. The option of hydro power generation in the ACT was considered prior to the construction of the Kingston Powerhouse, though was not practical due to the limited water capacity of

[30] This would have been necessary for the safe control of the system and management of the combined load. Oral history of the operating staff in the 1940s indicated that they reported to Goulburn NSW for major load changes and metering of supply.
[31] H A Jones, pp132-133

the Cotter River system. Electricity was not available at the time from NSW. Electrical generation was still its infancy with the first power stations in Australia being built from the 1880s and state wide regulation of electricity only emerged around 1920.[32]

The Kingston Power Station had a chequered career. Its design was based on the best available from eminent mechanical and electrical engineers in the power generation field and the Powerhouse design was appropriate for an efficient layout. The equipment was thoroughly documented in an open tender.

As coal was the most common available fuel, the Powerhouse was designed to allow for mechanised coal handling; high pressure water tube boilers with chain grate stoking; condensing steam engines, and heat recovery from exhaust gases to reduce water consumption and increase efficiency. While these features were regarded as state of the art when built,[33] they were soon superseded.

Two aspects of Canberra were challenges from the outset. These were that it was a new city which at first had virtually no population and that it was relatively remote. This made the Kingston Powerhouse more costly to build, and unlike most power stations which are built next to their supply of fuel, it had fuel transport and handling costs. So in amortising the construction cost and the fuel and operating cost, the price charged to its small customer base for generated electricity was high.[34] It also had one design feature that was unusual for its time; it had reciprocating steam engines when more efficient high speed steam turbines were becoming accepted. These were selected as turbines were not considered suitable for a small load.

As the load built up with the transfer of Parliament and government staff from Melbourne to Canberra, a turbo alternator was installed in 1927 to increase its capacity, and this made the Powerhouse more efficient. Hydro power from Burrinjuck was however cheaper, and in 1929, a line was installed from New South Wales to allow the purchase of outside electricity.[35] Subsequently, the Kingston Powerhouse only provided a standby supply in the event of problems with the New South Wales supply. At this point in time the Kingston Power Station was made redundant on grounds of cost rather than on technological grounds.

Electricity continued to be bought from NSW, but by 1939 the need for expansion of the NSW system led to two larger boilers and turbo alternators being installed at Kingston. In 1957, the Powerhouse was shut down for the final time as large scale hydroelectricity became available from the Snowy Mountains Scheme.

Apart from the cost disadvantages mentioned above, technological change certainly occurred with thermal power stations during its 40 year operational life. High voltage transmission lines meant larger power stations were built adjacent to coal mines and the east coast grid extended from South Australia to Queensland. More economical fuel handling with pulverised coal or natural gas and higher pressure higher temperature boilers as well as combined cycle turbines were able to achieve higher efficiencies and response to load changes, while greater automation and networking reduced running costs.

In the end the scale, location and technology meant that the Kingston Power Station was no longer economically viable or necessary when cleaner lower cost options were available from Snowy hydrogeneration and the east coast electricity grid.

Relationship with the Molonglo River

The Powerhouse for the new Federal Capital was deliberately sited in close proximity to the Molonglo River so that a source of cooling water was available.[36] A gauging weir had been previously established at a convenient location on the river to measure the seasonal flow and it became a convenient place to cross the river on the downstream side of the weir. The Kingston Powerhouse was located slightly

[32] Dictionary on Electricity - Australia 1880 to Present, IEEE 1996
[33] H A Jones, p130
[34] National Archives of Australia, A1, 1919/8647 Electric Light and Power Supply
[35] H A Jones, p130
[36] *Ibid,* p129/

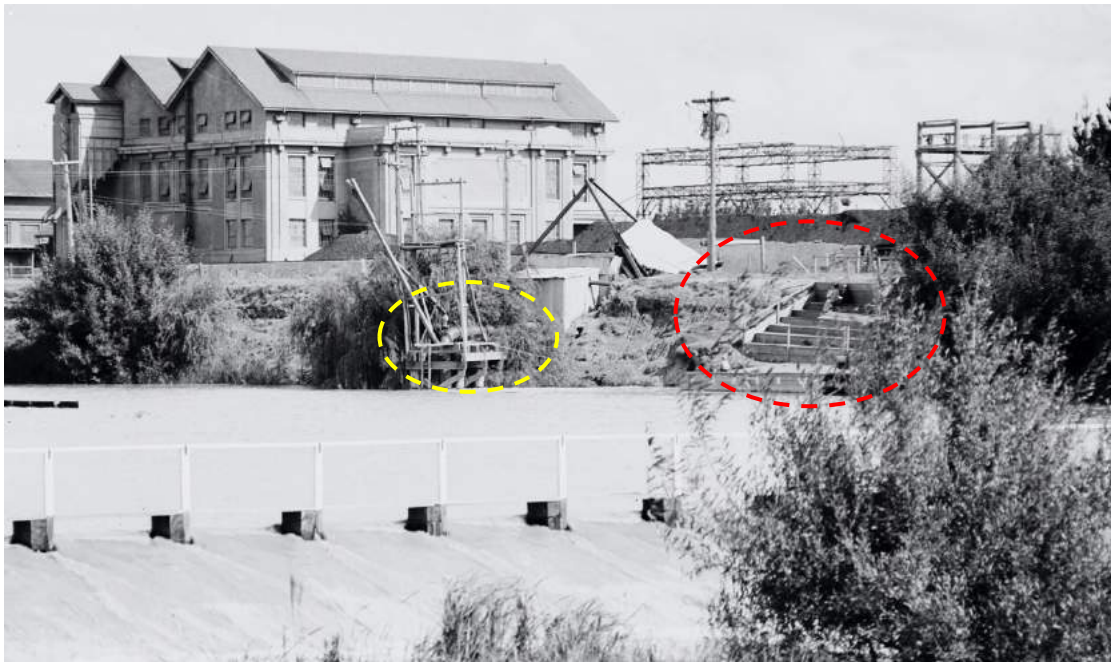
upstream of the weir, where the water level would be relatively constant except in times of flood or extreme drought.

Initially, water for the boilers was likely to have been drawn from above the weir in the Molonglo River. This muddy water likely caused accumulation of dirt in the boilers which would have needed to be periodically blown down. Whilst water reticulated from the Cotter Dam would have been cleaner, water was not available from this source until 1918 when the electric pumps in the Cotter Pumping Station were commissioned.

After the boilers in the Powerhouse were filled the amount of feed water required would not have been large, since the steam generated was condensed after passing through the engines and recycled back into the boilers. The only make up water required would have been to cater for the losses occurring though leakage in the condenser or elsewhere such as in smaller non-condensing pump engines, the whistle and maintenance operations. The requirement for makeup water would have been conveniently met from the reticulate water to the Powerhouse.

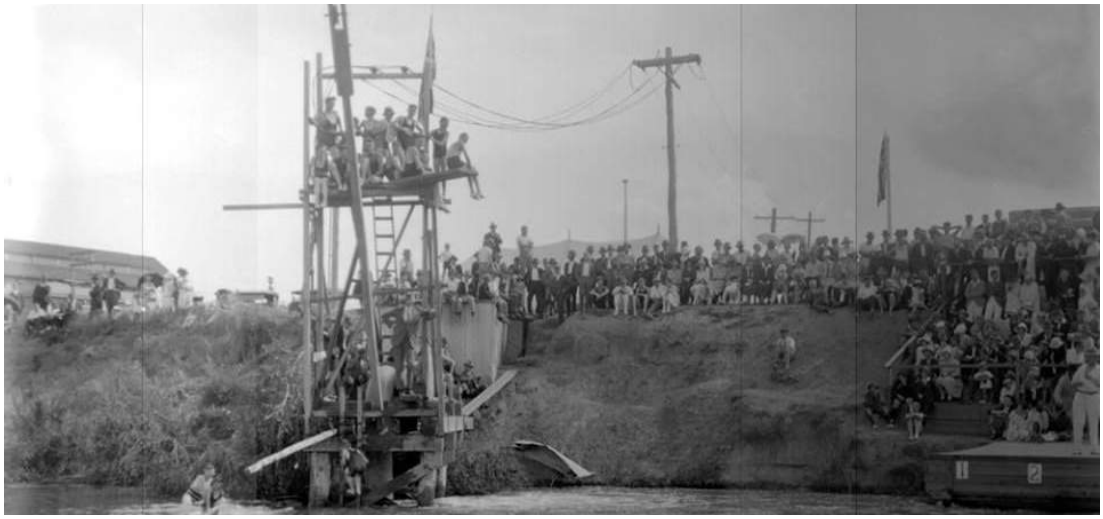
The much greater requirement for water was for cooling of the condensers.[37] A fairly constant flow would have been required whenever the engines were running. Cool water was drawn from the river, circulated through the condensers in the Powerhouse while being kept separate from the condensed steam, and after transfer of heat, warm water was returned to the river. The circulation of water required pumps within the condenser pit to maintain the required flow.

The heated water re-entering the river dispersed close to the weir raising the temperature at that end of the comparatively still body of water so that it became an attractive swimming location, extending the swimming season for local residents. The image below shows what appears to be tiered seating between the outlet pipe and the weir for participants and spectators to observe swimming events.



Swimming area in the Molonglo River upstream of the gauging weir (1929)
Steps down to the swimming area (red) and the pier for the outlet pipe (yellow) are indicated
(Source: National Archives of Australia, A3560, 5075)

[37] A general description of the purpose and operation of condensers is atwww.theengineerspost.com/steam-condenser-types/



Swimming carnival in the 'warm water' at the Powerhouse cooling water outlet. Note the diving tower over the discharge pipe with what appears to be a pulley (1920s)
(Source: Aurora Kingston Foreshore Pinterest page)

It is logical that the inlet pipe would be separated as far as practical from the outlet pipe so that the inlet water was as cool as possible. Historic photos show two distinct pipes entering the river. The image above shows a pipe entering the water while supported from a small timber pier. This is clearly the outlet pipe in close proximity to the weir where the water temperature was raised. The wide view of the Powerhouse and river in the image below shows both inlet and outlet pipes with the former located close to the cottages and workshop buildings that were erected closer to the water's edge. Both pipes were supported on timber piers.

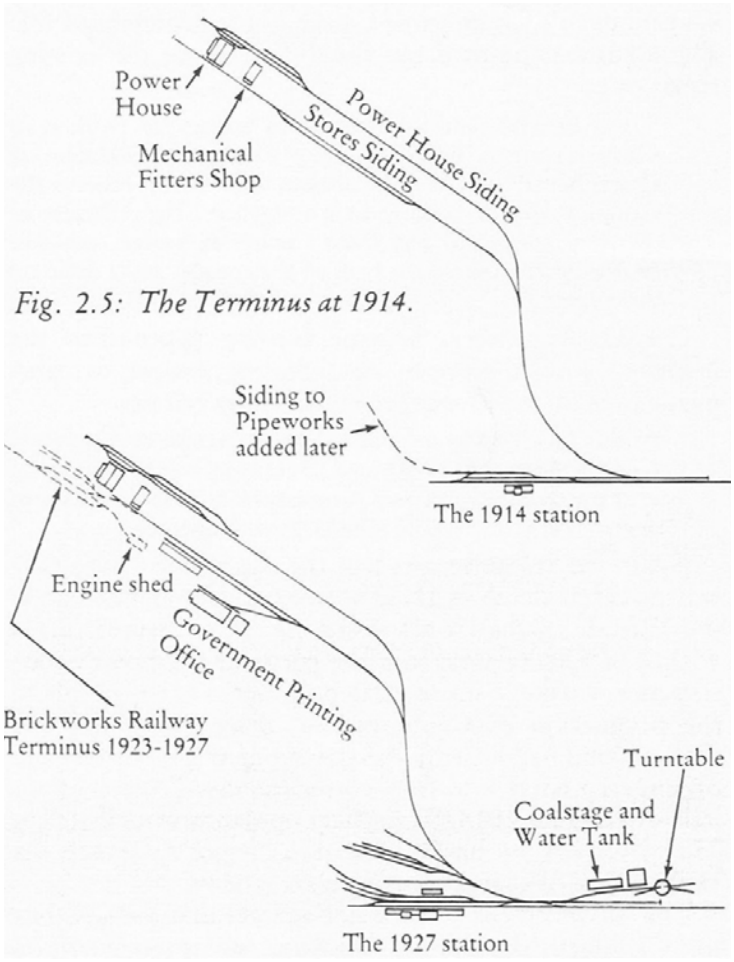
View of Powerhouse under construction showing the inlet pipe in red and the outlet pipe in yellow (circa 1914)
(Source: National Library of Australia, *143676091*)

A more formally constructed weir with a handrail. The weir may have been higher than the previous and probably created a deeper pool upstream. A pump house also seems to have been constructed by this time (1928)
(Source: National Archives of Australia, *A3560, 4224*)

Left: Outlet pipe at the swimming area (1929)
Right: Inlet pipe on upstream pier (1926)[38]
(Source: National Archives of Australia, A3560, 5075 and A3560, 54)

The railway lines

Another key consideration in the siting of the Powerhouse for the new Federal Capital was the construction of a railway line to deliver coal which was required to fire the boilers and produce steam. The railway lines to the north of the Powerhouse were constructed for this purpose, whilst those to the south were erected at a later date to transport bricks.



Railway lines in the Kingston area at 1914 (top) and 1950 (bottom)
The Powerhouse siding remained largely unchanged between 1914 and 1950
(Source: W Shellshear, 'Railways' in *Canberra's Engineering Heritage, p52)*

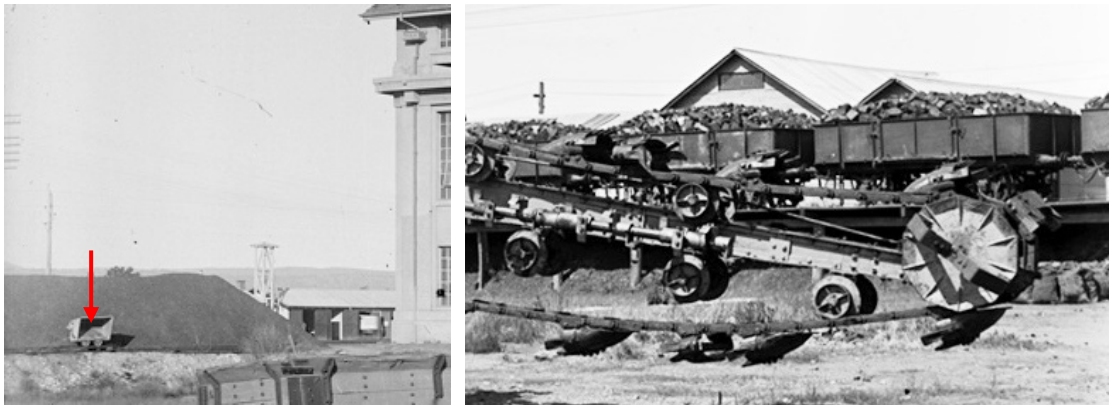
[38] A drawing for the design of the circulating pipe inlet is available at the National Archives of Australia, A2445, M123

Powerhouse siding

In 1914, the NSW railway was extended at the standard gauge of 5ft 3 inches (1600mm) from Queanbeyan to a temporary station forming the Canberra rail terminus[39]. From this, a branch line was constructed to form a siding to the north of the Powerhouse and a parallel siding that extended through the industrial area of Kingston, past the Stores Building and the Fitter's Workshop (refer to image below). As noted previously, the primary purpose of the Powerhouse siding was to transport coal to fuel the boilers. Additional loops were constructed at the end of the Powerhouse siding to allow the shunting of coal wagons for stockpiling and transfer of coal.

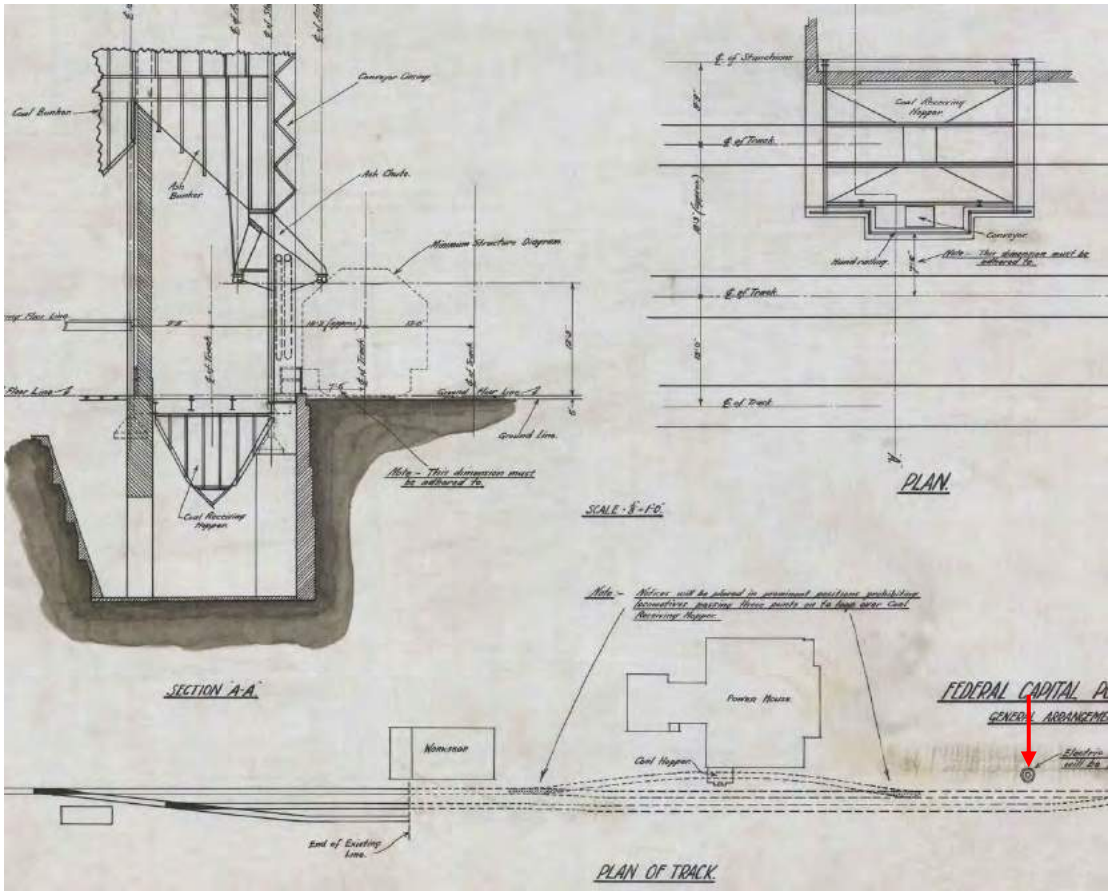
The first train into Canberra was hauled by steam locomotive 1210 on 25 May 1914, delivering coal on the Powerhouse siding. Passenger services ran from the Powerhouse to Queanbeyan from 1923.[40] It was not until 1927 that an improved service ran from the new Kingston (Eastlake) station. The Powerhouse was an activity and transport hub at that time.

The rail line from Queanbeyan allowed delivery of coal using rail wagons with dropped sides. Once delivered to site, coal was stockpiled on the ground adjacent to the rail siding. Coal handling at the power station was predominantly on standard gauge track with loops allowing shunting of coal wagons past the Powerhouse and to the coal hopper, or for stockpiling on the ground for later use. A powered capstan or winch was provided adjacent to the line west of the building to haul individual wagons for unloading at the coal hopper. There is photographic evidence that narrow gauge tipping skips, such as those used on construction sites, were also used as part of the recovery of stockpiled coal (see image below), presumably on temporary tracks which could be readily moved. This would have allowed coal to be placed in the chute/pit located below the ash hopper as it was required.



Left: Narrow gauge (2 feet) tipping skip at coal heap (1926)
Right: rail trucks to the Powerhouse siding (1927)
(Source: National Archives of Australia, A3560, 141 and A3560, 2864)

[39] W Shellshear, 'Railways' in *Canberra's Engineering Heritage*, Engineers Australia, Second Edition 1990. Note Shellshear referenced earlier research published by the Australian Railway Historical Society on Railways in the ACT by BT Macdonald and CC Singleton
[40] *Ibid,* p51



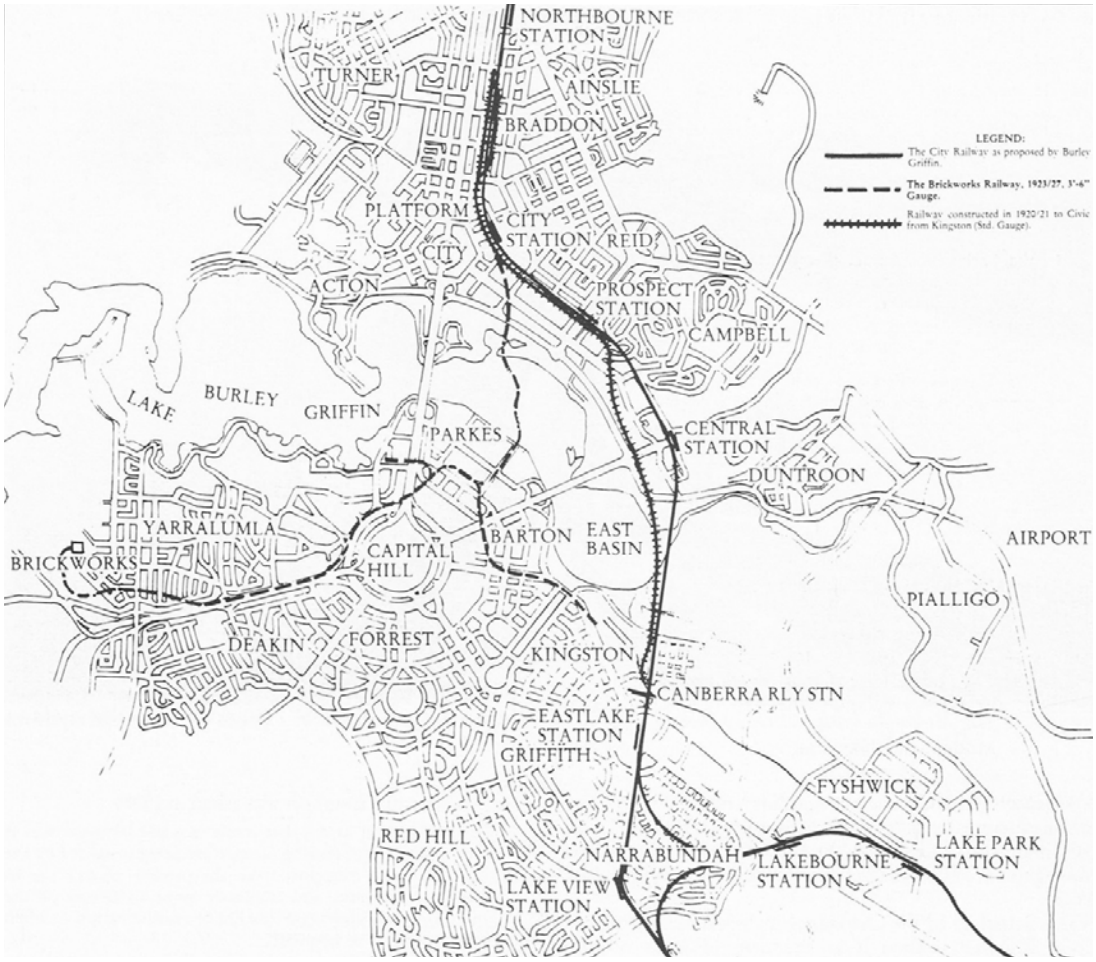
Plan showing general arrangement of railway track (1915). The location of the electric capstan is indicated (arrow) (Source: National Archives of Australia, A2445, M276B)

Brickworks line

Prior to 1923, bricks manufactured at the Yarralumla Brickworks were hauled to building sites, including to Kingston Powerhouse, by steam traction engines on roads and dirt tracks.[41] By the time of the commencement of the construction of Provisional Parliament House, it was recognised that there was a need to build a narrow gauge (3 ft 6 inch) railway from the Brickworks to Parliament House and extending to Kingston.[42]

The standard gauge Stores Siding railway at the Powerhouse site was located close to the terminus of the Brickworks line and allowed goods to be transferred between the two lines without any direct engagement with the operation of the Powerhouse. A small engine shed was built near the end of the narrow gauge line. A branch of the Brickworks railway was also built across the river from Parkes to Civic for transfer of bricks and construction materials. The image below shows the route of the Brickworks Railway from Yarralumla to Parkes and Kingston, with a branch from Parkes to Braddon, using part of the failed City Railway alignment. The first stage of the Civic Railway was disabled when the bridge across the Molonglo was destroyed in a flood in 1922. It was not rebuilt or extended at standard gauge.[43]

[41] These traction engines pre-date the John Fowler Road Locomotive nos 16161 and 16162 which were obtained in 1925.
[42] W Shellshear, p61
[43] *Ibid*



Plan showing the narrow gauge Brickworks Railway (dashed line)
(Source: W Shellshear, 'Railways' in *Canberra's Engineering Heritage, p60)*

The whole Brickworks line had a relatively short life, with the tracks dismantled and the rolling stock disposed of in the clean-up of the city for the opening of Parliament House in 1927. During its operation the railway enabled faster transport of bricks (it transported up to six million bricks per annum) than the previous steam traction engines that hauled heavy iron wheeled trailers on mostly unmade roads.[44] Traction engines and road locomotives however continued to play an important role in the transportation of goods for the construction of Canberra whilst the rail line was operational. The surviving John Fowler Road Locomotive no. 16161 (along with no. 16162) was used between 1925 and 1927 for rock, pipe and brick haulage, pile driving and towing an elevated grader.[45]

By the late 1920s, bricks were transported using lorry trucks. Remnants of the brickworks railway are located adjacent to the Canberra Brickworks in Yarralumla and consist of an embankment, cuttings and terraces. These are included on the ACT Heritage Register and further detail on them is included in the Canberra Brickworks Conservation Management Plan (GML Heritage, 2021).

[44] GML Heritage, Canberra Brickworks Conservation Management Plan, August 2021, p74
[45] Lovell Chen, John Fowler Road Locomotive No. 16161 Conservation Management Plan, draft August 2020, p5

3 feet 6 inch Brickworks tracks and tipping wagons for disposal at the end of life of the Brickworks to Kingston railway. The central line terminated at the temporary engine shed evident behind the right wagon (1926) (Source: National Archives of Australia, A3560, 141)

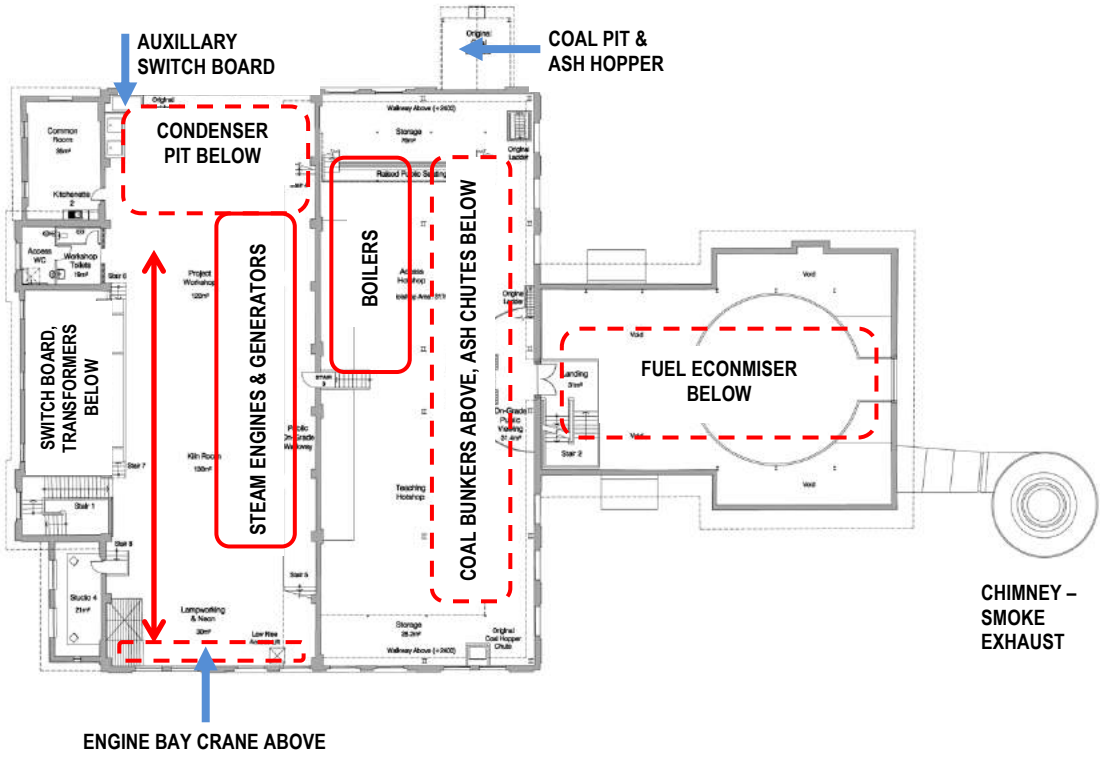
Operation of the Powerhouse

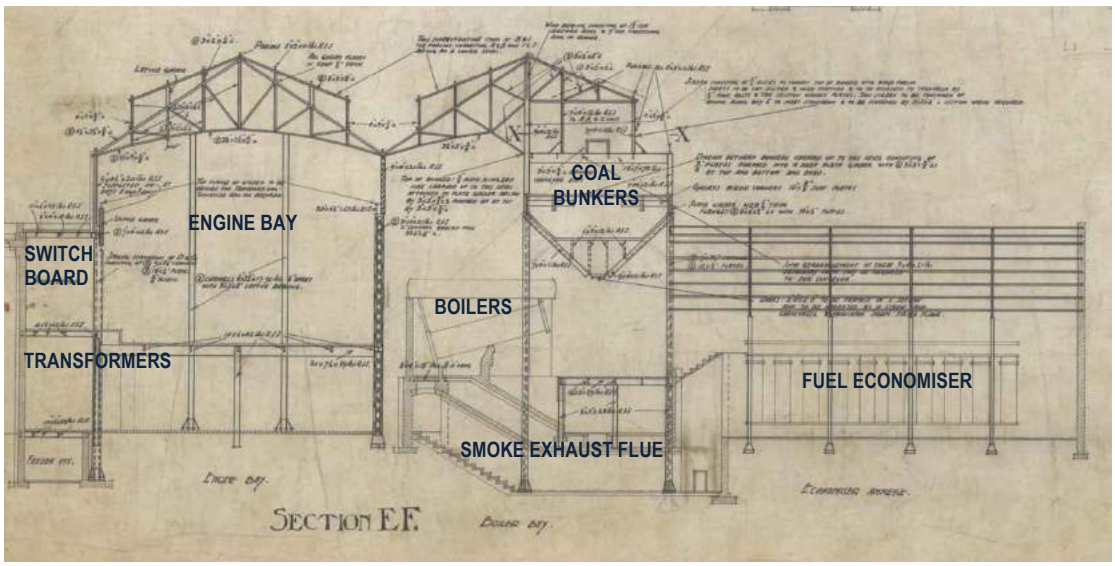
The Kingston Powerhouse building was purpose designed to house plant for thermal power generation. Whilst the plant had been specified in detail at the time of designing the building, allowance was made in the scheme to accommodate additional plant that was anticipated to be required as the population of the new Federal Capital grew.

The following items are discussed in further detail below and cover each aspect of the power generation process and where this was undertaken within the Kingston Powerhouse:

- Coal handling (coal pit, conveyors and bunkers);
- Ash disposal (conveyors, ash chutes, ash hopper);
- Boilers;
- Steam engines;
- Steam condensing;
- Generators;
- Switch board;
- Transformers;
- Switch Room;
- Auxiliary Switchboard;
- Fuel economiser;
- Smoke exhaust;
- Engine bay crane.

Each of these items are also identified/located on the drawings below.

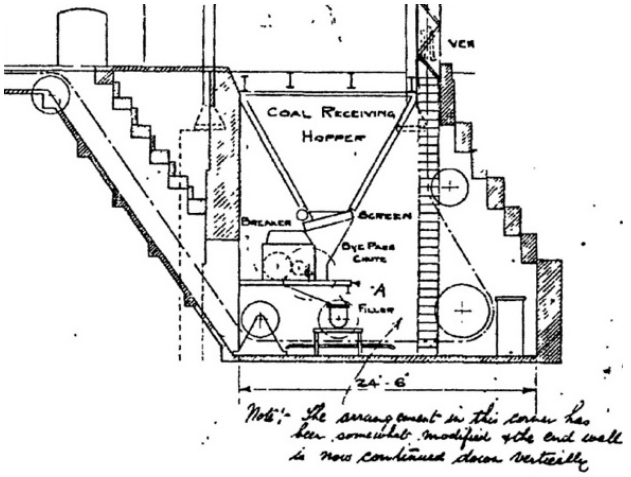




Longitudinal section showing the location of various plant. Note: this drawing is for the brick Powerhouse design (Source: National Archives of Australia, A2445, M10A)

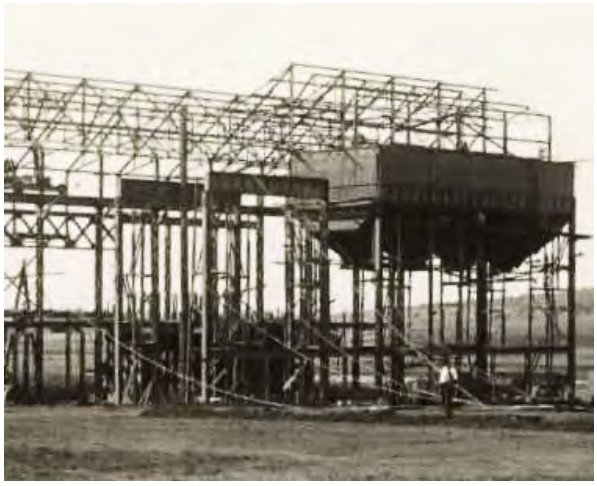
Coal handling

The black coal which was used as fuel for the power station was generally transported to Kingston by rail from coal mines in NSW. Coal was fed into the Powerhouse via a chute located below ground level between the rail tracks, where up to 40 tonnes was shovelled down to a coal receiver, coal breaker and screen to produce reasonably uniform lumps. While the coal receiver was covered over after the power station ceased operation, there are still remnants of a safety chain between the building and the structure supporting the ash hopper (see image below).



Left: Section through underground coal chute.
Right: Evidence of safety chain and barrier at former receiving hopper.
(Source: and Actew microfilm 82217-2050-00 and Keith Baker)

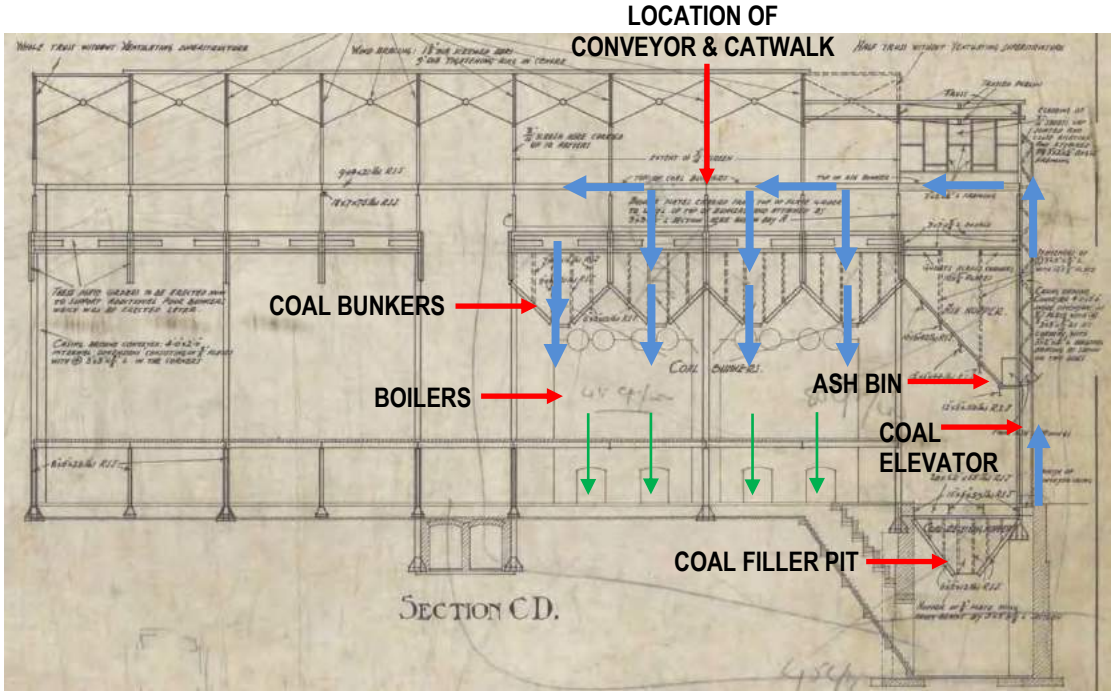
From the receiving hopper the coal was then transferred by a bucket conveyor to an overhead coal storage bunker above the boilers. Each coal bunker had a capacity of around 100 tonnes[46]. The coal bunkers were part of the original structural frame of the boiler bay (see image below) and remain in place.



Construction of the Powerhouse showing the internal bunkers which are an integral part of the structure (1913)
(Source: and National Library of Australia, 149340826)

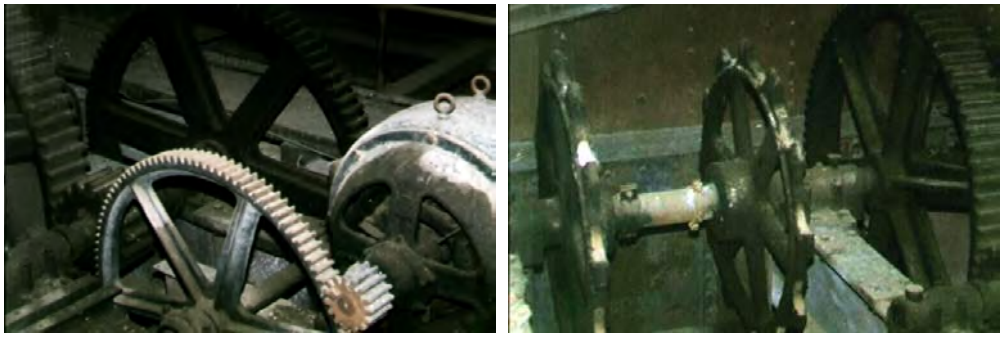
The contract for the delivery and erection of the coal and ash conveyor and accessories were awarded to Arthur Leplastrier and Co, Sydney in March 1913. This tender was advertised separately from the Generating Station Plant specification. The chain bucket conveyor ran in a large loop around the boiler bay, driven by an electric motor in the roof space. Sprockets guided the chains at the drive point and at each change of direction. The conveyor collected coal from the underground filler pit and elevated it on the outer edge of the ash hopper to a height where it turned to run horizontally inside the building above the coal hoppers, as can be seen in the section below.

[46] National Archives of Australia, A2446, drawing signed by A Lewis, Chief Mechanical Engineer, 1922

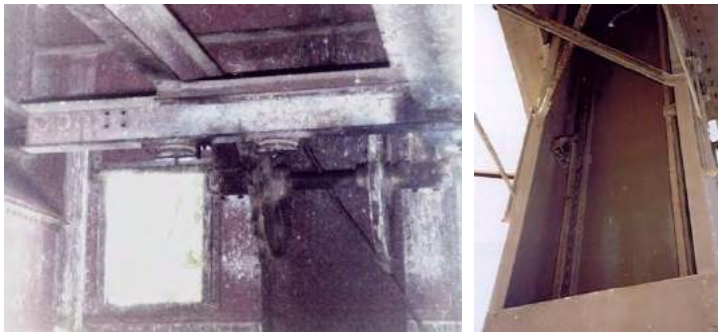


1913 section through the boiler bay showing the path of coal (blue arrows) and ash (green arrows). Note: This drawing shows coal bunkers to the north-east end of the boiler bay only, though they are located to both ends. (Source: National Archives of Australia, A2445, M10A)

Buckets on the conveyor (removed) would have been used for both coal and for ash and would have been manually controlled as to where they tipped their contents to fill the selected coal bunker, or at other times the ash hopper. Remnants of the conveyor system electric motor and geared drive remain in the roof space above the coal hoppers and vertical guide rails remain in a semi-enclosed duct alongside the ash hopper (outside the building) and at the opposite end of the boiler room inside the building (see images below).



Left: Conveyor motor drive and reduction gears in roof space. Right: Conveyor drive and sprockets in roof space (Source: Keith Baker)



Left: Conveyor intermediate sprockets at north-east end above ash hopper. Right: Guide rails inside vertical conveyor duct
(Source: Keith Baker)

Ash disposal

Like the coal bunkers, the ash hopper is an integral part of the building structure and remains *in-situ,* despite much of the other machinery having been scrapped. The bucket conveyor used to deliver coal was also used to remove the smaller volume of ash and clinker remaining from the burnt coal. The conveyor extended across the floor of the ash room below the boilers and the ash that was deposited from the boiler ash chutes would have been manually shovelled into the empty conveyor buckets completing their circuit from delivering coal.[47] The ash would then have transferred below the coal filling area and up the elevating part of the conveyor until above the ash hopper (figure 9.14). The catwalk in the roof space that ran alongside the coal bunkers extended to the ash hopper and from that position an operator would have had to tip each bucket to discharge the ash into ash hopper.

When the ash hopper was reasonably full, the ash would be dropped by gravity into a rail wagon or road truck parked below the hopper delivery arms. The transfer was activated by lever operated ash valves on the end of each delivery arm hopper.[48] The ash was then taken away to landfill.

Boilers

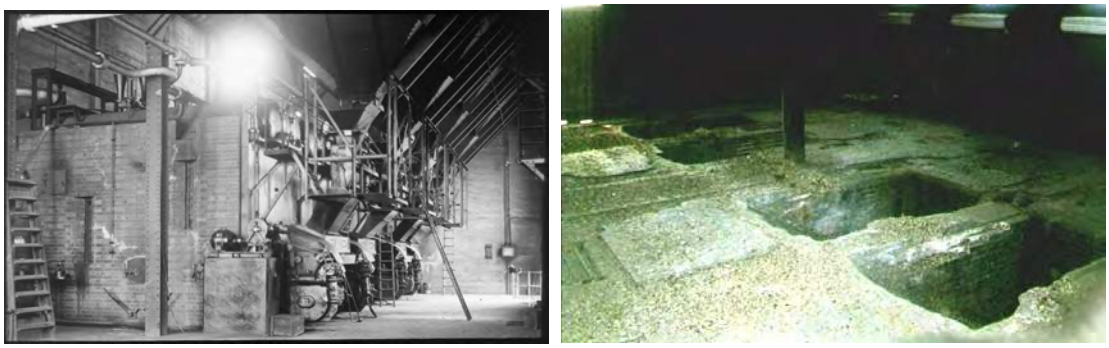
Three Babcock and Wilcox water tube steam boilers were initially specified for installation at Kingston Powerhouse in 1913, with a fourth boiler ordered soon after. These were installed in pairs in the north-east half of the boiler bay. Each boiler was capable of evaporating 8,000 pounds of water, to produce steam at a pressure of 185 pounds per square inch under nominated conditions, and 100-120 degrees Fahrenheit of superheat. Each had chain grate stokers, feed water pumps and heaters, and induced draft fans.

The fourth Babcock and Wilcox boiler under construction. Note the superheater and bank of water tubes below the steam and water drum. The motor drive for the chain grates is in the centre of the image (circa 1914)
(Source: National Library of Australia, 143675733)

The original boilers were known by the operators as the 'ACT Boilers' to distinguish them from later 'PWD Boilers'.[49] The boilers were located directly below the four coal bunkers at the north-eastern end of the boiler bay. The coal fed down from overhead bunkers via a chute and smaller hopper to feed the chain grate stokers at the lower part of each boiler. The speed of the electrically driven chain grate was

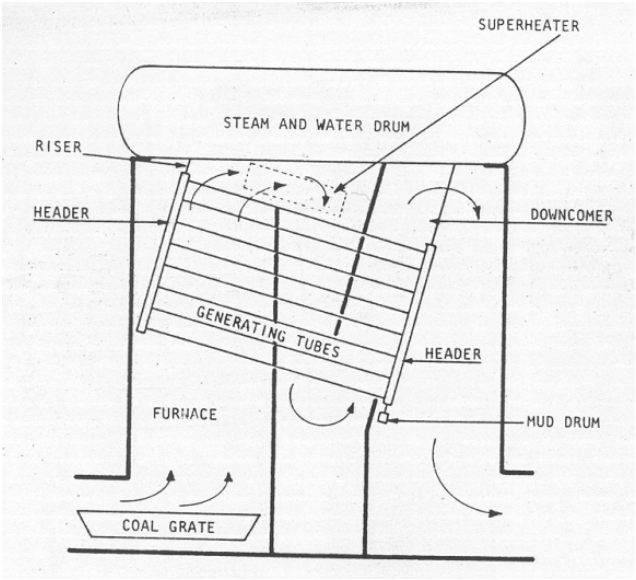
[47] Oral history Ron Hourigan Ashman at Powerhouse in 1950
[48] Drawings of the hopper arms, National Archives of Australia, A2445, M184A
[49] 1998 Oral history with Ron Hourigan, Leading Fireman (Boiler Attendant) 1950

controlled by the fireman/boiler attendant to produce steam at the required pressure. The steam produced was fed through asbestos lagged pipes to the machine room next door. Ash was periodically raked from below the grate through chutes in the floor, leading to the ash floor below. When the boilers were removed, rectangular holes were left in the floor, indicating their former location.



Left: Boilers with coal feed chutes feeding the chain grate and platforms for operator to release coal through the chute to small hopper above grate (1915-1948). Right: Floor openings evident after removal of boilers (2014) (Source: National Library of Australia, 141443942 and Keith Baker)

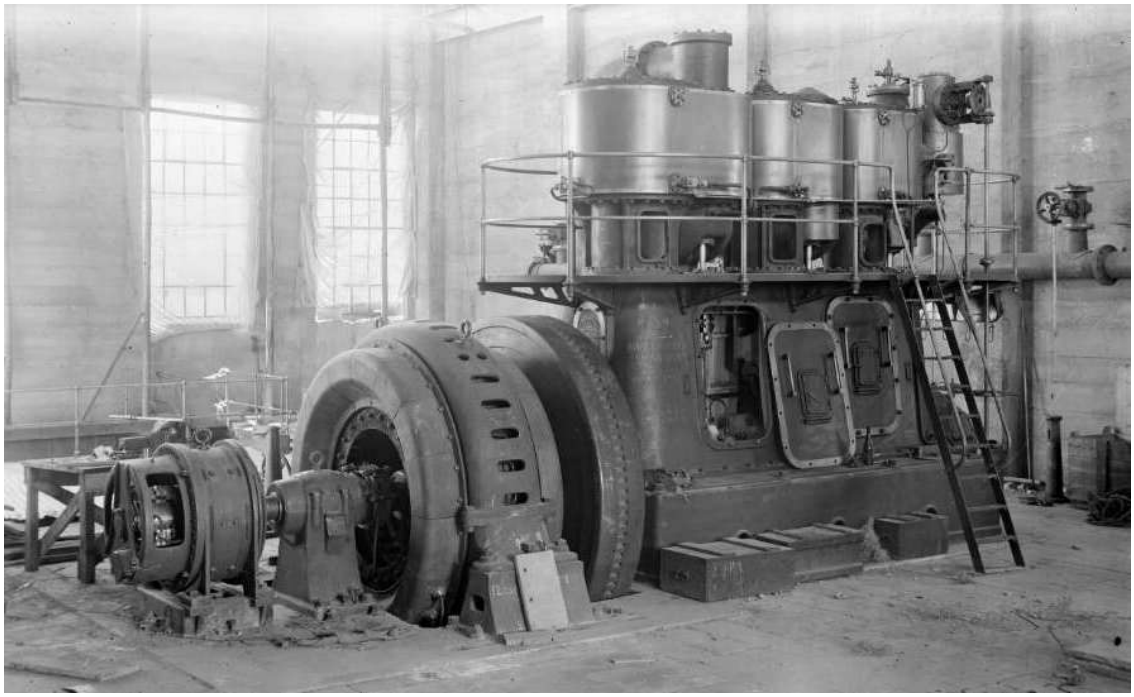
Babcock & Wilcox water tube boilers were commonly used in middle power range applications since the early twentieth century. This type of boiler was lined with refractory brick. As shown in the diagram below, the steam and water drum was positioned directly over the furnace combustion area along with the main bank of steam generating tubes. When superheating was required (as was the case at Kingston), superheater tubes were fitted directly below the drum. Water and steam rose along the main generating tubes as it was heated by the furnace gases, setting a natural thermal cycle.



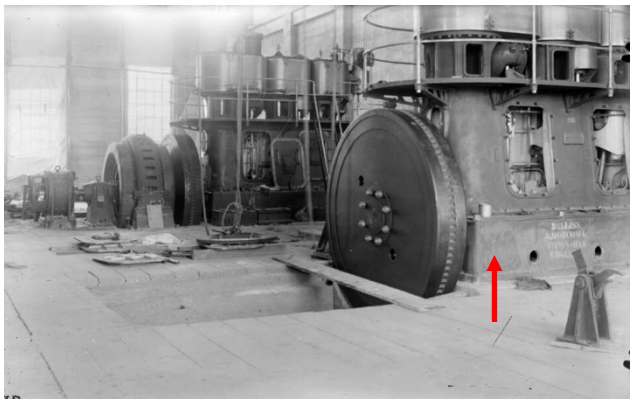
Operation of water tube steam boiler
*(*Source: *Boiler Attendants Notes, Technical Publications Trust, Perth, 1981*)

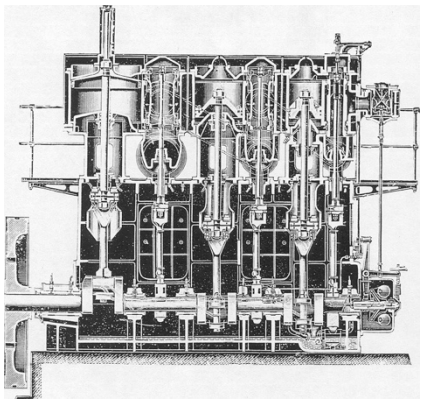
Steam engines

The Department of Home Affairs initially specified a single steam engine for the Kingston Powerhouse which was to be triple expansion double acting high speed with capacity to drive a 600kW generator at 250 rpm continuously, or at 20% overload for 2 hours. In accordance with the specification, a tender was accepted for the supply of a Bellis and Morcom engine manufactured in the United Kingdom. A second engine of the same specification was subsequently ordered.



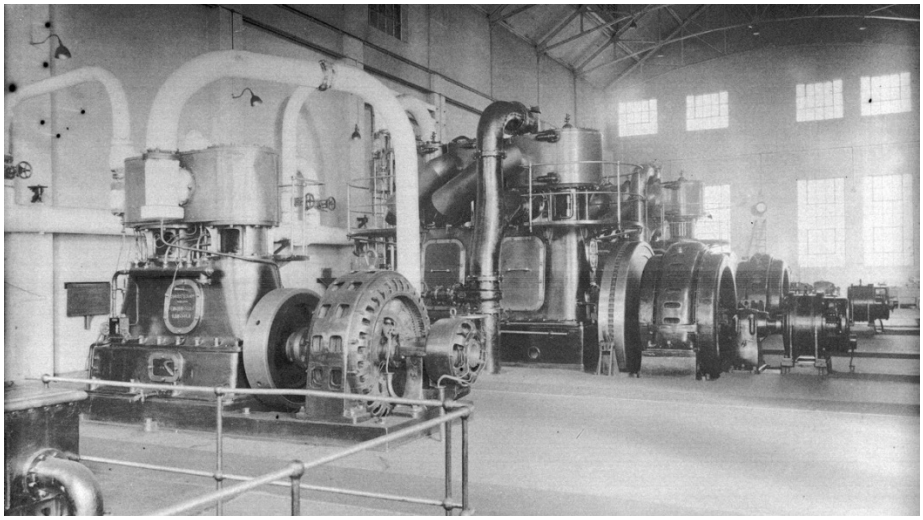
Bellis and Morcom 600kW triple expansion engine physically installed but yet to be polished and connected to the steam supply from the steam pipe on the rear wall (circa 1915)
*(*Source: *National Library of Australia, 143675551*)





Left: Second 600kW Bellis Morcom steam engine. The alternator is yet to be attached. The flywheel is recessed in the floor and studs are provided for direct coupling of the alternator as on the first machine. (circa 1915)
Right: Section through a typical Bellis and Morcom triple expansion engine of the time. Not the three cylinders of increasing diameter from right to left to obtain power form the progressively expanding steam. (circa 1915)
*(*Source: *National Library of Australia, 143675402 and E Cressy, A Hundred Yeads of Mechanical Engineering, Duckworth, London, 1937*)

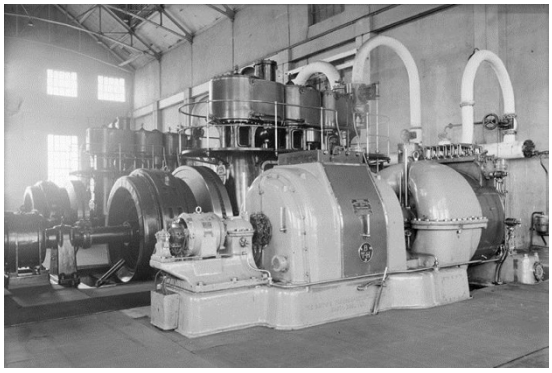
Prior to the completion of the Powerhouse, it was realised that the electrical load in Canberra would be very low in the early years while the capital was being established, so tenders were called for a smaller second hand generator for temporary and overnight use. A 150kW Hall alternator driven by a two cylinder compound Roby engine was supplied, and installed between the condenser pit and the first Bellis and Morcom engine (see image below). This set became known as the Roby-Hall generator.

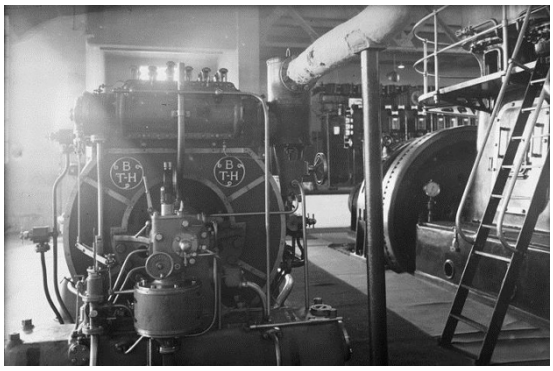


150kW Roby-Hall generator installed next to the first Bellis and Morcom engine (1927). Note the steam pipes from the wall on the left and the outlet pipe arching over the machine and extending through the floor.
*(*Source: *National Archives of Australia, A3560, 3261*)

The Roby engine employed a compound action with two cylinders,[50] whilst the Bellis and Morcom engines had three cylinders of increasing size. The arrangement of the valve timing in the latter to stop the input of steam partway through each piston stroke allowed the steam to expand to complete the stroke while reducing the amount of steam required, thus increasing efficiency. This form of compound engine is known as triple expansion. Regardless of the type of steam engine, there is the option of exhausting the steam to atmosphere, or condensing it back to water. The latter option was employed at Kingston and had the advantage of reusing the water as well as increasing the power output and efficiency as the final stroke is exhausting against a partial vacuum.

In 1927, to provide additional power a different form of engine was introduced in the form of a steam turbine. The new engine was a British Thomson Huston (BTH) turbo-alternator that employed a Curtis type turbine (see images below) which operated at 3,000 rpm in contrast to the reciprocating engines at 250 rpm. This allowed increased power output in a smaller footprint with the design inherently more efficient. The BTH unit was installed next to the second Bellis and Morcom engine, for the time making four engines in a row.

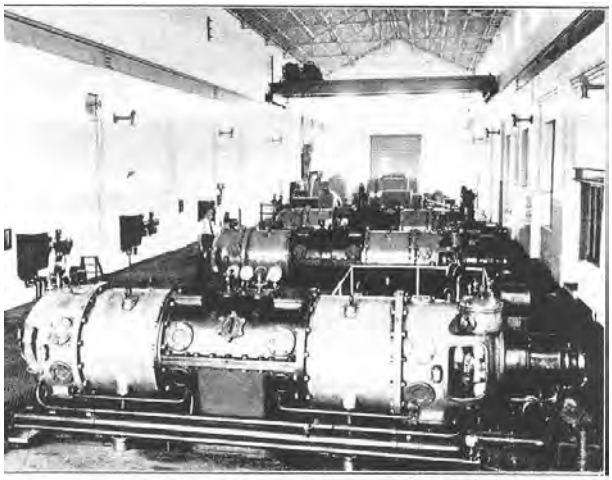




Left: BTH Turbo Alternator installed beside the Bellis and Morcom engines (1927)
Right: The steam end of the BTH Turbo Alternator
*(*Source: *National Archives of Australia, A3560, 3590, and A3560, 3593*)

[50] When describing the operation of reciprocating steam engines, double action refers to controlling the steam in a valve chamber beside the engine cylinder to alternately direct the piston down under steam pressure, then push it back up under pressure while exhausting the steam at the end of the stroke. Compound action refers to using the steam exhausted from one cylinder to release more energy by expanding in the next larger diameter cylinder. Of necessity the pistons must be arrange in a balanced way to drive the crankshaft around and keep the valves in time.

In 1938, two more turbine driven machines were transferred from Port Kembla. One was installed next to the BTH turbo-alternator, while the second replaced the first Bellis and Morcom and the Roby Hall which were separately disposed of, thus giving a different arrangement of four machines in a row. The introduced machines were known as Brush Ljungstrom, and each employed two alternators in a line with a single turbine between them.



Port Kembla Power House—Turbine Room looking East.

Brush Ljungstrom turbo alternators before relocation from Port Kembla
*(*Source: *E S Spooner, The History and Development of Port Kembla, Government Printer, Sydney 1938*)

Unlike the design of Curtis turbines (and most conventional turbines) which had alternate rows of fixed and rotating blades on a single shaft, the Ljungstrom turbine had no fixed blades, but alternate rows of movable blades which drove two shafts in opposite directions at 3,000 rpm.

Steam condensing

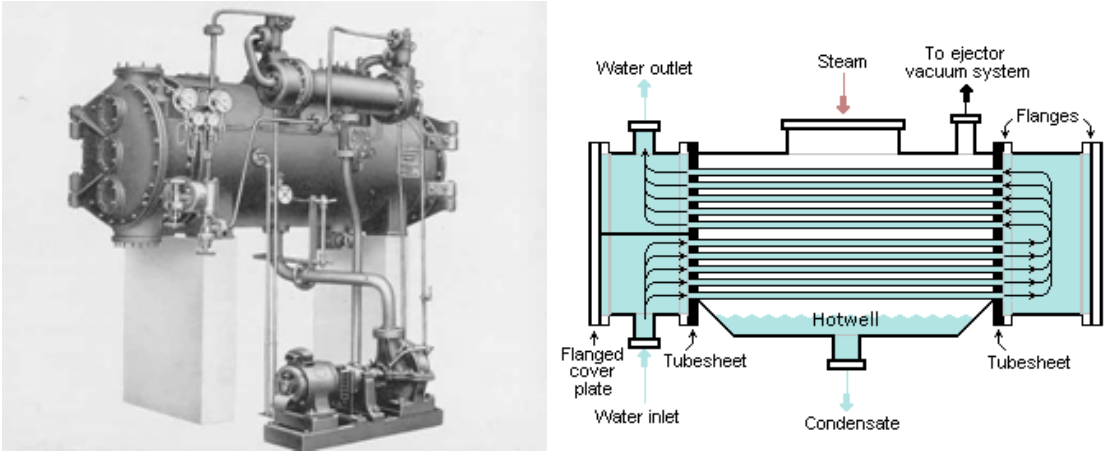
At the Kingston Powerhouse, condensers were installed in conjunction with the generator engines in a deep pit below an opening in the north east end of machine hall floor. Cool water was pumped from the pool above the weir on the Molonglo River to condense the steam and give maximum power from the engines.

Condenser pit at the north-east end of engine bay prior to Canberra Glassworks adaptive reuse (2002)
*(*Source: *Keith Baker*)

The 1912 Home Affairs specification, detailed the requirements for the Kingston condensing plant which consisted of a surface condenser, air pumps, hotwell pump and circulating pump.[51] No photos have been found of the condensers which were disposed of when the Powerhouse shut down, though from the

[51] Power Generating Station Plant for the Federal Capital Site. Specification, Conditions and Tender, Section II. Engine Room Plant, Commonwealth of Australia. Department of Home Affairs, Melbourne 1912 (National Library item A93826)

specification they appear to be similar to the surface condenser in the image and diagram below, although for a smaller engine.[52]



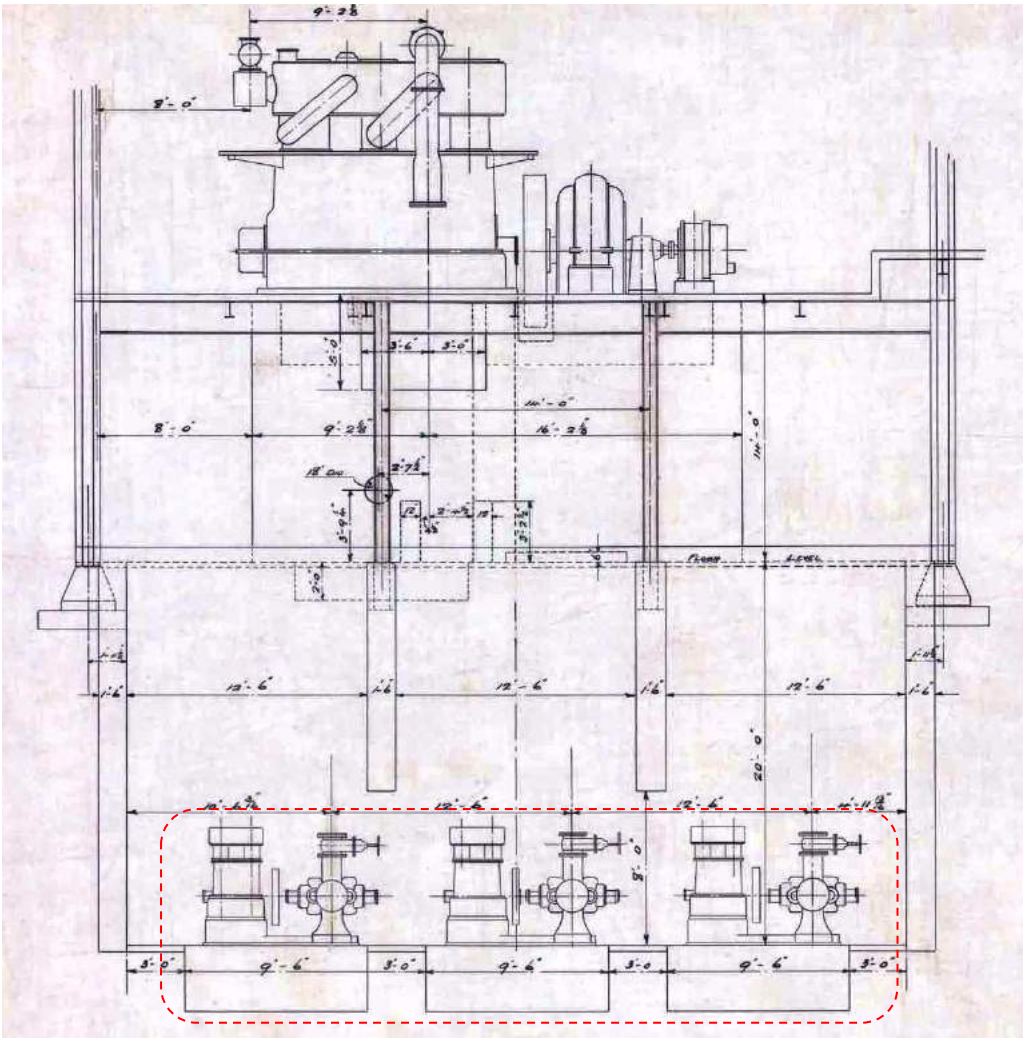
*Left: Surface condensing plant for a 300kW engine. Right: Diagram of typical water-cooled surface condenser (*Source: *Bellis and Morcom webpage, 'Surface condenser', https://en.wikipedia.org/wiki/Surface_condenser*)

Cooling water pumped from the river circulated through the bank of tubes in the condenser while the steam passing over the outside surface of the tubes was cooled and condensed, dripping down to the hotwell, from which the water was returned to the boiler (refer to diagram above). An air pump sucked out any air that had been carried through with the steam, maintaining a vacuum within the condenser. The heat transferred from the steam raised the temperature of the cooling water which was discharged back to the river. In the process the cooling water was kept entirely separate from the boiler water. Over time impurities from the river water would collect on the inside of the tubes, reducing the heat transfer and requiring cleaning by removing the end flange covers.

In the photo above, the pump at floor level would be to circulate the condensed steam from the hotwell to return it to the boiler. Cooling water required much larger pipes and a circulating pump, not shown in the photo.

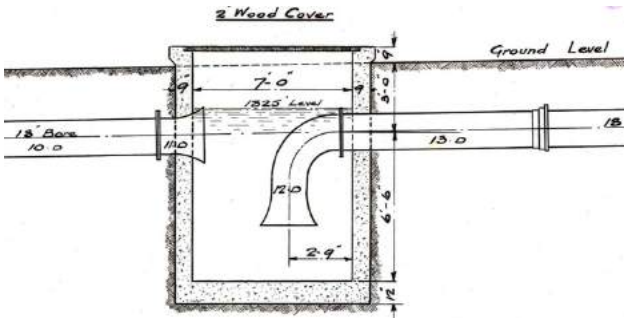
Design drawings dated 1913 show three steam-driven circulating pumps in the condenser pit, with a suction line to the river and discharge after the condenser back to the river (see below).[53] They were substantial two cylinder compound steam engines running at around 500 rpm, coupled to centrifugal pumps capable of delivering 2,200 gallons per minute under specified conditions. The pumps were connected to 18 inch diameter cast iron pipes.

[52] Bellis and Morcom in Ladywood webpage, http://www.oldladywood.co.uk/bellis.htm, 8 December 2018
[53] National Archives of Australia: A2445, M5013A and M5060A. Details of the two cylinder steam engine and pump are at A2445, M82A



Part section drawing showing 3 steam driven circulating pumps (indicated) in the condenser pit and the Bellis and Morcom engine and generator in the engine bay above.
(Source: National Archives of Australia, A2445, M5013A)

There is some discrepancy between drawings as to where the cooling water suction line and outlet entered and exited the building. An existing 18 inch cast iron pipe elbow, most likely the suction line, can be seen penetrating the building wall at ground level, although the design drawings showed the pipes to be through the wall below ground. The drawing below shows the design of the outlet pipe and siphon pit outside the building. The siphon would have carried the warm water back to discharge in the river just above the weir.



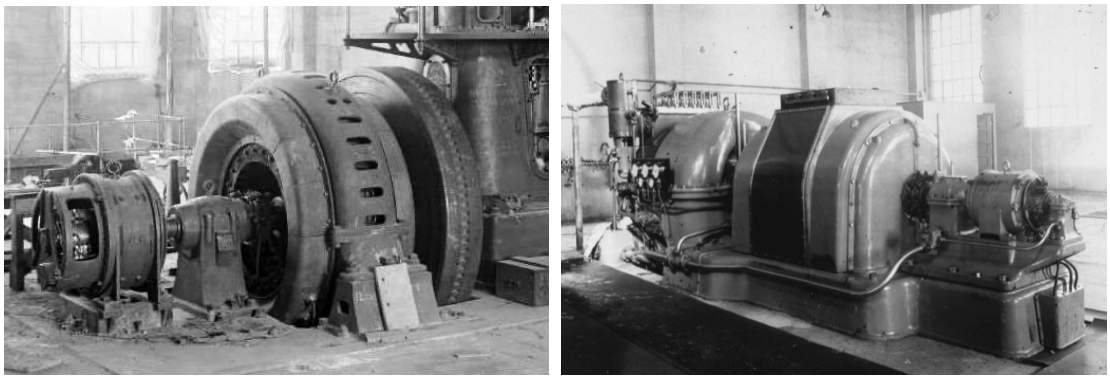
Left: Suction pipe penetrating the north-east wall of the Powerhouse at ground level
Right: Design of circulating water outlet syphon
(Source: Keith Baker and *National Archives of Australia, A2445, M122)*

Generators

The purpose of the Kingston Powerhouse was to produce electricity and the generators performed this essential function. Since the decision was made to use an alternating current supply at 50 Hz three phase, the generators at Kingston were more specifically alternators. Regardless of what type of engine was driving them, alternators are basically similar in that they have rotating electromagnets on a shaft (the rotor), running inside a stationary iron outer body known as the stator on which three evenly distributed coils of copper wire are wound. Electrical current is induced as the magnets pass the windings. When a north pole passes a phase winding, current is produced in one direction, followed by a south pole producing current in the opposite direction; thus alternating current. As the magnets on the rotor make a full revolution, they pass each of the phase windings in turn, thus producing similar cycles of current separated in time; thus three phase.

The main difference in alternators is that the structure of the rotor is constructed to match the designed speed of the engine to produce the required frequency of the electrical output. In the simplest case, a 3,000 rpm engine driving a two pole rotor will produce 50 Hz output. Slower engines require more poles on the rotor to achieve the same output frequency. To produce a magnetic field on the rotor requires a direct current supply, which is generated by a smaller DC generator known as the exciter, running on the same shaft.

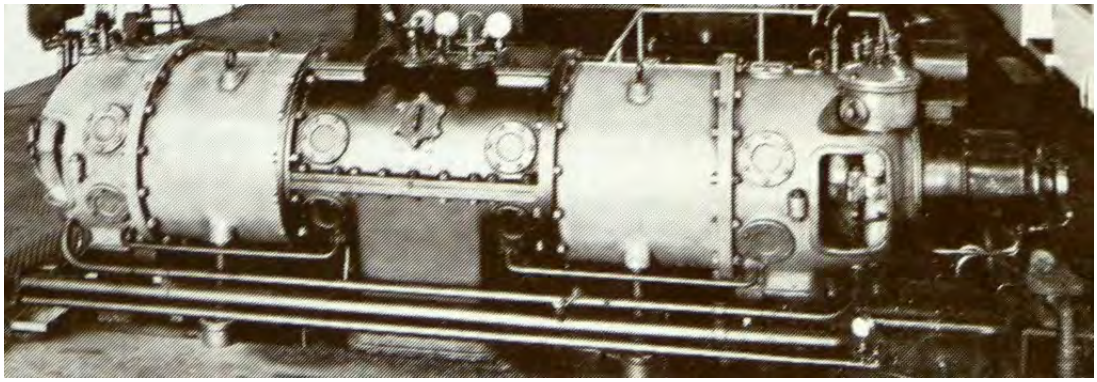
The alternators installed with the Kingston Powerhouse Bellis and Morcom engines were Brush 600kilowatt machines (see image below) generating at 5,500 volts. The rotor shaft was direct coupled to the engine flywheel, and there was a single bearing which supported the exciter end of the shaft. Since the engine speed was 250 rpm, the alternator would have required the equivalent of 24 poles on the rotor armature to produce 50Hz.



Left: 600kW Brush alternator. Note the exciter on left, alternator connected to engine flywheel and bearing in between (circa 1915). Right: BTH Turbo alternator with exciter driven by high speed turbine (1927)
(Source: National Library of Australia, 143675551 and National Archives of Australia A3560, 3591)

The Hall 150kW alternator driven by the Roby engine would have been similar to the Brush alternators on the Bellis and Morcom sets, though being smaller it would have been more practical to generate at 415 volts. By contrast, the 1500 kW BTH turbo alternator (see image above) operated at 3000 rpm which is the maximum speed that can be employed for a 50Hz electrical system, since the frequency is determined by the speed and the number of poles, and an alternator can not have less than one pair of poles. It also generated at 5,500V.

The 1500KW Brush Ljungstrom turbo alternators (see image below) with two physical alternators also operated at 3000rpm rotating in opposite directions, but only requiring one exciter as the alternators operated together.



Brush Ljungstrom turbo alternator with counter-rotating alternators at either end and exciter on far right (Source: E S Spooner, The History and Development of Port Kembla, Government Printer, Sydney 1938)

Switchboard

The alternators all fed into the 5.5kV switchboard located on a raised platform on the north-west side of the engine bay, below the lattice truss (see image below). The board had switchgear mounted on it to control and protect each of the alternators and outgoing circuits. The alternators generating at 5.5kV could connect directly to the switchboard, while the Roby Hall required a step up transformer to bring it up to the necessary voltage. Outgoing circuits were fed under the switchboard to leave the building below ground level.

5.5kV switchboard on a raised platform in the engine bay (1926) (Source: National Archives of Australia A3560, 13)

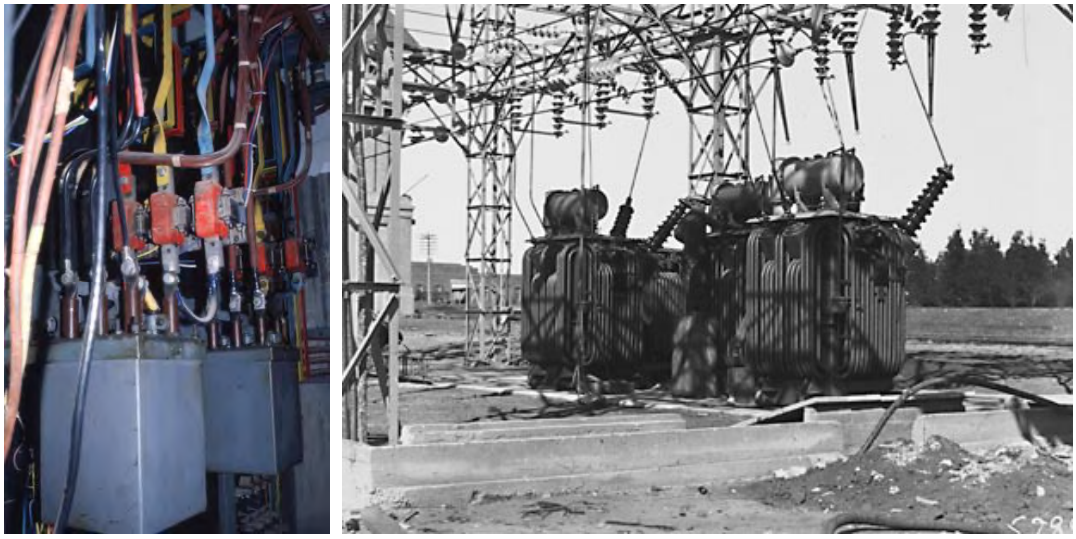
The outrigger on the left end of the switchboard was for synchronising alternators when they were brought on line. It consisted of a circular meter known as a synchroscope and three lights to operate two alternators connected in parallel, or when connecting to an outside supply, the two needed to be operating at the same speed and voltage and with the voltage in phase. This would have been achieved by having the incoming machine running slightly faster than the machine already on line, so the synchroscope was just rotating, and when the needle was near top dead centre the operator would close the switch. Once paralleled, the machines could share the load by the operator adjusting the engine governors, and regulate the voltage and power factor by varying the alternator excitation.

Transformers

Transformers are very commonly used to change voltage in alternating current systems. They normally consist of separate insulated copper coils wound on an iron core and immersed in oil in a steel tank. The change in voltage is determined by the relative number of turns in the primary and secondary windings.

Transformers were initially located on the ground floor immediately below the switchboard (see image below), for the connection of the Roby Hall machine, and separately to step down the 5.5kV generated to provide 415/240V to the auxiliary switchboard, which provided power at a usable voltage for electrical equipment around the Powerhouse. Feed to external loads in the district were taken underground at 5.5kV to the timber distribution tower to the north-west of the building, and from there on timber poles. An external transformer would have been required to step up the voltage from 5.5 to 11kV for distribution over the greater distance to the Cotter Pumping Station.

When the 66kV supply from Burrinjuck was introduced, distribution continued to be controlled from the 5.5kV switchboard inside the Powerhouse, so external transformers were required in the adjacent switchyard.



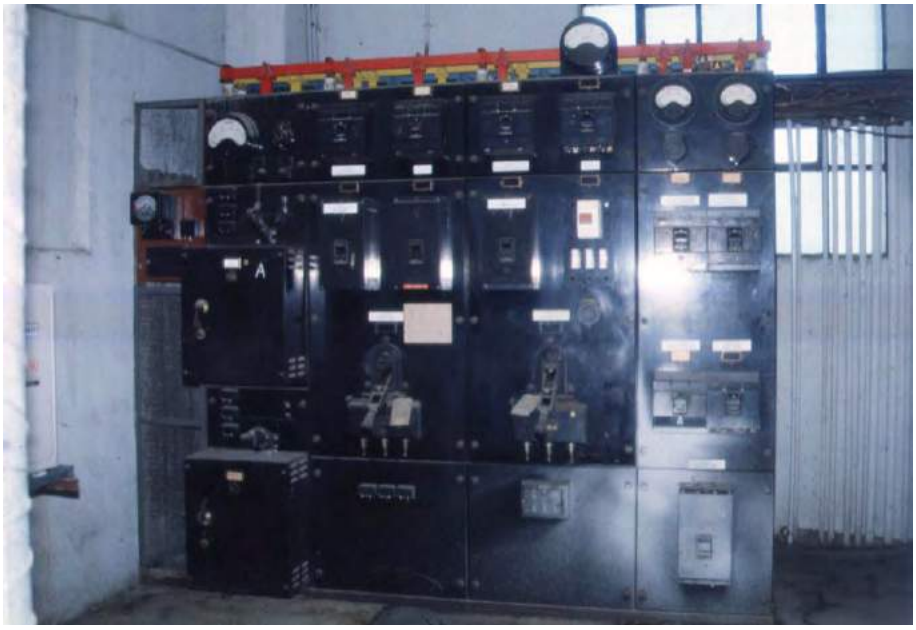
Left: Transformers below the switchboard (2002). Right: 66kV transformer in switchyard (1929)
(Source: Keith Baker and *National Archives of Australia A3560, 5789*)

1948 Switch Room

As the distribution system became more extensive, and supply was predominantly from the 66kV system, a new brick switch room with 11kV circuit breakers was built next to the switchyard. Local distribution was then upgraded from 5.5kV to 11kV. The adjacent Telopea Park Zone Substation was constructed decades later for a separate incoming supply to the area.

Auxiliary Switchboard

The items of equipment in the Powerhouse that were not steam driven (like lights, electric motors and a battery charger) were supplied from an auxiliary switchboard at 415/240 volts. Before connection of external power from NSW, power at 415/240 volts that was distributed from the auxiliary switchboard relied on at least one of the alternators running to generate electricity.

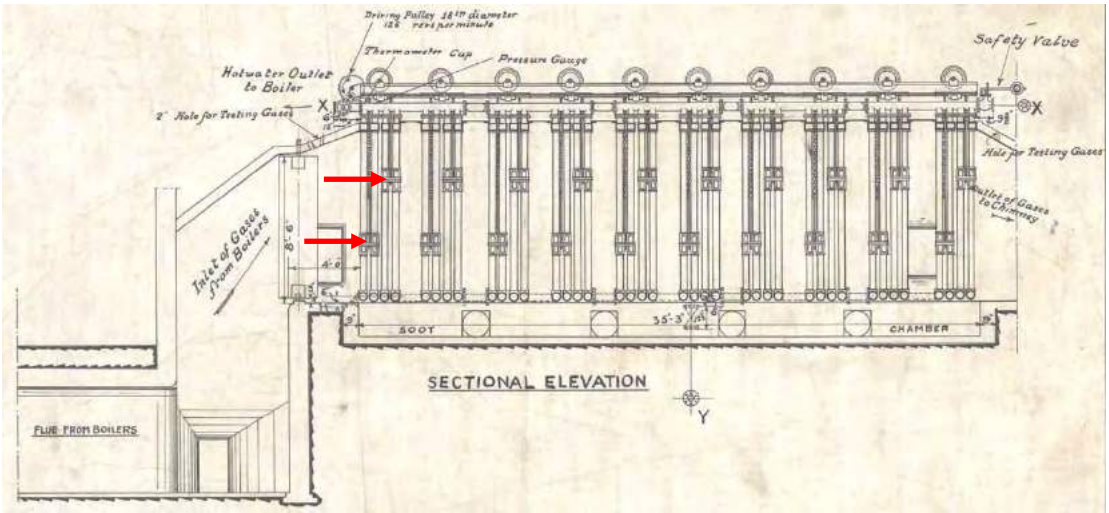


The 415 auxiliary switchboard (2002)
(Source: Keith Baker)

The auxiliary switchboard remains in place in a slightly modified form in the north-west corner of the former machine bay. A 5,500 volt to 415/240 volt transformer was located below the high voltage switchboard (at ground level), to supply the auxiliary switchboard. The switchboard in turn fed three phase electric pumps and fans around the Powerhouse as well as the coal handling conveyor, the chain grate boiler stokers and a capstan for hauling coal wagons outside the building. Auxiliary equipment, such as fans and pumps that needed to be run for a cold start before an alternator was brought on line, were generally steam driven. The whistle originally operated from steam, though in later years when the boilers were no longer run, the whistle operated using compressed air from an electrically driven compressor to the lower level. During World War II, the air raid siren also operated using electricity.

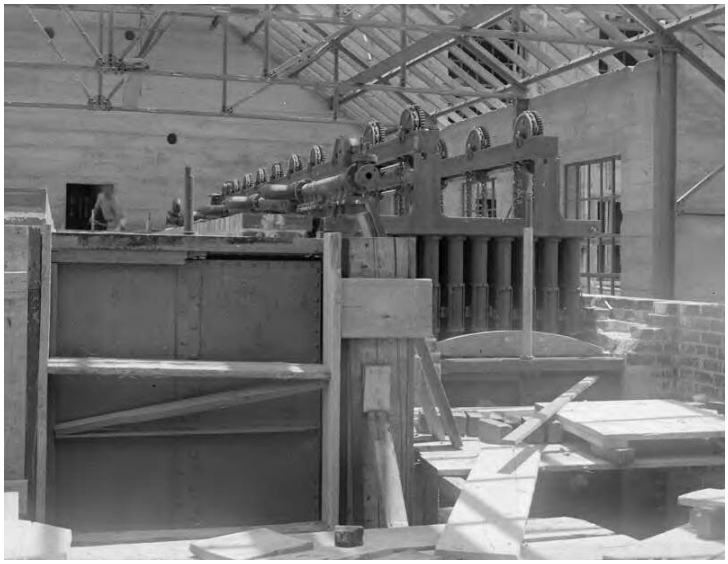
Fuel economiser

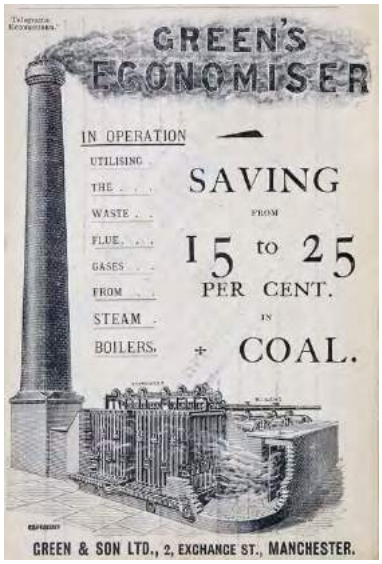
Heat from hot exhaust gases that would have otherwise been wasted was used to pre-heat the feed water (water from the condenser) for the boilers at the Kingston Powerhouse. Hot exhaust gases from the boilers were directed through the Greens Economiser which was located in the Economiser Annex, between the boilers and the chimney.



Part section showing the economiser receiving gas via a flue from the boilers and outlet to chimney (1913)
Scrapers for cleaning the tubes are indicated (arrows)
(Source: National Archives of Australia, A2445, M81A)

The supply, delivery and erection of a Green's type economiser was undertaken by Babcock and Wilcox Ltd, Sydney as contracted in March 1913. This was a separate contract to that for the supply and installation of the generating plant. A bank of Green's Economisers was installed in the Economiser Annex, with the exhaust flues from the boilers passing under the floor of the ash room, then into a brick tunnel encasing the economisers as shown in the section and photo below. The Economiser raised the feed water temperature from 140^0F to 260^0F.





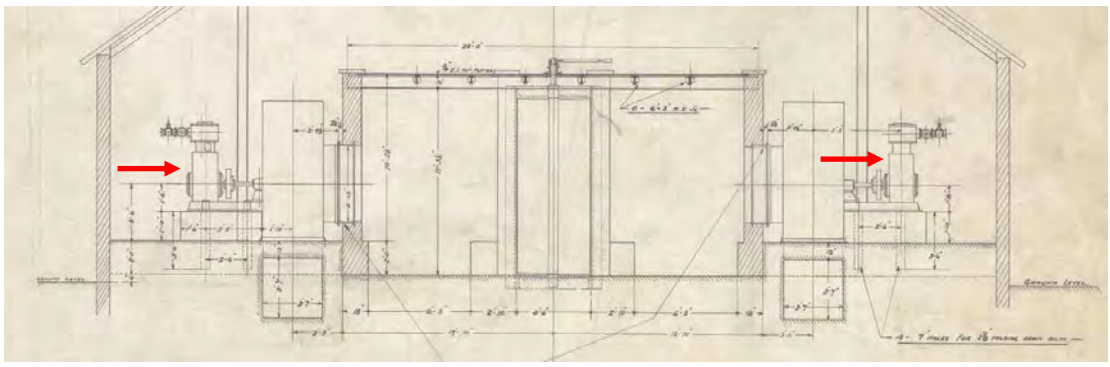
Left: Green's Economiser being installed in the Economiser Annex (circa 1914).
Right: Manufacture's advertisement extolling the virtues of the economiser
(Source: National Library of Australia 143675926 and Graces Guide to British Industrial Heritage webpage)

Green' Economisers were manufactured in modules with a bank of 10 initially installed as can be seen in the image above, with a bypass tunnel above floor level and provision for future duplication on the other side of the Ecomiser Annex.

Water from the engine steam condenser was circulated to the economisers where it passed through the banks of vertical tubes, while the hot gases passed around the tubes. As soot collected on the outside of the tubes it needed to be frequently scraped off to enable efficient heat transfer to the water in the tubes. Scraping was achieved by pairs of scrapers on chains over pulleys at the top of the economiser, which were driven up and down (refer to drawing on previous page).

Smoke exhaust

To assist the natural draught created by the chimney, induced draught fans were installed at the end of the Economiser Annex at the Kingston Powerhouse. Centrifugal fans were driven by steam pumps as shown in the drawing below. The fans forced air up the chimney in a parallel stream, without the flue gasses actually passing through the fans.



Part section with two steam engine driven induced draught fans (indicated) feeding into the chimney flue (1912)
(Source: National Archives of Australia, A2445, M45)

The design of the original chimney changed from an ornate masonry chimney that was square in plan to what was constructed as a plain circular chimney on an enlarged base (which was either hexagonal or octagonal). The original chimney was replaced in 1947 with a much taller tapered steel chimney. The image below shows that for a while both chimneys were in operation before the original one was removed. The photograph below shows the original chimney with a reinforcing band around it and guy wires supporting it.

The original and 1947 to the rear of the Economiser Annex (1951). Note both chimneys are in use. (Source: ACT Heritage Library, 000683)

Engine bay crane

An overhead travelling crane was installed in the engine room during the early stages of construction of the Powerhouse and remains in place. It runs on steel rails at high level along the length of the room. Its arrangement is similar to modern travelling cranes in that it has a pair of beams that span the two rails, on which a trolley runs with a hoist and hook. The crane was used to install machines, and to dis-assemble and re-assemble them when required for maintenance. The crane, which continues to be used in the Glassworks, is now rated at 2 tons, but was originally rated at 15 tons. All motions are manual, with the hoist operating by a rope pulley system.

Steam whistle

A steam whistle on the roof of the Kingston Powerhouse signalled the starting and stopping time for workers, and kept time for most of early Canberra. A whistle is visible in the earliest Powerhouse photos at the south end of the ridge of the machine bay roof and continues to the present.

The second whistle is believed to have been salvaged from HMAS Australia before it was scuttled off Sydney Heads after World War I.[54] This steam whistle was later put into storage on the direction of engineer in charge, Alan Jones when it was replaced with the extant one which has a lower volume.[55] When steam was no longer regularly available, the whistle was operated by compressed air. The air compressor to operate the whistle was installed on the ground floor. A cord attached to the whistle extended through the roof allowing the whistle to be operated from the machine floor below, providing steam was turned on in advance.

[54] John Gale, founder of the Queanbeyan Golden Age from 1860 believed the whistle came from HMAS Australia, as seen on a marked on a photo in his collection in the National Library
[55] Pers. Comm: Bob Harvey, former engineer, ACT Electricity Supply, ACTEW

Signalling by the whistle indicated daily start and stop time, not particularly for the powerhouse workers as some of them were on 12 hour shifts, but for the government employees in the workshops of the Kingston industrial area extending from the Powerhouse to the Government Printing Office and beyond. While the whistle was manually operated, time was carefully kept on a dedicated grandmother clock in the Powerhouse and was calibrated regularly by telephone communication with the Mount Stromlo Observatory which was the official Commonwealth time keeper.

The time the whistle was blown may have changed over the years as industrial conditions would have changed over the 50 years of operation.[56] An oral history project that involved recording of recollections of Powerhouse workers following World War II was conducted by Engineers Australia in 1998. John Carson, an electrical fitter who worked at the Powerhouse from 1947, recalled the whistle being blown at 8 am, 12 noon and 5 pm on weekdays.[57] Barney McHugh shift electrician from 1950, recalled that he had to turn steam on to the whistle 15 minutes before the required hour, then be sure to get to pull the handle on time to sound knock off time.[58]

The whistle could be heard in all the settled area of Canberra until the time when the Power Station closed in the 1950s. It is remembered by many long term Canberra residents that daily life was controlled by the Powerhouse whistle to the extent that without watches, children could play outside until the afternoon knock off whistle, by which time they were expected home.

4.4 A new life for the Kingston Powerhouse Historic Precinct

The following section provides an overview of change that has occurred at the site since the last CMP was prepared 20 years ago (Peter Freeman Pty Ltd, 2001). Since this time, numerous structurers at the former Powerhouse site have been demolished. These included:

- The 1972 additions to the rear of the Fitters' workshop (Bulk Supply Store Annexe)
- 1938 Switchboard Building which was located to the front (north-west) of the Powerhouse
- Circa 1950 and 1954-57 Electronics Workshops located to the north-east of the Powerhouse
- Circa 1950 Sewage Pumping Station
- 1950s Flammable Solvents Store
- 1953 Diesel Auxiliary Power Station and support structure for diesel fuel storage tanks located to the north of the Powerhouse
- 1950s transformer, located to the north of the Powerhouse
- Circa 1955 Line Section Main Workshop, located to the north-east of the Powerhouse
- Circa 1970 Board of Survey Store
- 1958 ACTEA Workshops located to the south-west of the Powerhouse.

These buildings were mostly single storey and were dispersed across the site. Demolition of the 1958 ACTEA workshop opened up views of the Powerhouse from Wentworth Avenue. Historically, views from Wentworth Avenue have changed multiple times with the Powerhouse being widely visible form the road on multiple occasions including several years after the Powerhouse was completed and when Interlake (Wentworth) Avenue was duplicated in the late 1920s. At other times, such as following the planting of the windbreak, the Powerhouse building has been partially screened.

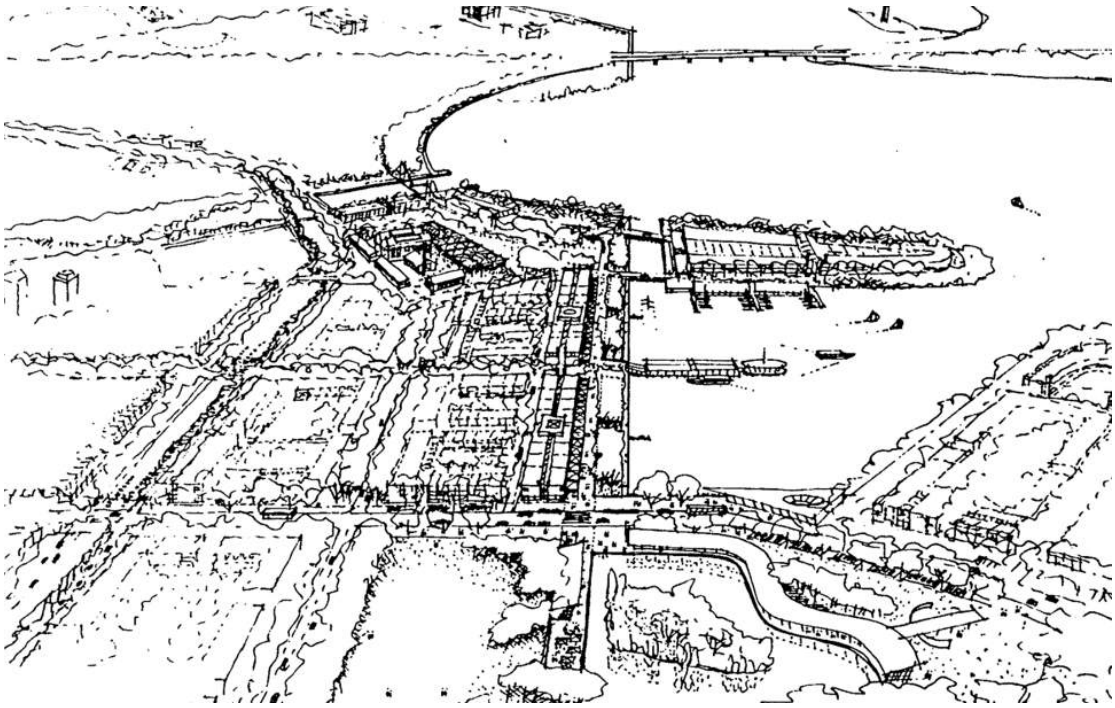
Sections of railway line were also reported to be evident in 2001, with one section noted to remain between the 1984 Telopea Park Sub Station and the Powerhouse. Ground levels to the front (north-west) of the building have also been built up since this time.

[56] In January 1948 the Commonwealth Arbitration Court approved a 40-hour, five-day working week for all Australians. National Museum Australia webpage, 'Defining moments', https://www.nma.gov.au/defining-moment
[57] ACT Heritage Library Manuscript Collections, Kingston Powerhouse Project, Interview with John Carson, Timed Summary
[58]ACT Heritage Library Manuscript Collections, Kingston Powerhouse Project, Interview with Barney McHugh, Timed Summary

Commencing in 2002, high voltage cables from the Telopea Park Substation were re-routed across the site, close to the base of the remaining railway embankment and about 16 metres north-east of the Powerhouse. This resulted in physical changes to the embankment, though archaeological investigations conducted since this revealed railway tracks and sleepers remained beneath the fill.[59] Sections of track that were exposed were subsequently removed.

ACT Government Ownership

Ownership of the Powerhouse site was transferred to the ACT Government in May 1997 as part of a land swap with the Federal Government who handed the land over in return for the Acton Peninsula site. At this time, a design competition was underway with the aim to transform the site into a mixed-use development with lively tourism, entertainment and cultural precinct on the lake shore.[60] The winning design by Colin Stewart Architects included a contemporary interpretation of part of the Griffins' design for the area, including the original vision for East Basin. The master plan proposed realignment of the foreshore to create a boat harbour with landscaped public foreshore.[61]



Kingston Foreshore Master Plan, Colin Stewart Architects (1997)
(Source: Stewart Architecture website, accessed 29 October 2020)

The approval of the Kingston Foreshore Variation to the Territory Plan (no.113) changed the Land Use Policy for the Kingston Foreshore Development Area from municipal services to entertainment, accommodation and leisure. It also entered the Kingston Powerhouse Historic Precinct onto the Heritage Places Register (now the ACT Heritage Register).[62]

As part of Stage 1 of the Kingston Foreshore Development Project, various studies were commissioned including an interpretation plan for the Precinct and a review of potential adaptive reuse options. Demolition of buildings affecting the proposed redevelopment and a clean-up of the site were also proposed as part of Stage 1 of the project.

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[59] Kingston Section 49 Heritage Strategy, Lovell Chen Architects and Heritage Consultants, Revised May 2013, p53.
[60] *The Canberra Times,* 30 May 1997, p5
[61] Suburban Land Agency webpage, 'The Design of Kingston Foreshore', https://suburbanland.act.gov.au/kingston/history, accessed 29 October 2020
[62] Standing Committee on Planning and Urban Services, Report no. 42 Draft Variation to the Territory Plan no.113 Kingston Foreshore, March 2000

In 2003, following ACTEW vacating the site, the ACT Government released its Arts Facilities Strategy which identified both the Powerhouse and the Fitters Workshop as a 'future hub for visual arts production'. The strategy included a vision for the Kingston Foreshore to be developed as a precinct for the 'Territory's leading visual arts production activities'. It also called for major refurbishment of the Powerhouse and that planning be undertaken for a Glass Centre at the site.[63]

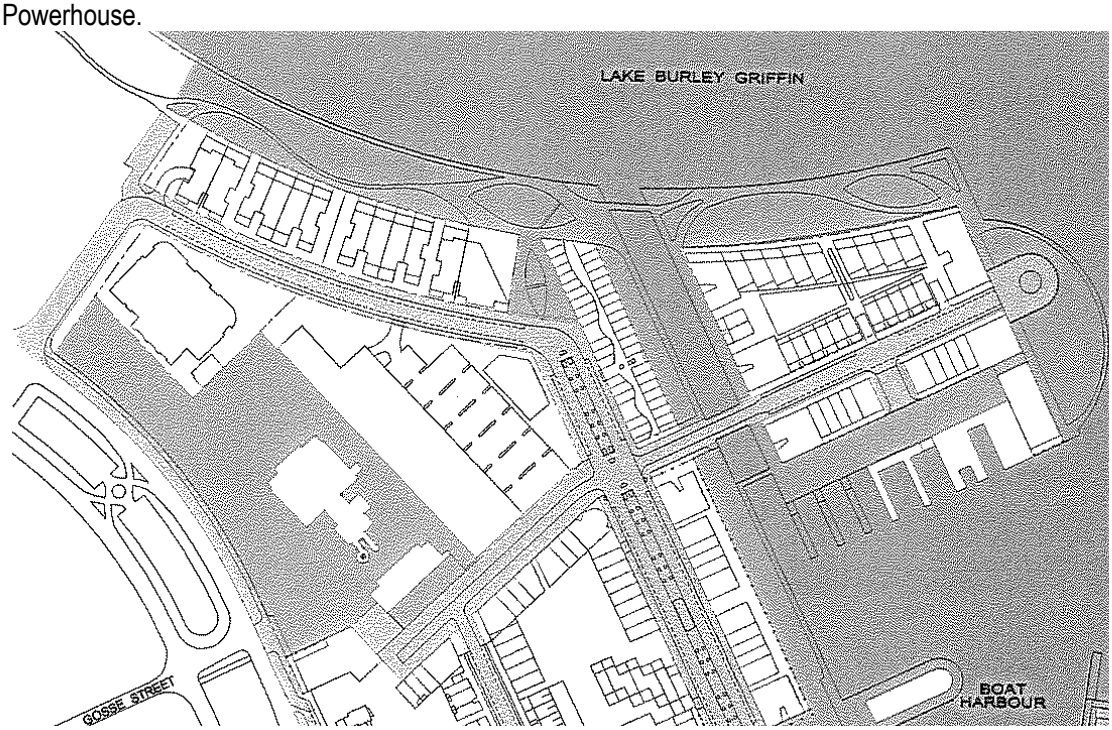
Previous statutory policy and designs

Despite the requirement to retain the Bowen Park and East Basin visual links having existed since the listing of the Kingston Powerhouse Historic Precinct on the Heritage Places Register in 2000, commentary on these visual links was not provided in the Kingston Powerhouse CMP Review (2001).

In the winning design for the redevelopment of the Kingston Foreshore (Colin Stewart Architects, 1997), which became the basis for the future planning of Kingston Foreshore, visual links between the Powerhouse and both East Basin and Bowen Park would have been blocked, with continuous development shown to the north-east, north-west and south-west of the Powerhouse.

Subsequent refinement of the Kingston Foreshore redevelopment is documented in the Kingston Foreshore Development Control Plan (DCP), Revision 2 (Kingston Foreshore Development Authority, June 2002). In this document, development to the south-west of the Powerhouse was to 'be restricted to maintain clear views of the principal building façades from Wentworth Avenue'. The plan also noted 'the distinctive gable tile roof of the Powerhouse will remain the dominant landmark building on the Foreshore development and will be visible from most vantage points particularly from across the lake and from Kings Avenue Bridge'. This was to be achieved by limiting the height of development along the lakefront to four storeys.

In addition, the DCP included a mandatory requirement for development fronting the lake to 'ensure that views to the Powerhouse roof are maintained from the surrounding areas'. No other views to the Powerhouse were identified in the DCP and continuous built form to the north-east of the Powerhouse was shown on the accompanying plans which would have blocked views of the full height of the Powerhouse from East Basin as well as views from the south edge of the lake to the roof of the Powerhouse.



Part of public domain plan in the Kingston Foreshore Development Control Plan, Revision 02 (June 2002)

[63] ACT Government, Arts Facilities Strategy, 2003, pp19-26

The built-form (white) would have blocked views of the Powerhouse from the south shore of East Basin

Requirements related to views were incorporated into the Territory Plan including in the CZ5 Mixed Use Development Code (CZ5 Code, no longer effective as of December 2012) and the Kingston Structure Plan which remains in force and is discussed in further detail in the Opportunities and Constraints Chapter. The CZ5 Code also set a maximum height limit of 4 storeys, with a limited number of buildings allowed to exceed this height provided that they did not detract or compromise views and vistas to the Powerhouse. It also included an additional requirement for land to the north-east of Eastlake Parade (north of Trevillian Quay). This requirement was 'to retain significant visual links between the Powerhouse building and East Basin, development in the area is required to be punctuated to frame and emphasis the views of the Powerhouse Building'. No new legislation relating to these visual links was introduced after the CZ5 Code was repealed in 2012.

New works commence

Work on the construction of a new harbour at Kingston commenced in 2007.[64] New development to the Kingston Foreshore commenced in December 2002 with the construction of The Gateway located on Wentworth Avenue between Giles and Eyre Street.[65] The Waterfront Apartments, which are located between the Powerhouse and Lake Burley Griffin, were constructed in 2007 and reduced the visibility of the Kingston Powerhouse Historic Precinct from the lake.

In May 2014, the Kingston Section 49 Master Plan was prepared by the former Land Development Agency to identify future opportunities for the site and illustrate how the area could be developed as a mixed-use precinct. To facilitate construction of a multi storey car park, a Development Application for demolition of the 1948 Switch Room was conditionally approved but has since lapsed (in late 2019). The Kingston Section 49 Mater Plan was not formally documented as an Estate Development Plan nor lodged for planning approval. It remains as a historic study reflecting the understanding of the site at the time as well as recording of both community sentiment and the arts facilities that were contemplated. It has no statutory status.

By June 2015, a feasibility study which built on the work of the Kingston Section 49 Master Plan was released. This feasibility study was prepared by Stewart Architecture. In October 2015, the Kingston Arts Precinct land was released to the market by way of a two stage tender process seeking innovative urban design ideas that would integrate heritage, arts and private development into a unique destination complimentary to existing offerings at the Kingston Foreshore.[66]

The tender for Section 49 required respondents to prepare a development proposal for the design and delivery of a mixed-use precinct incorporating facilities for identified arts organisations who will co-locate in the new Precinct.[67] Whilst the progress on the design of the selected tender was made in the years following, in late 2021, the ACT Government announced the delivery of the design and construction of new subdivision works, arts buildings, carparking and public domain for Section 49 will be by its own agencies.

Throughout 2020-22, artsACT and the arts organisations continued to work on defining their functional requirements, new accommodation design and location within the proposed Arts Precinct by developing a 10 year plan and operational vision. Arts organisations co-locating within the future Arts Precinct are:

- Aboriginal and Torres Strait Islander art space
- Canberra Contemporary Art Space
- Canberra Glassworks;
- Craft ACT

[64] 'ACT Govt award Kingston harbour contract', ABC News online, accessed 29 October 2020
[65] Kingston Foreshore Development Authority, Annual Report 2002-03
[66] Suburban Land Agency webpage, 'History of Section 49 Kingston, https://suburbanland.act.gov.au/kingston/history-of-section-49-kingston, accessed 31 August 2020
[67] A functional design brief for the identified arts organisations was prepared in 2016 by Philip Leeson Architects in consultation with artsACT.

- M16 Artspace
- Megalo Print Studio
- PhotoAccess.

Completion of the arts precinct is now estimated by late 2025 and the ACT Government propose to retain ownership of all heritage assets identified in the Kingston Powerhouse Historic Precinct as well as new purpose-built arts buildings, public car park and public domain. On completion, the Kingston Powerhouse Historic Precinct would be retained on Territory Land. artsACT would manage the new Kingston Arts Precinct for a period of 5 years before transitioning to an independent body.

4.5 Canberra Glassworks

The Canberra Glassworks was officially opened by Mr Jon Stanhope MLA, ACT Chief Minister and Minster for the Arts and Heritage on 25 May 2007.[68] The project was designed by Tanner Architects who won the Royal Australian Institute of Architects, ACT Chapter, Heritage Architecture Award.

As part of the adaptive reuse of the building, the economiser annex became the main entry point and the front of the building became the loading dock, with various service enclosures (including modern sub-stations) constructed in front of the façade. A full hot shop was installed in the location of the boilers with less heat intensive glass blowing and mosaic work conducted in the engine bay. An elevated public gallery was constructed around the perimeter of the boiler bay to allow for observation of the artists as well as closer examination of the original coal bunkers.

In 2009, an outdoor café pavilion was constructed to the north-east of the economiser annex, also to the design of Tanner Architects.

1948 Switch Room

The 1948 Switch Room is currently used for short-stay accommodation for artists working at the glassworks. The 11kV switchgear was installed in the structure in 1960 and the building was later extended to the south-west to accommodate additional switchgear. The switchgear was removed when the building was adapted to an office in the mid-1980s. At this time, the original doors to the centre of the north-east elevation were converted to windows and a porch was erected to the south-west. Adaptation of the building for residential accommodation, including a new fit-out, was completed in 2007.

4.6 John Smith Murdoch (Architect)

Scottish born architect John Smith Murdoch migrated to Australia in about 1884 and shortly after was employed by the Queensland Department of Mines and Public Works. In 1902, he was appointed District Architect of the Queensland Department of Public Works. In July 1904, Murdoch joined the newly formed Commonwealth Department of Home Affairs rising to the position of Chief Architect in the Department of Works and Railways in 1919. This made him the first Commonwealth Government Chief Architect.[69]

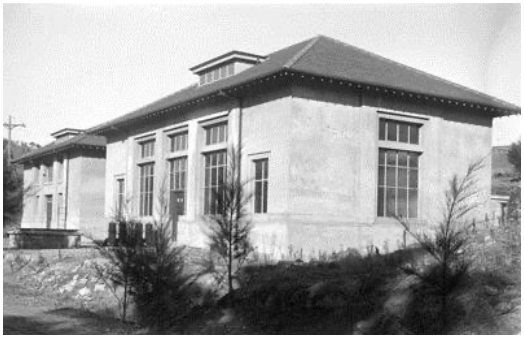
Murdoch's later work, particularly that from the 1920s, embraced a stripped classical style that adopted a classical composition articulated by receding wall planes, openings and structural elements that eschewed lavish detail. These buildings often employed flat roofs, projecting parapets and distilled classical proportions.[70] His most well regarded building completed in this style is provisional Parliament House (1922-27) which is the most prominent example of his work. The former High Court building in Melbourne (1925-28) also encapsulate features of Murdoch's stripped classical style as does the Hotel Canberra (now the Hyatt Canberra, 1914) and the East and West Provisional Secretariat Offices (1924-26, 1925-27).

Other buildings in Canberra that can be attributed to Murdoch include Gorman House (former Ainslie Hotel, 1924) and the Hotel Kurrajong (1925-26). More broadly, notable buildings designed by Murdoch in

[68] Fitters' Workshop Conservation Management Plan, Updated by Duncan Marshall, 2018, p37
[69] Australian Dictionary of Biography, entry for John Smith Murdoch (1862-1945), accessed 1 September 2020
[70] Shire of Melton Heritage Study, Volume 5, former Rockbank Beam Wireless Station, David Moloney *et al,* 2006

other states include the Commonwealth Offices, Melbourne (1910-13), Spencer Street Mail Exchange, Melbourne (1915-17), General Post Office, Perth (1914-1923), City South Telephone Exchange, Sydney (1922) and the State and Commonwealth Offices, Brisbane (1930).[71]

Contemporaneous industrial facilities designed by Murdoch include the former Pumping Station at the Cotter Dam (designed 1912), and the Federal Woollen Mills, North Geelong (1915). Like the Kingston Powerhouse, these buildings have a largely symmetrical form with prominent roofs featuring shed dormers with timber louvres. The Cotter Pumping station has the same material palette as the Kingston Powerhouse, with arts and crafts influences, both having rendered walls, terracotta tile clad roofs and exposed rafter/purlin ends. The buildings at the Federal Woollen Mills are constructed of red face brick, more typical of the period, and employ restrained details to modulate the walls including plain pilasters.



Left: Federal Woollen Mills, North Geelong (C D Pratt 1927). Right: Cotter Pump House (1926)
(Source: State Library Victoria: H91.160/1042 and National Archives Australia: A3560, 178)

[71] Adelaide General Post Office: Heritage Management Plan, Lovell Chen, 2016, p120

5 Physical assessment

5.1 Introduction

This chapter provides a contemporary physical description of the extant fabric at the Kingston Powerhouse Historic Precinct, including the main Powerhouse building, the Fitters' Workshop, the 1948 Switch Room, remnant industrial infrastructure and landscape features, including surviving embankments associated with the railway sidings. Photographs included in this section were taken by Philip Leeson Architects between September 2020 and May 2022. A condition assessment for the three buildings within the Historic Precinct has been undertaken as part of the preparation of this CMP and is included in Appendix E.

In addition, Canopy Tree Experts were engaged to carry out a preliminary arboricultural assessment of all regulated trees within the heritage area, providing brief notes on the condition and recommendations for the management of the trees. The full report is provided at Appendix B.

The three remaining buildings at the Powerhouse site were constructed parallel with the railway sidings that once served the site. The earliest of these railway lines was to the north-east of the extant buildings and its approximate location is indicated by the extant embankment. The Fitters' Workshop is located at the south-east end of the Historic Precinct whilst at the north-west end, the Precinct includes the 1948 Switch Room and the trees on the corner of Wentworth and Avenue and Eastlake Parade.

Aerial showing the location of the Kingston Powerhouse Precinct Buildings
(Source: ACTmapi showing 2020 aerial photograph)

The former Transport Depot adjoins the south-east end of the Kingston Powerhouse Historic Precinct and is also included on the ACT Heritage Register.

The area between the Powerhouse and the 1948 Switch Room is currently an asphalt car park which can be accessed from Eastlake Parade.

5.2 Powerhouse

Exterior

The Powerhouse building consists of a large, paired gable section to the front (north-west) and smaller, single gable part to the rear. The large section contains the boiler bay (south-east) and engine bay (north-west), whilst the smaller gable section to the rear is the economiser annex. The original façade/front elevation of the Powerhouse which includes the original entry porch is oriented to the north-west, though the building has been designed in the round with all elevations featuring restrained classical detailing. The base of the 1947 chimney stack and associated brick flue are located to the rear of the economiser annex. Modern portals in the economiser annex now act as the main entrances to the Glassworks. There is also a contemporary addition to north-east side of the economiser annex that is used as a café.


Left: north-west façade of Powerhouse. Right: economiser annex and base of chimney stack to rear of Powerhouse

The prominent gable roofs are clad in unglazed terracotta tiles and each gable incorporates louvred roof ventilators. These distinctive vents have a skillion roof (also known as shed dormers) of shallower pitch than the main roof and are similar to contemporaneous industrial buildings designed by John Smith Murdoch, including those at the Cotter Pumping Station and Federal Woollen Mills, North Geelong. There are decorative timber brackets to the eaves of the ventilators and the spandrels are finished with battened sheeting. All eaves are lined with spaced timber boards/slats, except for those to the gable ends of boiler and engine bays which are lined with battened sheeting. Gutters are a quad profile and original rectangular rainwater heads remain.

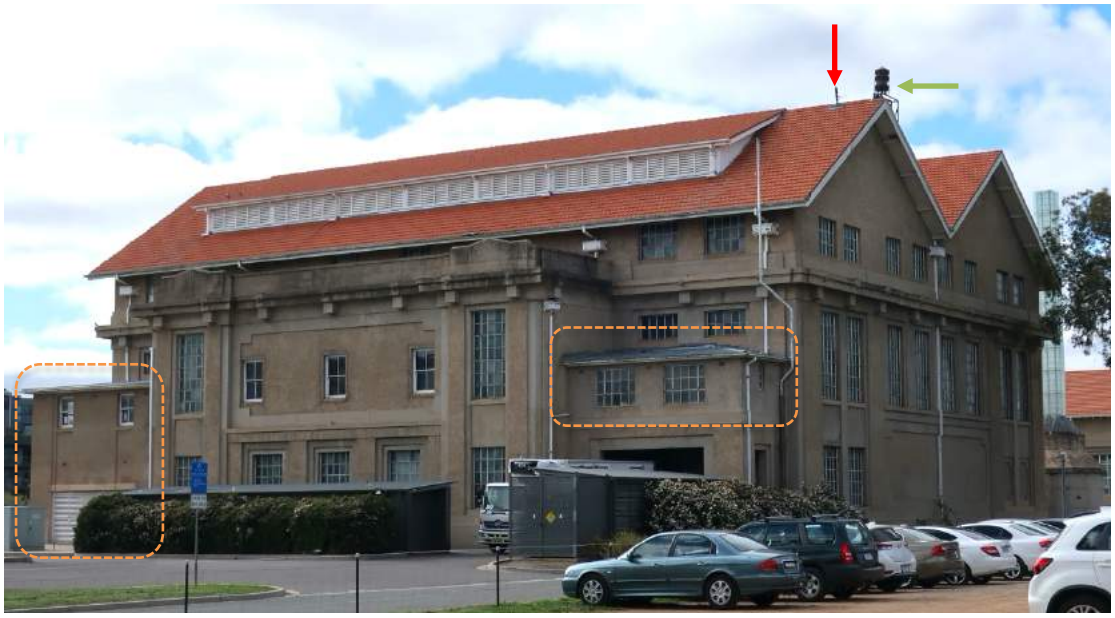

Left: Shed dormer/ventilator. Right: Rainwater head and decorative timber moulding to bargeboard

The steel framed Powerhouse building has walls constructed of unreinforced concrete that have been finished with contrasting roughcast and smooth render. These materials, along with the terracotta roofs, reflect the influence of the Arts and Crafts. Details picked out in smooth render include the plinth and the substantial cornice which has restrained detailing and large, widely spaced cuboid brackets. Plain pilasters to all elevations are of roughcast render as are the large, recessed panels located centrally to the upper part of the façade and lower part of the north-east and south-west elevations.

Original windows are steel framed multi-paned types that incorporate awning openings. These windows are largely vertically oriented with shorter horizontal windows to ground level and the upper part of the boiler and engine bays. Glazing is a mix of types, including reed and wire reinforced glass.

Boiler and Engine Bays

The largely symmetrical façade features a two storey, central bay that projects forward of the gable roof and has a parapet with flat central section flanked by low pitch gables. This, along with the entry porch, distinguishes it from the other elevations. There are three non-original timber-framed sash windows to the first floor of the central bay which were installed in 1959. Either side of the projecting bay, additions with low pitch hipped roofs have been introduced (circa 1955). That to the south-west end has been constructed on top of the original entry porch. Contemporary service enclosures associated with the Canberra Glassworks, have been erected in front of the façade and include store enclosures, waste areas and modern sub-stations. These enclosures compromise the full visibility of the façade and the ability to appreciate the original entry to the Powerhouse.



Façade showing circa 1955 additions (orange), steam whistle (red arrow) and World War II air raid siren (green arrow)

Consistent with the largely symmetrical design of the building, the north-east and south-west elevations have the same architectural format with the north-west distinguished from the other by the presence of the original riveted steel coal elevator and ash bin. The south-west elevation incorporates additional windows to the boiler bay *in lieu* of the coal elevator. This structure extends across one of the tracks (possibly buried) of the former railway siding to the north. Patching to the north-east elevation indicates the location of previous infrastructure including the metal flue from the condenser pit.

An early steam whistle (now operated with compressed air) remains to the ridge of the engine bay as does a World War II air raid siren. The original entry porch is now used as a loading dock and has a modern roller door for the delivery of goods. The porch has a pair of timber-framed pedestrian doors with multipaned upper part and multi-paned highlight and sidelight. Metal boot scrapers remain to either side of the porch.


Left: Timber door to porch and boot scraper (red arrow). Right: Ash hopper and coal elevator to north-east end of boiler bay. The repair patches indicated (red arrows) is where the flue from the condenser pit penetrated the wall

There is evidence that previous openings (not original) on both the north-east and south-west elevations have been filled in. The south-east elevation of the boiler bay is largely intact, though modern roller doors have replaced the original shutters. These openings provided ventilation/fresh air to the boilers.

Economiser Annex

The economiser annex is centrally located to the rear of the boiler bay and incorporates a mezzanine level. Its prominent gable roof has relatively low eaves. Modern glazed entries have been installed on both the north-east and south-west sides of the annex in enlarged openings and act as the entrances to the Glassworks. A window opening has also been made into a doorway to provide access to the café addition and a large opening has been cut in the rear (south-east) wall.

Modern landscape treatments within the Kingston Powerhouse Historic Precinct and located beyond (such as Jack Ross Park), align with the modern, glazed entrances to the Glassworks. This assists with wayfinding, allowing people to identify the current entries to the Powerhouse building from both Wentworth Avenue and the Kingston Foreshore.


Left: South-east end, economiser annex. Right: south-west elevation, economiser annex

The contemporary café addition has a cuboid form and is connected to the economiser annex via a small metal clad link. This obscures much of the north-east elevation of the economiser annex. A smaller toilet addition was previously located to this side of the economiser annex.

Chimney and Flue

The original chimney and associated horizontal flue, which were located centrally to the rear of the economiser annex, have been demolished. Red bricks inlaid into the gravel are possibly meant to be an interpretive device for the original chimney, though historic photos suggest that it had a hexagonal or octagonal base (not square) and a longer flue with the chimney located a similar distance from the Economiser Annex as the extant chimney base.

The 1947 chimney base and associated flue have been adapted into a small gallery. The concrete chimney base is lined with bricks internally and supports a contemporary glass artwork *Touching Lightly* by Warren Langley which was completed in 2010. A small metal access door remains to the base of the

chimney on the north-east side. The chimney is connected to the economiser annex by a brick flue. The concrete roof to this flue has been removed and a modern glazed section added to the top to allow it to be used as a walkway.


Left: Red brick interpretative device for original chimney. Right: Chimney base with red brick flue

Interior

The description of internal parts of the Powerhouse below commences with the original entry and stair, which is located on the ground floor, and then moves to the boiler and engine bays located on the first floor as these were the primary spaces for the production of electricity. This is followed by a description of other spaces located on the ground floor which serviced the engine and boiler bays located above.

Original Entry

The entry includes the main stair which provides access to the engine bay. The room has rendered walls that retain a painted grey and black dado. The original concrete stair has a timber handrail with scrolled end that is supported on plain steel uprights. It includes a decorative newel which incorporates scrolled steel and there are cupboards below the upper flight. Above the stair are two decorative pendant lights with metal framing and glass diffusers.

Left: Concrete stair. Right: Lights to the stairwell

Engine Bay

The first floor engine bay is a large open plan space that extends the full width of the building and originally housed the steam powered reciprocating engines. It is now used as a glass making workshop. Below the engine bay are numerous smaller service spaces, including the condensing pits at the north-east end which were used to condense steam from the engines back into water which was fed back to the boilers to produce superheated steam again. An office and kitchen are located in the circa 1955 additions to the front of the building and are accessed from the engine bay, as is a larger office which was originally an open platform for the switchboard. The toilets adjacent to the switchboard platform were originally an office and have timber-framed multi-pane highlight and sidelights to the doorway.

Engine bay looking south-west. The overhead crane is located adjacent to the far wall and the lattice girder above the opening to the former switchboard platform is indicated

The engine bay has steel trusses with curved bottom chord and the underside of the roof is lined in ripple iron. An overhead crane remains and continues to be used by the Glassworks. A section of floor, in the west corner consist of temporary timber framing that can be removed to allow goods to be hoisted from the loading dock below. The remainder of the floor appears to be a modern concrete slab, that has been constructed on top of an earlier floor, including over the void that had been located to the north-east end of the engine bay.[72]

Two enamelled light fittings remain and are suspended from the trusses. Metal light shades, with a shovel like profile also remain to the walls. Whilst these lights are not original, they may date to the mid-20th century. A substantial switchboard is located to the northern corner.

The original switchboard for the Powerhouse was located on an elevated platform on the north-west side of the engine bay. A substantial steel truss/lattice girder is located above the opening to this platform which has been partitioned off to create an office and is accessed via two concrete stairs. The original walls of this switchboard platform are rendered and have a high dado moulding. The later partition wall is finished with battened sheeting and the floor has a modern finish.[73]

Boiler Bay

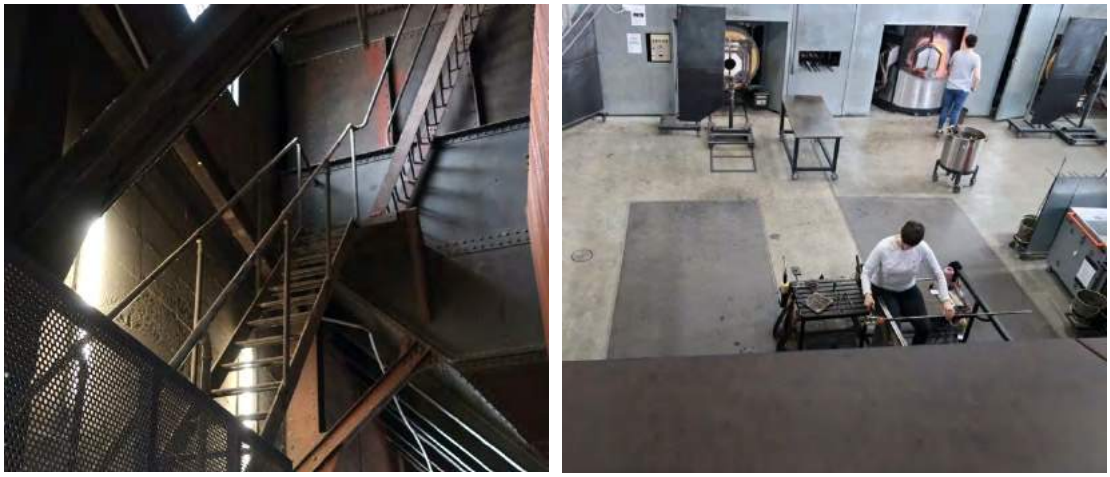
The floor of the boiler bay is located below that of the engine bay. The boiler bay is dominated by the original steel coal hoppers/bunkers that are located to the south-east side and are an integral part of the

[72] This obscures the 'evidence indicating former location of engines and other equipment, hoist holes indicating usage, and railings around the north indicating original detailing' noted in the 2001 CMP.
[73] This obscures/has replaced the previous viny floor tiles which are noted in the ACT Heritage Register listing to indicate the 'original position of high voltage switches'.

building's steel structure. This area has been fitted out as the Hot Shop and has a modern mezzanine that extends around the north-east and south-east sides as well as a modern lift.

Boiler bay showing coal hoppers and original light fittings (indicated)

The underside of the modern sarking to the roof is exposed and the upper parts of the walls are exposed off-form concrete. Another coal elevator is located at the south-west end of the boiler bay and a steep steel stair/ladder is located adjacent to the south-east wall. This provides access to a mezzanine level between the north and south banks of coal hoppers. Original light fittings are fixed to the north-west side of the coal hoppers whilst wall mounted light shades, matching those to the boiler bay are fixed to the south-east wall. On the same wall there are remnants of an early paint finish with a red and black dado. There are also various conduits and distribution boards fixed to this wall.



Left: steel ladder adjacent to south-east wall. Right: the dark coloured concrete to the floor indicates the location of the ash chutes

The air dampers (noted in the ACT Heritage Register listing) which regulated smoke entering the flues from the boilers, were not evident during the inspection, nor were the pipes that extended from the boiler bay into the engine bay. Patches to the wall are evident in the engine bay and indicate the previous location of penetrations.

Ground Floor

The ground floor (below the engine and boiler bays) retains sections of the original ash chutes, flues and condensing pits. In addition, this level now includes many modern concrete block walls that divide the space into various amenities, including toilets, store rooms and workshops. It is understood that the condensing pits in the north corner of the building are now used for water storage. Whilst the upper part of the ash chutes have been filled in to provide a flush floor in the boiler bay, the lower parts are intact. One of these retains substantial metal doors.

Left: steel doors to ash chute. Right: original light fitting (arrow) and cable terminating box (circle) to current mould making room

Two early steel ladders remain to this level, though have been blocked off at first floor level. One is located above the condensing pits and the other provides access to the east corner of the boiler bay. Below the original switchboard platform, the steel cable rack remains as do several cable terminating boxes (in the current mould making room and technician's office). An original metal light fitting also remains to this area. An early three phase switch and a later Westinghouse 'No-fuse Load Centre' switchboard are located in the former battery room (now a kitchenette).

Left: steel ladder above location of condensing pits. Right: brick lined flue

Sections of the original brick flue, which collected smoke from the boilers and directed it to the economiser annex, also remain. These have segmental arched ceilings and brick steps. The lower ends have been blocked off and the central part has been cut through to improve pedestrian circulation within the building.

The coal and ash elevator to the south-west end of the building, which is evident in the boiler bay, is concealed by contemporary walls at ground level.

Economiser Annex

The economiser annex contains the Glassworks reception and gift shop as well as the kitchen for the café. Two new openings have been created between the boiler bay and the economiser annex and another has been enlarged as part of the 2007 works.

Left: reception. Right: steel roof trusses, view to south-east

The modern sarking beneath the roof is visible internally and the walls are exposed off-form concrete. Openings in the rear wall have been infilled and may indicate the location of the original flue. The floor is a modern concrete slab. A substantial drill press is located below the modern stairs.

5.3 Fitters' Workshop

Completed a year after the Powerhouse, the Fitters' Workshop relates to the former building in its form, detailing and materiality. The Fitters' Workshop faces the Powerhouse (north-west) and there were previously various buildings to the rear (south-east). To the south-west of the Fitters' Workshop, between the workshop building and the former Transport Depot, is a raised concrete platform which appears to incorporate a former railway platform wall.

The concrete building has a transverse gable roof similarly clad in unglazed terracotta tiles and has exposed rafter ends. Photographs from the 1920s show that the building incorporated six skylights to the south-east side, though these appear to have been removed when the roof was clad in new tiles. Bargeboards have a chamfered lower edge and there is an ovolo moulding below the pointed edge of the tiles. The soffits are battened sheeting to the gable ends and timber boards to the other sides. The Fitters' Workshop also features contrasting roughcast and smooth render, though this has been extensively repaired. The cornice/string course to this building is a simplified version of that to the Powerhouse.


Left: North-west elevation, Fitters' Workshop. Right: North-east elevation, Fitters' Workshop

Original windows are steel framed multi-paned types and all now have modern glazing. The large rectangular windows generally have an operable part (awning) to the top, though these appear to have

been fixed shut. One window to the south-west elevation also incorporates a casement opening. The symmetry of the north-west elevation has been partially impacted via the introduction of a doorway in an enlarged window opening at the south-west end. Above this door and the window to the north-east end of this elevation are segmental arched highlight windows. Both of these bays are slightly recessed and incorporate a decorative projecting panel below the highlight windows. These bays are made more prominent by the flanking bays that have solid roughcast walls.

Left: South-east elevation, Fitters' Workshop. Right: South-west elevation, Fitters' Workshop with platform in foreground

An original doorway is located centrally to the north-east elevation above which is a steel framed fanlight. A matching fanlight is located to the south-west end, though the central door to this elevation has been modified to form a window. Both elevations have a symmetrical format with the central opening flanked by a window to each side. The door to the north-east elevation has a concrete sill. Several modern electrical distribution boxes have been mounted to part of the north-east elevation. The roughcast render appears to have been reapplied to this elevation, including over the cornice which originally had a smooth finish. Marks and missing render to the roughcast walls show where elements such as downpipes and rainwater heads were originally located. The rainwater heads have all been removed and downpipes have been replaced.

The rear elevation had previously been partially internalised as evidenced by paint, bricked up openings and remnant flashings to the wall. This wall is unrendered and the concrete construction which was poured in layers between boarded formwork is evident. The elevation is partially painted at either end where buildings were previously located. There is a centrally located, modern aluminium door which is flanked by steel-framed windows. The lower part of this opening appears to have been widened. To the central part of both this elevation and that to the north-west are three louvered openings. The glass louvers have a timber frame and have been sheeted over internally.[74]

The original doors to the south-east and north-west elevations have been fixed open on the inner face of the wall. Like the other two sets of doors, these consist of a pair of braced and ledged doors. Two of the original doors also incorporate smaller pedestrian access doors.

Interior

The interior is a single, open plan space. There is a non-original suspended ceiling which conceals the originally exposed steel trusses. These trusses are constructed of riveted steel angels fixed to the top of the concrete walls using Lewis bolts. Modern suspended lighting has been installed on the ceiling, with surface mounted conduits. The floor is concrete and appears to be a modern slab laid over the original floor. A few metal pipes are embedded in concrete on the south-east side adjacent to the door and have been cut-off flush with the slab.

[74] These were sheeted over in 1956 when the roof trusses were reinforced and the ceiling was installed. These works may have been associated with the installation of heating in the building.

Left: Interior of Fitters' Workshop, looking north-east. Right: Overhead crane to Fitters' Workshop

Apart from the overhead travelling crane, there is very little remaining evidence of the machinery that was previously located in the building.[75] Rails for the crane are supported on substantial corbels to the north-west and south-east walls. There is also a rendered cornice with smaller corbels supporting the roof trusses. The walls have been rendered and painted with a narrow, painted dado line added. Modern surface mounted conduits and switches have been installed internally along with other services, including exit signs, fire detectors etc.

The crane now incorporates a modern electric hoist motion with flexible cable electrical supply, though otherwise appears to be in original condition, with manual chain controlled long travel and cross travel. The 2018 Fitters' Workshop CMP noted that it was likely that the present load capacity has been down-rated to its present two tonnes. Whilst the crane in the Fitters' Workshop is a similar age to that in the Powerhouse, it has a slightly different construction which indicates that it was made by a different manufacturer.[76] The existence of grease pots on the bearings indicates that it is of considerable age.[77] There is clear evidence of the removal of the manual hoist chain from the crane trolley, which would have become redundant when the electric hoist was fitted. All of this suggests that the crane is the original.[78]

At the time of construction, it was common practice for machinery in factories and workshops to be driven by one or more large motors powering overhead line shafts from which individual machines were belt driven. In the Fitters' Workshop, an electric motor was fixed to the wall with belt drive to the line shaft mounted on the wall above. Other machines, such as the lathe, were driven by a belt from the line shaft. Evidence of the brackets (I beams/RSJs) that supported the motor remain to the south-east wall (below the third corbel form the north-east end). Other steel channel section fixings can also be seen on the opposite wall.

Various upgrades works were undertaken during 2006 and 2015. The 2006 works included the blocking off of two doorways to the south-east elevation, overhaul of the rainwater disposal system (gutters and downpipes), repainting, removal of an exhaust stack to the east corner, replacement of asbestos eaves lining and the removal of various switchboards and cables. Works were also undertaken to openings, including the replacement of window glass and repairs to the timber doors. Repairs to the external render were also completed and probably included the re-rendering of the north-east elevation.

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[75] In 1928, the machinery installed in the workshop consisted of six lathes, three drilling machines, one Universal milling machine, one Universal grinding machine, planning machine and shaping machine, and the usual assortment of hacksaws, emery wheels, etc. One of the three drilling machines is now located in the foyer of the Glassworks

[76] Both cranes had manually operated travel and bolted and riveted construction. Modern cranes are welded construction and electric driven cranes became increasingly commend by the 1940s. Communication between Keith Baker and Ernie Coot (authorised crane maintenance inspector, CHLE Pty Ltd Fyshwick) 2010.

[77] Unlike the grease nipples or sealed bearing that would be expected if the whole crane had been replaced at the time of the workshop extension to the south-east in the 1920s.

[78] Personal communication between Keith Baker and Alan Christie BE (M&E) FIEAust, 2010.

Further works were undertaken to the openings in 2015 and involved the installation of the glazed doors with sidelights and fixing of original timber doors in an open position. The upgrades to electrical, lighting and fire services were also completed at this time.

5.4 Former Switch Room

The former Switch Room has been modified several times since it was constructed, though retains its original gable roof form and skillion section to the north-west. The main gabled section of the building has been extended to the south-west (during the 1960s), by extruding the original form. The gable roof is clad concrete tiles and has plain timber bargeboards. Eaves are lined with fibre cement sheeting and the quad gutters return to each end. Original rectangular decorative rainwater heads also remain.


Left: South-east elevation, 1948 Switch Room showing the 1960s addition to the south-west end. Right: north-west elevation

The red face brick building has a projecting rowlock course at sill level and original openings are grouped together on the three original elevations below continuous rendered hoods. The horizontality of these elements, combined with the steel framed windows, are indicative of Streamlined Moderne, though the building is otherwise of relatively conservative design. A group of three original multi-paned windows, with pivot openings, remain to the south-east elevation and a bank of six remain to the west elevation. Original windows remain to the north-east elevation, though the central doors have been replaced with windows. The north-east elevation retains a small, circular vent to the gable end with timber louvres.


Left: North-east elevation, 1948 Switch Room. Right: Kerb, step and service access point to front (south) of Switch Room

A circa 1985 gable porch is located to the south-west end of the 1948 Switch Room and is not in keeping with the industrial character of the building. The south-west end of the building is located close to the concrete kerb with service hatches located in the adjacent section of pavement. It is not known if the cable tunnel shown on the original drawings remains. This was centrally located beneath the building, extending parallel with its longer sides.

5.5 Railway sidings

The railway siding that serviced the Kingston Powerhouse was known as the Powerhouse siding and was located to the north-east of the Powerhouse and Fitters' Workshop. This siding travelled from the 1914

extension to the Queanbeyan railway in the east and terminated before reaching the north-west end of the Powerhouse site. To the north-east of the Powerhouse, the siding consisted of three railway tracks, with one located below the coal elevator/ash bin and another two further to the north-east (refer to the History Chapter for a drawing showing the location of the railway tracks).

Kingston Power Station with rail lines and coal heaps (1929)
The three railway lines to the north-east of the Powerhouse are indicated
(Source: National Archives of Australia A3560, 5451)

Whilst the railway tracks are not currently visible, their location can be interpreted to an extent by the embankment to this area and the open linear space that remains between the substation in the north-west and residential development fronting Giles Street in the east. The form of the embankment has been modified over the years, particularly in more recent times when high voltage powerlines were installed at its base and a car park was constructed to the front (north-west) of the Powerhouse. The high voltage powerlines are part of a network of many subterranean services (mostly electrical) that have been laid over the last 100 plus years (refer to Opportunities and Constraints Chapter for further detail). Early photographs suggested that this embankment was much steeper at the north-west end and was relatively flat in the vicinity of the roadway that was located between the Powerhouse and the Fitters' Workshop.

Left: Embankment to the north-east of the Powerhouse with relatively gentle slope. Right: Kingston Powerhouse with rail embankment in foreground (W J Mildenhall, n.d., source: National Library of Australia 2303723)

An interpretive installation and surface treatment has been installed over the railway siding, immediately to the north-east of the Powerhouse and the Fitters' Workshop. This consists of loose gravel which is difficult to traverse and short sections of indicative metal rails and off-centre timber to represent sleepers.


Left: Short length of interpretative track to the northern railway siding. Right: Space between the Fitters' Workshop and the former Transport Depot where the south railway line had been located. The concrete platform is indicated

A branch from the Queanbeyan line was also located to the south-west of the Fitters' Workshop and terminated before reaching the Powerhouse. This line, referred to as the stores siding, had been established by 1923 and was serviced by a platform to the south-west of the Fitters' Workshop. A platform wall remains in this location.

A narrow gauge line was located to the south-west of the stores siding and extended past the Powerhouse and west to the Yarralumla Brickworks. This line and associated siding had been removed by 1958 when an electrical workshop was erected between the Powerhouse and Wentworth Avenue. No visible evidence of this railway line is now apparent, though the extant driveway that provides access to the car park located to the north-west of the Powerhouse is located in the position of the Brickworks line.

5.6 Trees

Mature trees located within the Kingston Powerhouse Historic Precinct consist of two groups and another isolated specimen. The oldest trees are located at the corner of Wentworth Avenue and are remnants of Charles Weston's 1920s windbreak plantation. Trees in this group are identified in the ACT Heritage Register Entry as intrinsic features and consist of nine Monterey Pines (*Pinus radiata)* and four gums, planted in rows according to species. These have been badly impacted by the recent drought with four of the pines already dead and the remaining five in very poor condition and almost dead. The four gums are in good condition and consist of two Blue Gums (*Eucalyptus bicostata)* and two River Peppermints (*Eucalyptus elata*). It is noted that others, including the ACT Heritage Register entry, have misidentified these as White Brittle Gums.


Left: Trees to corner of Wentworth Avenue and Eastlake Parade. Right: Trees to south-west of Powerhouse

The second group of trees is located to the south-west of the Powerhouse, between the building and Wentworth Avenue and were planted in the 1930s. This group consists of four Monterey Pines and another gum that could not be identified from ground level. Of these trees, only the gum is identified as an intrinsic feature in the ACT Heritage Register Entry.[79] Just one of the pines in this group is in good health and another is in fair health, with the other two almost dead.

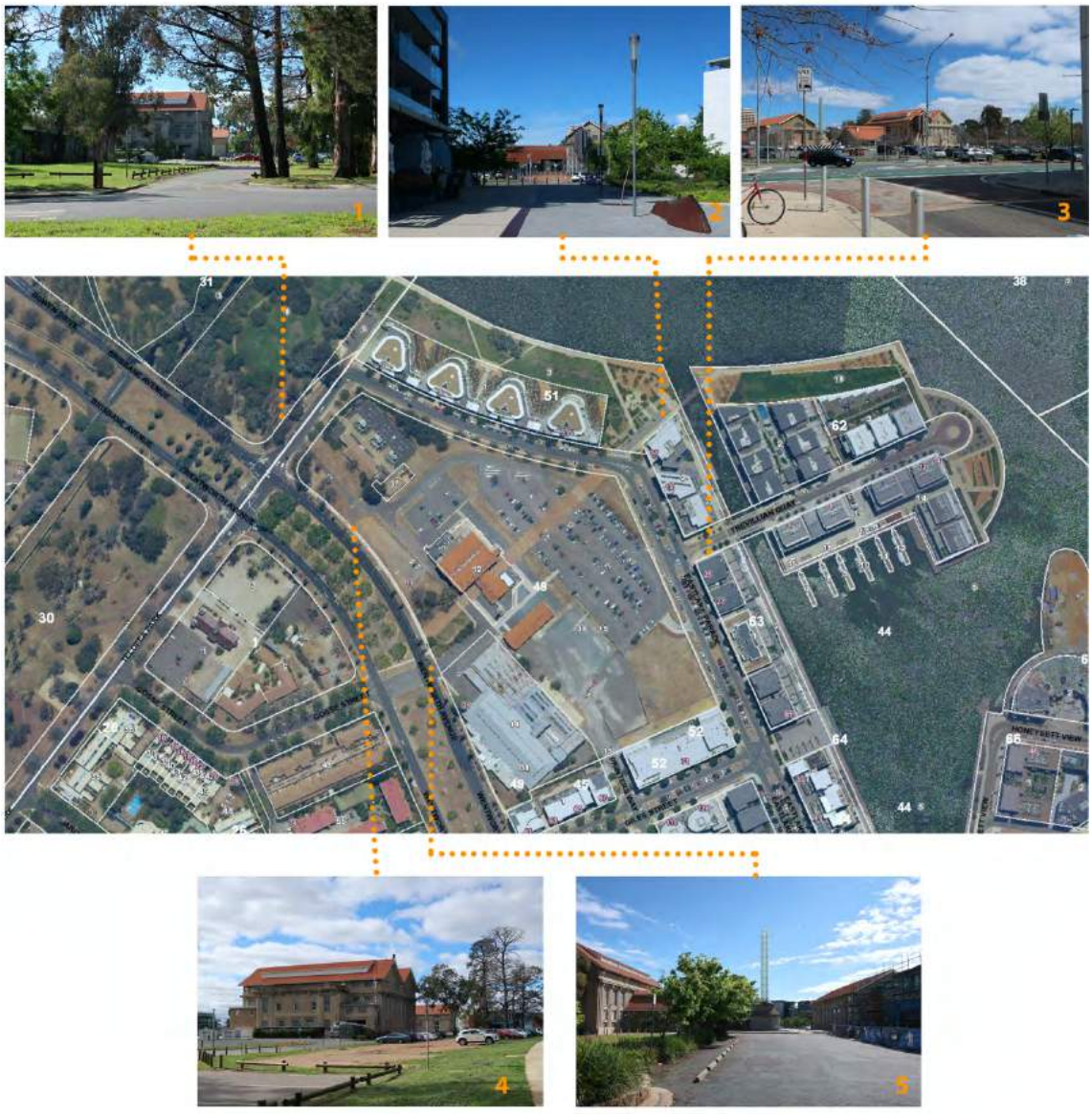
In addition to the two groups of trees, there is a large isolated Blue Gum located adjacent to the 1948 Switch Room. This is not identified as an intrinsic feature and is of more recent origin.

Blue Gum adjacent to Switch Room

[79] The trunk of the gum may be located outside the ACT Heritage Register boundary

5.7 Visual Links

Views of buildings in the Kingston Powerhouse Historic Precinct have changed over time owing to a combination of factors including the creation of Lake Burley Griffin, the construction and demolition of various structures associated with the former Government industrial services area, changes to the Kingston Foreshore, and substantial redevelopment of the area. The aerial photograph below and accompanying images highlight views of the Kingston Powerhouse Historic Precinct that are currently attainable from outside the Historic Precinct.



Aerial photograph showing location of views discussed below. 1. Bowen Park, 2. East Basin, 3. Trevillian Quay, 4. Wentworth Avenue bend, 5. Wentworth Avenue opposite Gosse Street
(Source: ACTmapi showing 2020 aerial photograph)

Visual links from East Basin and Bowen Park to the Kingston Powerhouse are noted as significant in the ACT Heritage Register entry for the precinct. The Register entry requires that the significant visual links between the Powerhouse (the building rather than the Historic Precinct) and both East Basin and Bowen Park be retained, and that the prominent gables and roof form of the Powerhouse be visible from potential water transport links to and from the Kingston Foreshore area. These visual links are discussed in detail below.

In the current configuration, the Powerhouse is widely visible from both Wentworth Avenue and Eastlake Parade. This is partly due to the modern development along the Kingston Foreshore and the removal of other view blocking elements (windbreak, buildings) to the north-west and south-west.

In addition to framing views of the Powerhouse from East Basin, the Kingston Foreshore development currently allows for framed views between the edge of the Kingston Harbour to both the rear of the Powerhouse and the Fitters' Workshop. The most substantial of these views is along Trevellian Quay which aligns with the established street pattern of Kingston (the street aligns with Gose Street).

Wentworth Avenue

Given that Wentworth Avenue is a main road that survives from the time Eastlake (Kingston) was established, views of the Powerhouse and Fitters' Workshop from this street are where the broader public would have viewed these buildings at close range. As previously noted, there have been times when the building was less visible form Wentworth Avenue, such as in the early 1920s when the windbreak was planted and following the construction of the 1958 ACTEA workshop. At other times, including when the Powerhouse was first constructed and following the duplication of the road in the late 1920s, the Powerhouse building would have been widely visible from Wentworth Avenue.

Wentworth Avenue remains a key transport corridor and is subsequently still the principal address/street frontage of the Kingston Powerhouse Historic Precinct. It is likely that the majority of both future arrivals into, and casual observance of the Precinct will be via Wentworth Avenue. The front/north-west elevation of the Powerhouse is currently widely visible from Wentworth Avenue, including the intersection with Eastlake Parade. Full views of the south-west elevation, which is the same as the north-east elevation except that it lacks the coal elevator/ash chute, are also obtainable from Wentworth Avenue. It is from this side, that most people would view the Kingston Powerhouse Historic Precinct.

Further to the east, the economiser annex, chimney base, Fitters' Workshop and the former Transport Depot are all evident in views from the intersection of Wentworth Avenue and Gosse Street. The primary vehicle entry to this part of the Government industrial and services area has always been located opposite Gosse Street, meaning that this part of the site has always been visible from Wentworth Avenue.

East Basin/Lake Burley Griffin visual link

Owing to recent multi-storey development, views of the Kingston Powerhouse Historic Precinct from Lake Burley Griffin and areas to the north of the lake are much more limited than they were historically. Plantings surrounding the development, including those to Jack Ross Park, partially screen remaining visual links between the Powerhouse and East Basin, though it is noted that these are not necessarily permanent features.

Historically, prior to the creation of Lake Burley Griffin, the Molonglo River was approximately aligned with what is now the south shore of East Basin whist the area that is Kingston Harbour was a section of land between the river and Jerrabomberra Creek. The close proximity of the river was fundamental to the selection of the Powerhouse site and a strong visual relationship between power stations and a nearby body of water was common (refer to the comparative analysis in the Analysis and Statement of Significance chapter). Prior to the redevelopment of the Kingston Foreshore, the Kingston Powerhouse Historic Precinct was widely visible form the river and later the lake (see image below).

Left: Former Kingston Powerhouse site (circa 1997) prior to the redevelopment of the Kingston Foreshore
Right: A small part of the Powerhouse roof is currently visible from Kings Avenue Bridge.
(Source: Kingston Foreshore Development competition brochure).

For pedestrians, the fullest view of the Powerhouse building from the shore of East Basin is from the direction of Jack Ross Park with some screening from current trees and other services such as lighting. Much of the north-east side of the Powerhouse, including the paired gable roof, is visible in this visual link from the area between Eastlake Parade and the north-east end of the adjacent pedestrian bridge. This side of the Powerhouse is architecturally the same as the south-west side save for the coal elevator/ash chute which is the current focal point in views across Jack Ross Park.

Further to the east, along the shore of East Basin, the upper part of the Powerhouse remains visible, though the lower walls and Economiser Annex are obscured by built form and landscape terraces. This view is oriented at an angle to the geometry of Jack Ross Park which has a format that is perpendicular to the Powerhouse and aligns with the modern entry of the Glassworks located in the Economiser Annex.

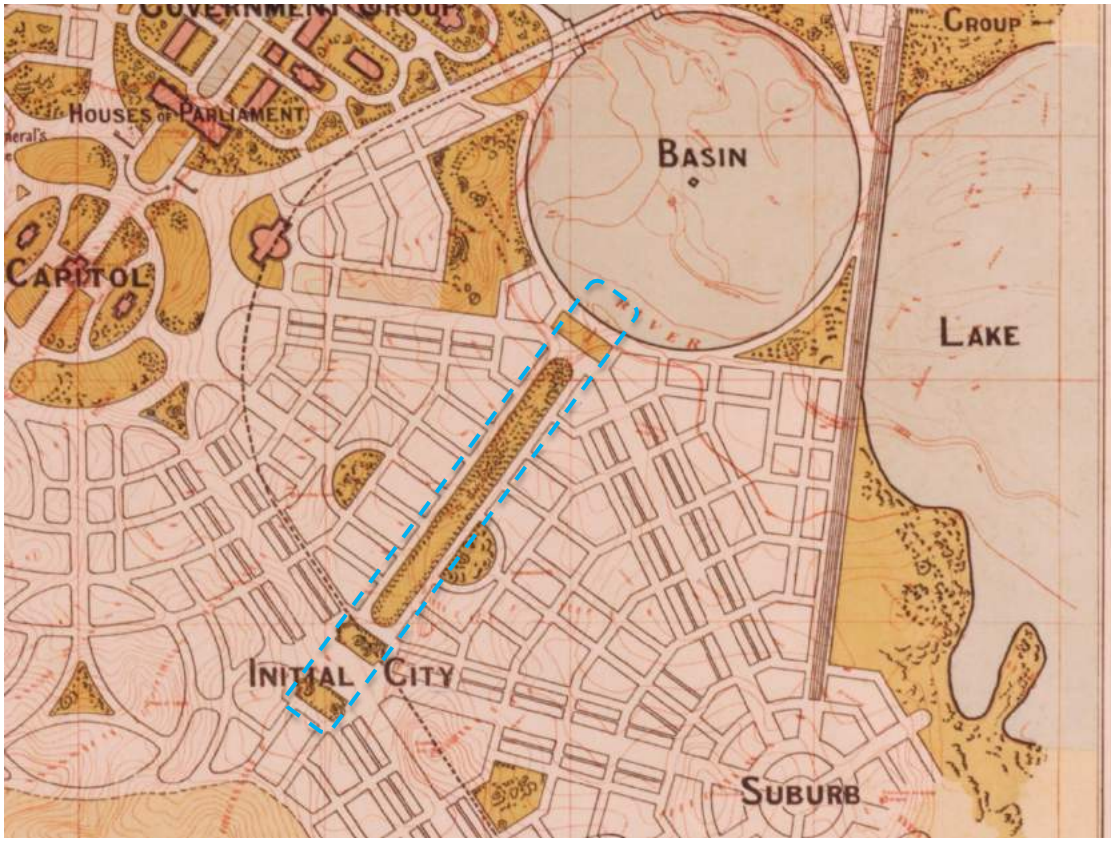
Current views of the Powerhouse from the direction of Jack Ross Park

A pedestrian link between Eastlake Parade and the East Basin shore is available via a ground level walkway in the residential building to the north-west of Powerhouse (7-13 Eastlake Parade). Views of the Powerhouse from the waterfront are not attainable via this link owing to the limited size of the opening (refer to images below). A view of the front of the Powerhouse is available from the Eastlake Parade side of this link. Additional oblique views of the rear of the Powerhouse are obtainable from Trevillian Quay.

Left: Access way through residential building at 7-13 Eastlake Parade. Right: View from access way to front of Powerhouse

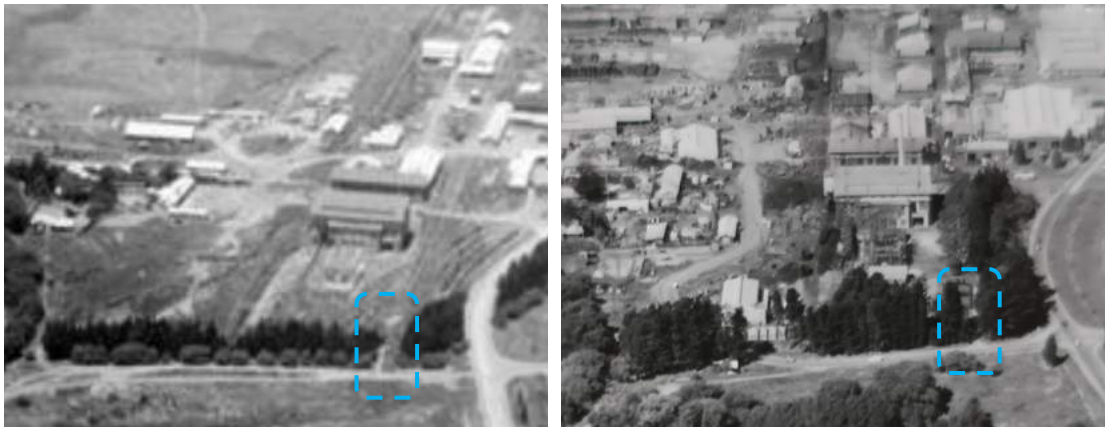
Bowen Park

Currently about half of the façade/front elevation of the Powerhouse and part of the Fitters' Workshop are evident in views from the south-east corner of Bowen Park. This park is located at the end of the Telopea Park and Brisbane Avenue axes as depicted on the Griffins' plan for Canberra. It is an important part of the Griffins' planning geometry for the area that was introduced in revised plans of the Federal Capital, including the 1913 plan which had an initial city located on the south side of the lake in the Kingston/Manuka area (see plan below).



Part of Canberra Federal Capital of Australia preliminary plan (signed by Walter Burley Griffin 1913) showing the Telopea Park axis (blue) between the initial city and East Basin.
(Source: National Library of Australia)

Pedestrian views from Bowen Park are currently facilitated by the roadway that provides access to the Powerhouse car park. This road is located in the area where the brickworks railway line passed through the site for a short time and created a gap in the windbreak that was planted to the north-west end of the Government industrial precinct. This would have allowed for views of the front of the Powerhouse from the undeveloped area which became Bowen Park when Lake Burley Griffin was constructed.



Left: Aerial view of Powerhouse from north-west showing the gap for the railway line in the wind break (1928)
Right: Aerial view of Powerhouse with remnant gap in windbreak (circa 1955)
(Source: National Archives of Australia, A3560, 7715, ACT Heritage Library)

Overlay showing the approximate location of the brickworks railway and circa 1941 roadway relative to the current vehicle entry from Eastlake Parade. The drawing on the left side indicates that the road for residences was constructed on the brickworks railway cutting. The current entry to the car park is in a similar location.
(Source: National Archives of Australia A2617, Section 59/13802 and A2445, M2270C overlaid on ACTmapi aerial, showing February 2022)

Current views of the Powerhouse from the direction of Bowen Park

6 Archaeological Potential

This chapter has been prepared by Navin Officer Heritage Consultants Pty Ltd and provides contextual information relating to Aboriginal Heritage as well as commentary on both Aboriginal archaeological sensitivity and historical archaeological sensitivity. The historical analysis included in this chapter has been prepared in response to a request from the ACT Heritage Council which required that further research be undertaken by a qualified archaeologist. The study area is defined by the ACT Heritage Register entry boundary for the Kingston Powerhouse Historic Precinct. The area to the south-east of the Fitters' Workshop has previously been assessed as having considerable archaeological potential, though this area is located outside the heritage boundary.[80]

6.1 Aboriginal heritage

Cultural context

Early accounts of Aboriginal lifestyles in and comparable with the current study locality describe aspects of a successful hunting and gathering economy and eventful social life and inter-group contacts. The material culture, which is partly reflected in the surviving archaeological record, included stone and wooden artefacts, skin clothing and bark and bough temporary dwellings.[81]

Tribal boundaries within Australia are based largely on linguistic evidence and it is probable that boundaries, clan estates and band ranges were fluid and varied over time. Consequently 'tribal boundaries' as delineated today must be regarded as approximations only, and relative to the period of, or immediately before, European contact. Social interaction across these language boundaries appears to have been a common occurrence.

A reconstruction of clan boundaries based on Tindale (1974) indicates that the northern ACT area fell within the tribal boundaries of the Ngunnawal people.[82] There is some uncertainty as to which language was spoken by the Aborigines of northern Canberra. This area appears to have been close to the linguistic boundary between the Gundungurra and Ngunnawal languages. Eades (1976) notes that published grammars for these two languages are virtually identical.[83] However according to Eades, the Ngunnawal of northern Canberra probably spoke the Gundungurra language.[84]

Jackson-Nakano notes that Aboriginal family groups within the Canberra-Queanbeyan district and surrounds were known by many names in the early nineteenth century, but local Europeans who knew them best referred to them as Kamberri – also spelled Kgamberry, Kamberra and even Nganbra (Ngambri). She says the heart of their country was centred on the area now referred to as the Acton Peninsular. Some Kamberri individuals, she says, intermarried with neighbouring Ngunawal families from the 1880s, and some descendants of such marriages re-identify in modern times as Ngunnawal. While maintaining their distinct association with the ACT and surrounds, members of Kamberri-Ngunnawal families might also identify personally as Ngunawal, Walgalu or even Wiradjuri through their familial links to these other groups. [85]

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[80] An assessment of the archaeological potential of the area to the south-east of the Fitters' Workshop is provided in the Fitters' Workshop CMP (Duncan Marshall, 2018)

[81] J Flood, *The Moth Hunters.* Australian Institute of Aboriginal Studies, 1980, Canberra
S F Huys, Prehistoric Gungahlin. A Model of Human Occupation, 1993, Unpublished BA Hons thesis, Department of Archaeology and Anthropology, Australian National University, Canberra.

[82] N B Tindale, *The Aboriginal Tribes of Australia,* 1974, ANU Press, Canberra.

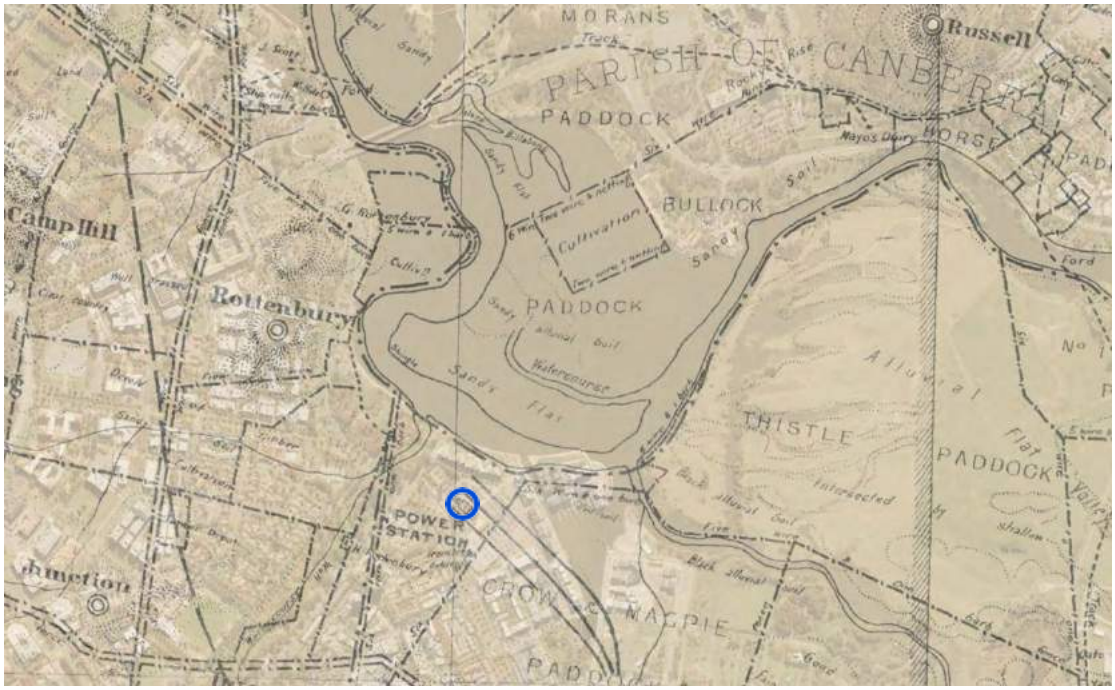
[83] H R Mathews, The Gundungurra grammar. In The organisation, language, and initiation ceremonies of the Aborigines of the south-east coast of NSW in *Royal Society of NSW Journal and Proceedings*, vol. 34:262-281, 1900
R H Mathews, The Gundungurra language, *American Philosophical Society Proceedings*, vol. 40 no 167:140-148, 1901
R H Mathews, The Ngunawal language, in The Wiradyuri and other languages of NSW, in *Anthropological Institute of Great Britain and Ireland Journal*, vol 33: 294-299, 1904

[84] D K Eades, The Dharawal and Dhurga Languages of the New South Wales South Coast, *Australian Aboriginal Studies Research and Regional Studies No 8,* 1976, AIAS, Canberra

[85] A Jackson-Nakano, The Kamberri: A History of Aboriginal Families in the ACT and Surrounds. *Aboriginal History Monograph 8, Weereewaa History Series 1,* 2001, Australian National University Press, Canberra, p.xiv, xv

6.2 Aboriginal archaeological context

The Kingston Powerhouse Historic Precinct is located near the southern shore of Lake Burley Griffin, which has been formed by the damming of the Molonglo River. The Molonglo River corridor would have been an important prehistoric Aboriginal resource zone that attracted a considerable level of hunter-gatherer occupation. This importance may have paralleled that of the Murrumbidgee River corridor, where over two hundred Aboriginal sites including open camp sites, stone quarries, scarred trees and ceremonial sites had been recorded by the early 1990s.[86]



Overlay showing the 1915 map of the Federal Territory over a 2017 aerial photograph. The Molonglo River approximately aligned with what is now the south shore of East Basin. The Powerhouse is indicated (blue) (Source: ACTmapi)

Archaeological surveys carried out along sections of the lower Molonglo suggest that gentle slopes, spurs and alluvial flats along the river will exhibit the highest archaeological potential.[87] These areas are sheltered climatically and located close to resources. The Molonglo River valley was the prime source of water and food resources and provided access to the Limestone Plains for local and visiting Aboriginal groups.[88] Based on the brief records and observations made by a limited number of interested local individuals and artefact collectors it appears that the larger sites in the central Canberra area were associated with the sand bodies situated within, and adjacent to, the fluvial corridor of the Molonglo River.[89]

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[86] J Klaver, The Known Aboriginal Archaeological Resource Murrumbidgee River Corridor, 1993 Report prepared for David Hogg Pty Ltd by Navin Officer Archaeological

[87] W B English, Where the Molonglo Runs, 1985, Unpublished BA(Hons) Thesis, Department of Prehistory and Anthropology, Australian National University, Canberra, ACT.

[88] Godden Mackay Logan Heritage Consultants (GML), Lake Burley Griffin Heritage Assessment Report prepared for the National Capital Authority (with contributions on Indigenous cultural heritage by Navin Officer Heritage Consultants), 2009.

[89] *Ibid*

Navin Officer Heritage Consultants (NOHC), Lake Burley Griffin ACT: Heritage Management Plan Indigenous Heritage Component, 2006, report to Godden Mackay Logan

J E and S Schumack, An Autobiography, or Tales and Legends of Canberra Pioneers. (Edited by L. F. Fitzhardinge), 1967, ANU press, Canberra

W P Bluett, *The Aborigines of the Canberra District at the Arrival of White Ma*n, 1954, Manuscript held at the Library of the Australian Institute of Aboriginal and Torres Strait Islander Studies

H P Moss, Evidence of Stone Age Occupation of the Australian Capital Territory, 1939, *ANZAAS* 24:163-166

Historically, artefacts have been recovered from areas adjacent to the Molonglo River that were submerged with the creation of Lake Burley Griffin. Since those artefacts were collected, the sites now consist solely of marked locations on a map. There are two instances of collected artefacts being removed from sites that now are within the lake boundaries.[90] Kinsela marks the location on his map where Moss just gives a description as a sandy ridge between Parliament House and the Molonglo River. It is possible that Moss' site was closer to Parliament House and thus not within the lake boundaries. However, it is more probable that it was found in the continuation of the same sandy ridge as noted by Kinsela, close to the Molonglo River.

The design and construction of Lake Burley Griffin transformed the Molonglo River corridor from a largely natural terrain to a highly managed civic landscape. The lake now obscures many of the elements which would have been valued by its pre-twentieth century indigenous custodians – the resources of the river, and the camping and ceremonial grounds on its banks and adjacent slopes. Geomorphological studies of the Molonglo valley have revealed lacustrine deposits which indicate that a lake once existed in approximately the same location as the modern lake.[91] It is thought that this natural lake formed during colder and drier conditions, such as in the Pleistocene period, when slope deposits derived from Black Mountain dammed the Molonglo. There is a possibility that the high water stage of the lake persisted into the period of human occupation and was at one time a feature of indigenous occupation.

While no evidence of Aboriginal occupation relating to the prehistoric Lake Burley Griffin has yet been identified, the modern reinstatement of the lake can at least be seen as a symbolic return of the ancient Canberra landscape, and of the indigenous cultural landscape which developed around it.

6.3 Aboriginal archaeological sensitivity

A number of archaeological assessments have been conducted in areas close to the Kingston Powerhouse Historic Precinct. Assessments have also been undertaken in areas that may have had similar topographic attributes to Kingston in the past. These include Duntroon,[92] Russell,[93] Dairy Flat,[94] Fyshwick,[95] Jerrabomberra Wetlands,[96] Lake Burley Griffin,[97] Pialligo,[98] and at East Lake.[99]

K Binns, *Handbook for Canberra Prepared for the Members of the ANZAAS on the occasion of its meeting held in Canberra, January, 1939*. Commonwealth Govt Printer and F W Robinson, *Canberra's First Hundred Years and After,* 1927, Penfold, Sydney, 2nd Edition.

[90] H P Moss, 1939 and W H P Kinsela, Observations of the Goulburn and Canberra Districts. *Mankind,* 1934, 1(8):204-205.

[91] Legge in Woolnough 1938 and A A Opick, The geology of the Canberra City District. *Bur. Miner. Resources. Aust.Bull. 1958, 32*

[92] Navin Officer Heritage Consultants, Residential Re-Development at Royal Military College of Australia Duntroon, ACT, 2001, report to Defence Housing Authority and Royal Military College of Australia (RMC-A) Duntroon ACT Heritage Management Plan - Aboriginal Cultural Heritage, 2008, report to Godden Mackay Logan Pty Ltd.

[93] Navin Officer Heritage Consultants, Morshead Drive and Pialligo Avenue Upgrade, ACT Archaeological Subsurface Testing of MRPAD2 and MRPAD4 and Additional Archaeological Subsurface Testing of MRPAD4 (Site MRA2), 2008, reports to SMEC and Proposed Construction Compound and Storage Area Morshead Drive and Pialligo Avenue Upgrade Aboriginal Archaeological Assessment, 2008 report to SMEC.

[94] Navin Officer Heritage Consultants, Proposed Fyshwick Effluent Rising Main Replacement, Fyshwick-Kingston, ACT. Cultural Heritage Assessment, 2002, report to ActewAGL Water Division.

[95] Australian Archaeological Survey Consultants, Proposed Fyshwick Effluent Rising Main Replacement: Cultural Heritage Assessment, Test Pitting, 2002, report to ActewAGL Water Division.
Navin Officer Heritage Consultants, Fyshwick Road Network Feasibility Study Cultural Heritage Desktop Review, 2010 report to URS Australia.

[96] Australian Archaeological Survey Consultants and Cultural Heritage Management Australia, Jerrabomberra Wetlands Cycle Path Cultural Heritage Assessment, 2008, report to SMEC Pty Ltd.

[97] Navin Officer Heritage Consultants, Lake Burley Griffin ACT: Heritage Management Plan Indigenous Heritage Component, 2006, report to GoddenMackay Logan.

[98] P Trudinger, Confounded by Carrots, 1989, unpublished Litt.B thesis. Department of Prehistory & Anthropology, ANU

[99] Navin Officer Heritage Consultants, East Lake Electrical Infrastructure Implementation Project, ACT. Cultural Heritage Assessment, 2009, report to Purdon Associates and Proposed Underground Transmission Cable Route Option Eleven Jerrabomberra Wetlands Nature Reserve, ACT. Archaeological and Geomorphological Subsurface Testing Program, 2010, report to Purdon Associates.

Aboriginal site types recorded in these areas include scatters of stone artefacts, isolated stone artefacts and subsurface deposits of stone artefacts.

The Kingston Powerhouse Historic Precinct is situated on the crest of a low spur line situated adjacent to the floodplain of the Molonglo River (see image below). Based on the results of previous studies in similar areas it is considered likely that Aboriginal sites would have been present in the vicinity of the Kingston Powerhouse Historic Precinct. However, the levels of industrial development and activity that have occurred in the area which are likely to have removed and/or disturbed any Aboriginal sites that may once have existed, has reduced the Aboriginal archaeological potential of the area to low.

Location of the Kingston Powerhouse Historic Precinct (blue circle) relative to the pre-Canberra landscape as recorded in an extract from circa 1912 contour map of the site of the Federal Capital
(Source: Map of contour survey of the site for the Federal Capital of Australia, Dept of Lands, Sydney, from original plan by F. J. Broinowski, National Library of Australia)

6.4 Historical archaeological sensitivity

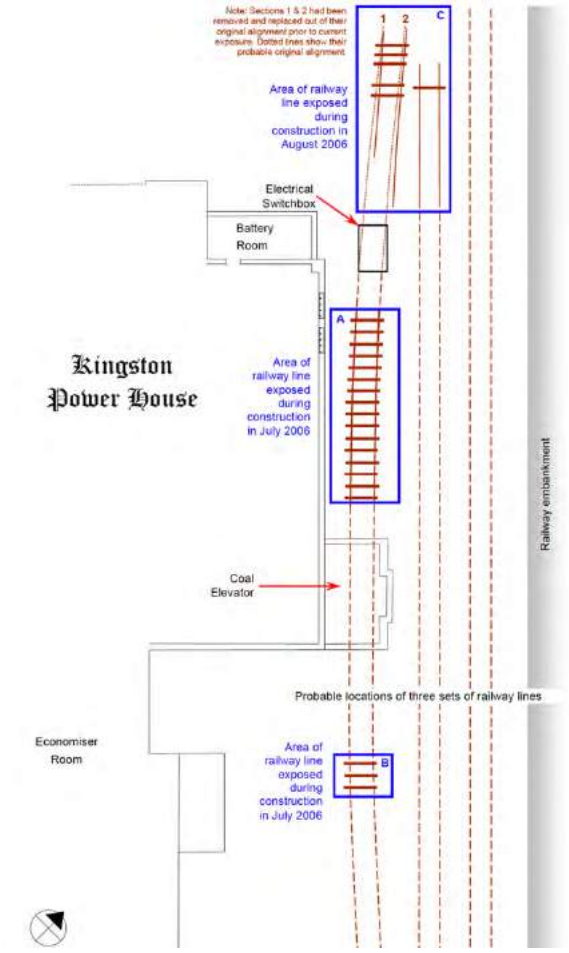
Based on a review of photos, maps and plans of the Kingston Powerhouse Historic Precinct, it is considered that subsurface archaeological remains of earlier buildings and features may be present in the Precinct. The figures below show the site and the changes to the buildings over time. These are based partly on extracts from Freeman Collett & Partners Cultural Mapping Study 1993, and 1996, as well as the additional research undertaken during the preparation of this CMP. Archaeological remains may exist from the following:

- Powerhouse railway siding (by 1914)
- Timber tower (by 1915)
- First chimney stack (by 1915)
- 66kV switchyard (1929)
- Brickworks railway line (1923)
- Switch house (1938)
- Patrolman's' Residences (1941)
- Coal bunker (1948)
- Cable tunnel (1948)
- ACTEA workshop (1958)

The railway lines, their alignment and the embankment built for them are an intrinsic feature of the overall operation and industrial servicing of the site. The first chimney stack and the timber tower are early features which have been replaced. Later buildings such as the coal bunker, 66kV switchyard, Patrolman's' Residences and ACTEA Workshops tell of the adaption and change of the site over time.

The 2018 Fitters' Workshop CMP also identified areas to the south-east of the Fitters' Workshop where subsurface remains may be located. This includes earlier buildings such as the Blacksmiths' Shop, Explosives Store and Joinery Shop. These areas are however located outside the boundary of the Kingston Powerhouse Historic Precinct and are not covered by the policy contained within this CMP.

It is not known how much demolition of the structures, paving and building in the area has reduced/removed the potential for subsurface archaeological remains to be present, however, results of previous monitoring and recording programs conducted in the Kingston Powerhouse Historic Precinct has shown that subsurface cultural material can remain in previously disturbed contexts in the Kingston area.[100] This includes sections of the railway track that were exposed during construction work in the area in 2006 (refer to plan below).



Plan of Kingston Powerhouse showing locations of railway lines exposed during construction (blue boxes) (Source: Kingston Powerhouse House Original Railway Lines Archival Recording, Navin Officer Heritage Consultants, 2006)

[100] Navin Officer Heritage Consultants, Kingston Powerhouse Original Railway Lines. Archival Recording, 2006, report to the ACT Land Development Agency
Navin Officer Heritage Consultants, Heritage Significance Assessment- Stockpile of Original, Disused Railway Lines, Kingston Powerhouse, ACT, 2007
Navin Officer Heritage Consultants, Historical Heritage Significance Assessments - Kingston Foreshore Harbour Development, reports to ACT Land Development Agency, 2007-2008

There is significant historical and archaeological evidence to indicate there may be further remains of at least three sets of railway lines aligned in a north-east/south-west orientation, and the railway embankment, in the area to the immediate northeast of the Kingston Powerhouse building. Archaeological evidence may include metal, timber and brick/stone remains, post holes and/or foundations of buildings, and artefacts that may elucidate the construction and use of these buildings.

If subsurface archaeological deposits remain undisturbed in the vicinity of the Kingston Powerhouse Historic Precinct, they would constitute a potential archaeological resource that could contribute to an understanding of the uses of the site, and would supplement the knowledge of early industrial/engineering buildings in the ACT.

Former elements that may have archaeological remains, 1910s

Former elements that may have archaeological remains, 1920s

Former elements that may have archaeological remains, 1930s

Former elements that may have archaeological remains, 1940s

Former elements that may have archaeological remains, 1950s

7 Analysis and Statement of Significance

The analysis of significance includes a comparative analysis with other contemporaneous power stations and a brief discussion in regards to the design of the Powerhouse in the context of the work of architect John Smith Murdoch.

7.1 Comparative analysis: power stations

As there are no other power stations in the ACT, a brief review was completed of extant examples throughout Australia. These include some of the earliest centralised power stations and are outlined in the table below. Most of these are relatively large power stations that were amongst the first in the respective cities. It is noted that numerous smaller power station buildings, of humble design, remain in regional areas, though they are typically later examples that date from the 1920s and 1930s.

Details	Photo
Richmond Power Station Complex, Victoria Opened in 1891 and thought to be the oldest electric power station in Victoria. Large, centralised power stations became possible during the 1880s after the development of alternating current supply. The power station is one of few 19th century coal-fired electricity generation stations. This power station was the first in Victoria to adopt 50 cycles-per-second alternating current which is now standard in Australia. Late Victorian complex designed by Henry B Gibbs, constructed with bichrome brick. The façade has an asymmetrical form incorporating a squat tower.[101]	 *Melbourne Electric Supply Co Ltd (1910)* *(Source: Museums Victoria)*
Ultimo Power Station, Pyrmont, NSW Constructed 1897-1899 First large central power station constructed in NSW. Originally had four 850 kilowatt generators, though additional capacity was rapidly introduced. It was the first in the State to use steam turbine-driven alternators (1905). Most of the plant and equipment was removed following the station's closure in 1964, though a gantry crane and chimney bases remain. Five brick buildings remain, mostly with restrained details. The office is one of the more decorative buildings and is constructed of red brick with stone dressings. It features a central, decorative stone entrance bay which is capped by a pediment and incorporates a decorative carved spandrel above the door. Other buildings feature plain stone or rendered dressings and corbelled brickwork.[102]	 *Ultimo Power Station (1937)* *(Source: City of Sydney Archives, A-00029703)*

[101] 'Former Richmond Power Station', Victorian Heritage Database, accessed 2 September 2020
[102] Nomination of Ultimo Power House as a site for an Historic Engineering Marker, The Institution of Engineers, Australia, November 1994. 'Ultimo Power House (under consideration)', State Heritage Inventory, accessed 2 September 2020

Details	Photo
Grenfell Street Power Station, Adelaide Constructed 1900-01, extended 1912 This power station provided Adelaide's first permanent public electricity supply. It provided electricity for the city's lighting and private properties, initially using direct current supply, though alternating current equipment was installed in 1913. The output was originally 150 kilowatts and was increased to 12,250 kilowatts. The power station had major problems with the cartage of coal and supply of cooling water and ceased operation in 1925. The plant has been removed.[103] A relatively decorative industrial building constructed of red brick with rendered, rusticated ground floor and a large number of horizontal rendered bands. The building has a faceted oriel tower to the street corner and rendered parapet with bracketed cornice.	 *Adelaide Electric Supply Company (1923)* *(Source: State Library of South Australia, B10366)*
White Bay Power Station, Rozelle, NSW Constructed 1912-1917 Built by the Department of Railways to provide power for the railways. The earliest plant included three turbo-alternators with a continuous rating of 8.7 megawatts. The power station retains a representative set of machinery that demonstrates the process of coal fired thermal power generation. Located adjacent to White Bay which allowed coal to be shipped to the power station and provided a ready supply of water. Retains an assemblage of machinery for generation of coal-fired electricity.[104] The extant substantial buildings are largely constructed of brick (later buildings are constructed with concrete) and have restrained detailing. Most have a vertical emphasis created by pilasters that extend the full height of the buildings and project above the curved parapets.	 *Aerial view of White Bay power station (1930)* *(Source: City of Sydney Archives, A-00007796*)

[103] Nomination of the Grenfell Street Power and Converter Stations for an Historic Engineering Marker, Engineering Heritage Branch Institution of Engineers Australia, South Australia Division, 13 February 1995
[104] White Bay Power Station Conservation Management Plan, Volume 1, Design 5 Architects, July 2011, pp7-9. White Bay Power Station, World Heritage Encyclopedia, accessed 8 September 2020

Details	Photo
East Perth Power Station Constructed 1913-1916 The first large scale electricity supplier in Western Australia. Located on the banks of the Swan River with ready access to water and adjacent to the railway line which was used to deliver coal. Power generation commenced with a single 4 megawatt generator, though by 1917 there were three of the generators operating. Retains some plant and equipment, including steam turbines. The remaining part of the first power station is constructed of reinforced concrete and has a gable roof with central clerestory. The building has been altered and the original decorative mouldings to the elevations have been removed.[105]	 *East Perth Power Station (circa 1920)* *(Source: N Moredoundt, The challenges, conflicts and outcomes of managing twentieth century obsolescence in Western Australia)*
Cockatoo Island Powerhouse, NSW Constructed 1918 Constructed to supply power to the Commonwealth Dockyard. The building retains some equipment, including DC switchboard, two pumps and a substantial brick chimney. It was powered by three, 1,000 kilowatt turbo-generator sets.[106] Use of DC power was feasible as the dockyard it supplied was physically proximate to the powerhouse.[107] The extant building is a refined bichrome brick structure with rendered dressings. The building features a central projecting tower facing the dock and is divided into arched and rectangular bays. The gable roof has been reclad in terracotta tiles.	 *Powerhouse area* *(Source: Cockatoo Island webpage, accessed 3 September 2020*)

Discussion

The Kingston Powerhouse was constructed at a time when large scale, centralised power stations were being erected in other Australian cities. Many of these were constructed to supply electricity to the local tramways. Leading up to World War I, the use of alternating current was becoming more common with power stations that had previously supplied direct current power fitted with new machinery to allow for the production of the former. Other power stations constructed during the mid-1910s were fitted with steam driven turbines which were considered more advanced when compared to the reciprocating steam engines that were used at Kingston. At the Ultimo Power Station, steam turbines were installed in 1905, several years before designs on the Kingston power station had commenced.

Like the Kingston Powerhouse, other successful power stations relied on the close proximity of a waterway to supply cool water and access to a suitable transport system, often rail, to facilitate the supply of coal. Many of those discussed above retain a strong visual connection with the water body from which cool water was drawn. The Grenfell Street Power Station, Adelaide had neither of these attributes and was closed down only 24 years after it was completed.

[105] 'East Perth Power Station', Heritage Council of Western Australia Register of Heritage Places, accessed 3 September 2020
[106] Cockatoo Island, *Sydney Journal,* Patrick Fletcher, December 2011, p80
[107] East Perth Power Station', Heritage Council of Western Australia Register of Heritage Places, accessed 3 September 2020

Whilst the Kingston Powerhouse and associated Fitters' Workshop buildings are largely intact, the boilers, steam engines and economiser have all been removed. A review of power stations in other states indicates that many others have also had much of the power generating equipment removed. Comparable facilities that do retain equipment, albeit different to that used at Kingston, include White Bay Power Station, East Perth Power Station and Cockatoo Island Powerhouse.

In the early days of operation, there were two 600 kilowatt brush alternators at Kingston along with a smaller 250 kilowatt alternator which was used during periods of very light load. This generating capacity was substantially less than that produced at contemporary power stations at East Perth and White Bay which provided power to much larger settlements and their tramways/railways. The considerable output of these power stations is reflected in the substantial size of the buildings when compared to that at Kingston. Most of those outlined above were considerably enlarged/redeveloped whilst in operation to cater for ever increasing demand. Those at Ultimo, White Bay and East Perth, had substantial new buildings constructed to accommodate improved machinery.

The larger power stations, including those at Ultimo and White Bay were constructed with good quality brickwork and incorporated some decorative details typical of the period, though they had a utilitarian, industrial appearance. This was reinforced by the used of corrugated metal sheeting to clad the expansive roofs. Decorative details to these buildings were largely limited to brick arches, curvilinear parapets and plain pilasters that often extended the full height of the building, emphasising the sturdy construction and substantial size.

Constructed at the same time as the Kingston Powerhouse, the first power station at East Perth also had concrete walls but could be considered to have had a more utilitarian appearance that lacked the articulation of the external envelope at Kingston. The East Perth Power Station, like that at Ultimo and White Bay are now an assemblage of structures from different periods.

In contrast to the above substantial power stations, the office building to the Grenfell Street Power Station, which was completed only two years before the Kingston Powerhouse, is more liberal in its decoration. Built to house the headquarters of the Electric Lighting and Traction Co., the building is of architectural note to South Australia. It has contrasting wall materials typical of the period (brick and render) and incorporates numerous decorative elements including a rusticated ground floor, faceted oriel tower and bracketed cornice. Similar devices have been employed at the Kingston Powerhouse which includes contrasting roughcast and smooth render, a projecting central bay to the façade with gabled parapets and a plain cornice.

One of the more unusual elements for a power station, are the prominent gable roofs of the Kingston Powerhouse which are clad in terracotta tiles. The power station building at Cockatoo Island has a simple gable roof also clad in terracotta tiles but lacks the roof ventilators that were common to industrial buildings.

The prominent gable roofs of the Kingston Powerhouse, with timber lined eaves and exposed purlins are more comparable with domestic scale arts and crafts architecture as is the massing of the economiser annex which has low eaves. In this aspect the design of the powerhouse relates to the Federation period buildings of John Smith Murdoch, many of which were erected in Queensland, that incorporate typical Arts and Crafts characteristics. The Powerhouse also includes restrained classical elements such as a plain cornice and pilasters flanking recessed wall planes. Such characteristics became typical in later buildings designed by Murdoch whose stripped classical style also became known as the Federal Capital style.


Left: Customs House and Residence, Maryborough, QLD (J S Murdoch), is a good example of Arts and Crafts influenced design. (Source: Queensland Heritage Register, online database)
Right: Old Parliament House, Canberra (J S Murdoch), is the most well regarded building completed in the Federal Capital Style. (Source: ACT Heritage Library, 007864)

Conclusion

The Kingston Powerhouse was constructed at a time when other large power stations were being erected in Australian cities. The power generation capacity of the Kingston Powerhouse was considerably less than other power stations which were erected for larger populations and to power the local transport networks. Some of the other power stations also used more advanced technology and were extended multiple times to allow for increased power generation capacity. This has meant that many of the remaining power station buildings of the late Federation period have been considerably more altered than the Kingston Powerhouse, albeit the power generation machinery has been removed at the latter. In addition, the Kingston Powerhouse is a distinctive building that is unlike other identified examples and has been designed in the round with numerous decorative, yet restrained details incorporated.

7.2 Assessment Against ACT Heritage Significance Criteria

In this section, the heritage significance of the Kingston Powerhouse Historic Precinct has been assessed against the current ACT Heritage Significance Criteria which are based on the HERCON criteria. Previous assessments, including that in the existing citation, were based on the old ACT criteria which have been superseded. It is also noted that almost 20 years have passed since the last CMP update was completed for the Kingston Powerhouse Historic Precinct and that substantial change has occurred in the area and to the Powerhouse in that time.

(a) importance to the course or pattern of the ACT's cultural or natural history;

The Kingston Powerhouse was one of the first permanent buildings constructed in the Federal Capital for the new Commonwealth. Its existence was fundamental to the development and establishment of Canberra as it provided power to various essential services including the Cotter Pumping Station, which critically supplied the new City with water. The power station was built and operated by the Federal Government and provided the first power to the Federal Capital in 1915. At this time, large power stations that generated electricity from coal fired, steam powered equipment, were also being erected in other Australian cities. The layout of the Powerhouse, with side by side boiler and engine bays as well as the integrated coal elevators, coal hoppers, and other remaining internal fittings provide tangible evidence of electricity generation in the Federal Capital.

The relationship of the site close the Molonglo River (now Lake Burley Griffin) is of historic significance as the selection of this site was driven by the need to have access to cool water, which was obtained from the pool in the river created by the gauging weir, as well as the proximity to the anticipated extension of the railway from Queanbeyan. Located close to the current south shore of East Basin, views of the Powerhouse were readily available from the Molonglo River and later Lake Burley Griffin until the redevelopment of the Kingston Foreshore.

This railway located to the north-east of the Powerhouse buildings facilitated the transportation of coal to the Powerhouse to fire the boilers and was also used by passenger services. The linear open space and

remnant railway embankment to the north-east of the Precinct are both historically significant as they denote the location of the original railway sidings which consisted of three tracks adjacent to the Powerhouse building. A narrow gauge railway line to the south of the Powerhouse extended to the Yarralumla brickworks and for a short period carried wagons of bricks that were used to construct prominent Canberra buildings. This railway line created a gap in the windbreak to the north-west, allowing the façade/front elevation to be viewed from the undeveloped area that became Bowen Park.

Following the establishment of the Powerhouse, other Government industries were established nearby including the Transport Depot, Government Printing Office, Government Sawmill and Trades School. These industries, including the power station were important in the development of Canberra and became a place of major employment and a hub of production. These facilities, like the Fitters' Workshop, provided centralised government services in the early years of the Federal Capital.

During this time, the Fitters' Workshop played an important role in the provision of industrial/engineering services and is one of relatively few places that survive from the initial phase of development in the 1910s. It performed this role for approximately six decades and was important place for the training of apprentices who were essential in maintaining a skills base for the operation and maintenance of the Powerhouse and other facilities. The large scale, open plan format and remaining crane facilitate an understanding of how the Fitters' Workshop was used.

The industrial buildings at Kingston, like those at the Powerhouse , were oriented parallel with the railway lines. The Powerhouse, Fitters' Workshop and 1948 Switch Room, along with the nearby Transport Depot, are the only buildings that survive from the once large industrial area.

The whistle located on the roof of the main Powerhouse building was an important soundscape feature throughout Kingston. The whistle sounded at various stages of the workday for employees of the government workshops and consequently, marked distinct phases of the day for the local community. The siren was installed beside the whistle during World War II as part of the Canberra Air Raid Precautions program and is the only one in Canberra that remains in its original location.

The surviving trees at the corner of Wentworth Avenue and Eastlake Parade are remnants of Thomas Charles Weston's 1920s windbreak plantation along Interlake (now Wentworth) Avenue and are also of historic significance. Weston played a seminal role in the National Capital's early planting program and these trees relate to the first phase of development which sought to protect the Capital from climatic extremes. Later trees to the south of the Powerhouse are consistent with those planted in Weston's windbreak and were planted the following decade, during the 1930s.

The Powerhouse ceased to provide power to the National Capital in 1929 when a cheaper source of electricity supply became available. It was reactivated for a short period in the years 1936-42 when repairs were required to the Burrinjuck Dam which supplied water to the Burrinjuck Hydro Eclectic Scheme that provided power to Canberra. It also partially operated in 1942-46 to supply power to the Belconnen Naval Station, which was one of the most powerful transmitters in the world at that time. The power station was again regularly used in 1948 until 1955 and occasionally until 1957 when Post-war construction in NSW placed severe strain on the NSW grid. The 1948 Switch Room building provides evidence of this later period of reactivation as does the chimney base to the rear of the Powerhouse which was also erected in the late 1940s. Installation of 11 kilovolt switchgear (removed) in 1948 Switch Room occurred 12 years later in 1960.

The Kingston Powerhouse Historic Precinct meets this criterion.

(b) has uncommon, rare or endangered aspects of the ACT's cultural or natural history;

The former Kingston Powerhouse is the only centralised power station that was constructed for the Federal Capital. Whilst no longer operational, no other power station has been erected in the ACT as power generation for the Territory was initially replaced by Burrinjuck Hydro Power Station in NSW and electricity continues to be drawn from the NSW grid, supplemented by contemporary renewable sources.

The Kingston Powerhouse Historic Precinct is associated with Canberra's early engineering history and is relatively rare as a surviving part of the initial civil infrastructure that was put in place to facilitate the development of the Federal Capital. The former Kingston Powerhouse and Fitters' Workshop are two of

relatively few surviving industrial buildings/complexes that date from the first few decades of development in the ACT.[108] Other intact early 20th century industrial places in the ACT include the Cotter Pumping Station (from 1915) as well as the Yarralumla Brickworks (from 1913).

More broadly, the Kingston Powerhouse is one of only a few intact power station buildings that were erected in Australia before the end of World War I. Unlike a limited number of other power stations however, the majority of plant, including the boilers and engines/turbines have been removed. The construction of coal fired steam power stations occurred in the large Australia cities in the early 20th century, though most constructed at the time of that at Kingston were fitted with more advanced steam turbines instead of reciprocating engines. As use of electricity increased, other power stations were added to and altered, though that at Kingston had sufficient room to allow for the installation of additional equipment as demand grew.

The Kingston Powerhouse Historic Precinct meets this criterion.

(c) potential to yield important information that will contribute to an understanding of the ACT's cultural or natural history;

The Kingston Powerhouse Historic Precinct has archaeological potential relating to demolished buildings and buried infrastructure. Original features that were key to the function of the Kingston Powerhouse and artefacts discarded by workers may remain beneath later fill. This includes the railway tracks to the north-east of the Powerhouse and Fitters' Workshop as well as the footings of the original chimney that was positioned to the rear (south-east) of the economiser annex. Archaeological remains may also exist from the timber transmission tower, 66kV switchyard, brickworks railway, the 1938 switch house, 1941 Patrolman's Residences, 1948 coal bunker, 1948 cable tunnel and the 1958 ACTEA workshop. Whilst it is unclear how much demolition of structures in the area has removed the potential for subsurface archaeological remains to be present, results of previous monitoring and recording programs show that substantial subsurface cultural material can remain in previous disturbed contexts in the Kingston area. If archaeological deposits remain in the Precinct, they would constitute a potential archaeological resource that would contribute to the understanding of the uses of the site, and would supplement the knowledge of early industrial/engineering buildings in the ACT.

Previous archaeological studies suggest that aboriginal sites would have been present in the vicinity of the Kingston Powerhouse Historic Precinct which was located close to the Molonglo River. The levels of industrial development and activity that has occurred in the Precinct has reduced the Aboriginal archaeological potential to low.

The place also has research potential in terms of further understanding the generation of electricity in the ACT. This has already been explored to some extent by the preparation of an oral history that recorded the recollections of workers in 1998, the Interpretation Plan prepared by Keith Baker and Associates (2002) and the additional research undertaken during the preparation of this CMP. The capacity to understand this process in further detail has been partially impacted by the removal of key machinery, including the boilers, reciprocating engines and economiser. The equipment/movable items are fairly well documented in historic archives, including in images held by the National Archives of Australia.

The Kingston Powerhouse Historic Precinct does not meet this criterion.

(d) importance in demonstrating the principal characteristics of a class of cultural or natural places or objects;

The Kingston Powerhouse Historic Precinct, including the largely intact Powerhouse and 1948 Switch Room, were part of the only power station erected in the ACT and the surviving fabric demonstrates various aspects of how power was generated using coal. The distinctive internal spatial planning of the Powerhouse, including the substantial boiler and engine bays, are typical of power stations of the period as was the close proximity to a cool water supply and access to rail for the transportation of coal. The Powerhouse, Fitters' Workshop and 1948 Switch Room are all oriented perpendicular to the former

[108] Refer to Fitters' Workshop Conservation Management Plan, pp47-48

railway lines which were fundamental for the delivery of coal and influenced the orientation of early development in the area.

Other remaining infrastructure, including the large coal hoppers, coal elevator, ash chutes, brick flues and chimney base, facilitate an understanding of various aspects of electricity production from coal. The elevator and hoppers allowed coal to be delivered to the boilers in the boiler bay, whilst ash from the burning of coal was discharged through chutes in the floor. Hot gases from the process were directed through the brick flues to the economiser annex and eventually out the chimney to the rear. Superheated steam from the boilers was directed to the adjacent engine bay to drive the engines and alternators to produce electricity. This steam was condensed in the condensing pits located in the north corner of the building for reuse in the boilers.

The open plan of the Powerhouse is comparable with others in Australia, though several larger examples from the period remain. Whilst some of the other examples also retain a substantial proportion of plant, the buildings are generally less decorative or have been subject to greater modification than the Kingston Powerhouse. Compared with other powerhouses, the Kingston Powerhouse is notable for its prominent, expressed roofs and its largely intact three dimensional form that has been subject to fairly minimal alterations and additions.

The Kingston Powerhouse and Fitters' Workshop are examples of early 20th century industrial architecture and were amongst the first permanent buildings erected in the Federal Capital. The use of large steel multi-pane windows was common for industrial buildings, though the use of concrete as a wall material is more unusual for the period. Typical of other power stations of the period, the Powerhouse and Fitters' Workshop are substantial buildings and were widely visible in Canberra as little other development occurred in the formative years. As noted in the existing statement of significance, the Powerhouse was a landmark structure in its lakeside setting, though this has been impacted by the redevelopment of the Kingston Foreshore. The Powerhouse and Fitters' Workshop do however retain landmark qualities when viewed from the surrounding streets, including Wentworth Avenue.

Both the Powerhouse and the Fitters' Workshop were designed by noted architect John Smith Murdoch whose stripped classical architecture became known as the Federal Capital style. Characteristics of this style that are evident to the Powerhouse include the largely symmetrical façade/front elevation, projecting bay with parapet, relatively plain cornice/string course and the modulation of the elevations into vertical bays with recessed planes flanked by pilasters. The Fitters' Workshop is also a symmetrically designed building with a similar cornice and walls that are also divided into vertical bays that are indicative of classical origins. Whilst the restrained classical detailing to both buildings is consistent with Murdoch's later work, the material palette, which includes contrasting smooth and roughcast render, terracotta tiles and timber, are all reflective of the Arts and Crafts aesthetic and appear to carry over from his earlier work. The prominent shed dormers were also an element employed by Murdoch, though they were not commonly found on buildings designed by others.

The Switch Room is a modest building that incorporates some detailing with horizontal emphasis indicative of the Streamlined Moderne. This includes the continuous projecting rowlock course at sill height and the continuous concrete hoods above banks of steel framed windows.

The Kingston Powerhouse Historic Precinct meets this criterion.

(e) importance in exhibiting particular aesthetic characteristics valued by the ACT community or a cultural group in the ACT;

The Powerhouse and Fitters' Workshop have a distinctive industrial aesthetic deriving from the robust concrete construction, large steel framed windows and remnant plant including the coal hoppers and coal elevator/ash bin. Whilst the substantial Powerhouse building could be said to be a local landmark, the importance of this particular characteristic to the broader ACT community has not been investigated in detail during the preparation of this CMP.

It is noted that staff of the Canberra Glassworks and artists have expressed an appreciation for the aesthetic of the Powerhouse building. It is also evident from the Kingston Arts Precinct Stakeholder and Community Engagement (underway), that various community groups including the National Trust of Australia (ACT), the Inner South Canberra Community Council and the Kingston and Barton Residents

Group, value the architectural character of the existing buildings within the Kingston Powerhouse Historic Precinct.

Further research and engagement with the community would be required to confirm if the Kingston Powerhouse Historic Precinct meets this criterion.

(f) importance in demonstrating a high degree of creative or technical achievement for a particular period;

The Kingston Powerhouse and to some extent the Fitters' Workshop, display a degree of creative achievement through the application of stripped classical style to an industrial building. Whilst they are good examples of this style, they do not meet the high level required by this criterion.

The construction of a large permanent building in the Federal Capital at the time the Powerhouse was erected also displays a degree of technical achievement as other infrastructure had yet to be established. The building was indented to be constructed using brick, though the newly established Yarralumla Brickworks were unable to produce bricks of sufficient quality at the time. This led to a change in the design of the building and the specification of in situ concrete as a wall material. Whilst this material was not commonly used in this manner at this time, it had been used in other earlier buildings.

In regard to the technical aspects of the operation of the power station, this criterion has not been considered as much of the original machinery has been removed. It is also noted that rapid advances in power generation were made during the time that the Kingston Powerhouse was constructed and that subsequently the machinery, including reciprocating engines, were rapidly superseded by superior technology.

The Fitters' Workshop CMP identified that the Workshop 'housed an exceptionally fine collection of engineering machinery that was central to the maintenance and development of Canberra's early infrastructure'. Like the Powerhouse however, this collection is no longer present.

The Kingston Powerhouse Historic Precinct does not meet this criterion.

(g) has a strong or special association with the ACT community, or a cultural group in the ACT for social, cultural or spiritual reasons;

Whilst the social significance of the Kingston Arts Precinct has not been investigated in detail in this CMP, it is evident from the Kingston Arts Precinct Stakeholder and Community Engagement process (underway) that the Kingston Powerhouse Historic Precinct is valued by members of the community.

As can occur when development proposals are put forward, the proposed Kingston Arts Precinct has seen a fair amount of coverage by the press, with numerous articles discussing the project and its relationship with the Kingston Powerhouse Historic Precinct. Media reports have included claims that heritage groups (such as the National Trust) and local residents were opposed to the demolition of the 1948 Switch Room and have expressed concerns regarding the impact of previous proposals on the existing heritage buildings.[109]

Consultation relating to previous iterations of the master plan also suggests there is public sentiment towards the Kingston Powerhouse Historic Precinct. This includes the Section 49 Kingston Consultation that was undertaken in 2011 and found that 'the history and heritage of the area was almost universally valued by participants'. Those that participated particularly valued the buildings which they suggested 'provided a unique link to the now defunct industry and Canberra's past'.[110]

The Fitters' Workshop CMP identified that the Workshop has special acoustic qualities which make it very suitable for musical performance and that it has become a favoured venue within parts of the community.

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[109] Examples include 'Progress appears stalled in jewel in the crown of Kingston Foreshore', *The Canberra Times,* 4 February 2019. 'Concerns about lack of consultation over Kingston arts precinct hotel move', *Brisbane Times,* 28 November 2016. 'National Trust calls on government not to demolish historic Switch Room in Kingston', *The Canberra Times,* 9 February 2017

[110] Kingston Section 49 Appendix 5: Community and Stakeholder Consultation, Purdon Associates, 2014, p5

The CMP noted that 'with more time and more intensive use, such uses would be likely to result in social value'.

Whilst collectively these sources provide insight into aspects of the heritage listed Precinct that are valued by parts of the community, further research is required to establish if this satisfies the requirement for the place to be valued by the broader ACT community or a cultural group and if this association is 'strong' or 'special'. It is acknowledged that social values have not been attributed to the Kingston Powerhouse Historic Precinct in the existing heritage citation, though it is noted that such values are not static and can change over time.

Further research and engagement with the community is required to confirm if the Kingston Powerhouse Historic Precinct meets this criterion.

(h) has a special association with the life or work of a person, or people, important to the history of the ACT.

The Kingston Powerhouse and Fitters' Workshop were designed by John Smith Murdoch who is best known for his later work (1920s) that was developed as Commonwealth Government Architect. His buildings from this period embraced a stripped classical style that adopted a classical composition articulated by wall planes, openings and structural elements that eschewed lavish detail, with the most acclaimed example being Provisional Parliament House.

Whilst the Kingston Powerhouse was the first building designed by Murdoch in Canberra, it is not the first that he designed for the Commonwealth, with the more richly decorated Commonwealth Offices in Melbourne completed in 1912. To date, no information has come to light to suggest that Murdoch had a special association with either the Powerhouse or the Fitters' Workshop.

There is currently no clear association with former workers of the Kingston Power Station, though this has not been investigated in detail in this CMP. It is acknowledged that the industrial/engineering workers at Kingston played an important role in the development and maintenance of Canberra and that previous studies (including the Fitters' Workshop CMP) have noted that the place has a strong and special association with this group. This has however, not been identified in the ongoing community consultation that is being undertaken as part of the Kingston Arts Precinct project.

The Kingston Powerhouse Historic Precinct does not meet this criterion.

7.3 Summary Statement of Heritage Significance

The Kingston Powerhouse Historic Precinct including the Powerhouse, Fitters' Workshop, Switch Room, the northern railway line and early trees, is of historic and representative significance to the Australian Capital Territory. The Powerhouse also possesses rare aspects that are significant to the Territory.

The Precinct is historically significant as the Powerhouse and Fitters' Workshop were amongst the first permanent buildings constructed for the new Federal Capital. The construction of the Powerhouse was fundamental to the development and establishment of Canberra as it provided power to various essential services including the Cotter Pumping Station, which critically supplied Canberra with water. The power station provided the first power to the Federal Capital in 1915.

The location of the Powerhouse is also significant as this was driven by the need to have access to water and a railway line to transport coal. Views of the Powerhouse from Lake Burley Griffin are important as these reinforce the historic relationship between the power plant and the Molonglo River.

The Fitters' Workshop also played an important role in the first phase of the development of the new Federal Capital and was an early part of the industrial area of Kingston that provided important industrial/engineering services. It was part of a range of centralised services provided by the Government and was an important place for the training of apprentices. Its large size, open plan and the crane facilitate an understanding of how the Fitters' Workshop was used.

Also of historic significance was the railway line to the south of the Powerhouse which extended to the Yarralumla Brickworks and carried wagons of bricks that were used to construct prominent Canberra buildings. The whistle located on the roof of the main Powerhouse building is significant as it was an

important soundscape feature throughout Kingston and broader Canberra, marking various stages of the workday for employees and distinct phases of the day for the local community. The World War II air raid siren is also significant as the last remaining air raid siren in Canberra that remains in its original location.

The surviving trees at the corner of Wentworth Avenue and Eastlake Parade are Significant as remnants of Thomas Charles Weston's 1920s windbreak plantation along Interlake (now Wentworth) Avenue and relate to the first phase of development in the new Capital. The 1930s trees, to the south-west of the Powerhouse are consistent with those planted in Weston's windbreak and are also significant.

Whilst the Powerhouse ceased to operate in 1929, it was reactivated in 1936-42, in 1948-57 and also partially operated in 1942-46. Development dating to these later operational phases is also significant as this provides evidence of reactivation and changing operational requirements. Such development includes the 1948 Switch Room and the chimney base to the rear of the Powerhouse which was also erected in the late-1940s (Criterion A).

As the only centralised power station constructed for the Federal Capital, the Kingston Powerhouse is significant to the ACT. The Kingston Powerhouse Historic Precinct is relatively rare as a surviving part of the initial civil infrastructure that was put in place to facilitate the development of the Federal Capital. The former Kingston Powerhouse and the Fitters' Workshop is one of relatively few surviving industrial buildings/complexes that date from the first few decades of development in the ACT. (Criterion B)

The extant buildings at the Kingston Powerhouse Historic Precinct are of representative significance as structures constructed for the manufacture and distribution of power and the surviving fabric demonstrates various aspects of how power was generated using coal. The distinctive internal spatial planning of the Powerhouse, including the substantial boiler and engine bays, are significant as they are typical of power stations of the period.

The Kingston Powerhouse and Fitters' Workshop are good examples of early 20th century industrial architecture. The use of large steel multi-pane windows was common for industrial buildings, though the use of concrete as a wall material was more unusual for the period. The substantial Powerhouse building and Fitters' Workshop with distinctive industrial aesthetic retain landmark qualities when viewed from the surrounding streets.

Both the Powerhouse and the Fitters' Workshop, which are related stylistically, are of representative (aesthetic) significance. Designed by noted architect John Smith Murdoch, they are early examples of his stripped classical mode which became known as the Federal Capital style. Characteristics of this style are significant and include the largely symmetrical north-west façade/front elevation of the Powerhouse with central parapeted bay, the relatively plain cornice/string course and the modulation of the elevations into vertical bays with recessed planes flanked by pilasters. The prominent gable roofs and material palette consisting of unpainted render (contrasting smooth and roughcast) as well as terracotta tiles and timber elements are also significant as they reflect Murdoch's earlier Arts and Crafts influenced work. (Criterion D)

7.4 Features intrinsic to the significance of the place

Intrinsic features

Items listed below are considered intrinsic to the significance of the Kingston Powerhouse Historic Precinct and shall be retained and conserved. In accordance with the ACT Heritage Council *Conservation Management Plans Guiding Principles* (2015), elements are not ranked according to the level of significance but are instead identified as either intrinsic to the significance of the place or not (the latter have not been specifically identified).

As the Kingston Powerhouse Historic Precinct has changed over time to meet evolving needs, elements that are identified as intrinsic to the significance of the place are generally those which relate to the period prior to the winding up of power generation at the Powerhouse for the final time in 1957. This includes structures, landscape elements and internal fitting and fixtures that although not original, demonstrate various changes that were undertaken to extend the life of the Kingston power station.

As set out in the ACT Heritage Register citation, the following are features intrinsic to the significance of the place:

The place comprises the following significant features identified on Figure 48a:

a) Powerhouse building, together with significant internal fabric identified below and indicated on Figure 48b;
b) Fitters' Workshop (Bulk Supply Store);
c) Original alignment of the railway and existing railway track and embankment
d) Landscape elements: Monterey Pines (*Pinus radiata – A)*, Blue Gums (*Eucalyptus bicostata – B)* and the River Peppermints (*Eucalyptus elata – B)*.[111] *There is another unidentified gum and a group of Monterey Pines located between the Powerhouse and Wentworth Avenue that are also significant.*
e) Base of the second chimney stack;
f) Fabric and operation of the siren and whistle; and
g) 1948 Switch Room.

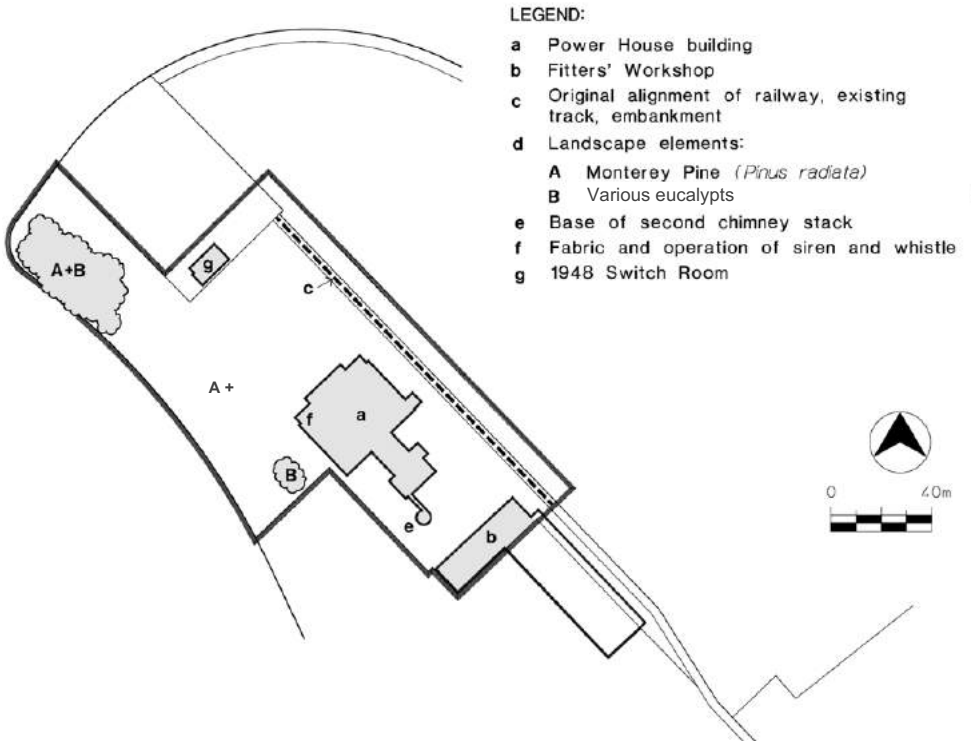


Figure 48b: Kingston Powerhouse Historic Precinct: significant features (amended)
(Source: ACT Heritage Register citation)

The following schedule of significant internal fabric in the Powerhouse is also taken from the ACT Heritage Register citation. Items that are no longer apparent (they have been removed or are concealed by new works) have been struck out in the list below.

Stairwell (ground and first floors)

- Steps, railings, handrails, cupboards beneath stair (1)
- Original light fittings (8)

Basement (ground floor)

- Condensing pits (2)

[111] It is noted that the eucalypts are incorrectly identified as White brittle gums (*Eucalyptus mannifera) in the heritage citation.*

- Light fitting on central beam (4)
- Ladder to first floor and into condensing pit (5)
- Ash chutes (6)
- Coal elevator (7)
- Original light fittings (8)

Battery Room (ground floor)

- ~~Original joinery~~ and three phase switch on right had side of door as you enter, ceiling and cable terminating boxes and cable rack.

Economiser Room (ground floor)

- Trusses
- Drill press (9)[112]
- Position of flue (10)

Engine Room (first floor)

- Floor [if exists, it is concealed by a new slab], ripple iron ceiling [appears to have been renewed], trusses, fenestration, louvres and gantry, sign, columns, beams and services (external electrical wiring)
- Internal operating mechanism for siren and whistle (1)
- Building services switch board (12)

Tea Room (first floor) [now workshop toilets and accessible toilet]

- Windows and door and wall framing

Switch Room (first floor)

- Original position of high voltage switches evident on the vinyl floor tiles (3). [This room now has a modern finish and it is not clear if the footprint of the high voltage switches is still evident below the modern finish.]
- Curved moulding on the wall

Boiler Room (first floor)

- Walls, ceiling
- Coal hoppers (19)
- Coal elevator (7)[113]
- Ladder/stairs on east wall (14)
- ~~Air dampers (15)~~
- Wall bracket light fittings with shovel shaped reflectors (16)
- Original light fitting (8)
- Evidence on east [south-east] wall surface decoration featuring red section from floor finished with a black line below cement washed walls (17)
- ~~Portion of pipes through west [north-west] wall of Boiler Room into the Engine Room (18)~~ [the location of these is evident only in patch repairs]

[112] The drill press is thought to have originally been located in the Fitters' Workshop where it was driven from an overhead line shaft

[113] No. 7 is also the ash hopper

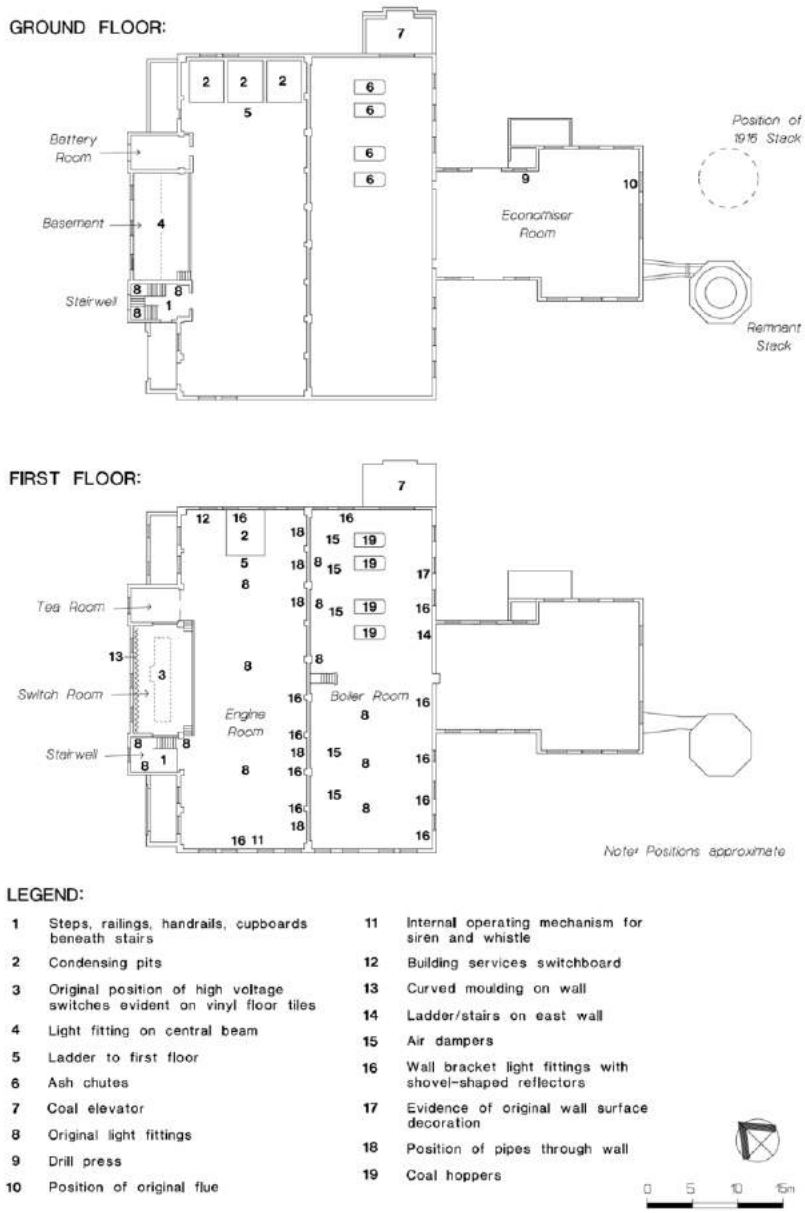


Figure 48b: Kingston Powerhouse Historic Precinct: significant internal fabric of Powerhouse building (Source: ACT Heritage Register citation)

In addition to the aforementioned features, the following visual links with the Powerhouse are considered significant:

- Visual link from East Basin across Jack Ross Park and the adjacent pedestrian bridge.
- Visual link from Bowen Park down the current driveway which was constructed on the alignment of the Brickworks railway

Neutral features

The 1960s addition to the south-west end of the 1948 Switch Room is considered a neutral feature as this was constructed following the cessation of power generation at the site. The modern fit-out to the Powerhouse and the contemporary café addition are also considered to be neutral features. Modern services and doors/windows to the Powerhouse are also neutral features.

Intrusive features

The 1980s porch to the south-west end of the 1948 Switch Room is considered to be an intrusive element as it has a domestic character that is at odds with the former industrial building.

8 Opportunities and constraints

This section explores a range of opportunities and constraints that are important factors to consider in the formulation of suitable conservation policies for the Kingston Powerhouse Historic Precinct. These relate to the significance of the Historic Precinct, statutory obligations, management context and stakeholders views, including the ACT Government's vision for the proposed Kingston Arts Precinct, as well as the current condition. These opportunities and constraints have been considered together with evidence of significance in the development of conservation polices.

8.1 Heritage significance

There are both opportunities and constraints arising from the need to conserve and enhance appreciation of the features intrinsic to the significance of the place (listed in the preceding chapter). Some of the main challenges and opportunities are discussed below.

Views and visual links

One of the key heritage considerations for new built form within the Kingston Powerhouse Historic Precinct is the need to maintain visual links between the Powerhouse and identified public places located outside the Historic Precinct. As previously noted, the ACT Heritage Register entry requires that significant visual links be retained between the Powerhouse and both East Basin and Bowen Park. Within these visual links there is an opportunity to highlight key architectural and industrial details of the Powerhouse, including the distinctive double gable roof, the coal elevator/ash chute and the original entry porch which contributes to understanding the orientation of the building. It is the coal elevator/ash chute that distinguishes the north-east elevation from the south-west elevation and is essential for understanding how the Powerhouse operated. The opportunity to frame and maintain visual links with key elements from outside the Historic Precinct would need to be considered with other functional and planning requirements to achieve good heritage, land use and urban design outcomes.

It is acknowledged that the historic format of the Powerhouse largely prevents the activities within the building from being viewed from the surrounding public domain owing to the size and location of windows combined with the use of obscure glazing. Given that these are significant characteristics, activation of the open space surrounding the Powerhouse would likely need to be achieved through new, sympathetic built form rather than modification of the existing building.

In contrast to the historic format of the Powerhouse, the modern glazed entries to the economiser annex allow for views into the Powerhouse. These elements, along with the café, partially activate the area and also act as makers for pedestrians, assisting with wayfinding. The current landscaping to Section 49 and the more permanent public domain (park, bridge etc.) on the opposite side of Eastlake Parade align with the entry to the economiser annex. Retention of views to the entry of the Glassworks is desirable from an urban design perspective, though it is noted that the retention of visual links between East Basin and both the two storey part of the Powerhouse and the modern building entry would have considerable impacts on future works to the north-east of the Historic Precinct. Balancing good urban design with heritage requirements will be a key consideration in achieving a positive heritage outcome and a vibrant arts precinct.

Left: View of Powerhouse Precinct from east end of Bowen Park. Right: view of Kingston Powerhouse Historic Precinct from the opposite side of Wentworth Avenue

Other planning instruments (discussed below) which extend beyond the boundary of the heritage listed Precinct, such as the Territory Plan, include provisions for more distant views.

Should the reconfiguration of existing infrastructure be considered, there is an opportunity to improve views to the north-west elevation of the Powerhouse by relocating modern service enclosures (including modern sub-stations). This would improve the visibility of the original entrance porch and assist with the interpretation of the north-west elevation as the historic/designed front of the building.

Siting

As the buildings in the Kingston industrial areas were constructed perpendicular with the railway lines that serviced the area, the buildings in the Historic Precinct are orientated at an angle to the local street grid which was based on the Griffins' plans. There is an opportunity to heighten the ability to interpret the location/alignment of the original railway and its relationship with the existing buildings. There is also an opportunity for the orientation of new development within the Historic Precinct to reinforce the historic orientation of buildings relative to the railway sidings. This could be achieved by orientating new built form parallel with the former railway corridor.

The siting of the 1948 Switch Room some 60 metres from the Powerhouse and its close proximity to the modern substation, mean that it is not readily apparent that this building is part of the group of heritage structures. Both the use of the interceding space as a carpark and the truncation of the existing interpretive railway line at the north-west end of the Powerhouse building do not assist with this. There is an opportunity to implement interpretative devices to facilitate an understanding of the intended use of the 1948 Switch Room. This might include changing the name of the building (currently referred to as the Chapel) to something that reflects its former use and interpreting previous physical connections to other infrastructure (such as the cable tunnel extending to Wentworth Avenue).

Whilst there is considerable opportunity to construct new additions to the rear (south-east) of the Fitters' Workshop where buildings were previously located, the Powerhouse was designed to be viewed in the round (from all sides) and incorporates decorative features to all elevations.

Integrity

The modern service enclosures to the front (north-west) of the Powerhouse and the reorientation of pedestrian access to the building, which is now via the economiser annex, diminish the ability to interpret the original format of the façade of this prominent building. There is however limited opportunity to re-establish the original front porch as the main entry to the Glassworks as the internal spaces adjacent to the porch are highly constrained by the mass concrete footings that were used to support the engines. These spaces have been adapted for service purposes (storage etc.) and it would be difficult to adapt them for other purposes.

The porch addition to the south-west of the 1948 Switch Room impacts on the presentation of this modest building giving it a somewhat domestic character. Removal of this element would improve the presentation and could be used as an opportunity to better facilitate the interpretation of the building's former industrial use.

The cotemporary glass sculpture *Touching Lightly* by Warren Langley, which sits on top of the extant chimney base, assists with an understanding of the original function of this structure.

More broadly most of the industrial infrastructure and buildings associated with the Kingston industrial area have been demolished. There would be an opportunity to introduce interpretive devices to assist with understanding the area's industrial past. This might include the naming of new streets and buildings to reflect previous uses.

Former Transport Depot

The Kingston Powerhouse Historic Precinct is located adjacent to the former Transport Depot which is also included on the ACT Heritage Register. Together with structures in the Kingston Powerhouse Historic Precinct, the various parts of the former Transport Depot are the last remaining buildings of the once extensive industrial and services complex located at Kingston. Much of the former Transport Depot is currently leased by the Old Bus Depot Markets which operate weekly on a Sunday. There is an opportunity for the former Depot building to be integrated into the proposed Kingston Arts Precinct and potential for the building to be used more frequently as well as provide public access to areas that are currently not occupied. There would be an opportunity to accommodate new arts uses within the building to support its ongoing maintenance and conservation.

As a listed heritage place there are requirements under the *Heritage Act 2004* to conserve and appropriately manage the former Transport Depot in a manner respecting its heritage significance. Conservation policy relating to the building, including policy for adjacent development, is provided in the Former Transport Depot CMP (April 2021) which was approved by the ACT Heritage Council in June 2023.

8.2 Statutory Obligations

The statutory items that pertain to the Kingston Powerhouse Historic Precinct, which is proposed to be redeveloped, include:

- *Australian Capital Territory (Planning and Land Management) Act 1988*
- National Capital Plan (Commonwealth)
- Territory Plan 2018 (ACT)
- *Planning and Development Act 2007* (ACT)
- *Heritage Act 2004* (ACT)
- *Trespass on Territory Land Act 1932*
- National Construction Code.

National Capital Plan

The *Australian Capital Territory (Planning and Land Management) Act 1988* established the National Capital Planning Authority, who were required to prepare a National Capital Plan (NCP). The purpose of the Plan is to ensure that the ACT is planned and developed in accordance with its national significance with detailed provisions provided for Designated Areas. These areas are deemed to have 'the special characteristics of the National Capital'. Whilst the Kingston Powerhouse Historic Precinct is not located within a Designated Area, special requirements apply under the NCP to the Kingston Foreshore and are in addition to the requirements of the Territory Plan (discussed below).

The Commonwealth's interest in Kingston Foreshore is 'to ensure Lake Burley Griffin Foreshore in East Basin continues to be developed as a major landscape feature in East Basin helping to unify the National Capital's central precincts'. The special requirements that apply include a provision for building height which is as follows:

> *The overall height of buildings in the area is to be generally consistent with that of the tree canopy of mature trees in the area. This can be achieved through buildings being a maximum of four storeys except for some taller buildings or focal elements where these do not significantly impact on the landscape of the area or detract from the massing of the Kingston Powerhouse building.*

Territory Plan and Planning and Development Act 2007

The *Australian Capital Territory (Planning and Land Management) Act 1988* also required the preparation of a Territory Plan consistent with the NCP. The Territory Plan informs and guides planning and development in the ACT with the exception of Designated Areas in the NCP. The Territory Plan is prepared and administered by the ACT Planning and Land Authority as required by the *Planning and Development Act 2007.*

The Kingston Powerhouse Historic Precinct is Subject to a Future Urban Area (FUA) overlay for the purposes of Section 51 (2) (a) of the *Planning and Development Act 2007.* Structure plans included in the Territory Plan, set out broad principles and policies for development of a Future Urban Area.

The Territory Plan sets out a series of land use zones and the objectives for these zones. The Kingston Powerhouse Historic Precinct is also designated CZ5 Mixed Use Zone. This zone allows for higher density residential development alongside a mix of compatible uses including office, retail and community use.

Structure Plan

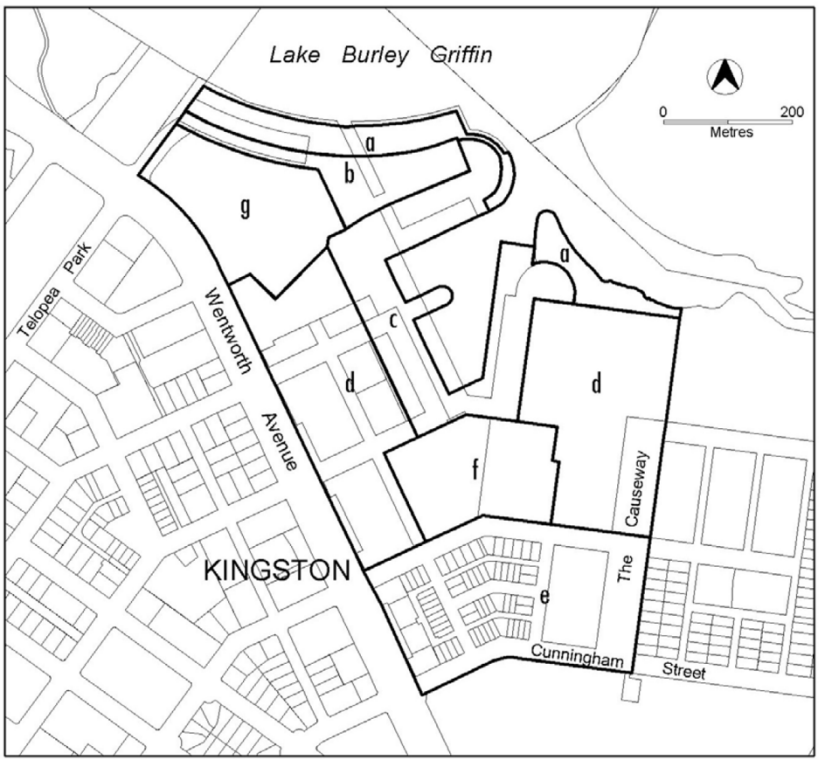
A Structure Plan for the Kingston Foreshore covers land bound by Wentworth Avenue, Lake Burley Griffin, The Causeway and Cunningham Street. The purpose of this plan is to protect and promote the idea of a modern mixed use development area integrating with the structural concepts of the Walter Burley Griffin Plan for Canberra. One of the ten qualitative design objectives outlined in this document is:

> *2. To ensure that the heritage significance of the site is recognised and that in particular the Power House remains a landmark building.*

The structure plan also includes general objectives including:

> *(c) Reflect and celebrate the cultural significance of the site.*

The Structure Plan includes principles for several precincts within the Kingston Foreshore area. These precincts are shown on the plan below with the Kingston Powerhouse Historic Precinct located in precinct g.



Kingston Foreshore Precincts a-g
(Source: Territory Plan, Structure Plan Kingston Foreshore 2010)

The following policy applies to Precinct g, which covers a larger area than the heritage listed Kingston Powerhouse Historic Precinct:

(a) Preserve and protect the heritage significant building and elements in a manner which encourages adaptive reuse.

(b) Provide opportunities for activities and facilities to be integrated with the historic building and setting of the Power House.

(c) Promote public access to, and experience and understanding of, the heritage significance of the place.

(d) Respect significant views to and from the Power House.

In addition, the structure plan contains specific provisions related to heritage which consist of:

(a) Ensure that the Kingston Power House Historic Precinct is conserved and appropriately maintained consistent with its heritage significance. Strongly reflect the cultural significance of the site as the historic commercial and industrial heart of Canberra in the urban design and presentation of the development.

(b) Encourage public appreciation of the heritage values of the site through appropriate interpretation within the Kingston Power House Historic Precinct and in neighbouring precincts.

(c) Promote the conservation, reinstatement, consolidation and interpretation of the historic fabric and encourage its adaptive reuse.

The above provisions mean that the heritage significance of the Kingston Powerhouse Historic Precinct needs to be considered when undertaking development within a broader area (precinct g).

Kingston Precinct Map and Code

The Powerhouse Historic Precinct is subject to additional provisions under the 'Kingston Precinct Map and Code' which provides additional planning, design and environmental controls for specific areas or blocks. This code sets out additional prohibited uses as well as those that may be permitted subject to assessment. For the Kingston Powerhouse Historic Precinct, additional uses that may be approved include a craft workshop, indoor entertainment facility, light industry, place of assembly and tourist facility.

The Kingston Precinct Code also sets out requirements related to built form, number of storeys as well as materials and finishes. The following applies to land that is part of the Kingston Powerhouse Historic Precinct (located in area e).

C40 The number of storeys achieve all of the following [several provisions are listed including]:

a) A limited number of buildings may exceed 4 storeys provided they comply with all of the following:

i. They do not detract or compromise views and vistas to the Power House.

b) To retain significant visual links between the Power House building and East Basin, the roofline of development in area b is punctuated to frame and emphasise the views of the Power House building.

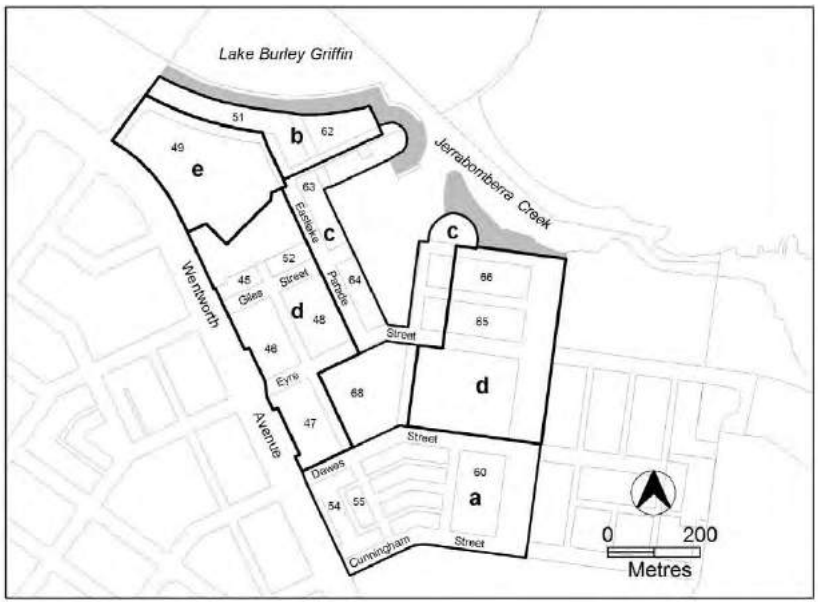


Figure 4 Kingston Foreshore
(Source: Territory Plan, Kingston Precinct Map and Code 2017)

Development Approvals

The *Planning and Development Act 2007* requires that development be assessed in accordance with the provisions of the Territory Plan and the Act unless it has been defined as exempt development. General exemption criteria are outlined in Schedule 1 of the *Planning and Development Regulation 2008*. The *Planning and Development Act* defines development as:

a) Building, altering or demolishing a building or structure on the land;
b) Carrying out earthworks or other construction work on or under the land;
c) Carrying out work that would affect the landscape of the land
d) Use of land, or a building or structure on the land including beginning continuing or changing use of the land;
e) Subdividing or consolidating the land
f) Varying a lease relating to the land
g) Putting up, attaching or displaying a sign or advertising material otherwise in accordance with a licence issued under the Act, a sign approval or unleased land permit under the *Public Unleased Land Act 2013*

Under the CZ5 Mixed Use Zone, various uses require a Development Application. For development in the Kingston Powerhouse Historic Precinct, the Development Application will be referred to the ACT Heritage Council as discussed below.

DA Assessment Tracks

The ACT planning system has a track-based system for assessing developments with three assessment tracks: code track, merit track and impact track. The code track applies to simpler developments that meet all the relevant rules in the Territory Plan. The merit track usually includes multi-unit and commercial developments as well as application to vary a lease. The impact track is used for developments that have a major impact on the environment. An Environmental Impact Statement (EIS) is required for any Development Application (DA) in the impact track, unless EIS Exemption is granted. An EIS details the anticipated environmental impacts of a development as well as proposing avoidance, mitigation and offset measures.

An environmental significance opinion (ESO) is an opinion that can be given by the ACT Heritage Council where a proposal is not likely to have a significant adverse heritage impact. If an opinion is given to that effect, the proposal is taken out of the impact track, unless other reasons apply. The proponent can then submit a merit track development application or consider the exemptions available under the *Planning*

and Development Act 2007. Proponents can seek an ESO if the proposal is likely to have a significant adverse impact on the heritage significance of a place or object registered under the *Heritage Act 2004.*

Estate Development Plans

Under Section 139 of the *Planning and Development Act 2007,* where an application for development approval is for the development of an estate, the application must be accompanied by an estate development plan (EDP) for the estate. An estate development plans sets out the proposed development of the estate, and the creation of blocks in the estate, in a way that is consistent with the precinct code in the Territory Plan.

In accordance with Section 94 of the *Planning and Development Act 2007,* an estate development plan must identify:

a) *the block boundaries for individual blocks proposed for inside the estate and the boundaries proposed for the whole estate; and*

b) *if the estate is in a future urban area—the zones proposed for the estate and any existing zones that are to continue to apply.*

An estate development plan may include the following for the estate:

a) *design and construction requirements for roads;*

b) *design and construction requirements for infrastructure works and landscaping;*

c) *particular areas for particular detailed purposes;*

d) *a tree management plan;*

e) *design and construction requirements for reticulated services;*

f) *design and construction requirements for works on proposed public land;*

g) *a provision, which is consistent with the territory plan, that is proposed to apply to the ongoing development of a block in the estate (an* **ongoing provision***) that—*

   i. *relates to the subject matter addressed by an existing mandatory rule or criteria applying to the block; and*

   ii. *does not permit the development of the block in a way that would not be permitted by the existing mandatory rule or criteria.*

Where an EDP is approved under a development application, the planning and land authority must vary the Territory Plan to identify the zones that will apply to the land and remove the Future Urban Area overlay from the land.

ACT Heritage Register Listing

As the Kingston Powerhouse Historic Precinct is registered under the *Heritage Act 2004,* any development must not contravene the Act and ACT Heritage Council advice must be obtained prior to proceeding with works. This applies even where works do not require Development Approval or Building Approval.

Where a Development Application for the site is made, the planning authority must refer the application to the ACT Heritage Council. The *Planning and Development Act 2007,* provides that the Heritage Council give advice to the planning and land authority about the effect of development on the heritage significance of the place and that this advice must be considered by the authority in approving or refusing to approve a Development Application.

As an item listed on the ACT Heritage Register, any changes, adaptation or maintenance/conservation works undertaken within the Kingston Powerhouse Historic Precinct, must be in accordance with the approved CMP and/or subject to a Statement of Heritage Effect (SHE) approval under the ACT *Heritage*

Act 2004. This CMP has been prepared for approval under the *Heritage Act* and will be referred to when assessing the proposed redevelopment of Section 49.

The only provisions for legally sanctioned disturbance to a heritage place or object, or the diminution of the heritage value of a Heritage Place or Object is to conform to one of the exceptions listed in section 76 of the Act. According to this section, the offence provisions of the Act (sections 74 and 75) do not apply if engaging in conduct in accordance with the following:

(vii) a heritage guideline;

(ii) a heritage direction;

(iii) a heritage agreement;

(iv) a conservation management plan approved by the council;

(v) development approval under the Planning and Development Act 2007,

(vi) an excavation permit;

(vii) a Statement of Heritage Effect approved by the ACT Heritage Council.

Under Section 74 of the *Heritage Act 2004,* a person commits an offence if they engage in conduct that diminishes the heritage significance of a place or object and is either reckless or negligent about whether the conduct would diminish the heritage significance of the place or object. Where a person commits an offence by engaging in conduct that diminishes the heritage significance of a place or object this is a strict liability offence.

Where development or an activity is likely to diminish the heritage significance of the Kingston Powerhouse Historic Precinct, a Statement of Heritage Effect (SHE) application must be made to the Heritage Council in writing. Council may direct a person or entity to make an application for approval of a SHE, and the person or entity may only start the activity if the Council approves a SHE for the activity. Under Section 61H of the *Heritage Act 2004,* the Heritage Council must approve the SHE if satisfied on reasonable grounds that the proposed activity is justifiable, that there are no reasonably practicable alternative ways to carry out the proposed activity at the heritage site, and that the applicant has identified reasonable steps to reduce the risk of diminishing the heritage significance, or damage to, the heritage site.

The SHE must set out:

a) *a description of the place or object,*
b) *details about the proposed activity, including the reason for the activity and the extent and duration of the activity;*
c) *the likely effect of the proposed activity on the heritage site, including the effects that may diminish the heritage significance of, or damage, the heritage site;*
d) *the measures the applicant will adopt during the activity to reduce the risk of diminishing the heritage significance of, or damage to, the heritage site; and*
e) *whether other reasonably practicable ways of carrying out the activity at the heritage site are available.*

The process outlined above manages the changes that can be undertaken to a place listed on the ACT Heritage Register in order to minimise negative impact on the heritage significance of the place.

The *Heritage Act 2004* also contains provisions for heritage directions, heritage orders, repair damage directions, offences, penalties and heritage agreements. A person is considered to have committed an offense if they intentionally contravene a requirement of a heritage direction, fail to comply with a repair damage direction, or engage in conduct that demises the heritage significance of a place and are reckless about this would diminish the heritage significance.

Specific requirements for the Kingston Powerhouse Historic Precinct are provided in the ACT Heritage Register citation for the site and are reproduced below. Whilst these were written under previous legislation, they are taken to be heritage guidelines for the purposes of the *Heritage Act 2004*. Where guidelines have been made, they directly affect the advice provided by the Heritage Council to the planning and land authority on any development application.

The place is to be conserved and appropriately maintained consistent with its heritage significance. In conserving the place, its prior use as an industrial site for the generation of electricity should continue to be evident and accessible to the public.

i) Buildings including alterations and additions

a. *The Power House is to remain the dominant feature of the Precinct in any future development.*
b. *The industrial character, form and scale of the Power House and Fitters' Workshop shall be retained. External additions to the Power House, Fitters' Workshop and 1948 Switch Room shall only be permitted if the proposed additions do not adversely affect the heritage significance of the place.*
c. *External alterations to the Power House, Fitters' Workshop and 1948 Switch Room, including alterations to external finishes, shall reflect and complement the architectural style of the buildings.*
d. *Internal alterations or additions to the Power House and Fitters' Workshop will respect proportions of space and may only be permitted where it can be demonstrated that they will not adversely affect the heritage significance of the place. Any alterations or additions shall be undertaken in accordance with a Conservation Management Plan approved by the ACT Heritage Council and any subsequent amendment of that plan. Any proposed works which will require the alteration or removal of the significant internal fabric identified at Schedule 1 will require a Development Application.*
e. *Any new buildings or elements shall be consistent with the architectural character of the place, and where possible, shall positively enhance the public's ability to understand its former industrial use and historic role in the development of the National Capital. New construction shall only be permitted where it can be demonstrated that it will not adversely affect the heritage significance of the place and will not affect the landmark qualities of the Power House and Fitters' Workshop.*
f. *The base of the second chimney stack shall be conserved in its current location. If the base of the first chimney stack is uncovered during development works this shall be conserved and protected from disturbance.*
g. *The siren and whistle shall be conserved and retained in its current location on the roof of the Power House and maintained in working order. Consideration shall be given to future operation for interpretive purposes or new use.*

ii) Demolition of Buildings

a. *Demolition of the Power House, Fitters' Workshop, base of the second chimney stack and 1948 Switch Room shall not be permitted, other than in exceptional circumstances, including circumstances in which the buildings are structurally unsound and beyond economic repair or where there are significant public health and safety reasons to warrant demolition. Demolition shall not be permitted unless it can be demonstrated that there is no prudent and feasible alternative.*
b. *Demolition of any part of the original fabric of the above features shall only be allowed in the context of sympathetic conservation of the place, including any alterations and additions.*
c. *Accurate recording of any building or structure shall be undertaken prior to any demolition or removal of fabric.*

iii) Landscape

a. *The plantings on the corner of Mundaring Drive and Wentworth Avenue of Monterey Pine (A) and White Brittle Gum (B), and those to the west of the Power House of White Brittle Gum (B), are to be conserved and when appropriate, replaced with the same species of tree. All are to be maintained.*
b. *The alignment of the former railway and existing railway track should be retained as a linear open space and appropriately expressed in future landscaping treatment. An indicative portion of the existing railway track should be retained, conserved and interpreted in situ.*
c. *The immediate spaces surrounding the Power House, Fitters' Workshop and railway alignment that demonstrate the industrial servicing and operation of these buildings shall be retained and appropriately landscaped.*
d. *Significant visual links shall be retained between the Power House and*
    i. *East Basin and*
    ii. *Bowen Park. The prominent gables and roof form of the Power House shall be visible from potential water transport links to and from the Kingston Foreshore area.*
e. *Excavation and landscaping works shall be undertaken in accordance with approved archaeological procedures.*

The ACT Heritage Council may direct a person or entity to make an application for approval of SHE, and the person or entity may only start the activity if the Council approves the SHE for the activity. The Council must approve the SHE if satisfied on reasonable grounds that the proposed activity is justifiable and that the applicant has identified reasonable steps to reduce the risk of diminishing the heritage significance, or damage to, the heritage place. The following table outlines when approval from the ACT Heritage Council is generally required.

Element	When to seek ACT heritage advice	When approval of a Statement of Heritage Effect (SHE) is required	When approval is not required
Site	When proposing to subdivide the site	Where the proposed subdivision is likely to diminish the significance of the Historic Precinct	-
Generally	When repairs are proposed following damage or when modification of non-original features is proposed	When new development or modification of original features is proposed	When undertaking works scheduled in an approved CMP scope of works
Building exteriors	When repainting elements that are already painted in a different colour	When changing the existing finishes or materials	When repainting elements that are already painted to match existing
Northern railway corridor	When proposing any changes to this area	Excavation of the former railway corridor	
Modern equipment and plant	When replacing existing modern plant and equipment	When installing new plant and equipment that is likely to diminish the significance of the heritage precinct	When servicing or repairing existing modern equipment
Signage	Modifying/replacement of existing signage	Installation of new signage that is likely to diminish the significance of the heritage precinct	Removal of modern signage
Trees	When pruning or replacing trees in accordance with the policy contained in this CMP	When proposing tree removal or replacement that is inconsistent with the policy contained in this CMP	-

Trespass on Territory Land Act 1932

The *Trespass on Territory Land Act 1932* applies to trees on unleased Territory Land and land occupied by the Territory. Section 7 of the Act covers damaging trees and states:

> *A person shall not, without reasonable excuse, damage or destroy trees, plant, garden, plantation or afforestation area on unleased Territory land or land occupied by the Territory.*

Further controls for trees on public land forms part of the Urban Forrest Bill 2022. In addition to protecting trees on leased land, the legislation will (from 1 January 2024) apply to all trees on public land, regardless of their size. The legislation will require that approval be obtained from the director-general for an activity on leased land that would or may damage a tree located on public land.

The *Tree Protection Act 2005* protects trees that are registered or a regulated. The trees at the Kingston Powerhouse Historic Precinct are not registered under the Act and are not considered regulated trees as they are located on unleased land. This Act will be replaced by the new Urban Forrest legislation.

National Construction Code

The National Construction Code (NCC) provides the minimum necessary requirements for the safety, health, amenity, accessibility and sustainability of the design, construction and performance of structures throughout Australia. Compliance with the NCC is typically required where substantial alterations (refer to *Building [General] Regulation 2008* for definitions) are proposed. As the buildings within the Historic Precinct have been refurbished relatively recently, extensive refurbishment of the existing buildings is unlikely to be proposed in the near future. That said, where substantial alterations are proposed a whole of building upgrade to meet the NCC would be required. The application of substantial alteration is triggered for activities such as change of function (change of classification under the NCC) and an increase in gross floor area exceeding 50% of the existing floor area.

8.3 Management context and stakeholders

There are several separate parties that hold an interest in the Kingston Powerhouse Historic Precinct as outlined below.

ACT Government's vision

During the mid-1990s, the ACT Government undertook a land swap with the Federal Government to acquire the area associated with the Kingston Foreshore and then commenced the process of consulting with the community on its redevelopment. The ACT Government's vision to rejuvenate the under-utilised industrial area as a unique waterfront precinct was established through the national design competition for the site in 1997 which attracted 79 entries from around Australia. The award-winning master plan by Colin Stewart Architecture proposed to embrace the area's heritage through the creation of a cultural precinct (now known as the Kingston Arts Precinct). The vision for Kingston Foreshore was to create retail commercial, residential and recreational areas whilst preserving the overall historical significance of the Kingston Powerhouse Historic Precinct.

The ACT Government remains committed to the delivery of an arts precinct to the highest value and standard that is sensitive to its surroundings, its cultural heritage and future sustainable living. The arts precinct at Kingston is a key part of the ACT Government's ambition for Canberra to become recognised as Australia's Arts Capital and is proposed to be a state-of the-art addition to the Canberra arts scene.[114] The arts precinct will be the destination for Canberra's visual and arts culture.[115]

Owners and managers

The Kingston Powerhouse Historic Precinct is owned and managed by the ACT Government with current management shared across multiple ACT Government agencies. This creates some challenges and can be a source of confusion when it comes to coordinating events. Currently, artsACT are responsible for the management of the Powerhouse and 1948 Switch Room whilst ACT Property Group manage the Fitters' Workshop. The carparking within the Kingston Powerhouse Historic Precinct is managed by Access Canberra and the landscape is currently managed by the Suburban Land Agency. An overview of these organisations is provided below:

- artsACT are the ACT Government's arts agency which is part of the Chief Minister, Treasury and Economic Development Directorate. artsACT provides policy, funding and infrastructure to support participation in, and access to, the arts. They support arts organisations and artists through several facilities dedicated to arts activities.

[114] Canberra Australia's Arts Capital: A statement of ambition for the arts 2021-2026
[115] Canberra Australia's Arts Capital: Arts, Culture and Creative Policy 2022-26

- ACT Property Group manages the commercial buildings and properties owned by the ACT Government which have become surplus to service delivery needs or are transferred from other Government agencies.
- The Suburban Land Agency (SLA) is an ACT Government statutory authority who are responsible for the redevelopment of the Kingston Foreshore and is the custodian of the Section 49 land. The SLA is responsible for urban renewal and conducting Government Land Sales.
- Access Canberra is also part of the Chief Minister, Treasury and Economic Development Directorate. Access Canberra provides regulatory services in the ACT, including licensing, management of traffic and parking infringements.

An Arts Destination

Since the initial planning for the redevelopment of the Kingston Foreshore in the late 1990s, it has been proposed to develop a new cultural precinct centred on the historic buildings of the Kingston Powerhouse Historic Precinct. In accordance with this long-term proposal, policies within the CMP have been developed to respond to the opportunities and challenges associated with realising an arts precinct within the Historic Precinct.

As previously noted, there is an opportunity to improve public accessibility to the existing heritage buildings within the Kingston Powerhouse Historic Precinct as well as the Former Transport Depot located adjacent to the Historic Precinct. This could potentially be achieved by making underutilised buildings available for hire for arts uses or other compatible uses.

There are numerous examples of industrial heritage sites in Australia that have been adapted and renewed to create facilities for the arts and creative industries. The aesthetic of industrial places is often readily compatible with arts uses with many examples demonstrating that industrial fabric can be retained with a patina that helps to understand the history of a place. Examples include Carriageworks and Cockatoo Island in Sydney as well as River Studios in Melbourne. In addition to being sensitive to the industrial characteristics of the Kingston Powerhouse Historic Precinct, there is an opportunity to symbolically link new arts uses with the historic uses of Kingston which was a place of electricity generation, distribution and manufacture (the area was a place where printing was undertaken, and where joinery, concrete products and other parts were manufactured).

There is also an opportunity for the significant features of the Kingston Powerhouse Historic Precinct to act as a focal point of the new arts precinct. This would help to reinforce the urban character and identity of the place and has the capacity to improve the desirability of the area, acting as a draw card for both locals and tourists. The combination of significant elements within the Historic Precinct and distinctive arts facilities has the potential to create a series of diverse and unique public spaces. Further, the incorporation of compatible, viable new uses would help to economically contribute to the ongoing conservation of the Historic Precinct.

Kingston Arts Precinct

The Kingston Arts Precinct will be the final stage of the Kingston Foreshore development. It is proposed to be a fully integrated arts precinct that would include purpose-built arts facilities, artists accommodation, outdoor events space, public, commercial and residential areas as well as structured car parking. The Kingston Arts Precinct would bring together geographically dispersed arts groups and their venues into one dedicated arts hub with new facilities proposed for the Canberra Glassworks (in addition to the existing Powerhouse) as well as for Craft ACT, Canberra Contemporary Art Space, M16 Artspace, Megalo Print Studio, PhotoAccess, an Aboriginal and Torres Strait Islander art space and an office space for the precinct facilitator.

The above arts organisation have developed an operational vision for the Kingston Arts Precinct which is reproduced below:

> ***Mission, vision and values***
> *Ever-changing, ever-challenging, always collaborative –*

Our vision
Grounded in Country, we welcome you to celebrate and strengthen creative and cultural practices. At the creative heart of Canberra, let's generate more together than we could possibly have imagined alone.

Our purpose
To champion courageous artistic endeavour, energise thinking, and create deep connections across Australia and across the world. To foster the generous collaborations that build Canberra's thriving new creative place.

Our values

*We are **dynamic***
We're the destination for Canberra's visual arts and culture – and our journey there has already begun. Our artists thrive within complexity and diversity – and we're here to inspire you.

*We are **adventurous***
We're deeply engaged in the fusion of traditional and contemporary practice. We value experimentation. We draw on decades of social engagement and deep artistic focus to create new work and new experiences. We invite you to explore what we've created.

*We are **collaborative***
Our doors are open to everyone. We engage your curiosity and expand your thinking. When you visit us, you're connecting into a local, national and international arts scene through its Canberra home.

The governance model of the future arts precinct has been co-designed with the arts sector and broader community and shares the principles of hospitality, access, artist and sector development as well as embedding meaningful relationships and learning from Aboriginal and Torres Strait Islander peoples.

As part of the planning for the Kingston Arts Precinct, the Government is working with Traditional Custodians and the Aboriginal and Torres Strait Islander Arts Network to increase visibility of Ngunnawal cultural arts. It is proposed that Aboriginal and Torres Strait Islander arts space would play a cultural leadership role in supporting and promoting First Nations' creative talent.[116]

The ACT Government sees the Kingston Arts Precinct as a rare opportunity to create a significant legacy to inspire, move and influence people for generations to come. Once the Kingston Arts Precinct is complete, artsACT would be responsible for managing the arts hub whilst the ACT Government would be responsible for maintaining remaining Territory assets. It is proposed that future place activation, including cultural programming and precinct events coordinated by artsACT, increase visitation to the Kingston Powerhouse Historic Precinct and improve utilisation of the heritage buildings.

Current occupants

Both the Powerhouse building and the 1948 Switch Room operate as the Canberra Glassworks. Canberra Glassworks is Australia's leading centre for contemporary glass art, craft and design and provides artists with state-of-the-art equipment. The current facility in the Powerhouse provides opportunities for visitors to interact with and learn about glassmaking and view exhibitions.

It is understood that Canberra Glassworks requires additional space within the proposed Kingston Arts Precinct redevelopment to meet their needs. This includes extra facilities for a new gallery and retail space, a gallery holding room, artists' studios, a meeting room, additional storage, loading dock, catering kitchen, office space and workshop space.

The capacity to accommodate additional facilities in the Powerhouse is constrained by the format of the extant building which includes substantial double height volumes and large mass concrete supports below the engine and boiler bays that occupy a relatively large portion of the building footprint. Opportunities to construct further additions to the Powerhouse are also limited as the building was designed in the round (to be viewed from all sides). There are also challenges associated with the level changes within the

[116] Canberra Australia's Arts Capital: Arts, Culture and Creative Policy 2022-26

building as there is currently only one lift. This lift is used as a combined goods and passenger lift and is required for transporting fragile glass objects between floors.

Part of the Powerhouse building, including the modern addition, is leased by the restaurant Brodburger. From our inspections, it was evident that the lack of dedicated café service entry and no provision for direct access to storage facilities was problematic for both Brodburger and the Canberra Glassworks.

The Fitters' Workshop is currently operated as a venue for function or event hire. The building is managed by ACT Property Group and additional facilities, including a kitchen, are required to assist with function use. Pro Musica organises an annual festival, The Canberra International Music Festival, at the Fitters' Workshop and is a key user of the building. The organisation values the character and acoustics inside the Fitters' Workshop and has been an advocate for the retention of the building, in particular the large internal volume, as a venue for musical performance.

Community

Engagement with the community regarding the proposed Kingston Arts Precinct is ongoing. Most recently this has included consultation to inform the development of the draft Place Brief.[117] The Place Brief is a set of high-level principles which shape the future development of the site and reflects the place-based approach adopted by the ACT Government for developing the arts precinct. It brings together the ideas and ambitions of the arts organisations and community.

Engagement for the development of the Place Brief consisted of two community workshops, stakeholder walkshops, two Community Panel meetings, a creative panel discussion, a public pop-up, employee surveys and the online YourSay collaboration page. Findings from this phase of engagement are contained in the Report on engagement to inform the Kingston Arts Precinct Place Brief (Communication Link and Suburban Land Agency, no date). Consultation with the community will continue as part of pre-development work, including the preparation of concepts for the Estate Development Plan.

As part of the Place Brief engagement process, participants of Co-Create Workshop 1 were asked to select a location on a map of the Kingston Foreshore area where the ideal entrance or 'front door' to the Kingston Arts Precinct should be. The majority of participants nominated the area to the south-west of the Powerhouse (Wentworth Avenue side) as the preferred 'front door' location.

Previous Government sponsored consultation with the community was conducted between 2011 and 2015. Key findings from these consultations are summarised in a 2019 report by Judd Studio with issues identified as important including:

- Reinforce the significant industrial heritage of the area;
- New buildings do not dominate or screen the Powerhouse;
- Preserve all heritage listed buildings in the Historic Precinct including the 1948 Switch Room;
- Retain industrial heritage character;
- Retain view of heritage buildings from Wentworth Avenue;
- Sensitive to heritage architecture – reflect historical links in colours, materials and structure;
- Limit building height to ensure relationship with existing visual landscape and respect heritage;
- Adequate separation between old and new development.

These recommendations are largely consistent with the requirements set out in the ACT Heritage Register for the Kingston Powerhouse Historic Precinct and have been considered in the preparation of the conservation policy.

[117] Kingston Arts Precinct Place Brief, Draft, ACT Government, Suburban Land Agency, no date

8.4 Current condition

Building fabric

Overall the buildings located in the Kingston Powerhouse Historic Precinct are in good condition as they have undergone various upgrades over the past couple of decades. There are a number of maintenance issues that should continue to be monitored and remediated as part of an ongoing, cyclical maintenance program, though it is acknowledged that many of these relate to areas that are difficult to access, including timber fascia boards and eaves linings, lead flashings and rainwater goods.

The Powerhouse and Fitters' Workshop are both in relatively good condition, though a number of ongoing issues with damp were noted with the base of the in-situ concrete walls friable in several locations. Testing is recommended to confirm if this is due to rising damp. There may be an opportunity to co-ordinate the assessment and repair of these walls as part of the delivery of the Kingston Arts Precinct. Consolidation of the loose concrete surface may be required once the cause of deterioration has been identified and rectified to safeguard the walls and mitigate potential slip hazards. This may involve installation of a damp proof course.

It is possible that the capacity of the existing rainwater goods, particularly the box gutter to the Powerhouse, are not sufficient to deal with heavy downpours which will increase in frequency and intensity. There would be an opportunity to upgrade rainwater disposal systems across the site as part of the delivery of the Kingston Arts Precinct when changes to underground services are likely to be required across the Historic Precinct.

There would also be an opportunity to reduce the cost of repair works by co-ordinating works to all of the heritage buildings in a way that resources can be shared. For example, at height works (such as those requiring an elevated work platform) could be undertaken simultaneously to all three buildings. These works could include replacement of broken glazing, painting of weathered elements, including difficult to access fascia boards, barge boards, eaves linings and steel window frames. Inspection of larger cracks to the Powerhouse and Fitters' Workshop at height could also be undertaken at this time to establish the cause, which may relate to corrosion of embedded metal.

The 1948 Switch Room is also in good condition, though poor ground surface drainage to the south-west of the building has been noted by the Canberra Glassworks Technical Manager. There would be an opportunity to improve drainage around this building as part of the delivery of the Kingston Arts Precinct.

Precinct landscape

The Kingston Powerhouse Historic Precinct has historically been relatively free of landscaped areas, except for the tree plantings to the south and north-west of the site to provide a windbreak. A relatively small number of trees from these plantings remain. Of those that do remain, several are in poor condition or dead due to the recent drought. Those that are in poorest condition have suffered from extended dry periods and are Monterey Pines which are a declared weed species. There is an opportunity to replace these with trees that are better suited to the local climate.

Historic photographs show that the areas around the Powerhouse buildings were not landscaped and included bare ground, heaps of coal or ash and other items associated with the industrial use of the Precinct. There is an opportunity to implement a robust landscape that is sympathetic with the historic industrial character of the site.

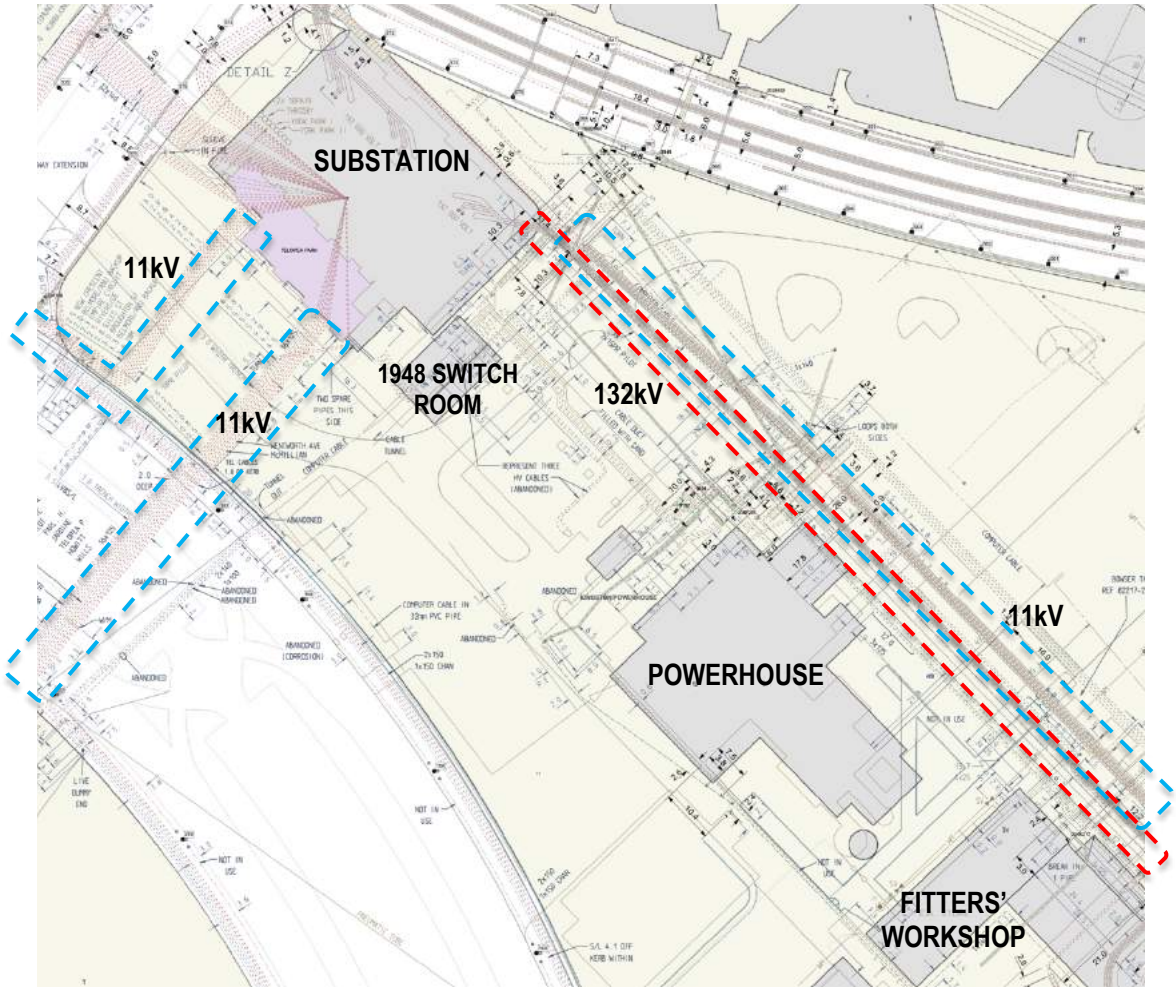
As noted in the Physical Description, site levels within the Precinct have changed from the historic format. This includes the railway embankment to the north-east that has been modified to accommodate car parking and allow for the installation of high voltage underground power lines. Historic evidence (such as photographs) demonstrates that the previous format of the embankment, which was more steeply sloped when compared with the current form. During its operational years, the ground levels to the front/north-west of the site were lower than the current levels (refer to image below). Given the levels across the site have been altered from the historic format, the existing levels are not considered significant and there would be an opportunity to modify these if required for functional reasons.

Kingston Powerhouse showing brickworks rail line with trucks (1926)
Note that the ground levels to the front of the Powerhouse are lower than they currently are with the northern railway embankment (indicated) higher than the adjacent land
(Source: National Archives of Australia, 3106216)

Subterranean services

Consistent with the historical use of the site as a place of power generation and distribution, there is an extensive network of subterranean services located within the Kingston Powerhouse Historic Precinct. These are a combination of historic abandoned and redundant infrastructure as well as active services and are/were primarily for power distribution.

One of the most substantial pieces of underground infrastructure is the high voltage line (132kV) which extends from Telopea Park Substation to the south-east. This line is located to the north-east part of the Kingston Powerhouse Historic Precinct and is shown on the survey below. There are also 11kV power lines that extend from the Substation, through the north-west part of the Historic Precinct and under Wentworth Avenue. Additional infrastructure is located between the Powerhouse and the 1948 Switch Room and includes abandoned high voltage cables and cable ducts filled with sand. A cable tunnel is also thought to be located under the 1948 Switch Room and to the south-west of this building.



Electricity network at the Kingston Powerhouse site. The 132kV (red) and 11kV (blue) lines are indicated
Note the survey includes buildings (grey) that have since been demolished
(Source: Section 49 Master Plan, 2014)

Infrastructure associated with power generation at Kingston (up to 1957) would constitute a potential archaeological resource that could contribute to an understanding of the uses of the site and would supplement the knowledge of early industrial/engineering practices in the ACT, including the production and distribution of electricity. The location of subterranean services also has the potential to impact on new uses and built form within the Kingston Powerhouse Historic Precinct. These constrain excavation works as well as the location of new structures and could impact on the cost of works where re-routing of services is required.

9 Conservation Policy

The conservation policies set out in this section are a guide for the maintenance of, and future change to, the Kingston Powerhouse Historic Precinct. They have been developed after reviewing the significance of the place and after consideration of the known opportunities and constraints. The conservation policy is intended as a framework by which the Precinct should be managed in order to maintain significant fabric, guide sensitive change and conserve the heritage significance.

The approach taken in formulating the policy is based on the ACT Heritage Council guiding principles and the processes outlined within the Australia ICOMOS Charter for Places of Cultural Significance, known as the Burra Charter (reproduced in Appendix A).

9.1 Guiding conservation objectives

The identified heritage significance of the Kingston Powerhouse Historic Precinct shall be conserved and change shall be carefully managed such that negative impact on heritage significance is avoided. In general, this significance relates to the fabric and features associated with the development and use of the site as a place for generating electricity (1913 to the mid-1950s) including the buildings, the setting and potential archaeological deposits.

The conservation of the Kingston Powerhouse Historic Precinct shall be carried out in accordance with the principles of the Burra Charter. This document provides guidance on the conservation of and managing change at places of heritage significance. Works that have a potential impact on significant fabric or values shall be guided by a professionally documented assessment relevant to that area or component (i.e. a Statement of Heritage Effect – SHE).

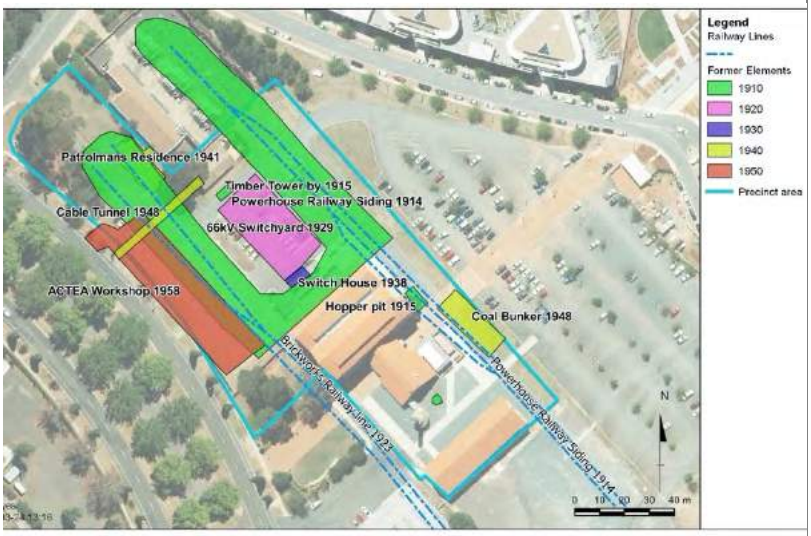
This CMP shall be referred to for specific conservation policies which shall guide the management of the Kingston Powerhouse Historic Precinct.

9.2 Policies relating to this Conservation Management Plan

1.1	**Statement of significance**	The statement of significance in this CMP should be adopted as a basis for guiding the ongoing management of the heritage place.
1.2	**Burra Charter**	All works that could impact on the place should be undertaken in accordance with the principles of Australia ICOMOS including the Charter for the Conservation of Places of Cultural Significance (Burra Charter).
1.3	**Heritage Council Approval**	This CMP should be submitted to the ACT Heritage Council for approval under Section 61J of the *Heritage Act 2004*. Upon approval, the CMP will become the guiding document for the conservation and management of the Kingston Powerhouse Historic Precinct.
1.4	**Sound advice**	Experienced heritage professionals shall be involved in any future works in the Precinct and sound conservation principles must be applied to any work. Conservation practitioners and tradespeople with appropriate heritage experience shall be involved in works to significant buildings and structures. Where works have the potential to impact on known and potential archaeological areas with the Precinct, advice should be obtained from suitably qualified historic archaeologists on the archaeological potential of proposed areas of work.
1.5	**Planning documents**	All planning documents developed for or relevant to the Kingston Powerhouse Historic Precinct shall refer to this CMP as a primary guide for the conservation of its heritage values.

1.6	**Availability**	This CMP has been commissioned by the ACT Government though would preferably be made available to the public and relevant stakeholders. These are discussed in the preceding chapter and include the owner, managers and occupants of the buildings.
1.7	**Review**	This CMP should be reviewed and updated as applicable at 5 year intervals to take into account new information and any changes in management. Review of the CMP may also be necessary if major changes to the place occur and the policies contained in the CMP are no longer appropriate. Following review of the CMP, it should be submitted to the ACT Heritage Council for approval.

9.3 Policies relating to archaeology

2.1	**Archaeological survey**	A Precinct wide archaeological survey using non-invasive techniques, such as ground penetrating radar (GPR) shall be undertaken to ascertain the location of any archaeological remains that may be extant within the Precinct. The results of this will then be used to inform any ongoing works in the Precinct. Archaeological procedures shall then be developed for all works involving subsurface excavations. These procedures may include archaeological monitoring, subsurface excavation to confirm the results of the GPR survey and salvage excavation.
2.2	**Archaeological investigations**	Appropriate archaeological investigations shall be carried out following the GPR survey of the Historic Precinct. These works shall only be undertaken following issue of an Excavation Permit under Section 61E of the *Heritage Act 2004.*
2.3	**Archaeological management**	All excavation and landscaping works, particularly in areas of identified archaeological sensitivity (see image below), shall be undertaken in accordance with approved archaeological management procedures developed following completion of an archaeological survey.  Areas of identified archaeological sensitivity consist of: • Powerhouse railway siding (by 1914) • Timber tower (by 1915) • First chimney stack (by 1915) • 66kV switchyard (1929)

		• Brickworks railway line (1923) • Switch house (1938) • Patrolman's' Residences (1941) • Coal bunker (1948) • Cable tunnel (1948) • ACTEA workshop (1958) If the base of the first chimney stack is uncovered during development works, this shall be conserved and protected from disturbance. Archaeological findings shall be appropriately recorded and should be addressed in the Interpretation Strategy.
2.4	**Interpretation during Archaeological Investigations**	Archaeological heritage has potential to inform the heritage interpretation of the site. It is recommended that any archaeological investigation within the Precinct also incorporate opportunities for public engagement and interpretation such as public open days where finds and the archaeological process can be interpreted to the public.

9.4 Policies relating to statutory authorities

3.1	**Compliance with legislation**	All stakeholders must comply with all relevant legislation including the: • *Planning and Development Act 2007* (ACT) • National Capital Plan (Commonwealth) • Territory Plan 2008 (ACT) • *Heritage Act 2004* (ACT) • *Trespass on Territory Land Act 1932* (ACT) • National Construction Code. This includes the need to seek relevant approval for changes within the Kingston Powerhouse Historic Precinct from the planning authority and the Heritage Council.
3.2	**ACT Heritage Council Guidelines**	Specific requirements for the Kingston Powerhouse Historic Precinct are provided in the ACT Heritage Register citation for the site (reproduced in Appendix F). Under the *Heritage Act 2004,* they are taken to be Heritage Guidelines and have statutory effect. They cover all significant features within the registered boundary and set out requirements for excavation, landscaping, significant trees, the alignment of the former railway line, visual links, alterations and additions, and demolition. These requirements have been reproduced in the Opportunities and Constraints chapter.
3.3	**Reporting of unforeseen discoveries**	Should any unforeseen heritage discovery (e.g. archaeology found during excavation or other elements uncovered as part of building works) be found, any works at the heritage discovery are to cease until such time as ACT Heritage Council advice and approval is obtained. Any heritage discoveries must be reported within five working days.
3.4	**Statement of Heritage Effect (SHE)**	A Statement of Heritage Effect will be required to be approved by the ACT Heritage Council for works that diminish or damage the Kingston Powerhouse Historic Precinct. Heritage Council advice is required for all works within the Historic Precinct.

9.5 Policies relating to maintenance

4.1	**Maintenance plan**	The maintenance plan in the Implementation chapter of this CMP shall be implemented by the managers of the site to limit the need for more expensive repair works, improve the longevity of the buildings and associated elements, and safeguard the heritage values of the place. ***Rationale*****:** *Gradual deterioration of building fabric is inevitable over time due to age, weather and use. Insufficient maintenance can result in more rapid deterioration of fabric which can be expensive to rectify if not property addressed. It may also result in the loss of significant heritage fabric which can impact on the heritage values of the place. Implementation of an inspection and maintenance plan would help to ensure that unnecessary deterioration is prevented or circumscribed.*
4.2	**Maintenance works**	Detailed surveys should be undertaken by an experienced conservation practitioner, approximately every 5 years. If unoccupied, the condition of historic buildings should be reviewed more regularly by a building practitioner (at least every 6 months) to avoid irreparable deterioration from trees, pests, water ingress, vandalism etc. If defects are identified, steps shall be taken to address these without impacting on the heritage significance of the place. It is not necessary to remove signs of use or wear and tear and a patina is an acceptable aesthetic for heritage places, particularly any accretions, redundant fixtures etc. that contribute to an understanding of the former industrial use.

9.6 Policies relating to building conservation

5.1	**Items which must be retained**	Elements that have been identified as intrinsic to the significance of the place (Analysis and Statement of Significance chapter) contribute to the industrial character and shall be retained in their original location.
5.2	**Items which must be retained and conserved in working order**	The whistle and World War II air raid siren shall be conserved and retained in their current location on the roof of the Powerhouse. The whistle shall be maintained in working order and shall continue to be controlled internally from the south-west end of the engine bay. The overhead crane to the engine bay shall also be maintained in working order.
5.3	**Items which must be retained though could be relocated**	The drill press, currently located in the entry foyer (economiser annex), must be retained on site. Consideration could be given to relocating this drill press to its historic location should this be established. Statement of Heritage Effects approval may be required if it is to be relocated to another building within the Kingston Powerhouse Historic Precinct.
5.4	**Demolition of Buildings**	Statement of Heritage Effect approval is required for all demolition works associated with intrinsic features. The demolition the Powerhouse, Fitters' Workshop and base of the second chimney stack shall not be permitted other than in exceptional circumstances, including circumstances in which the buildings are both structurally unsound and beyond economic repair or where there are significant public health and safety reasons to warrant demolition.

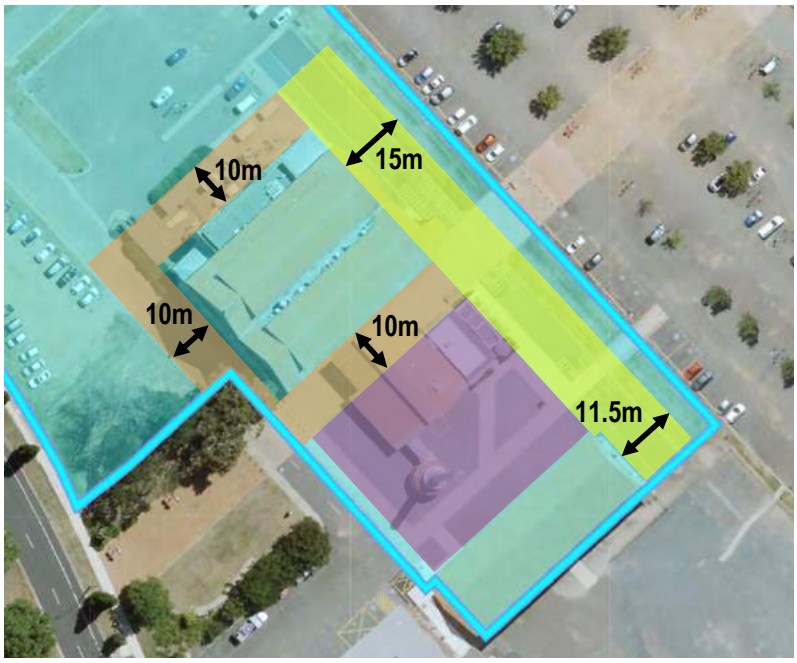
		Demolition shall not be permitted unless it can be demonstrated that there is no prudent and feasible alternative. An application to demolish significant elements shall be supported by the relevant structural, health or economic assessments undertaken by appropriate professionals. Demolition of the 1948 Switch Room should not be permitted. Demolition or removal of any significant fabric shall only be allowed in the context of sympathetic conservation of the place, including any alterations and additions. Accurate recording of any intrinsic feature shall be undertaken prior to any demolition or removal of fabric.
5.5	**Items which may be adapted or demolished**	The following elements could be adapted or demolished, provided that significant fabric is conserved and careful recording occurs. ● Modern internal fit-out for the Glassworks. ● Modern entry portals to the economiser annex. ● Modern café addition to the Powerhouse. ● Porch to the south-west end of the 1948 Switch Room. ● Aluminium doors to Fitters' Workshop.
5.6	**Reinstatement of original features**	Reinstatement of previously removed items (where documentation exists) is encouraged. Advice and approval from the Heritage Council is required for reinstatement of original features. There is an opportunity to reintroduce original elements that have been removed including: • More sympathetic shutters to the rear (south-east) elevation of the Powerhouse to replace the modern Colorbond roller doors. • The coal pit to the railway siding (below the ash chute) which allowed coal to enter the building. Excavation of the area would be required to determine the extent that remains. • Contrasting smooth render to the exterior of the Fitters' Workshop (north-east elevation). Reinstatement of original features must be informed by a strong understanding of the heritage significance and further research would be required on original features before Heritage Council approval could be obtained. Reinstatement of the above would serve to improve the presentation of the place and improve the ability to interpret how the site operated as a power generation facility.
5.7	**Internal alterations**	Internal alterations or additions to the Powerhouse and Fitters' Workshop shall respect the proportions of the spaces and may only be permitted where it can be demonstrated that they will not adversely affect the heritage significance of the place. Any proposed works which will require the alteration or removal of the significant internal fabric identified in the heritage listing will be subject to a Statement of Heritage Effect (SHE) approval under the ACT *Heritage Act 2004.* Trusses to the roof of the Powerhouse are to remain exposed internally. The interior of the 1948 Switch Room could be reconfigured to remove modern partitions associated with the 2007 fit-out. The exposed trusses should not be further concealed.

9.7 Policies relating to use

6.1	**Public access**	The use of significant buildings in the Kingston Powerhouse Historic Precinct and the land surrounding these buildings should continue to facilitate public access. It would be desirable to implement a program of curated events and installations to increase visitation to and interaction with the Kingston Powerhouse Historic Precinct. ***Rationale:*** *An increased understanding of the heritage significance of the Kingston Powerhouse Historic Precinct will serve to improve the broader awareness of the site, thus leading to greater certainty regarding the long term conservation of its heritage significance.*
6.2	**Services**	If practical, relocate above ground modern services, sub-stations and service enclosures (required for the operation of the Canberra Glassworks) located immediately to the north-west of the Powerhouse. Throughout the Kingston Powerhouse Historic Precinct, locate necessary new services in a sympathetic, discrete manner so as to be as visually unobtrusive as possible. Services should be introduced in a manner which has minimal impact on significant fabric. Archaeological management controls may be required for any works where subsurface excavation is proposed (refer to policy 2.2 archaeological management). Heritage Council advice and approval is required for all service removal and installation works.
6.3	**Powerhouse**	The use of the Powerhouse shall be sympathetic to the industrial character of the building and continue to allow for retention of the open plan of the engine and boiler bays. The current use as the Canberra Glassworks is considered a sympathetic use.
6.4	**Fitters' Workshop**	The primary use of the Fitters' Workshop shall be sympathetic to the industrial/engineering character of the building and continue to allow the open plan to be interpreted. The overhead travelling crane should be used if possible. The current use of the Fitters' Workshop for event hire is considered a sympathetic use.
6.5	**1948 Switch Room**	There is an opportunity to make this building accessible to the broader public. Where possible, a new use would preferably provide opportunities to interpret the original intended use of the building which is not readily apparent in its current state.

9.8 Policies relating to setting

7.1	**Trees**	Trees are to be retained and maintained where their condition makes this appropriate. This includes the plantings on the corner of Mundaring Drive and Wentworth Avenue (Monterey Pines, Blue Gums and River Peppermints) and the 1930s trees to the south-west of the Powerhouse (Monterey Pines and an unidentified gum). Where the condition of the trees does not allow for their retention, the Monterey Pines, which are a declared weed species, shall be replaced with Canary Island Pines or Torrey Pines. Blue Gums and River Peppermints shall be replaced with the same species of tree. Should River Peppermints be considered unsuitable for a particular location, they could also be replaced with Blue Gums. Trees should be replanted in the same location and in the same configuration, that is, they should planted in rows according to species as was typical of windbreak plantings in the early Federal Capital. The spacing of trees within linear rows should be conserved as close spacing was a key characteristic of windbreak plantings. Minor changes to spacing may be permissible where it does not impact on the form and character of the remanent section of the windbreak.
7.2	**Railway sidings**	The alignment of the former Powerhouse railway lines (three to the north-east of the Powerhouse) should be retained as linear open space within the Precinct and appropriately expressed in future landscaping treatment. If existing railway tracks remain beneath the fill and are in reasonable condition, an indicative portion should be retained, conserved and interpreted in situ. A change in level between the railway line and the land to the north-east shall be retained, though the form of the embankment could be modified. A more meaningful interpretation strategy for the former railway lines shall be implemented as part of any redevelopment of the Kingston Powerhouse Historic Precinct. ***Rationale:*** *A railway line had been erected to the north-east of the Powerhouse by 1914. As the site sloped down to the river, an embankment was constructed to the north to provide a level foundation for the railway. This railway was fundamental to the operation of the Powerhouse as it allowed for the delivery of coal. Its alignment dictated the orientation of all adjacent development at Kingston including the power station buildings and the neighbouring transport depot.* *No railway lines are currently evident, though it is possible that these are located below the modern landscaping. Investigations to confirm if the railway tracks and sleepers remain should be undertaken in accordance with the archaeological policy contained in this CMP.* *Indicative railway lines have been constructed on part of the embankment to the north-east of the Powerhouse for interpretation purposes. The faux railway is not continuous and does not reflect the substantial materials this infrastructure was originally constructed of. It is currently difficult to interpret the full length of the existing embankment.*

7.3	**Open space**	The immediate spaces adjacent to the Powerhouse and Fitters' Workshop (including the railway alignments) that demonstrate the industrial servicing and operation of these buildings shall be retained as open space and appropriately landscaped. Buildings shall not be erected in the areas identified in yellow and orange in the diagram below. Further policy relating to the siting of new built form is located at section 9.9 policies relating to views and vistas and section 9.11 policies relating to new development. New built form be set back from the main part of the Powerhouse (engine and boiler bays) by a minimum of 10 metres. Open space shall be retained between the north-west façade (projecting bay) of the Powerhouse and the former location of the 1938 switch house (about 10 metres) to be consistent with historic development in the precinct which was sited away from the Powerhouse for functional reasons. New built form shall be set back from the north-east elevation of the Powerhouse by 15 metres. This would ensure that linear open space is maintained in the location of the former railway corridor, which included the three railway lines and a shoulder to the embankment.[118] The same corridor shall be maintained to the north-east of the Fitters' Workshop with development to be set back about 11.5 metres from the wall of the workshop building.  *Aerial showing areas where open space shall be retained. Minimum setbacks between new built form and the heritage buildings are indicated. New development shall be located at least 10 metres from the main part of the Powerhouse (orange). The northern railway corridor (yellow) shall be retained as linear open space. The immediate spaces surrounding the Powerhouse and Fitters' Workshop that demonstrate the industrial servicing and operation of these buildings shall be retained and appropriately landscaped. The blue indicates the boundary of the registered Kingston Powerhouse Historic Precinct*

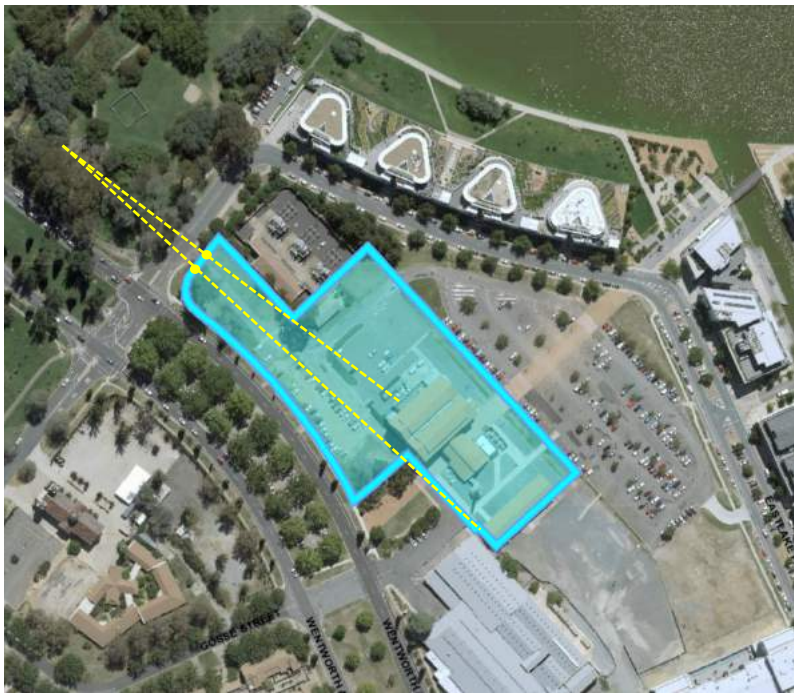
[118] Historic plans show that the outer track was set 13.2 meters from the structural grid (steel columns) of the Powerhouse wall. See National Archives of Australia, A2445, M276B, Federal Capital Power Generating Station – General Arrangement of Railway Tracks, 1915. Later plans show that coal was stored adjacent to the rail siding at a distance of about 15 meters from the wall of the Powerhouse. See A2617, Section 13/15228, Sketch Plan of part of the Kingston Stores Area, 1944.

9.9 Policies relating to visual links

8.1	**East Basin visual link**	Significant visual links shall be retained between the Powerhouse and East Basin. The prominent gables and roof form of the Powerhouse shall be visible from potential water transport links to and from the Kingston Foreshore area. This visual link extends beyond the boundary of the Kingston Powerhouse Historic Precinct. In the current context, views of the full width of the double gable roof of the Powerhouse are obtainable for pedestrians from the edge of the lake. Within the Kingston Foreshore development, the existing pedestrian networks allows for views of the Powerhouse between the buildings located either side of Jack Ross Park as well as the adjacent pedestrian bridge and from the shore of East Basin beyond (refer to yellow lines on the aerial below). Partial views of the double gable roof from East Basin are obtainable outside the yellow lines. Within the yellow lines, built form should be designed to allow for a view of the full width of the prominent double gable roof from East Basin. Maximising views to other parts of the north-east elevation is encouraged and new development should be articulated to frame views of the Powerhouse. Stepping down the height of development to follow the topography of the land, which falls towards East Basin, would help to achieve this objective. A view of the full height of the east corner of the Powerhouse (boiler bay), including the unique coal elevator/ash bin that distinguishes this elevation from that facing Wentworth Avenue, shall also be maintained from East Basin. This view shall include the elevator/ash chute and the associated bay of the Powerhouse as indicated in orange on the aerial photograph below. No new built form should be sited within this area. It is acknowledged that this view does not align with the existing geometry of the modern development of the Kingston Foreshore, with the focus of the view being the main part of the Powerhouse and its industrial features rather than the modern entry to the Glassworks. ***Rationale:*** *Historically, the Kingston Powerhouse was widely visible from the north, across the Molonglo River (later Lake Burley Griffin). Views of the Powerhouse from the north are now restricted owing to the construction of multi-storey buildings adjacent to the shore of the lake.* *The relationship with the Molonglo River, which became Lake Burley Griffin, was fundamental to the Powerhouse as access to water was essential to its operation. On this basis, retaining a visual link with the water body (East Basin) is considered important as it would facilitate the interpretation of the Precinct's original use.* *The north-east side of the Powerhouse has the same architectural format as the south-west side save for the coal elevator/ash chute. Given this, and that this functional element is important for understanding how the Powerhouse operated, the coal elevator/ash chute should form the focal point of visual links from East Basin. Broader views of the corresponding south-west elevation are discussed at Policy 8.3. It is from Wentworth Avenue that most people currently view the Powerhouse and is likely this will continue in the future.*

		 *Aerial showing significant visual link between the Powerhouse and East Basin (yellow). A view of the double gable roof of the Powerhouse from East Basin shall be retained within the area bound by the yellow lines. No built form shall be erected in the area highlighted in orange. The blue indicates the boundary of the registered Kingston Powerhouse Historic Precinct (Source: ACTmapi showing February 2022)*
8.2	**Bowen Park visual link**	Significant visual links shall be retained between the Powerhouse and Bowen Park. A view of the full height of the north-west façade/front of the Powerhouse from Bowen Park shall be retained. The full width of the entry porch and part of the decorative parapeted bay should remain visible from Bowen Park as indicated on the aerial photograph below. Views of the south-west end of the Fitters' Workshop, when viewed from Bowen Park shall also be maintained. This visual link is framed by the remnants of the circa 1920 windbreak plantings. It corresponds with the vehicular entry off Eastlake Parade which has been located on this part of the site since about 1941 and was constructed in the location of the brickworks railway line, both of which created a gap in the densely planted windbreak.[119] There should be no new built form within this visual link (yellow lines). It is not considered necessary to retain a view from Bowen Park of the 1960s addition to the south-west end of the 1948 Switch Room as this portion of the building was constructed after the Powerhouse closed for the final time.[120] Service enclosures located to the front of the Powerhouse building, which partially obscure this elevation, should be relocated to limit the impact on views of the building.

[119] Visual links between Bowen Park and the Powerhouse were otherwise screened by the windbreak to the north-west from the 1920s (when the trees grew to a considerable size) up until the 1960s when it was largely removed.
[120] The period of significance is the years leading up to the closure of the Powerhouse for the final time in 1957.

		 *Aerial showing view corridors that shall be retained. The yellow view corridor shall allow for views of the full height of the Powerhouse. The Fitters' Workshop should remain visible in views from Bowen Park* *(Source: ACTmapi showing February 2022)*
8.3	**View from Wentworth Avenue**	A view of the full height of the Powerhouse building from Wentworth Avenue, which is a key transport corridor and the principal address of the Historic Precinct, shall be retained. This view should include the prominent, paired gable roof of the Powerhouse. This could be achieved by retaining open space between the south-west side of the Powerhouse and Wentworth Avenue.  *View of Powerhouse from south-west side* The current open setting means that the Powerhouse building, including the north-west façade/front is widely visible from Wentworth Avenue, including the intersection with Eastlake Parade. It is from this side, that most people would view the Kingston Powerhouse Historic Precinct.

8.4	**Vistas along the northern railway siding**	Vistas along the former railway siding to the north-east of the heritage buildings, in which both the Powerhouse and Fitters' Workshop can be seen at the same time, shall be retained.  *Vista along the railway corridor looking to the Fitters' Workshop from area adjacent to Powerhouse* An appreciation of the relationship of both the Powerhouse and the Fitters' Workshop with the northern railway siding, which connected and serviced both buildings, shall be maintained.
8.5	**A view of all heritage buildings**	Within the Kingston Powerhouse Historic Precinct, a viewpoint should be maintained from which it is possible to view the 1948 Switch Room, the Powerhouse and the Fitters' Workshop.

9.10 Policies for existing buildings

9.1	**External changes to the Powerhouse**	New additions shall not obscure significant fabric. Changes to the Powerhouse shall only be permitted if they do not adversely affect the heritage significance of the place. Any changes must not impact on the ability to interpret the original three dimensional form of the Powerhouse building.
9.2	**External changes to Fitters' Workshop**	No new buildings shall be constructed within the Kingston Powerhouse Historic Precinct to the south-west, or north-east of the Fitters' Workshop building. No additions shall be constructed to the north-west side of the Fitters' Workshop. New buildings may adjoin the south-east of the Fitters' Workshop subject to the following: • The central section of the south-east elevation should be left open to view; • The connection of any new building to the Fitters' Workshop shall have minimal impact on significant fabric. The evidence/scars of former structures in the south-east wall shall be preserved as should the exposed concrete finish. Former doorways in the south-east wall of the Fitters' Workshop may be re-opened to achieve access.

9.3	**External changes to Switch Room**	Changes to the 1948 Switch Room shall only be permitted if they do not adversely affect the heritage significance of the place. The 1980s porch to the south-west end of the Switch Room would preferably be removed.
9.4	**Record keeping**	All works undertaken to significant buildings or elements shall be recorded, and copies of those records submitted to the ACT Heritage Council for information.

9.11 Policies relating to new development

10.1	**Siting north-east of Powerhouse**	The alignment of the former railway siding located to the north-east of the Powerhouse and Fitters' Workshop shall be retained as linear open space. New development should be sited to allow for the alignment of the railway siding to continue to be interpreted (refer to policy no. 7.3 – open space).
10.2	**Siting south-west of Powerhouse**	Development to the south-west of the Powerhouse shall be sited to maintain a clear view of the Powerhouse building (including the paired gables over the engine and boiler bays) from Wentworth Avenue. Linear open space to the south-west side of the Powerhouse and Fitters' Workshop, aligning with the gap between the Fitters' Workshop and former Transport Depot, should also be retained as linear open space (refer to policy no. 7.3 – open space).
10.3	**Orientation and planning**	Development within the Kingston Powerhouse Historic Precinct that is located adjacent to the former railway sidings shall be orientated in a manner that reinforces the historic planning. This included buildings in the Kingston Powerhouse Historic Precinct and neighbouring industrial and service areas oriented parallel with or perpendicular to the railway lines.
10.4	**Primacy of the Powerhouse and Fitters' Workshop**	The Powerhouse is to remain the dominant feature in any future development. New development shall only be permitted where it can be demonstrated that it will not adversely affect the heritage significance of the place and will not affect the landmark qualities of the Powerhouse and Fitters' Workshop. The primacy of the buildings shall be maintained by careful siting of new development and articulation of the scale and bulk of new buildings. The Powerhouse should continue to read as one of the largest buildings in the Kingston Powerhouse Historic Precinct.
10.5	**Materials**	Use of robust industrial materials (e.g. steel, glass and concrete) should be considered. The material palette should complement that of the Powerhouse and Fitters' Workshop.
10.6	**Landscape treatment**	New landscaping shall be sympathetic with the historic industrial character of the site. Landscaping elements would preferably be robust in character and complement significant fabric. Plantings of domestic character should be avoided. Landscape treatment within the Kingston Powerhouse Historic Precinct should facilitate the interpretation of the former industrial use of the stie.

9.12 Policies relating to interpretation and education

11.1	**Interpretation Strategy**	An interpretation strategy shall be prepared and implemented as part of any redevelopment of the Kingston Powerhouse Historic Precinct. The interpretation strategy shall be submitted to and to and endorsed by the ACT Heritage Council prior to implementation. In regards to the development of an interpretation strategy, the ICOMOS *Ename Charter* (for the Interpretation and Presentation of Cultural Heritage Sites) is a useful reference. The placement of interpretive elements should be developed in consultation with the various stakeholders. The manner in which the fabric itself is presented is the primary means of facilitating interpretation of heritage significance. Presenting the site, including railway sidings, in a manner that conveys the original/early format would facilitate interpretation, including assisting with an understanding of the power generation processes. The landscape treatment in the Kingston Powerhouse Historic Precinct should facilitate an interpretation of the former industrial use. *Rationale: Whilst there is some existing signage relating to the former use of the site, this is somewhat limited.* *Existing signage includes the Institution of Engineer's plaque fixed to the south-west side of economiser annex, a sign with historic images located to the north-west of the Fitters' Workshop and a Canberra Tracks sign located to south of the Powerhouse.*
11.2	**Preparation**	The interpretation strategy and content for interpretive devices shall be prepared by a suitably experienced interpretation specialist. Regard shall be had to the Kingston Power House Interpretation Plan prepared by Keith Baker and Associates Pty Ltd in association with Peter Freeman Pty Ltd (2002).
11.3	**Content**	The interpretation strategy shall address all of the identified heritage values of the Kingston Powerhouse Historic Precinct. Content shall be developed in consultation with stakeholders. The content should complement the physical fabric of the site and enhance appreciation of the processes and activities that were undertaken within the Kingston Powerhouse Historic Precinct. There is also potential to incorporate findings from the oral history which was undertaken in 1998 and records the recollections of workers.[121] New interpretation should convey the importance of the Historic Precinct to the establishment of the Federal Capital and the prominence/landmark status of the Powerhouse in the early years of Canberra.
11.4	**Existing tours**	Tours of the former Powerhouse are conducted by the Canberra Glassworks and include an overview of the history of the building with some discussion regarding its original features.

[121] Engineering Heritage Canberra oral history program – special project series Kingston Powerhouse Project, Matthew Higgins, available ACT Heritage Library

		Such initiatives facilitate a broader understanding of the heritage significance of the place and would ideally continue to operate.
11.5	**Railway sidings**	The interpretation strategy implemented as part of the redevelopment of Kingston Powerhouse Historic Precinct shall include implementation of strategies for the interpretation of the railway siding to the north-east of the Powerhouse. This railway line was fundamental to the operation of the Powerhouse as it allowed for the delivery of fuel (coal).
11.6	**Steam whistle and siren**	Both the steam whistle and World War II air raid siren shall be retained in their current location on the ridge of the Powerhouse. Use of the siren and steam whistle for interpretive purposes should be allowed for where this complies with applicable noise controls.[122] The steam whistle historically marked the commencement and conclusion of the work day for employees in the Kingston industrial area.
11.7	**Original chimney stack (demolished)**	There is an opportunity to implement an improved interpretation strategy for the original chimney stack which has been demolished. The footprint of the original stack has been interpreted in the pavement, though historic images suggest this was hexagonal or octagonal in plan (not square) and that the chimney was located further from the building. New interpretative devices should more accurately reflect its original format. The footings of the original chimney stack and associated flue may remain beneath the pavement. If the base of the original chimney stack is uncovered during future works, this shall be conserved and protected from disturbance.

[122] It is likely that the noise generated by both the air raid siren and the whistle exceeds permissible noise levels (noise standards) for the zone (outlined in the Territory Plan). Noise is regulated by the *Environmental Protection Act 1997* and the *Environmental Protection Regulation 2005.* Further investigation is required to confirm if this is the case.
Use of the siren is supported by the ACT Heritage Council. The CMP authors note that the operation of the World War II siren could be traumatic for some people and that unlike localised interpretative devices (particularly visual material), sound can be pervasive and could reach those who have not elected to participate.

10 Implementation

10.1 Maintenance schedule

Maintenance of the Kingston Powerhouse Historic Precinct must address all significant components of the place, including building fabric and associated landscape elements. As noted in the conservation policy, a maintenance plan shall be prepared and implemented by the managers of the site/various building managers. This maintenance plan should cover the items listed in the table below and is to be conducted in addition to detailed surveys by experienced conservation practitioners which should be completed approximately every five years.

The table below provides details on inspections that should be undertaken to protect significant fabric. Fabric that is not significant, including modern elements that are required for security and fire precautions, plumbing, electrical and other building services should also be regularly reviewed in line with regulatory requirements.

Frequency	Area	Element	Inspect / Maintenance Activity
6 months – 1 year	Roof	Gutters, downpipes and rainwater heads	Clear debris and blockages. Check for deterioration and remedy all identified leaks. Confirm water is not ponding.
Yearly	Roof	Cladding, flashings, fascia boards, eaves linings and bird proofing	Deterioration and efficacy. These elements can be replaced like for like if the need arises. Gently clean timber surfaces to remove build-up of cobwebs, guano etc.
	Walls	Cement render and brickwork	Monitor cracking, particularly large horizontal cracks that may be the result of the corrosion of embedded metal. Loss of material, including render and mortar. Damp. If any of the above have come to light, seek assistance from a heritage architect.
	Windows	Steel framed windows	Replace all broken glass. Deteriorated putty should be replaced with new. Testing of putty should be undertaken before replacement to confirm presence/absence of asbestos. If rust is minor in extent, remove rust, treat steel and repaint. Maintain operability.
	Doors	Timber framed doors	Replace all broken glass. Deteriorated putty should be replaced. Badly damaged sections of timber should be repaired (a flexible epoxy could be used).

Frequency	Area	Element	Inspect / Maintenance Activity
			Maintain operability.
	Powerhouse	Interior	Remove accumulated oil and grease to internal finishes associated with cooking in the café.
	Chimney	Concrete base and associated brick flue	Check for leaks and rectify.
	Trees	All trees	Monitor condition and undertake necessary maintenance in accordance with arborists recommendations. Trees are to be maintained to both extend their life and safeguard the public.
2-3 years	Powerhouse roof	Siren and whistle	Inspect at height for deterioration and pests.
	Walls	Redundant fixtures and fittings	Monitor condition. Resecure as required.
5-7 years	Exterior	Painted steel and timber	Renew all deteriorated paint finishes to exterior of buildings.

10.2 Conservation works

This section outlines a scope of prioritised works and includes recommendations for further investigations to address issues and defects that were identified during site inspections undertaken during September 2020 (Powerhouse and 1948 Switch Room) and May 2022 (Fitters' Workshop).

Where physical evidence of earlier paint colour schemes remain, consideration could be given to reinstating more sympathetic paint colours. Historic photographs show for example that the rainwater goods (gutters, downpipes, and rainwater heads) were painted a darker colour that contrasted with the mid shade of the fascia boards and steel framed windows.

Prioritisation

Each of the identified issues/defects have been assigned a priority level. These levels are defined in the table below.

Priority	Time frame	Description
Urgent	Within 12 months	These works are required to stabilise the rapid deterioration of significant fabric. They typically relate to areas where deterioration has progressed to a considerable degree.
Essential	1-3 years	These works are required to stabilise the ongoing deterioration of significant fabric. They typically relate to areas which are beginning to deteriorate.
Recommended	>5 years	These works are not considered essential, though would serve to improve the presentation or improve functionality.
Investigate	0-3 years	Further investigation is required to determine the extent and cause of the defect or if the identified defect may have further implications.

Scope of conservation works

Prior to proceeding with works, confirm if hazardous materials (e.g. lead in paint, asbestos in sheeting, lagging and glazing putty) are present.

Location	Issue/defect	Recommended works	Priority
Powerhouse – Urgent Works			
Steel framed windows	There are numerous panes of broken glass to the steel framed windows.	Confirm no asbestos present in glazing putty. Replace broken glass panes.	Urgent
Timer framed door (main entry)	There are four broken glass panes.	Replace broken glass.	Urgent
Rainwater heads	The rainwater head to north-east side of the projecting bay (to the façade) is leaking and causing damage to the roof, walls and ceiling below.	Repair/replace to match existing.	Urgent
Downpipes	Staining and biological growth was noted to the downpipe located to centre of south-west elevation and indicates that it is leaking and possibly blocked towards the base.	Unblock downpipe. All downpipes should be regularly cleared of debris.	Urgent
Powerhouse – Essential Works			
Chimney base	Internally, there is considerable salt efflorescence and black deposits, particularly to the south-east side and to the walls of the flue. Salts may be from the combustion of coal and are migrating to the surface due to wetting and drying from damp. There are also a few fretting bricks.	Remove salts from brickwork (e.g. using a poultice or captive head washing). Replace badly fretted bricks with second hand to match existing to prevent brick dust from continually falling to gallery floor.	Essential
	The surrounding ground levels are higher than the internal floor level.	Treat base of wall externally or reduce ground levels to prevent damp migrating into gallery.	Essential
Timber fascias with steel plates	There is extensive peeling paint, particularly to higher sections.	Prepare timber and repaint to match existing. Filling of weathered timber with a flexible epoxy may be required in several locations.	Essential
	There is biological growth, and possibly rot to the two storey addition to the north corner.	Confirm condition at height. It may be necessary to replace the fascia board with new to match existing.	Essential
	A section of the decorative timber moulding beneath the pointed tile	Confirm efficacy of rainwater goods at height, including	Essential

Location	Issue/defect	Recommended works	Priority
	edge has been lost at west end of south-west elevation. The mouldings to the north-east and south-west elevations adjacent to the valley gutter are rotten, likely due to water overflowing in this area. The mouldings to each end of the north-east elevation are also rotten as is that to the south end of one of the dormers to the boiler bay.	capacity of valley gutter. Once rainwater goods have been repaired, cut out rotten sections of timber moulding and scarf in new section to match existing. Reattach all sound timber and paint all timber elements.	
Eaves lining with timber strapping	Strap loose at valley gutter to south-west end and at west corner under low pitched roof. The sheeting to the eaves is missing where overflow pops to the valley gutter have been installed.	Refix timber strapping. Reinstate missing sheeting to match adjacent.	Essential
Timber slats to soffits	There is a loose slat to north-east side of the economiser annex above the entry lobby.	Reattach.	Essential
Fibre cement sheet linings with straps to 1950s additions.	Some peeling paint is evident. The strapping to the south end of the two storey addition is rotten. There is a loose cover strip between the fascia and gutters to the addition located above the entry porch.	Confirm presence of asbestos and repaint if safe. Once drainage issues have been rectified, replace rotten timber strapping to match existing. Remove loose material and replace as required.	Essential Essential
Pointed tile edge	The barge pointing to the economiser annex roof is missing adjacent to north-east entry. Pointing is also missing to the west end of south-west elevation. The mortar pointing to the south-west end of the economiser annex has cracked.	Reinstate missing pointing following repairs/reinstatement of decorative timber barge moulding. Replace damaged pointing.	Essential Essential
Quad gutters	There is extensive peeling paint to all gutters. The gutter to the south-east side of the shed dormer to the boiler bay has deformed/slumped at the north end.	Repaint. Resecure/replace as required.	Essential Essential
Rainwater heads	There is extensive peeling paint.	Repaint.	Essential

Location	Issue/defect	Recommended works	Priority
Ash hopper	There is corrosion to several elements including a steel purlin and the ends of the loading arms.	Confirm extent of corrosion at height. Remove surface corrosion, treat and repaint.	Essential
Steel framed windows	There is peeling paint to the steel frames. One of the windows to the maintenance workshop has a deformed steel frame.	Repaint. Straighten deformed section of steel frame (removal of glazing will be required).	Essential Essential
Timber framed sash windows to former switch platform	Water damaged timber sill.	Remove loose material and fill with a flexible epoxy.	Essential
Timber framed sash windows (north-east and north-west elevations)	There is peeling paint and the underlying timber is exposed. There is also one broken pane.	Repaint. Replace broken glass.	Essential
Lead flashings	A section of flashing to one of the dormers to the boiler bay has come loose. Flashings to either side of the dormer to the economiser annex have also come loose/detached.	Refix/replace using lead flashing of suitable code.	Essential
Rainwater heads	There is extensive peeling paint.	Repaint.	Essential
Powerhouse – Recommended Works			
North-east elevation: redundant metal conduit	A conduit has partly detached on the north-east elevation.	Refix loose conduit.	Recommended
Workshop toilets	Broken air brick/vent to west corner of common room and kitchenette.	Replace with second hand to match existing.	Recommended
Powerhouse – Further Investigation Required			
Brick flue (now storeroom)	Salt efflorescence is evident and is likely from historic use (burning of coal). The bricks appear to be stable.	As the brickwork is fairly stable and the area is not regularly accessed, it may be acceptable to leave this as is. It is however recommended that testing of salts is undertaken to understand if they are deleterious.	Investigate

Location	Issue/defect	Recommended works	Priority
Brick flue between chimney and economizer annex	The brickwork appears to be damp. There is no capping/ weathering evident to the top of the brickwork. There is a large vertical crack to the north-east side, possibly caused by corrosion of embedded metal.	Review at height and repair as required. Installation of a flashing or mortar weathering may be required to shed water. Engage structural engineer to assess cracking. Removal of corroded metal and stitching of brickwork (for example with stainless steel ties) may be required. Use mortar mix no stronger than existing for repointing.	Investigate
Chimney base	Water is reported to enter the gallery space from above. Externally, there is considerable biological growth to the upper part of the concrete. Concrete is breaking away from the ceiling adjacent to a corroding steel lintel.	Further investigation at height is required to confirm the source of water ingress. Once damp is rectified, organic growth could be removed using a mild biocide and a low pressure water wash. Engage structural engineer to review condition of lintel. At a minimum, remove loose concrete and surface rust to steel and treat to prevent further corrosion.	Investigate Investigate
Concrete walls	Concrete is exfoliating at the base of wall in several areas including that male and female toilets, hot water plant room, centre management office and lift lobby. Loose material is continuously falling from the walls.	Confirm if walls are damp and test for salts. Removal of salts and installation of a DPC may be required. Consolidation of the existing concrete may also be required is some locations.	Investigate
Concrete walls	There are numerous cracks to the concrete walls, most of which are vertical. There have been vertical cracks to the walls for a considerable period of time. In addition to the vertical cracks, there are a few horizontal cracks that are potentially more serious and may relate to the corrosion of embedded steel. These are evident to the cornice of the projecting bay to the façade and above the west window to the south-west elevation (ground floor) where a previous repair has failed.	Monitor size and extent of vertical cracking. Inspect condition at height (with structural engineer) to determine appropriate remedial works. It may be necessary to replace/repair embedded metal prior to repairing the concrete and render.	Investigate

Location	Issue/defect	Recommended works	Priority
Stair 1 - walls	There are cracks to the north-east and south-west walls. The paint finish to the painted dado is deteriorating/ peeling off.	Monitor cracks. Investigate options for consolidation of the paint finish.	Investigate
Workshop toilets	Peeling paint to concrete wall (external wall) and ceiling (may be due to water damage).	Address issues with external rainwater goods and repaint.	Investigate
Galvanised valley gutter	Whilst not inspected at height, there is staining/rot at the gable ends that suggest the box gutter regularly overflows.	Inspect box gutter at height and confirm if sufficient capacity.	Investigate
Downpipes	From ground level, the downpipes appear to be in reasonable condition, though the efficacy of these was not tested. Downpipes may be of insufficient size, particularly those to the valley gutter.	Confirm capacity of rainwater goods. Installation of larger downpipes may be required if insufficient.	Investigate
Flat roof (behind parapets)	Not visible from ground level	Inspect condition at height.	Investigate
Centre management office window	There is some staining that suggests there may be water leaks.	Investigate and repair contemporary window and flashing as required.	Investigate
Fitters' Workshop			
Unrendered concrete wall	There is peeling paint to the rear (south-east) wall.	Confirm if paint is lead-based. Loose lead-based paint should be removed to reduce risk of exposure.	Urgent
Concrete cornice	The lower corner of the cornice to the south-east side has partly broken away and there are cracks to other sections. It is possible that additional sections of concrete are loose and at risk of falling.	Inspect condition of cornice at height to confirm reason for deterioration and if any material is loose. Make safe by removing loose material. Treat rust and protect exposed reinforcing (if exposed) to prevent further deterioration.	Urgent/Inspect
Timber doors	There is peeling paint to the doors to the north-east end. There is rot to one of the stiles and the exposed timber to the bottom rails has weathered. Several of the V-jointed timber boards to the centre of the door have had the lower part replaced.	Confirm extent of deterioration to stile. Scarf in new section of timber if required. Prepare all timber and repaint.	Essential

Location	Issue/defect	Recommended works	Priority
Downpipes	Biological growth to the upper parts of the downpipes on the south-east side indicates that they leak.	Inspect downpipes for blockages. Replace damaged sections with new to match existing.	Essential
Gutters	Biological growth to the joints in the gutter indicated that it leaks.	Inspect condition at height. Repair or replace damaged sections of gutter to match existing.	Essential
Steel-framed windows	There are a few areas of chipped paint where the steel has been exposed and is rusting.	Treat rust and repaint frames where paint is missing.	Essential
Unrendered concrete wall	There are several cracks to the south-east concrete wall. The most substantial of these are located above the windows. The steel in the lintel above the northern window is exposed and is beginning to rust.	Inspect at height to confirm extent of rust. Where possible remove rust and protect steel.	Essential
Rendered concrete walls	The base of the rendered concrete walls to the north-east and north-west appear to be damp. In some areas on the north-east elevation, the modern render has come away from the wall, exposing both the original roughcast render and the underlying concrete which is friable.	Confirm if wall is damp and test for salts. Removal of salts and installation of a DPC may be required.	Investigate
Modern concrete slab/topping to interior	There are several cracks to the slab, including a few that radiate out from embedded pipes.	Monitor cracks to ensure slab does not become a trip hazard.	Investigate
Battened sheet ceiling	There is some damage/deformation to the sheeting to the south-west end. This is possibly a result of previous leaks (the current paint finish appears to be in reasonable condition).	Monitor condition of ceiling to confirm if there are any active leaks.	Investigate
1948 Switch Room			
Downpipes	The PVC pipes leading to the water tank have cracked.	Replace broken pipes.	Urgent
Bargeboards	There is peeling paint and some weathered timber to the bargeboards.	Repaint timber elements.	Essential
Gable vent	The bottom louvre has split.	Replace timber louver with new to match existing.	Essential

Location	Issue/defect	Recommended works	Priority
Gutters	The gutters are dented and have deformed.	Resecure sound gutters. Confirm condition of guttering at height.	Essential
Site drainage	The street drain is noted to continually be blocked with debris leading to flooding of the area surrounding the porch. There is also extensive moss growth at the drain to the south-east side, suggesting that water ponds in the area.	Reconfigure drainage and pavement level surrounding the building to ensure that water is adequately directed away from the structure.	Essential
Steel framed windows	There are three broken panes to windows on north-west side.	Replace broken glass.	Essential
Skillion roof	Whilst not inspected at height, some rust was evident from ground level.	Inspect condition at height. If extensive rust to roof sheeting, replace with new to match existing.	Investigate

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