Ultimo Power House (curtilage extension: Powerhouse Museum Complex)

The Heritage Council of NSW considers nominations for listing on the State Heritage Register based on an assessment of its heritage significance and taking into account any submissions received from the public. The Heritage Council of NSW then makes a recommendation to the Minister who has the final decision on whether or not to direct the listing of the item on the State Heritage Register.

Item details

Name of item:	Ultimo Power House (curtilage extension: Powerhouse Museum Complex)
Other name/s:	Ultimo Power House, Ultimo Power Station; Ultimo Tramsheds, Ultimo Tram Depot, Harwood Building, Ultimo Post Office, Powerhouse Museum, Wran Building
Type of item:	Complex / Group
Group/Collection:	Recreation and Entertainment
Category:	Art Gallery/ Museum

Property description

Lot/Volume Code	Lot/Volume Number	Section Number	Plan/Folio Code	Plan/Folio Number
LOT	3		DP	216854

LOT	1		DP	631345
LOT	3		DP	631345
LOT	1		DP	770031
LOT	1		DP	781732
LOT	37		DP	822345

Statement of significance:

The Powerhouse Museum Complex is of potential State heritage significance for reflecting innovative approaches to both power generation and museology in the history of NSW. The 1899 Ultimo Power House is of State historic, aesthetic and technical heritage significance as the first large state-owned electricity generating station in NSW. This is complemented by the potential historic, social and associative significance of the adaptive reuse of the site as the Powerhouse Museum in 1988, including the Wran and Harwood buildings.

The Ultimo Power House has State historic significance as the original generating station supplying electricity to power the electric tramway network throughout Sydney. It was one of the largest and most important generating stations in NSW for many years. It has State significance as a site of technological transfer and innovation for electricity generation in NSW and possibly in Australia. The historic purpose and function of the power station

remain readable through the surviving building fabric and in-situ engineering structures including gantry cranes and chimney bases.

The change in use to a major public museum has potential State historic significance as a central part of the major cultural projects of the 1988 Bicentenary, a significant event in NSW and Australian history which engaged much of NSW's population and ushered in a new sense of national self-confidence while raising important questions about Aboriginal rights. The museum complex, as completed, was considered at the time to be a highly innovative design, producing a state-of-the-art museum by world standards.

The conversion to a museum has potential State historic and technical significance for its role in the wider heritage conservation movement as a lauded, highly influential early example of adaptive reuse of industrial heritage, nationally and internationally. Ongoing upgrades of internal fabric and fixtures related to museum use in buildings such as the Harwood and Post Office buildings reflect the changing requirements of the museum function over time.

The purpose-built 1988 Wran building contributes to the group's potential State historic and aesthetic significance for its landmark form, scale and spatial relationship with the other buildings. The Wran building, together with the Powerhouse Museum Complex has potential State significance for its associations with notable political, design and museum figures including Neville Wran, Jack Ferguson, Lionel Glendenning, Richard Johnson, Lindsay Sharp and Norman Harwood.

The complex has potential State social significance for people across Sydney, NSW and Australia, for whom it represents an important educational and cultural institution and tourist destination. The Powerhouse Museum Complex and its changing use from power station to cultural institution, offers a unique insight into the stages of technological change, development and urban renewal that occurred in NSW during the 20th century.

Date significance updated: 23 Feb 24

Description

Designer/Maker:	NSW Railway Commissioners (Power House complex); NSW Dp't. of Public Works, L. Glendenning (PHM)
Builder/Maker:	J. Stewart and Co. Sydney (Power House complex)
Construction years:	1897-1987
Physical description:	The remains of the Ultimo Tramways Power House principally comprise four interconnected buildings which were: 1. the Engine Room and Turbine Hall, 2. the (2nd) Boiler House, 3. the Office Building and 4. the Switch House. Adapted to house the Powerhouse Museum, these buildings survive largely as external shells. The building envelopes are largely intact but most of the internal fittings and fixtures have been removed. The adaptive re-use of the buildings saved them from further deterioration and eventual demolition. In addition the Powerhouse Museum complex includes the adjacent former Ultimo Post Office, on the south-eastern corner of Harris and William Henry Streets. OFFICE BUILDING The Office Building is a three storey symmetrical building, 30rm wide and 14m deep, with seven bays, built in a simplified Italian Renaissance Classical style. It faces William Henry Street and is partly obscured by the William Henry Street Bridge. The rusticated stone base supports a stone plinth on which sits the brick superstructure. The articulation continues in the form of brick pilasters with a sandstone entablature, above which is a brick parapet. On the ground floor, window mullions are in the form of classical pilasters, while on the top floor they are plain. Beneath each window is a spandrel infilled with bricks in herringbone pattern. The frontispiece is in the form of an aedicule two stories high, with large-scale stone pilasters on stone pedestals, surmounted by a pediment. Within the frontispiece is an entrance having semicircular arch with a console keystone. The principal feature in the aedicule is the spandrel which identifies the building's ownership as the New South Wales Government Transport Department (NSWGTD). Surrounding the name of the building is a band of lightning bolts, a stylised representation of electricity, which passes behind a decorated floriated crest incorporating the Southern Cross. The spandrel was once surmounted by a leadlight window which bore the State Coat of Arms. On the top floor, each

pair of pilasters, on the east and west ends, is gathered over a semi-circular opening which makes the semi-circular arched windows appear recessed.

The building has a distinguished architectural composition shown in brickwork, windows and facades. The bricks are very fine plastic-moulded and have a warm red-brown colour and pointed with a light red-brown mortar. The work throughout is English bond except in the spandrels where it is herringboned. The robust cedar window joinery is very fine and is consistent with the time of building. The repetition of the pilasters, spandrels and windows on the north, east, and west facades adds to the careful ornamentation of the building. All that remains of the old boiler house on the eastern side of the Office Building is the remains of the first chimney stack and the flashing outline of the gable roof in the brickwork of the second boiler house.
Decorative stonework and brickwork on the northern facade of the Office Building are still in very good condition.

THE ENGINE ROOM
Contemporaneous with the Office Building but different in concept and design is the Engine Room. It is approximately 30m wide and 30m deep and is, in effect, an extension of the Office Building. The bricks, still laid in English bond, are brown-grey and the character of the building is much more utilitarian. The pilasters are strengthening devices and divide the west front (the building's only facade) into five bays with paired windows. The openings of the metal framed windows are segmental-arched and each brick sill runs the length of the window only and not the length of the bay, as on the office building. The facade is completed by a parapet which conceals the box guttering. Beneath the parapet is a double stringcourse of brickwork.

Initially it comprised four reciprocating steam engines driving 850 kW direct current generators. Alternating current generators operating at 25 cycles were added from 1902 and turboalternators from 1905. The state's first pulverized coal fired boilers were commissioned here in 1923. By 1942 the station's capacity had grown to 79.5 megawatts (Engineers Australia citation).

The Engine Room retains many features; the overhead Case travelling gantry cranes remain intact and in place; the white wall tiles were retained, and the floor was finished with tiles carefully matched to the originals; a hole in the eastern wall remains where a pipe carried steam from the Boiler House, and nearby there is a counter-weighted mechanism on the wall that once supported the pipe; the spherical glass light shades are reproductions of those seen in early photographs of the room; the switchboard gallery on the northern wall is mostly original, including one of two staircases and the cast-iron columns with decorative brackets that support the cast-iron floor plates; the

other staircase and the wooden balustrades are reproductions. These remaining features inform how the space operated. The viewing window from the Switch House, which allowed control staff to keep watch over the generating equipment, is still in place.

The tall, roof-high stumps of two of the three brick chimneys are still in place (the upper parts having been demolished before the museum project was proposed) and in excellent condition, towering over the Boiler House; one is used as part of the museum's air-conditioning system, and the other houses stairs that allow access to the roof.

The Engine Room retains many features, and its ambience was recreated by using it to house working steam engines, some of them powering other machines.

THE TURBINE HALL

The Turbine Hall, an extension eastwards of the Engine Room, is a very simple, very strong expression of the utilitarian architecture of the early 20th century and one of the prime large examples of Edwardian industrial architecture in Sydney. Its size, 56m x 31m, reflects the size of the turbo alternators it was designed to house. The facade is divided into eight bays, which are further proportioned by a horizontal band which divides the facade into sixteen elements. The west facade's principal quality is its sheer scale which is enhanced by very carefully controlled simplicity. Emphasising the main articulation of the facade is a moulded stone stringcourse at the sill level of the upper windows and a moulded stone cornice capping the top of the parapet. The main elements are the very tall, semi-circular headed windows.

These main windows have stone sills and the window bays, flanked by pilasters, terminate in stepped brick corbels and are surmounted by a stone gable cornice.

The overhead Goninans of Newcastle 1929 gantry crane that served the Turbine Hall is still in place, complete with the high-level rails along which it ran.

THE SWITCH HOUSE

The Switch House is a brick building, three stories on the east and two stories above ground level on the west. The west facade is divided into seven bays, the northernmost of which is given emphasis by means of a dentillated gable which incorporates a centrally-placed circular motif with herringbone infill. The remainder of the building

features a dentillated segmented extension of the parapet. The brickwork between each pair of windows extends even higher and terminates in dentillated bracketed caps. All dressings, sills, lintels and caps are of rendered concrete.

The viewing window from the Switch House, which allowed control staff to keep watch over the generating equipment, is still in place. Decorative stonework and brickwork on the on the Switch House are still in very good condition.

THE SECOND BOILER HOUSE

The Second Boiler House is the largest building in the complex, 83m long and 23m wide, and has the largest continuous facade to the east. The three tiers of windows, arranged in thirteen bays, are a vigorous architectural solution to the problem of dealing with a very tall facade. The height from string course to plinth is much greater than on the west facade of the Turbine Hall, which it complements. The thirteen bays are evident on the top tier of the building, above the string course. Below that, the fourth and fifth bays from the north end were combined to form a tripartite entrance bay, which allowed access to rail trucks on the east siding. The south facade of the Boiler House, although abutting the Turbine Hall and matching it in size, was created somewhat differently, preserving the individuality of the building. The pilasters, their terminations in stepped corbels and the gable cornices are the same but the windows are smaller, arranged in two tiers and segmental-headed, as on the east facade.

The tall, roof-high stumps of two of the three brick chimneys are still in place (the upper parts having been demolished before the museum project was proposed) and in excellent condition, towering over the Boiler House. One is used as part of the museum's air-conditioning system, and the other houses stairs that allow access to the roof.

THE WATER COOLING SYSTEM AND MANIFOLD

The Water Cooling System and Manifold were an integral component of the power station. The system is underground and is not visible. Underground conduits possibly built of sandstone taking cool water to the Power House from Darling Harbour water’s edge and hot water from the Powerhouse to the water’s edge. Remains of the engineering equipment / manifold of this cooling system are located in the carpark of the Novotel accessed from Murray Street.

Two of the underground tunnels, which brought cooling water from Darling Harbour to (passing through large

condensers to cool the steam after it had been used in the turbine-alternators and) condense steam, and returned the warm water to its source, are still in use as part of the Powerhouse Museum's air-conditioning system.

THE WEST (later WRAN) BUILDING (POWERHOUSE MUSEUM)(opened, 1988):
Runs along (predominantly fronts) Harris Street, to the corner of William Henry and Harris Streets, representing the Powerhouse Museum's formal entry, which is made through the Galleria on (its) level 3. The building is the most prominent component of the landscape when viewed from Darling Drive and nearby Harris, Systrum, Macarthur, Hay and William Henry Streets (Curio Projects, 2022, 289).

Purpose designed and built for opening in 1988 to house the Powerhouse Museum (as its entry and circulation space) and become the new home of the Museum of Applied Arts and Sciences (MAAS)(ibid, 2022, 286).

Comprised (when built) two vaulted spaces - Vault 1 (the Galleria) and Vault 2 (ibid, 2022, 289). Lionel Glendenning's barrel vaulted design responded to 'the golden mean proportion' of the Turbine Hall, with Vault 1 (of the Wran building) making architectural reference to MAAS's first home in the 1879 Garden Palace (Sydney's International Exhibition), and (Wran Building's) Vault 2 referring to the arches of the Boiler House (ibid, 2022, 286).

The Harris Street forecourt ('level 3' of the site) and the Grace Bros. Courtyard (now known as the Level 1 Courtyard) were formed at the same time (ibid, 2022, 289).

The main (Wran Building) space is partially glazed with an external colonnade running along Harris Street. From the (single public) entry, ramps, escalators and lifts lead the visitor to the various parts of the museum and its interactive displays. The Wran Building and Galleria derive from the arched form of this earlier building (the 1879 Garden Palace) whilst also creating spatial sequences that expand and augment the existing great rectangular volumes of the Turbine and Boiler Halls - the Ultimo / Pyrmont 'cliff of buildings' (ibid, 2022, 286).

Vault 1 (the Galleria) has a high, partially glazed, arched steel roof with glazed facades on north, south and west. The northern elevation represents the rear of the building and is associated with a series of fire doors opening onto a courtyard that leads to William Henry Street via a set of stairs. It meets Vault 2 along its northern and southen elevations.

As designed by Glendenning, the Galleria abuts, yet is detached from, the Turbine Hall to its east through an offset in its arched roof which extends over the hall stone and brick parapet, displaying the carefully articulated distinction between the old and the new. The same technique has been executed at its junction with the Engine Room (ibid, 2022, 289).

Vault 1 houses the museum's permanent exhibits - Locomotive No. 1 (near its southern end) and the Boulton and Watt Steam Engine (towards the northern end). Modifications to the building in 2013 and removal of a raised viewing platform mean that the Boulton and Watt Beam Engine can no longer be viewed as originally intended. The Boardroom - a simplified model of the hall's Turbine Hall / Boiler House on level 5, sits at the southern end of the Galleria (ibid, 2022, 289).

Vault 2 (Touring Exhibition Hall) has a lower and broader scale than Vault 1, and is characterised by a prominent corrugated steel roof that arcs down in a reverse curve(d) edge. The east and south facades have glazed frontages that extend to door height and provide an exit to Harris Street and the museum's forecourt. The exteriors of its north and south ends are finished in fibre cement sheets, painted white and marked with the Museum's name. The same material is used in the colonnade finish (ibid, 2022, 290).

The Exhibition Hall is associated with a mural of the Australian sky (white clouds on blue) along its northern and southern internal elevations. Its original light-painted Renfoil ceiling has (since) been painted black. The Touring Exhibition Hall is partitioned into two black box spaces for temporary exhibitions and the north end was significantly reconfigured to be used as a UTS classroom. Modifications carried out in the 2000s included addition of black plywood panels to block natural light on level 3. The original Italian 'nougat' tiled flooring in Vault 2 has been partly damaged by removed fitout over time and much of it is (now) covered by carpet. Two triangular balconies on level 5 and originally intended to provide views of exhibitions on lower floors have now been modified and no longer function as they were intended. One looks onto an empty space while the other is being used to house lockers (ibid, 2022, 290).

A central element between Vaults 1 and 2 is divided over 3 levels and occupied by studios, offices, storage and service spaces. The First Nations Design and Fashion Hub occupies the northern end of its top level. Level 2 is used for temporary exhibitions and occupied by a theatrette and theatre, below Vault 2. Level 1 is occupied by a digitisation studio, plant and storage and service rooms (ibid, 2022, 290).

Today, the Wran building provides access for schools and groups at level 2 from the Macarthur Street Entry, through the Galleria does not have a clear intermediate zone between the outside and the exhibition areas. The admissions desk and cloaking facilities are located behind the west wall of the Switch House, and a visitor must turn right and go through the arched opening in the west wall of the Turbine Hall to find the reception area. The different levels in the building are generally accessed through the inclined ramp that runs parallel to the length of the building and connects levels 1, 2, 3 and 4. A lift at the southern end connects levels 3, 4 and 5 (ibid, 2022, 290).

A significant amount of original fabric has been retained in the Wran Building. This includes the structure and external joinery, the George Freedman-designed carpets, and the 'nougat' tiled flooring (much covered by new carpet). In addition to the interiors of the two theatres and the perforated metal balustrades (ibid, 2022, 290).

HARRIS STREET / ENTRANCE COURTYARD (1988):
Opening in 1988 and remodelled in 2011/12, the wide paved forecourt is accessed from Harris Street. Paved in brick, it has two levels. The lower and much larger level provides access to the main entry which enters into Vault 1 of the Wran building. The second level provides access to the Museum cafe and the shop and is also the main public exit. A ramp and stairs connects the two levels of the terrace.

GRACE BROS. / LEVEL 1 COURTYARD (1988):
The level 1 Courtyard (formerly the Grace Bros. Courtyard) was added at the same time as the Wran Building. It currently exists as a 'rear courtyard' for the site. At present it houses a rectangular box-like cafe (although cafe operations ceased in 2020), a children's playground and a Utility substation surface entrance. Within it are the colourful (blue and red) 1988 external stair and lift shaft of the Boiler House which pay reference to the coal chutes, ash handling plant and coal handling plant of the former Power House. Remnant bricks from where the Goods Line (Darling Harbour Rail Corridor) used to extend into the Boiler House are evident (ibid, 2022, 290).

The museum can be entered from the Goods Line (former Ultimo railway tracks, now a pedestrian access, east of the Powerhouse Museum group and former Power House buildings) through this Level 1 Courtyard.

ULTIMO TRAMSHED / TRAM DEPOT (later, HARWOOD BUILDING):
A single storey, brick-walled former tram depot shed, with engaged piers and constructed in English bond bricks. The front or southern elevation was always completely open, until June 1953, when security barriers were

installed. The uninsulated roof was clad in corrugated galvanised steel sheeting with some glass skylights (replaced in the mid-1970s with fibreglass sheets) in a sawtooth pattern. It had inclined southern faces with glazed windows to give an even light to the interior. The roof was carried on light steel trusses supported on transverse, fabricated plate web joists, intermediately resting on rivetted plate-web steel columns.

The Harwood Building was converted in the early 1980s to house offices, conservation labs, collection storage and exhibition space for the Powerhouse, opening in 1981. Its roof was reclad in new metal, reproducing the original saw-tooth form. The southern facade is now glazed in steel-framing, with central entry doors. The basement was redeveloped for the climate-controlled storage of objects and archives. It now houses workshops, conservation laboratories, a photography studio, library and offices. It is conveniently located next to the gallery so objects are readily accessible for conservation, photography and research.

ULTIMO POST OFFICE
The former Ultimo Post Office is a single storey brick building with ashlar and moulded stone dressings and a slate clad roof. The Harris Street (western) end has a parapeted gable which has stone coping finishing in segmental shoulders and topped with a frustum apex stone. On the gable there is a quarry faced frieze above a chink with a stone sill. At the eastern end the roof is of gabled hip form (AHC, 1984).

Windows are mainly double hung sashes with highlights above. A major feature is the stone, arched entry porch on the corner. It is double faceted and has ornate impost mouldings and archivolts. Above the corner is an embellished cartouche. The eastern section of the building (lower than the post office due to the falling ground) was originally the postmaster's residence. The former entrance here is flanked by oculi each with stone reveal and label mould. This elevation continues easterly as a stepped brick wall (with stone coping) to the back yard. A corbelled chimney with two pots rises from the roof of the building (ibid, 1984).

The building reflects aspects of both Federation Classical and Federation Romanesque design, elements of the latter being the parapeted gable, the large semicircular opening in the porch and the building's simple massing. The former post office is located on a major intersection in Ultimo and with its styling it forms an important element in the streetscape. Further it emphasises the large scale of the former Power House (now the Power House Museum) behind (ibid, 1984).

The building is constructed of face brickwork with timber double hung and bullseye windows and timber doors

with stone sills and lintels and a slate roof. The building is in Federation Queen Anne style with classical and Romanesque elements. The main entrance is through a recessed corner porch, the entry is embellished with a carved cartouche, indicating the high quality of work and craftsmanship available at the turn of the century.

Physical condition and/or Archaeological potential: The former Ultimo Power House complex has been substantially altered since its historic use and was a derelict asset open to the sky when acquired and transformed into the MAAS in 1988. After the closure in 1964 the main heritage brick buildings, including the Boiler Room and Turbine Hall, were largely stripped of remaining equipment and all associated moveable heritage elements, with new floors laid, roofing elements, and demolition of significant core elements (such as the Boiler Room chimneys in 1977), reducing the aesthetic appearance of the precinct. The 1988 Wran building, and other additions associated with adaptive reuse of the site, further impacted the heritage core buildings and their legibility and interpretation of former use.
The remaining features, including overhead gantry cranes in the Engine Room and Turbine Hall, The base of the Boiler House chimneys, floor tiling in the Engine Room, decorative stonework of the Office and Switch House, aid the legibility and interpretation of former use.

Modifications and dates: Numerous modifications between 1899 and 1988. See History and Integrity/Intactness.
See also: Block containing Ultimo Power House and Ultimo Tram Shed / Depot (bounded by William Henry Street (north), Harris Street, and Omnibus Lane (west), Macarthur Street (centre/south) and the Goods Line (Ultimo railway line, now Light Rail line)
NB: The evolution of the Powerhouse Museum site is given diagrammatically in Figure 2.45 - a series of maps, from 1901 until 1981 (Curio Projects, 2024, 49).

1960s: The two Boiler House chimneys were demolished to the roof line by a demolition contractor in the mid to late 1960s well before the commencement of the PHM project. At the beginning of the PHM project, the base of each chimney was repaired and these formed a vital architectural and service (air intake and exhaust system) element of the Transport, Communications and Space gallery.

After the closure in 1964 the main heritage brick buildings, including the Boiler Room and Turbine Hall, were largely stripped of remaining equipment and all associated moveable heritage elements, with new floors laid, roofing elements, and demolition of significant core elements (such as the Boiler Room chimneys in 1977).

Pre-1979: demolition of the Power House buildings and clearing the site for the new Museum had actually been considered prior to the project's approval by the Government in 1979. The far greater potential of placing the collections of the Museum in a permanent new home and in a fitting former industrial setting was recognised,

making the most of the opportunities of that very significant association.

Ultimo Tram Depot / Harwood Building:
c.1981-88: The adaptive re-use of the buildings saved them from further deterioration and eventual demolition. The Ultimo Tramshed / Tram Depot (now 'Harwood Building', next door to the Museum group, to its south) was completed first (opened 1981). Its walls needed little repair, but the dilapidated roof was replaced in the original saw-tooth form. A glass facade secured the south end of the Depot, ensuring it echoes the wide open entrance that greeted arriving trams. For the safety of visitors and staff, the tram tracks were removed and the inspection pits covered.

It (Stage 1: Harwood building) opened to the public in 1981 with exhibits (including the first railway locomotive (No. 1) in Australia, the first motor car manufactured in Australia, Bleriot's monoplane and a replica of Lawrence Hargrave's Box-kite), interactive experiences and a learning laboratory; it now houses workshops, conservation laboratories, a photography studio, library and offices. The basement was redeveloped as a secure, climate-controlled store for objects and archives, which has been of immense value: it is much closer to the galleries than is possible for most large museums; small and medium sized objects need travel only a short distance when selected for temporary display or after an exhibition is dismantled; and objects are readily accessible for conservation, photography and research.

The Harwood Building (fmr. Tram Depot) continued as the primary exhibition space (until 1988's opening of the museum alongside) with exhibitions, interactive experiences and a learning laboratory. It now houses workshops, conservation laboratories, a photography studio, library and offices. The basement was redeveloped as a secure, climate-controlled store for objects and archives, which has been of immense value: it is much closer to the galleries than is possible for most large museums; small and medium sized objects need travel only a short distance when selected for temporary display or after an exhibition is dismantled; and objects are readily accessible for conservation, photography and research.

Stage 2: Power House buildings into Powerhouse Museum:
Stage 1 of the new 'Power House Museum' as it was initially known, was as a preparation facility for Stage 2, which would occupy the adjacent Power House buildings. There were to be five main functions of the newly fitted-out building: a major workshop with unhindered height of 8 meters to the trusses; a state-of-the-art conservation laboratory; offices for collection management, exhibit design and other specialist technical staff; a 2500 square

meter climate-controlled storage area and a loading / receiving dock for secure object handling. Early in the development phase of Stage 1, the decision was made to include an exhibition gallery that would provide the public with a foretaste of what could be expected in the Stage 2 exhibitions.

The museum's curatorial driving force behind development of both Stage 1 facilities and associated exhibition was Norman Harwood, whose resourcefulness, determination and experience were indispensable to the success of the project. He was at the peak of a 30-year career at the museum, largely spent building up the world-class transport and engineering collections. From the other curators, he gathered object lists, specifications, ideas and aspirations and brought all these into planning meetings with the Government Architect's Branch and various specialist public and private contractors. The aim was to achieve a sympathetic blend of a respectful treatment of the historic building envelope of the former Ultimo Tram Depot and a flexible and functional facility that would become 'Australia's most sophisticated museum services complex'. The close collaboration between the museum, Government Architect's Branch and Public Works Department at that time set the standard for the development of Stage 2. Acknowledging Norm Harwood's importance to the project, the adapted Tramshed was christened 'The Harwood Building'.

In 1982, a series of coal hoppers and a steel supporting framework were still in place in the Boiler House, all that remained of a much more substantial system of structures that had once been configured on the external and internal walls of the building. However, the burning of coal to fuel the boilers had created such a corrosive environment that most of this steelwork had been removed by the time the Powerhouse Museum project had begun. The steel framework supporting the hoppers was also severely and dangerously corroded and it was considered that the retention of these structural elements was not possible.

The interior of the Ultimo Power House buildings were cleared with the exception of the gantry cranes and base of the two Boiler House chimneys (re-purposed for ventilation), new internal floors laid with reference to both the 1893 museum and the Garden Palace, spaces created and new buildings (the Wran Building and the Galleria) were erected on the western side.

The remaining (original/intact early) features, include the overhead gantry cranes in the Engine Room and Turbine Hall, the base of the two Boiler House chimneys, floor tiling in the Engine Room, decorative stonework of the Office and Switch House, aid the legibility and interpretation of former use.

The main part of the museum opened in 1988. Its grand spaces are appropriate for large objects and major exhibitions. As there had been many changes to the configuration of equipment and structures during the power station's working life, changes to make it suitable for a museum were in keeping with its history. The majority of the building fabric was retained, the missing roofs were replaced, machinery pits were filled in to create a safe environment, and partial mezzanine floors were created to provide display space for smaller exhibitions. The tall Galleria (inspired by the museum's progenitor, the 1879 Garden Palace) and Wran Building, whose large glazed walls and curved steel roofs contrast pleasingly with the old brick walls, were added on the western side and provide a wonderful entry experience. Suspending a diverse group of aircraft, from an early Bleriot to a huge Catalina and small modern planes, over other exhibits ensured that the Turbine Hall and Boiler House became dramatic spaces where visitors contemplate the scope of human creativity.

2005 - 06: the Wran Building's exterior was refreshed with a white facade and updated livery to complement the Ian Thorpe Aquatic Centre that was set to open nearby (Curio Projects, 2022, 287).

2006-07: the level 1 courtyard cafe was upgraded and 'Cog's Playground' established in it (ibid, 2022, 287).

2011 - 13: significant modifications and alterations made to the Wran Building as part of the Powerhouse Museum Revitalisation Project, including:
- works to Harris Street forecourt;
- blocking of glass facade on Harris Street elevation;
- works to southern facade, including removal of original glass life to allow relocation of the main (public) entry (eastward);
- transformation of the original entrance location to a 1800m2 level 3 temporary gallery;
- demolition (and relocation) of the level 2 toilet block to create a new exhibition space (ibid, 2022, 287).

2020 (March): due to COVID-19 restrictions, the Powerhouse Museum, along with all other NSW museums, was closed until further notice.

2024: The museum closed to the public in anticipation of a regeneration of the site as one ongoing home for the Powerhouse Museum, along with a new facility being built in Parramatta.

Further information: Adapted to house the Powerhouse Museum, the building envelopes are largely intact but most of the internal fittings and fixtures have been removed.

The former Ultimo Power House complex has been substantially altered since its historic use and was a derelict asset open to the sky when acquired and transformed into the MAAS in 1988. After the closure in 1964 the main heritage brick buildings, including the Boiler Room and Turbine Hall, were largely stripped of remaining equipment and all associated moveable heritage elements, with new floors laid, roofing elements, and demolition of significant core elements (such as the Boiler Room chimneys in 1977), reducing the aesthetic appearance of the precinct.

The 1988 Wran building, and other additions associated with adaptive reuse of the site, further impacted the heritage core buildings and their legibility and interpretation of former use.

The remaining (original or early) features, including overhead gantry cranes in the Engine Room and Turbine Hall, the base of the Boiler House's two chimneys, floor tiling in the Engine Room, decorative stonework of the Office and Switch House, all of which aid the legibility and interpretation of its former use.

Current use: Museum of Arts and Technology, exhibitions, evens, creative residents

Former use: Aboriginal land, farm, commercial/residential, Electricity generating power station

History

Historical notes: The site sits on the land originally occupied by Aboriginal people of the Cadigal, Gommerigal and/or Wangal clans of the Eora Nation.

The "Eora people" was the name given to the coastal Aborigines around Sydney. Central Sydney is therefore often referred to as "Eora Country". Within the City of Sydney local government area, the traditional owners are the Cadigal and Wangal bands of the Eora. There is no written record of the name of the language spoken and currently there are debates as whether the coastal peoples spoke a separate language "Eora" or whether this was actually a dialect of the Dharug language. Remnant bushland in places like Blackwattle Bay retain elements of traditional plant, bird and animal life, including fish and rock oysters (Anita Heiss, "Aboriginal People and Place", Barani: Indigenous History of Sydney City http://www.cityofsydney.nsw.gov.au/barani).

The Pyrmont peninsula appears to form part of the boundary between the Wangal and Gadigal clans. The Wangal boundary extneded from Tumbalong (Darling Harbour) westward to Rose Hill (in the area later called Parramatta), while th eGadigal occupied the land from the entrance of the (Sydney) harbour. extending along its southern shoreline towards Tumbalong. Despite these 'boundaries', Aboriginal people camped on both sides of Tumbalong and smaller, more diverse groups (sometimes referred to as 'bands') fished in its waters. Women married into neighbouring clans and individuals had responsibilities in other clan lands to which they were linked through parents, grandparents or marriage (Curio Projects, 2024, 32).

At the time of European invasion in 1788, the Aboriginal population of the Sydney Cove region has been estimated at around 1500-2000 people, a population that was severely and disproportionally impacted in the subsequent years, dispossessed and relocated from their traditional lands by the swiftly expanding European incursion (ibid, 2024, 32).

With the invasion of the Sydney region, the Cadigal and Wangal people were decimated but there are descendants still living in Sydney today. All cities include many immigrants in their population. Aboriginal people from across the state have been attracted to suburbs such as Pyrmont, Balmain, Rozelle, Glebe and Redfern since the 1930s. Changes in government legislation in the 1960s provided freedom of movement enabling more Aboriginal people to choose to live in Sydney (Anita Heiss, "Aboriginal People and Place", Barani: Indigenous History of Sydney City http://www.cityofsydney.nsw.gov.au/barani).

Compared with other nearby areas of Sydney, the Ultimo-Pyrmont peninsula remained largely undeveloped for many years following European arrival, affording retention of a stronger measure of Aboriginal presence in the earlier years of the NSW colony that was not equalled in adjacent areas such as Sydney and Farm Coves. Aboriginal people on the Ultimo-Pyrmont peninsula continued to live traditionally for decades after (1788) as is demonstrated through both the historical and archaeological records. Archaeological evidence demonstrates how new materials were adopted into traditional practices, such as fashioning a tool from a piece of glass. Colonial descriptions and images depict Aboriginal people continuing to camp and fish around Tumbalong (Darling Harbour) into the 1820s (ibid, 2022, 32).

It was not until the late 1830s and early 1840s that colonists began to turn their attention to the Pyrmont peninsula for more 'rural' uses, resulting in land clearance and further dislocation of Aboriginal people from their traditional

land. However the Ultimo area remained significantly under-developed, in comparison to larger nearby industrialised areas like Darling Harbour, until the late 1880s, and historic records suggest that the area continued to be used by local Aboriginal people during the mid-19th century for gathering oysters and cockles from the shore (ibid, 2022, 32).

Ultimo Estate: the Harris family (1803+) and industry

Ultimo forms the southern half of the Pyrmont peninsula, bounded by Darling Harbour on the east, Blackwattle Bay on the west and Broadway on the south. It was first leased from 1796 and later, became part of the estate of the surgeon John Harris in 1803 (by grant from Governor King) (ibid, 2022, 33). The sandstone ridge that is the spine of the Pyrmont peninsula was covered at the Ultimo end by rich alluvial soil. This had attracted some early market gardens, however Harris's vision for his property was not development, but the creation of a country seat.

Industries were attracted to the watercourses in the area and Harris moved to rural land (Shane Park) further west in 1821 and his Ultimo house was rented out.

John Harris died in 1838 with no children, leaving his (Ultimo) Harris Estate and surrounding properties to be divided equally between his brothers William and George. Complications with his will resulted in the brothers being able to received rent from the properties, but unable to subdivide the land. This in turn meant that while developed occurred in surrounding areas into the mid-19th century, the Harris Estate land remained quite sparsely populated and underdeveloped during this time. Following the deaths of William and George Harris, their sons (both named John Harris) inherited the land and in 1859 the Harris Estate was finally able to be subdivided (ibid, 2024, 36).

By the 1840s the property was being surrounded by industry, small commercial properties and abattoirs toward Blackwattle Creek. From the 1850s onwards the area was filled with cramped quarters, people living cheek by jowl with domestic animals, with no fresh water or sewerage, but any amount of flooding. Refuse and offal from the slaughter yards was intended to be taken out on the tide, but often remained to rot on the mudflats.

Darling Harbour Goods Line (1854-55):

Upon formation in 1849, the Sydney Railway Company approached the Harris family to request purchase of seven acres of (Ultimo estate) land to construct a railway connecting what is now Central Station with the new wharfing facilities proposed for Darling Harbour, including additional acreage for a goods terminus. This land was

eventually purchased in 1853, although management of railway and land was taken over by the NSW government in 1854 after the failure of Sydney Railway Company. A new embankment was built along the western edge of Darling Harbour to support the Goods Line, requiring importation of substantial volumes of soil (ibid, 2024, 36).

At its opening in 1855, the Darling Harbour Goods Line extended along the eastern boundary of Ultimo and ended just south of the future location of Pyrmont Bridge. The presence of the goods line in this location effectively severed the direct connection between Darling Harbour and Harris Street, with the (future) power house site located in between. This isolation of the land from the harbour, and underuse of the rail line in its early years, created tension between the Harris family and the government, with the land around the railway through the Harris (Ultimo) estate described in 1863 as being 'dilapidated, the railway merely an embankment with the rails set on and the terminus undeveloped' (ibid, 2024, 36).

In 1859 (after John Harris' death in 1838) the Harris family distributed land to a number of second- and third-generation family members. There were a few cottage-dwellers dotted around, using the land under grace and favour to run a few cattle or do a little local quarrying, while contemporary reports indicate that the area was so unsettled as to remain hospitable to Aboriginal people who still frequented the area.

The opening of the Pyrmont Bridge in 1858 made the peninsula more accessible, but also had the effect of allowing traffic to bypass the Ultimo end of it. Local protest persuaded the bridge company to include a central swing span in the bridge, so that ships could still get to the upper reaches of Darling Harbour... The Sydney Railway Company's ...Goods Yard and Goods Line opened in 1855, but as it did not extend to connect with the Pyrmont Bridge, the volume of goods passing through the yards was slight.

The Saunders family quarries business began in Pyrmont at an opportune time, as the gold rushes of the 1850s sparked a building boom and Pyrmont was the source of some of the best building stone. Charles Saunders started quarrying sandstone in 1853, creating three quarries nicknamed Paradise, Purgatory and Hellhole. His son Robert took over in 1880 and the quarrying was further expanded with the introduction of steam drilling. In the second half of the nineteenth century, much of the western side of the peninsula was quarried for stone to build Sydney's finest buildings.

By the 1870s the wool industry was successful and expanding rapidly. Wool auctions were transferred from London to Sydney, requiring city storage. The Circular Quay wool stores were no longer satisfactory. Ultimo, with

its deep-water harbour, and Darling Harbour's Goods Line were ideal. The peninsula's first wool store was the Richard Goldsbrough warehouse built on the corner of Pyrmont and Fig Streets in 1883. Twenty wool stores were built in the 1880s on the peninsula.

Government reclamation of the southern end of Darling Harbour and construction of the Iron Wharf in 1874 eventually allowed the reactivation of the Goods Line in the 1870s, which went on to become vital in transporting wool, coal, shale, timber and wheat in and out of Sydney. As a result of the industrial development boom following construction of the Iron Wharf and corresponding relevance of the rail(way) lines, the Darling Harbour Railway Goods Yard was built between 1874 and 1888 at the head of the Goods Line (north of the power house site) and continued to grow and develop into the 1920s. The location of the Goods Line was also to become vital in the transportation of large quantities of coal required by the Ultimo Power House for its operation, after it opened in 1899. The 1960s saw port functions and wool stores moving away from Sydney, which led to a decline in the functions of the (goods) railway. The Darling Harbour Goods Line was eventually closed in 1984, and the Goods Yards were redeveloped as part of the NSW government's Bicentenary project (ibid, 2024, 36, abridged). Part of the Goods Line was reused as Sydney Light Rail in 1997 (Curio Projects, 2004, Appendix D) (connecting Central Station via Ultimo, Pyrmont, Glebe and Annandale to Dulwich Hill).

From 1875 Colonial Sugar Refinery (CSR) dominated the northern tip of the peninsula. The company created work, controlled housing and polluted the air and water.

Sydney Technical College (1892) and Technological Museum (1893):
In 1892 Sydney Technical College, on Mary Ann Street, was built, while the adjoining Technological Museum, fronting Harris Street, was opened in 1893. The college expanded into surrounding streets and newer buildings, eventually taking in the Harris' old Ultimo House. As the new century approached, the college, in various incarnations, provided a new focus for industrial Ultimo, and opened up the possibility of further education through night classes in practical and applied sciences for many locals. (The Dictionary of Sydney).

The staff and contents moved to Ultimo (Sydney Technical College) in November 1892. (Director, J.H.) Maiden who still worked in 'the shed' in the Domain in the mornings, and in his Royal Mint office in the afternoons, delightedly advised Dr Daniel Morris, Director of (Royal Botanic Garden) Kew (London, UK) that 'a new building has been erected here at a cost of nearly 25,000 pounds and we go into it in a few months'. In January 1892 he inspected the new building finding it 'all but ready for handing over' and recommended that the basement be used

'at once for the storage of exhibits'. Some 40,000 exhibits, ranging from a delicate Doulton (china) vase to a sturdy Stephenson locomotive had to be appropriately packed and transported, together with office, workshop and laboratory equipment, showcases, framed pictures, a bulky and fragile herbarium, over 2000 maps, drawings and diagrams and over 3500 books. A decision on a contractor to pack and move the contents dragged into 1893 (Gilbert, 2001, 150-152).

On 4 August 1893, just 3 months after the old Museum was closed, the new one was opened. Sir Robert (NSW Governor) and Lady Duff, attended by private secretary and aide-de-camp, arrived at Ultimo to find a guard of honour of public school cadets, a school drum and fife band, several parliamentarians and officers of the Department of Public Instruction. Architect W.E. Kemp and Minister Suttor were there. Kemp provided a modest description:

'The style selected corresponds with that of the adjoining Technical College, and is an attempt to adapt the spirit of the Romanesque to the necessities and materials of the present day. The form of the building being necessarily for convenience, simple, no picturesque breaking up of outline could be attempted. The materials used principally being brick, effect has been sought by the harmony of colour; and this, by the use of such bricks as are easily obtainable, with a sparing use of stone to relieve the masses of darker and brighter colour of the brickwork, has it is thought, produced a simple and not unpleasing structure, which, though plain and massive, escapes the fault of heaviness. The building is 183' long by 50' wide, and has a basement storey under one half its length, three whole storeys 15' high, and an attic storey in the roof. Each floor is divided transversely into bays 16' wide, which, while providing separate compartments to facilitate the classification of the exhibits into groups also provides wall space on the cross partitions for the exhibition of maps, diagrams and other forms of exhibit The amount of floor spaceon each floor is 9150 square feet, and of wall space 6000 (square) feet, making in all 27.450 (square) feet of floor space and 182000 (square) feet of wall space, exclusive of the basement at the attic There is a protruding central portion which contains a handsome staircase, extending from the basement to the attic, and six large rooms for offices for the curator and his assistants. (ibid, 153-4).

Block containing Ultimo Power House and Ultimo Tram Shed / Depot
(bounded by William Henry Street (north), Harris Street, and Omnibus Lane (west), Macarthur Street (centre/south) and the Goods Line (Ultimo railway line, now a Light Rail line - part of Central Station to Dulwich Hill line)
NB: The evolution of buildings, uses and demolitions on the entire block (which became the Powerhouse Museum

site) is given diagrammatically in Figure 2.45 - a series of maps, from 1901 until 1981 (Curio Projects, 2024, 49).

Sydney's Tram history and Ultimo Tram Depot (1871 / 1898)
(aka: Ultimo Tram Shed / Sydney Tram Company Stables (from 1981, the Harwood Building):
The development of the tramway public transport system had its beginnings in a horse drawn tramway along Pitt Street between Circular Quay and the Redfern Railway Terminal, which opened in 1869. A steam powered network developed from the 1870s, first running through the city only, then rapidly expanding as a commuter service from suburban areas. Steep topography saw the addition of cable drawn trams in North Sydney and towards Rose Bay from the city during the 1880s. In 1893, the first complete electrically-powered tramway line opened on the north shore and its success led to the decision to adopt electric power for the tramway system overall. A single large electricity generating station was deemed necessary to provide this power and the first stage of the Ultimo Power Station opened in December 1899.

The first of the all-electric tramcar sheds, Ultimo Tram Depot (Stables for the Sydney Omnibus Company (1871*), stables for the City Carrying Company at the southern end of the block (by 1883) and feed cutting works located between these two stables) opened at the same time (Curio Projects, 2024, 62) in the block bounded by Macarthur, Pyrmont, Mary Ann and Harris Streets (in fact, Omnibus Lane, east of Harris Street) - block 20 of the Ultimo subdivision inherited by John Harris: ibid, 2024) at the south end of the (later) Ultimo Power Station site. Conversion of the tramlines proceeded rapidly and expansion of the power station followed in stages. Sydney's electric trams proved very popular, tramlines shaped the city's development, and the system became one of the most extensive in the world.

*In 1871 the newly formed Sydney Omnibus Company built stables and a hay shed on Block 20 of the Ultimo Estate (the subject site of, later, the Harwood Building). Later known as the Sydney Tramway and Omnibus Company, this horse-drawn omnibus company was one of Sydney's main private companies providing transport for most of its Eastern suburbs, through the city centre and out to Glebe, Forest Lodge, Newtown, Stanmore, Marrickville, St. Peters and the Cook's River (ibid, 2024, 35).

The Ultimo Tram Shed was built in 1898 (Curio Projects, 2024, 64). A 1938 - 50 Civic Survey Map shows it labelled as 'Dept. of Road Transport Tram Car Shed, showing the tram tracks feeding into it from Mary Ann Street to its south. A 1949 - 1972 building surveyor's detail sheet shows the building, labelled as 'Dept. of Road Transport & Tramways' with no tram tracks shown (ibid, figure 3.26, 67).

Ultimo Tram Shed would be substantially rebuilt as Stage 1 of the Powerhouse Museum, opened to the public by Premier Neville Wran on 4 September 1981. Its walls needed little repair, but the dilapidated roof was replaced in the original saw-tooth form. A glass facade secured the south end of the Depot, ensuring it echoes the wide open entrance that greeted arriving trams. For the safety of visitors and staff, the tram tracks were removed and the inspection pits covered. It was reused as a temporary public (museum) gallery (1981 - 1988), conservation and fabrication area and storage and archive space. A commemorative time capsule was buried in the Mary Ann Street carpark at the opening, including 1981 bottle of Penfolds' 'Grange' wine, Space Invaders game, newspapers, a UBD Street Directory, Sydney telephone books and photos of museum trustees and staff. It was formally renamed the Harwood Building, honouring long-time former curator, Norm(an) Harwood (ibid, 2024, 42) who was instrumental in the collaborative design and development of its facilities, and of the Stage 2 (main) Powerhouse Museum, in consultation with all curators about collections, needs in terms of spaces and conditions, archives, conservation laboratories, offices, etc.

Although an important transport link, the low Pyrmont Bridge (1858) kept ships off Darling Harbour at a time when increased exports made access vital. The solution was to rebuild the bridge, so it would open and allow ships through. The NSW Government bought the old toll bridge and held an international competition to commission a replacement. The new bridge, designed by Percy Allen, was eventually built in 1902 and was powered by electricity from the Ultimo Power Station.

In 1895, the Minister for Public Works commenced investigations into construction of an electric tramway between Circular Quay and Pyrmont (George Street to Harris Street), a proposal accepted by a majority in 1896. This was soon followed by a general policy to electrify all Sydney's existing tram lines. An Act of Parliament that sanctioned the George - Harris Street electric tramway, along with a supporting Power House and Car House at Ultimo, was approved in September 1896 (ibid, 2024, 37).

Ultimo Power House (1899 - 1963) and Sydney's electric tram network;
Ultimo Power House was the original generation station supplying electricity to Sydney's tramway network and general distribution of electric power in the area. It was the first large-scale electric power plant constructed in Australia - a title it retained for many years. The final location for the Power House was selected on the basis of a number of factors including: access to the Darling Harbour Rail Corridor (now the Goods Line and light rail line) for coal supply and the disposal of the ashes; access to Darling Harbour for adequate sea water supply for the

condensers; and the distribution of electrical current, and the low cost of the land and space for expansion (ibid, 2024, 37, abridged).

The majority of contracts for construction of the George and Harris Street tramway and associated Tram Stabling Shed (and Power House) were let between 1897 and 1898. J. Stewart & Co. contracted to build the Ultimo Power House and Tram Shed and Justin McSweeney awarded contract 8 to construct the water conduit connecting Darling Harbour to the Boiler House supplying seawater to the condensers (i.e.: the water cooling system and manifold). Construction of the Power House commenced in 1898 (ibid, 2024, 37).

The original (Power House) building occupied the north of the block bounded by William Henry Street (to the north). It consisted of the Engine House, Office, (Old) Boiler House, and Pump House, with the overall building measuring c.60m x c.30m, with the original pump house chimney stack constructed with 890,000 bricks extending c.91m above flue level (ibid, 2024, 37).

Ultimo Car House (Tram Shed / Depot), constructed at the same time as the Power House on the southern block bounded by Macarthur Street to the north, Mary Ann Street to the south, Omnibus Lane to the west, and the Darling Harbour Goods Line to the east, measured c.83m x c.39m and was the first of the electric tram depots opened for the early 20th century Sydney tram network. A Store and Repairing Shop, constructed by T.E. Spencer & Co., adjoined the Car House at the rear and featured the same sawtooth design of (roof of) the Car House (ibid, 2024, 37).

The first electricity was supplied to the tramway for an experimental tram ride on 22 November 1899. The Ultimo Power House was officially completed on 29 November 1899, powering the official opening of the Harris and George Street tramline on 8 December 1899. The tramline was incredibly popular and carried 95,000 passengers in the first 2 days of operation. Originally supplying power for electric traction for the George and Harris Street tramlines, the Ultimo Power House later extended its supply of electricity to the Eveleigh Railway Workshops (1900) and to Central Railway Station (1907)(ibid, 2024, 37).

By the turn of the 20th century, the majority of the northern block (of what is now the Powerhouse Museum group) between William Henry and Macarthur Streets had been resumed for the construction of the Ultimo Power House, resulting in the demolition of the houses at 517 - 523 Pyrmont Street, while houses at 137 William Henry Street and 554 - 556 Harris Street were retained until the 1920s (Curio Projects, 2024, 62).

Ultimo Post Office (1901 - 80s):
The purpose-built Ultimo Post Office opened in 1901 (on the southeast corner of William Henry and Harris Streets (part of the Powerhouse Museum block). It replaced the postal operation at 484 Harris Street. Ultimo Post Office was designed in Federation Queen Anne style by the NSW Public Works Department's Government Architect's Branch under (the direction of) Government Architect, Walter Liberty Vernon. It formally commenced operation in July 1901, and continued to function as a post office until the 1980s (ibid, 2024, 37). It has latterly been used as a childcare centre.

Sydney Glass and Tile Company / Glass Co. workshop/offices (1901) and holdings:
From December 1901 until at least... 1948, Sands Directories and Council Rates Assessment books identify the Sydney Glass and Tile Company (aka the Sydney Glass Co. Ltd / P / L) as lessees and occupiers of an area of 1 acre 13.5 perches at 496 - 504 Harris Street - adjacent to the south of the Ultimo Post Office on the corner of Harris and William Henry Streets. The Sydney Glass Co. constructed a building fronting Harris Street, identifed in 1911 as a double storey, 2-room stone workshop and offices, on land leased from Margaret Harris. The 1911 Council Rates Assessment book records Wright Sheards sub-leasing a wood and coal yard consisting of a single one-storey, one-room timber wood and coal yard with an iron roof, from the Sydney Glass and Tile Co. on Harris Street, recorded in the 1918 Sands Directory as being leased by Harry Chapman as the fuel merchant on this land The Sydney Glass and Tile Co. bought their initial site from Margaret Harris in September 1922 and by 1927 the company owned all the land along Harris Street between their factory at 496 - 504 Harris Street (next to Ultimo Post Office) along Harris Street to the intersection with Macarthur Street. The 1927 Council Rates Assessment book records Harry Chapman as remaining at 552 Harris Street, leasing it off Sydney Glass Co. Ltd. for a wood and coal yard, which included a brick shed and weighbridge. In 1948 Council Rates Assessment books describe the Sydney Glass Co. building as a 2-storey brick 3 and 5 roomed factory and offices with a basement and iron roof, although this is the only record of it having a basement in the history of the company's occupation of the site (ibid, 2024, 62).

At the commencement of (Ultimo Power House's) operation in 1899, cooling water for the condensers was sourced via a water conduit which connected Darling Harbour to the Boiler House. This had been built at the same time as the main Power House buildings in 1898. Land reclamation works around Darling Harbour in the 1920s, as well as the larger water requirements of new turbines in the Turbine Hall, necessitated the installation of new, longer intake and outlet conduits for the Power House. Conduit installation works started in 1923-24, and were completed

by 1928, proving to be one of the most expensive works undertaken during its modernisation (ibid, 2025, 38).

Initially it (Ultimo Power House) comprised four reciprocating steam engines driving 850 kW direct current generators. Alternating current generators operating at 25 cycles were added from 1902 and turboalternators from 1905 (Engineers Australia citation, 1994). Sydney's demand for electricity increased rapidly. Almost immediately after its 1899 completion, it became apparent that Ultimo Power House required expansion to increase its output capacity. In 1902, just 3 years after opening, the first extension was done. Developed by plans drawn by J.G. White & Co. of New York, the design consisted of a southern extension to the Engine House (later renamed the Turbine Hall) and construction of a new and larger Boiler House, extending the space by a further 54m south than the old Boiler House building had occupied. These extensions transformed the Ultimo Power House from a small power generation plant to a substantially sized power station more in line with modern power plants elsewhere in the world. At the time it was said to resemble the New York Metropolitan Street Railway Company's 96th Street Power House (ibid, 2024, 37).

By 1903 Ultimo was also powering other crucial city infrastructure including bright arc lights at metropolitan railway stations and shunting yards; the opening spans of the Pyrmont and Glebe Island bridges; grain elevators at Darling Island; machine tools, cranes and lights at Eveleigh Railway Workshops; and pumps for the city's low-level sewerage system, which served over 110,000 residents and improved public health (Ultimo Power Station supplied electricity to Sewage Pumping Station no. 1 (immediately to the north of Ultimo Power House, and which was the first to run on electric power) and, in time, another 15 of the 19 pumping stations in Sydney). The station contributed to electrification of the city's heavy rail network, and it supplied bulk power to some Sydney suburbs and later to the State grid. (Debbie Rudder)

Pyrmont Power Station was built by the Electric Lighting Department of the Municipal Council of Sydney and began operations in 1904 as the Sydney Electric Lighting Station.

By 1905, Pyrmont and Ultimo were providing Sydney with power for its lights and trams. They were thriving industrial suburbs and centres for the distribution of Australian wool, flour, milk, sugar and other foodstuffs with a combined population of nineteen thousand. Rail connected the suburbs to the port, trams took workers to their jobs. The railway yards, wharves, wool stores, power stations and mills created employment for residents.

In 1905, Ultimo Power House was the first place where turbine-driven alternators were tried in Australia and it

was, until the 1940s, the location where the first examples of most major developments in power generation technology, including mechanical boiler feed and, later, the use of pulverised coal, were tried in Australia. It was also amongst the largest of any generating stations operating in Australia until the 1940s. It was a major employer and its function of power generation brought further development to the surrounding area. At the same time, its landmark chimneys were the source of ash fallout problems for local people.

By 1910, Ultimo Power House was approaching capacity, with the majority of its power earmarked to serve Sydney's expanding tramway network. Thus, in 1912, the White Bay Power Station (across Sydney Harbour's Blackwattle and Rozelle Bays, to the west) was built to meet Sydney's growing need for electricity for lighting and general use. When the power house was in operation, residents who left their windows open would return home to find a fine dust coating their furniture. In 1913 the City Health Office wrote to the Town Clerk regarding the heavy smoke emissions from the Power House. The replay claimed this was to (sic) due to strikes by southern coal miners resulting in inferior coal being sourced from northern areas of NSW. The pollution in Ultimo would have been quite severe, with a 1924 news article reporting that the Power House used 700 tonnes of coal a day. Two pneumatic ash ejector plants were constructed in the Power House between 1911 and 1915. These delivered ash from boilers to railway trucks which removed it via the Goods Line, reducing the need for ash management by staff. This system was later replaced (c.1931) by an electrically propelled rail hopper truck which carried ash from the boilers to a wet sump (from) where it was then pumped into hopper barges on Darling Harbour, through 2240' of pipe(s) (ibid, 2024, 37).

Tramway Instruction Room (1913- 1914):
This building was built between 1913-14 fronting William Henry Street between the Ultimo Post Office and the Power House Offices (North Annexe). It was recorded in both the Sands Directory and the Council Rates Assessment books by 1914). It was a sizeable one-storey, one room brick building with asbestos shingle (tile) roof). The building contained significant tram car equipment which was used in training for the electric tram drivers. It was vacated in 1953 when a new training school opened in Randwick, and by 1954 it was being used as a storeroom for the Electrical Commission of NSW. It appears on the 1963 Sydney Water Plan of the site and remained in the site until its demolition in the mid-1980s as part of Stage two development of the Powerhouse Museum (it was recorded as being present by Godden et al, in the 1984 heritage report (ibid, 2024, 68).

The 1914 Council Rates Assessment book records a Railway Commissioners' workshop located on the corner of Harris Street before Macarthur St. (i.e.: 552 - 560 Harris Street). In July 1923 Margaret Harris sold the block on the

northern corner of Harris and Macarthur Streets to Maurice Newstead who mortgaged it to the E.S. & A. Bank who took possession after his 1938 death, selling it to Maize Products P/L, who built a single storey warehouse on it. Their warehouse at 552 - 560 Harris Street abutting Macarthur Street is described in the 1948 Council Rates Assessment book as a single-storey brick warehouse with iron roof. It is depicted in the c.1963 Sydney Water map. By 1980, it was referred to as the Manassen Building (ibid, 2024, 69).

The first generation of equipment at Ultimo (Power House) consisted of boilers made in Sydney and engines, generators and cranes made in the USA. As there were then only 3 power stations with greater output, all of them in the USA, Ultimo was a source of pride for Sydney's engineers, manufacturers and citizens. Building the power station and tram depot was a bold project carried out by NSW Public Works with the assistance of Australian contractors; the bricks, stonework, steelwork, wooden balustrades, and cast iron columns, staircases and floor-plates were made in Sydney. Later generations of equipment came from the USA, UK and Australia; the replacement of engines by steam turbines was the most important change and brought improved efficiency. Notably, turbo-generators for the station were made in Sydney in 1923, and an overhead crane for the Turbine Hall was made at Newcastle in 1929. In 1932 large mills were installed to pulverise coal, and all coal handling was converted to automatic processes; these changes again improved the station's efficiency. (Debbie Rudder).

Switch House (1922 - 27):
Predating but tangential to the 1927 - 32 modernisation works, was construction of the Switch House. This building, adjacent to the southern wall of the Turbine Hall, was built between 1922-27 and measured 23m wide, 61m long and 17m high. It was purpose-built to house a new control room, high tension switch gear, and transformer banks. The works enabled a major upgrade to the switching gear of the Sydney tramway network, as the existing switchboard facilities in the Engine House or Turbine Hall had reached their capacity (ibid, 2024, 38).

Modernisation and Upgrade (1927 - 32):
Between 1927 and 1932, Ultimo Power House underwent a major period of modernisation and remodelling to achieve greater efficiency of operation. This work included replacement and upgrade of much of the industrial equipment and plant, installation of a new pneumatic coal handling plant, and construction to the south of the Boiler House of a new concrete coal store with a storage capacity of 10,000 tonnes. The new coal storage bin allows (sic: allowed) continued operation of the Power House in case of strikes on the coalfields. Following completion of modernisation works in 1932, the Ultimo Power House was for a time the largest (electricity) generating plant in the Southern hemisphere (ibid, 2024, 38).

During the period of planning, construction and operation until 1929, the power house was officially referred to as 'Ultimo Power House'. By the time of the Railways Report of June 1930, its title had become 'Ultimo Power Station'. This was continued in official use by both the Electricity Commission and Railway Department until plans were announced in 1979 for its redevelopment, when its name reverted to 'Power House'.

The state's first pulverized coal fired boilers were commissioned here in 1923. By 1942 the station's capacity had grown to 79.5 megawatts (Engineers Australia citation, 1994).

In the 1920s, electrification of the suburban railway led to substantial extension and re-equipping of Ultimo Power House, and the White Bay Power Station also commenced operations as the second of the New South Wales (NSW) Railway and Tramways Department generating stations. These two worked closely together until the 1950s.

Ultimo Power House was subject to numerous adaptations and modifications over time, as necessary to meet the ongoing requirements of the power station. During World War 2, precautions were made here in case of an air raid, including construction of air raid shelters and barricading the lower windows of buildings with sandbags. A severe impact to NSW coal supply in the 1940s as a result of industrial action at the coalfields, resulted in conversion of the boilers to operate on fuel oil in 1947 (ibid, 2024, 40).

The Commissioner of Railways purchased 550 Harris Street in April 1948 providing a frontage to the street. State Railways operated the Power House until 1953 when the Ultimo Power House, along with all other Railway Department Power Houses, were transferred to the Electricity Commission of NSW (ibid, 2024, 40).

Sydney Glass and Tile Co. / Herman Haege / petrol station / Dalton Building (1948 - 1963)
In 1948 the block of land at 550 Harris Street was purchased by the NSW Government Railways allowing a Harris Street frontage to the Power House. In January 1954 the Sydney Glass Co. sold their land to the paper merchants Herman Haege Ltd. A section of its land was leased to Ampol to use as a petrol station from December 1957. In 1960 the 'Dalton Building' and store was constructed on Harris Street on the site of the former Sydney Glass Co. Building (next to Ultimo Post Office). The 1963 Sydney Water map shows Ultimo Post Office on the corner of William Henry Street, followed (south) by Herman Haege P/L, a right-of-way, and a service station (ibid, 2024, 69).

In the 1950s all the power generation facilities of the state were brought together under the NSW Electricity Commission, a central government authority formed to deal with the chronic post-war power shortages in NSW. As the interconnected network expanded and new generation power stations were completed and brought online, Ultimo's old machinery and city location saw its progressive redundancy. Allied to this was closure of the tramway system, in favour of motor buses, underway from the 1950s and was complete by 1963. The power station was then gradually stripped, the landmark chimneys were demolished to the roof-line and the buildings lay dormant and damaged by elements, vandals and the chimney's demolition

This decline of Sydney's tramways resulted in the closure of Ultimo Power House on 11 October 1963. By this stage it was only used as a minor component in the Electricity Commission's grid (mostly for tram function, only), having been superseded in its output capacity since 1923 by White Bay Power Station. Much of Ultimo (Power House)'s plant and equipment was disassembled and removed between 1965 - 66, following which the buildings fell into disrepair and were subsequently damaged by decay, squatters and vandals. In 1968 a large proportion of the former Pump House and chimney was demolished for construction of the William Henry Street bridge, while the two brick chimneys at the southern end of the Boiler House were demolished to the roofline (of that building) in 1976-77, resulting in severe damage to the Boiler House roof (ibid, 2024, 40).

Ultimo Power House was decommissioned in 1963 (Engineers Australia citation, 1994). From its closure until the late 1970s, a wide range of options of what to do with the defunct site were explored, with options ranging from total demolition of the site, through to full reconstruction and intervention. This period of contemplation of the its fate coincided with a period during which the MAAS were investigating options for relocation from their now-unsuitable location in Sydney Technical College, nearby. Both the options for the future of the power house, as well as the relocation of the MAAS, were also influenced by the ongoing process of de-industrialisation of Pyrmont and Ultimo that had been occurring since the 1950s (ibid, 2024, 41, abridged).

Suggestions for use of the site for a museum were made as early as 1964, when plans were made to convert the former Ultimo Tram Depot (Harwood Building) to a Transport Museum - although these were initially abandoned when it appeared there was a conflict with the route of the 1965 Western Distributor (motorway). When freeway plans were finally curtailed in 1977 avoiding the Power House site, its possible use as a museum re-emerged (ibid, 2024, 41 abridged).

In 1979 a decision was made to use the Ultimo Power House and the Ultimo Tram Depot, as the new location for the Museum of Applied Arts and Sciences (MAAS) - formerly the Technological Museum, which had outgrown its nearby 1893 building.

The Museum of Applied Arts and Sciences (MAAS): 1879 - 1981:
The MAAS has undergone many change in its 140 year history. Founded in 1880 following government acquisition of exhibits from the 1879 Sydney International Exhibition (held in 'The Garden Palace', in the Western Domain of Sydney Botanic Gardens
near Macquarie Street) and known initially as the Technological, Industrial and Sanitary Museum of NSW, it suffered an early loss with the fire that destroyed its first residence, The Garden Palace, in 1882. With the majority of the collections lost, the museum was re-established in the Agricultural Hall (aka 'Tin Shed') in the Outer Domain (near the State Library) in 1883, under the curatorship of Joseph Henry Maiden. The conditions of the former hall proved to be woefully inadequate to house and maintain the museum's collection, and in 1893, the Technological Museum finally moved into its own purpose-built home on Harris Street, Ultimo, within the (Sydney) Technical College, where it remained until 1988 (ibid, 2024, 41).

On 13 August 1979, NSW Premier Neville Wran announced the Ultimo Power Station and Tram Depot were to become the new home of the MAAS. Dr Lindsay Sharp was appointed as the Director (MAAS) to oversee the transition of the site to the new museum space, and the (planning) commenced with resumption of the William Henry and Macarthur Street block by the NSW Public Works Department in 1980. The 1980s design of the museum was coordinated by NSW Public Works Department in close association with the Powerhouse Museum's in-house design team (ibid, 2024, 41).

The original construction plan for the new Powerhouse Museum was to be undertaken in four stages.
Stage 1: Tram Depot to Harwood Building:
Stage 1 was opened in 1981 by the NSW Premier Neville Wran in the refurbished and adapted Ultimo Tram Shed / Tram Depot building, with exhibits including the first railway locomotive (No. 1) in Australia, the first motor car manufactured in Australia, (Hector) Bleriot's monoplane and a replica of Lawrence Hargrave's box-kite. The building was renamed 'Harwood Building' to acknowledge the huge contribution of the museum's curatorial driving force behind development of both Stage 1 facilities and the associated exhibition, Norman Harwood, His resourcefulness, determination and experience were indispensable to the success of the project. He was at the peak of a 30-year career at the museum, largely spent building up the world-class transport and engineering collections.

From the other curators, he gathered object lists, specifications, ideas and aspirations and brought all these into planning meetings with the Government Architect's Branch and various specialist public and private contractors. The aim was to achieve a sympathetic blend of a respectful treatment of the historic building envelope of the former Ultimo Tram Depot and a flexible and functional facility that would become 'Australia's most sophisticated museum services complex'. The close collaboration between the museum, Government Architect's Branch and Public Works Department at that time set the standard for the development of Stage 2. (see separate 19th and early 20th century Tram Depot / Harwood building history, above).

The Harwood Building had five main functions: a major workshop with unhindered height of 8m to the trusses; a state-of-the-art conservation laboratory; offices for collection management, exhibit design and other specialist technical staff; a 2500 square meter climate-controlled storage area and a loading / receiving dock for secure object handling. Early on a decision was taken to include an exhibition gallery to provide the public with a foretaste of what could be expected in Stage 2 exhibitions. The Harwood building continued as the Powerhouse Museum's primary exhibition space (until 1988's opening of the museum alongside) with exhibitions, interactive experiences and a learning laboratory.

Stage 2 Main Powerhouse Museum:
The Harwood Building was a preparation facility for Stage 2, which would occupy the former Ultimo Power House buildings next door to the Harwood Building's north.

In 1982, funding was made available for Stage 2 and works started on the reconstruction of the derelict power house. Primary individuals responsible for delivering Stage 2 were: Lionel Glendenning, architect; Peter Johnson, Director of Design; Peter Root, Project Director; and Lindsay Sharp, PHM/MAAS museum director. They worked with structural and mechanical engineers, acoustics, interiors and exhibit designers, graphic designers, furniture makers and designers, curtain and carpet designers. The works involved many local firms and contractors, with over 250 people employed on site daily and over 300 individual building contracts let to local firms. Between 1981 and 1990, in anticipation of the new facilities, 24,948 objects, including donations and bequests, were accessioned into the MAAS collection.

Works undertaken to the former Power House buildings in the adaptive reuse as the Powerhouse Museum mostly resulted in the industrial buildings remaining as shells only, with most (of their) original equipment, plant, machinery and finishes removed, refit(ted) with modern exhibits, amenities, and services as required for the

modern museum. The substantial bulk of the alterations and additions to the power house site were focussed along the Harris Street frontage, including construction of the new Wran Building. The water conduit (Water Cooling System and Manifold) connecting the Power House and Darling Harbour was repurposed to serve as part of the museum's air conditioning system (and it continues to do so, today). According to project architect, Lionel Glendenning, the design of the Wran building responded to 'the golden mean proportion' of the Turbine Hall, with Vault 1 making architectural reference to the MAAS's first home in the 1879 Garden Palace, and Vault 2 referring to the arches of the Boiler House (ibid, 2024, 41).

A heritage report prepared in 1984 (Godden et al, 1984) reported on the condition of the former power house buildings at the time (although the adaptation of the former Ultimo Tram Shed was undertaken prior to this assessment, without detailed heritage assessment and recommendations (being) prepared prior to development impacts. While the 1984 report made a number of recommendations for retention of the Power House industrial equipment and machinery in its adaptive reuse and interpretation, the majority of these were overridden in the design process for budgetary and time reasons (ibid, 2024, 41).

In 1984 the Darling Harbour Authority was formed by the Wran Government to redevelop the Darling Harbour area. Modern day Darling Harbour was reborn as a tourist destination with museums, shops, restaurants, hotels, overhead monorail and bars, and created as a gift to the people of NSW in celebration of Australia's Bicentenary in 1988. This brought about major changes to Ultimo and Pyrmont. The new Powerhouse Museum was an integral part of this Bicentenary project of national importance.

The development of the Powerhouse Museum in the cavernous spaces of the former Ultimo Power House presented a unique opportunity to interpret the Museum of Applied Arts and Science's transport and engineering collections that documented the technological revolution in power that occurred at the turn of the 20th century within a space that was contemporary with that transformation. The interior of the buildings were cleared, with the exception of the gantry cranes and base of the two Boiler House chimneys (re-purposed for ventilation), new internal floors laid with reference to both the 1893 museum and the 1879 Garden Palace, spaces created and new buildings (the Wran Building and the Galleria) were erected on the western side.

Stage 2 constituted adaptive reuse of former Power House buildings along with the newly constructed Wran Building (ibid, 2024, 42). The adaptive re-use saved the buildings from further deterioration and eventual demolition. The power house was substantially modified for its use as the Powerhouse Museum. The adaptive

reuse was an important early heritage conservation activity following on from the Green Bans of the 1970s. Adaptive reuse is an important conservation activity and the adaptive reuse of the power house is an early and important example of this practice in Australia.

Its grand spaces are appropriate for large objects and major exhibitions. As there had been many changes in configuration of equipment and structures during the power station's life, changes to make it suitable for a museum were in keeping with its history. The majority of building fabric was retained, missing roofs were replaced, machinery pits filled in to create a safe environment, and partial mezzanine floors created to provide display space for smaller exhibitions. The tall Galleria (inspired by the museum's progenitor, the 1879 Garden Palace) and Wran Building, whose large glazed walls and curved steel roofs contrast pleasingly with the old brick walls, were added on the western side and provide a wonderful entry experience. Suspending a diverse group of aircraft, from an early Bleriot to a huge Catalina (sea plane) and small modern planes, over other exhibits ensured that the Turbine Hall and Boiler House became dramatic spaces where visitors contemplate the scope of human creativity.

The spatial relationships in the power house conversion resulted from a collaborative process in the design development stage. The fit-for-purpose design includes the grand hall of the Boiler House being capable of displaying large scale aeronautical, space and ground transport exhibits, the interior cranes of the Turbine Hall and Engine Hall defining display areas and the arched volume of the new galleria, designed specifically to provide a grand setting for the Boulton & Watt engine and Locomotive No1, the first train in NSW.

Exhibitions formerly in the (Stage 1 Powerhouse Museum) Harwood Building were relocated to the Power House buildings and the Harwood Building was converted into conservation laboratories, collection storage and office space (ibid, 2024, 42),

At completion, the Powerhouse Museum was state-of-the-art in relation to museum curatorial standards. Exhibition spaces were designed to be used in a flexible way, with galleries with high floor and ceiling loadings and soaring spaces capable of enormous digital projections, suspended aircraft, steam engines and aerial acrobatics. The sea-water heat exchange and cooling system, which capitalised on the Power House's redundant water cooling system, provided 24-hour air-conditioned climate control, at 22 degrees celsius, 60% humidity, with high filtration of micro dust and gases. Low UV lighting and glass was installed; the existing historic overhead travelling cranes were refurbished and recommissioned, and steam boilers and a bespoke reticulated steam supply system were installed for the steam engine collection.

Stage 2 of the Powerhouse Museum opened to the public on 10 March 1988, as the flagship exhibition space of the Museum of Applied Arts and Sciences, with the former Ultimo Tram Depot (now Harwood Building) becoming offices, workshops, and state of the art conservation laboratories and storage for the collection of the museum.

The opening of the Sydney Monorail in July 1988 provided access to the new Powerhouse Museum from Darling Harbour (and the City), and construction of a nearby monorail station (named Powerhouse Museum Station, in 2002) and covered pedestrian walkway from the station to the museum. The monorail line was raised above ground and traffic and ran past the former Ultimo Power House's Boiler Hall alongside the light rail line (ibid, 2024, 42).

The re-design of the power house into a museum won numerous awards including the Australian Institute of Architects (AIA) - NSW Chapter's Sir John Sulman Medal for public buildings (Powerhouse Museum) in 1988, the AIA National President's Award for Recycled Buildings, the AIA NSW Chapter Belle Interiors Award for Interior Design and was a finalist for the National Sir Zelman Cowen Award. It won the ACROD Award for barrier free circulation, the 1988 Illuminating Engineering Society of Australia's Meritorious Award for display lighting in NSW, Westpac Museum of the Year Award (1988), the Australian Tourism Commission's Best Tourist Attraction in Australia Award (1988).

The redesign of a former industrial complex influenced other adaptation projects in New South Wales, Australia and internationally (e.g.: Casula Powerhouse (Liverpool) and Carriageworks (Eveleigh / Redfern) in NSW; Brisbane Powerhouse; and Longreach Powerhouse and Historical Museum in Qld.; Spotswood Pumping Station conversion into Scienceworks; and the Malthouse Theatre in Victoria; and adaptive reuse of Blackhawk Generating Station into Beloit College Powerhouse, Wisconsin in the USA (ibid, 2024.42) and of the Birkside Power Station into Tate Modern, in London, UK.

To help interpret the history of the buildings, the museum's collection includes photographs, archives and objects related to the power station, depot and tramways. Some objects relate to the Harris family, to working life and others to the public face of the power station and museum, including: full-size Sydney trams; models of NSW trams, electric locomotives and carriages; collections of tram destination rolls, tickets and photographs; a model of Pyrmont Bridge; architectural drawings of the Powerhouse; and the 1988 Sulman Medal. (Debbie Rudder). The Powerhouse is unique in being a museum devoted to applied arts, science and technology. Its nearest equivalents are the Victoria and Albert Museum in London, whose brief is 'art and design' and the Smithsonian Institution in

America, which divides its operations between 19 separate museums. The diversity and extent of collections is notable.

The Powerhouse Museum was the first of several post-modern developments in Ultimo, along with the ABC Centre and the University of Technology, that built on the area's history of education and led the way for newer and different industries centred around information and entertainment.

Its opening occurred on the weekend of March 12 and 13, 1988. The Powerhouse had 20,000 visitors on the first day and 25,000 on the following day. By September 1988, it had received its 1 millionth visitor. Between July 1988 and June 1989, there had been 2,112,001 visitors. Architect Gae Aulenti who designed the interior of the Musee d'Orsay (Paris), which opened in 1986, was one of the early visitors the Powerhouse Museum. The Powerhouse presaged London's Tate Modern - the conversion of a Bankside Power Station - and the yet-to-be-completed Studio Gang adaptive reuse of Blackhawk Generating Station into Beloit College Powerhouse (Wisconsin, USA)... The Director of London's Science Museum, Dame Margaret Weston, stated at (the) opening that 'This museum will rate among the best in the world. The architecture of the old building blending with the new building and the exhibition design is splendid' (SMH, 11/3/1988).

Other key early visitors included: Sir Terence Conran, Trustee of (London's) Victoria and Albert Museum and later Chairman of the Design Museum; Richard McCormack, President of the Royal Institute of British Architects; the Rt. Hon. Margaret Thatcher, Prime Minister of the UK; Her Majesty Queen Beatrix of the Netherlands; Daryl Jackson, architect for Museums Victoria; and designers Marc Newson, Philippe Starc, Karim Rashid and Ron Arad.

The opening year was followed by at least 25 years of successful exhibitions and programs attracting over 19.5 million visitors. When it opened in 1988, there were 25 permanent exhibitions and, for the first two decades, these were updated with a program of partial or complete changes of content. Permanent exhibitions and galleries were supplemented with special events and visiting exhibitions.

The learning environment of the Powerhouse Museum, a direct result of the relationship of purpose-designed exhibits within the context of the built for purpose and adapted buildings, was one of the first new Australian museums designed to embrace the movement away from static displays to interactive engagement. Up to the 1970s, museum education relied upon a didactic, behaviorist teaching model. In the 1980s, things began to change,

with a movement towards exploration, interactivity and hand-on museum displays. These ideas were put into museum practice in the science centres of the 1980s, focusing on experiential learning and the role of the museum to facilitate rather than dictate meaning to the visitor. Glendenning's design lauded the opportunities afforded by the former Ultimo Power House, which accommodated both the traditional style of museum and more radical and experimental display spaces.

One review in the journal 'Technology and Culture' described the Powerhouse Museum as setting 'new standards for the emergent generation of Australian museums' and it was applauded for its 'interactive displays... another great success story of the museum.'. Its opening predated Questacon in Canberra and Scitech in Perth (1988); the Maritime Museum in Sydney (1991); Science Works in Melbourne (1992); and the Melbourne Museum (2000). In 1986-87, William Burch, Assistant Director of the Australian Science and Technology Centre, Andrew Reeves, Deputy Director of the Museum of Victoria, and John Barker, Executive Officer of the Western Australian Science, Industry and Technology Council, all visited the Powerhouse.

In 2000 Bill and Melinda Gates lent Leonardo da Vinci's original scientific notebook, the 'Codex Leicester', a priceless and fragile work, hand-written in da Vinci's mirrored handwriting and illustrated with his drawings, to the museum, which had to meet stringent environmental standards, object handling conditions and display requirements. This same unique and valuable object was loaned in 2018 to the Uffizi Gallery, Florence, to mark da Vinci's 500th anniversary.

In 2005, Rail Corporation NSW (RailCorp) chose to sponsor the redevelopment of the Locomotive No. 1 exhibition as a centrepiece of the 150th anniversary celebrations of the NSW Railways. Locomotive No. 1 has been emblematic of the history of the NSW Railways since its acquisition by the museum in 1884 and it is internationally significant today.

From about 2010, cuts to funding and changes in focus led to a range of public criticism. In 2014 the state government announced plans to relocate the museum to a new facility in Parramatta and sell the site at Ultimo for redevelopment. The ensuing public furore, with advocates on both sides, has dominated the operation and perception of the museum up until the present (2020)(National Trust of Australia (NSW).

In 2011 - 2013 the Powerhouse Museum Revitalisation project brought various changes to elements of the museum, focussed on the Harris Street entry and courtyard, cafe and shop, and revisions to the interiors and

exhibition spaces.

In 2015 the NSW government signalled closure of the museum and its move, with collection, to a new purpose-built facility at Parramatta. The Ultimo site was suggested for redevelopment whilst keeping a cultural use and presence. Create Infrastructure is the agency managing the new potential re-use and re-activation of the site. The heritage halls of the museum were expected to close on 30 June 2020.

On 4 July 2020 the NSW government announced it has abandoned plans to sell the Ultimo site and will now use the Parramatta site as a second Western Sydney location for the museum. Premier Berejiklian said this would ensure Sydney had two world-class museum sites, boosting the arts, tourism and employment. The decision meant the Museum of Applied Arts & Sciences would soon boast 4 centres, the Powerhouse Museum at Ultimo, Sydney Observatory, the Museums Discovery Centre at Castle Hill and the new museum at Parramatta.

In 2020 the Ultimo Power House was listed on the State Heritage Register. Treasurer Dominic Perrottet and Arts Minister Don Harwin announced the Ultimo Powerhouse Museum would be retained and renewed. In June 2021, Harwin announced $480-500 million into the renewal project (Curio Projects, 2022).

A masterplan is being prepared for the site, and a conservation management plan... In 2021 the first post-COVID exhibition - one of a series of 12 - featured largely homegrown exhibitions embedded with social and oral history. They draw on topics such as the eucalypt, the Powerhouse's role in (research into) commercial production of oils, Australian pottery; and the history of graphic design. The first will present photographs by amateur photographer Bayram Ali, who documented the building the Snowy Mountains Hydro Electric Scheme from the mid-1950s-70s. In March, 'Iranzamin', its first exhibition exploring the arts and crafts of Persia, opens, coinciding with the Persian New Year (Morris, 9/2/2021).

The government pledged $500m funding - the first major investment in the museum since it was founded - in the budget. A design competition will be held in 2021 to find an architectural team to reorient the museum's entrance and create a public square at its rear (north), to connect visitors to the future Tech Central, Pyrmont peninsula and metro station development, Darling Harbour and Chinatown. The revamped and expanded museum will have a new, but not exclusive, focus on fashion and design (Morris, 15/6/2021).

On 4 December 2023, Minister for the Arts John Graham announced a revised project scope for the Powerhouse Ultimo heritage revitalisation, with a budget of $250 million (Curio Projects, 2024).

Historic themes

Australian theme (abbrev)	New South Wales theme	Local theme
3. Economy-Developing local, regional and national economies	Events-Activities and processes that mark the consequences of natural and cultural occurrences	Providing a venue for significant events-
3. Economy-Developing local, regional and national economies	Events-Activities and processes that mark the consequences of natural and cultural occurrences	Developing national landmarks-
3. Economy-Developing local, regional and national economies	Industry-Activities associated with the manufacture, production and distribution of goods	Energy supply industry-

3. Economy-Developing local, regional and national economies	Industry-Activities associated with the manufacture, production and distribution of goods	Powering local industries-
3. Economy-Developing local, regional and national economies	Technology-Activities and processes associated with the knowledge or use of mechanical arts and applied sciences	Technologies for adapting rail transport to serve maritime trade-
3. Economy-Developing local, regional and national economies	Technology-Activities and processes associated with the knowledge or use of mechanical arts and applied sciences	Technologies for electrical suppl
3. Economy-Developing local, regional and national economies	Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements	Building and maintaining the pub railway system-
4. Settlement-Building settlements, towns and cities	Accommodation-Activities associated with the provision of accommodation, and particular types of accommodation – does not include architectural styles – use the theme of Creative Endeavour for such activities.	Adapted heritage building or stru

4. Settlement-Building settlements, towns and cities	Land tenure-Activities and processes for identifying forms of ownership and occupancy of land and water, both Aboriginal and non-Aboriginal	Changing land uses - from subur urban-
4. Settlement-Building settlements, towns and cities	Towns, suburbs and villages-Activities associated with creating, planning and managing urban functions, landscapes and lifestyles in towns, suburbs and villages	21st century Suburban Developm
4. Settlement-Building settlements, towns and cities	Towns, suburbs and villages-Activities associated with creating, planning and managing urban functions, landscapes and lifestyles in towns, suburbs and villages	19th century suburban developm
5. Working-Working	Labour-Activities associated with work practises and organised and unorganised labour	Working complex machinery and technologies-
5. Working-Working	Labour-Activities associated with work practises and organised and unorganised labour	Working on public infrastructure projects-
5. Working-Working	Labour-Activities associated with work practises and organised and unorganised labour	Working in places of public entertainment-

6. Educating-Educating	Education-Activities associated with teaching and learning by children and adults, formally and informally.	Community education - adults, s excursions-
8. Culture-Developing cultural institutions and ways of life	Creative endeavour-Activities associated with the production and performance of literary, artistic, architectural and other imaginative, interpretive or inventive works; and/or associated with the production and expression of cultural phenomena; and/or environments that have inspired such creative activities.	Industrial buildings-
8. Culture-Developing cultural institutions and ways of life	Creative endeavour-Activities associated with the production and performance of literary, artistic, architectural and other imaginative, interpretive or inventive works; and/or associated with the production and expression of cultural phenomena; and/or environments that have inspired such creative activities.	Developing cultural institutions a ways of life-National Theme 8
8. Culture-Developing cultural institutions and ways of life	Creative endeavour-Activities associated with the production and performance of literary, artistic, architectural and other imaginative, interpretive or inventive works; and/or associated with the production and expression of cultural phenomena; and/or environments that have inspired such creative activities.	Applying architectural design to utlilitarian structures-
8. Culture-Developing cultural institutions and ways of life	Creative endeavour-Activities associated with the production and performance of literary, artistic, architectural and other imaginative, interpretive or inventive works; and/or associated with the production and expression of cultural phenomena; and/or environments that have inspired such creative activities.	Architectural styles and periods - 20th century postmodern-

8. Culture-Developing cultural institutions and ways of life	Creative endeavour-Activities associated with the production and performance of literary, artistic, architectural and other imaginative, interpretive or inventive works; and/or associated with the production and expression of cultural phenomena; and/or environments that have inspired such creative activities.	Architectural styles and periods - Federation warehouse-
8. Culture-Developing cultural institutions and ways of life	Leisure-Activities associated with recreation and relaxation	Going to a museum-
9. Phases of Life-Marking the phases of life	Persons-Activities of, and associations with, identifiable individuals, families and communal groups	Associations with the Hon. Nevil Wran AC CNZM QC, NSW Prem 1976-86-
9. Phases of Life-Marking the phases of life	Persons-Activities of, and associations with, identifiable individuals, families and communal groups	Associations with Richard Johns architect-
9. Phases of Life-Marking the phases of life	Persons-Activities of, and associations with, identifiable individuals, families and communal groups	Associations with the Hon. John Alexander (Jack) Ferguson MLC trade unionist, politiciian, public servant-

9. Phases of Life-Marking the phases of life	Persons-Activities of, and associations with, identifiable individuals, families and communal groups	Associations with Lionel Glendenning, architect-
9. Phases of Life-Marking the phases of life	Persons-Activities of, and associations with, identifiable individuals, families and communal groups	Associations with Norman Harw Powerhouse Museum curator and collaborative designer-
9. Phases of Life-Marking the phases of life	Persons-Activities of, and associations with, identifiable individuals, families and communal groups	Associations with Dr Lindsay Sh Powerhouse Museum Director-

Assessment of significance

SHR Criteria a)
[Historical significance]

The Ultimo Power House is of State significance historically for being the first state-owned, large electricity generating station in NSW and original generating station for the supply of electricity to power the electric tramway network throughout Sydney. At the time of its construction and for some years after it was one of the largest such plants in Australia. From 1899 to 1963 it was one of the largest and most important generating stations in NSW.

The Ultimo Power House site is historically significant as a place where the NSW electricity authorities trialled significant technological advancements and innovations in electrical generation. This included steam turbines and large-scale, alternating-current generation and steam turbines.

The Water Cooling System and Manifold is historically significant for its integral role in the function of the Ultimo

Power Station and remains in use as part of the air conditioning system of the Powerhouse Museum.

The Power House has associations with electrification of the suburban tramway and railway systems and with the general reticulation of electrical power in Sydney. It supplied power to and has close association with Pyrmont Bridge (SHR No. 1618), Glebe Island Bridge (SHR No. 1914), Sewage Pumping Station No.1 (SHR No. 1336) at Ultimo (and 15 other low level sewage pumping stations in Sydney) and the Ultimo Tram Depot (now, Harwood building). The historical purpose and function of the former power station is readable today through the building fabric, structure, in-situ engineering structures, gantry cranes and chimney bases.

The Ultimo Power House is also of State historic and aesthetic significance for its role in the transformation of the Powerhouse Museum complex and in the wider heritage conservation movement in NSW.

The former Ultimo Tram Shed (Harwood building) has potential State historic significance as the first tram depot shed in New South Wales, the first of Sydney's electric tramway depots, and the model for all the others. It has a close association with the Powerhouse Museum Complex as its initial public exhibition space, conservation workshops, conservation laboratories, climate-controlled storage facility and offices from its beginning and opening to the public in 1981. It was the public face of the Powerhouse Museum until Stage 2 opened in 1988 and has continued to service it since 1981.

The Powerhouse Museum Complex has potential State historic significance as an iconic museum and a major cultural project marking the 1988 Bicentenary. The Bicentenary was a significant event in the history of NSW and a transformative period in Sydney's history, particularly for urban design and heritage conservation. Of many cultural and heritage projects undertaken to mark the 1988 Bicentenary, the Powerhouse Museum stands out for the scale of its design ambition, the cultural investment in the collections and museum infrastructure, the popular acclaim and impact of the museum since 1988, and the development of a landmark museum with a distinctive museology and exhibition design.

It was and remains the largest museum in Australia with more than 42,000 square meters of state-of-the-art exhibition spaces and collections, conservation and research facilities. It is the principal museum of technology, industry, science, design and decorative arts in NSW. It inherits from the earlier Technological Museum historical and cultural associations with their origin in the 1879 Sydney International Exhibition, and important international event demonstrating Australia's industrial and manufacturing capabilities to the world.

The Powerhouse Museum Complex was influential in the urban design of the later buildings in the precinct and other museum facilities across Australia and internationally. It is contemporary with the Musee d'Orsay in Paris and was an inspiration for several subsequent adaptations of industrial heritage buildings, including the Tate Modern (London, UK) and the Blackhawk Generating Station into Beloit College Powerhouse, Wisconsin (USA.).

The Powerhouse Museum Complex is of potential State historic significance as the first large scale conservation and adaptation of an industrial heritage site in Australia and the first in NSW for cultural purposes (with few precedents at the time). It was the first such project undertaken with conscious heritage intent, framed around retention, adaptation and restoration of the former power house. The Powerhouse Museum Complex was one of the first of the 'new' generation of museums that opened in Australia in the 1980s. Museums moved from a didactic single-point-of-view model to a more democratised, participatory, representative and interactive engagement experience. The Powerhouse's opening predated Questacon (Canberra, 11/1988), Scitech (Perth, 8/1988), the Maritime Museum (Sydney, 1991), Scienceworks (Melbourne, 1992) and the Melbourne Museum (2000). The museum complex, as completed, was considered at the time to be a highly innovative design, producing state-of-the-art museum by world standards.

SHR Criteria b)
[Associative significance]

The Powerhouse Museum Complex has potential significance at State level for its associations with several notable figures. These associations include with project champions, former NSW Premier Neville Wran, who personally conceived, approved, and encouraged the project, and then Minister of Works and Deputy Premier, Jack Ferguson, who formed a remarkable political partnership championing many cultural and heritage achievements, this being their most substantial and ambitious.

It has potential associative significance at State level for the design work of principal design architect Lionel Glendenning as his most substantial and significant architectural and cultural achievement, exhibitions designer and director, Richard Johnson, and Powerhouse Museum Director, Dr Lindsay Sharp. This potential State associative significance extends to the NSW Public Works Department and Government Architect's Office in representing a high point in their output and outstanding quality of work. It includes those involved in adaptive reuse of the power house to the museum and in its early years, a veritable rollcall of individuals with important careers in museums or as heritage consultants. These include Norman Harwood, the museum's curatorial driving force behind development of both Stage 1 facilities (Ultimo Tram Sheds) and associated exhibition, who was indispensable to the project's success.

	Ultimo Post Office has associative significance of potential State level with the office of the NSW Government Architect, Walter Liberty Vernon, as one of a group of some 32 buildings built in a similar style by NSW Public Works between 1890 and 1910 in Sydney.
SHR Criteria c) [Aesthetic significance]	Ultimo Power House and Ultimo Tram Shed (Harwood building) have potential State aesthetic significance as a landmark group of buildings which relate closely to the visual and architectural industrial context and functioning of the area. The Boiler House building was, in its day, one of the largest brickwork structures in the State and its (former) chimneys were significant Sydney landmarks for 70 years. The former power station may have State technical significance as a site of technological transfer and innovation for electricity generation in NSW and possibly in Australia. Its achievements are recognised by Engineers Australia. Ultimo Post Office has potential State aesthetic significance as an outstanding example of a Federation former post office which demonstrates many of the key aspects of the style. The Powerhouse Museum Complex has potential State aesthetic and technical significance for its successful reuse as a purpose-designed and built museum successfully integrating old buildings with new. The conservation and adaptation was recognised as successful design, with awards including Sir John Sulman Award for excellence in public architecture, Australian Institute of Architects (AIA) National President's Award for Recycled Buildings, AIA NSW Chapter Belle Interiors Award for Interior Design and as a finalist for the National Sir Zelman Cowen Award. It was influential in the urban design of later buildings in the precinct and other museums across Australia and internationally. The Powerhouse Museum Complex has technical and aesthetic significance at State level as the first major, and a landmark early example of, the adaptive reuse of a large-scale industrial heritage site, which was then a radical and exhilarating new approach to museum making for NSW. The development of the museum within the cavernous spaces of the former power house presented a unique opportunity to profile and interpret the museum's transport and engineering collections in the context of the power technology revolution at the turn of the 20th century that was contemporary with the opening of the Ultimo Power House itself. The Sulman Award was for the whole museum complex, the citation noting the joining of old and new by stepped floors surmounted by two vaulted halls, exploiting the site's fall to provide a sequence of overlapping views, complementarity of new buildings with old, apt use of historic spaces for the museum's technology collection and importance of design collaboration between architecture and exhibitions.

The spatial relationships in the conversion resulted from a collaborative process in the design development stage. The fit-for-purpose design includes the grand hall of the Boiler House being capable of displaying large scale aeronautical, space and ground transport exhibits, the original interior gantry cranes of the Turbine Hall and Engine Hall defining display areas and the arched volume of the new Galleria, designed specifically to provide a grand setting for the Boulton & Watt engine and Locomotive No. 1, the first train in NSW. The remains of the two Boiler House chimneys were re-purposed for ventilation and access, new internal floors laid with reference to both 1893 museum and 1879 Garden Palace, spaces created, and new buildings (Wran building and Galleria) erected on the western side.

The Wran building is a landmark building on Harris Street with distinctive form and scale, whose architectural cues have been reflected in other contemporary buildings along Harris Street.

SHR Criteria d)
[Social significance]

The Powerhouse Museum Complex has potential State social significance as a highly esteemed educational and cultural institution and tourist destination. Its form and use are held in demonstrable public esteem at State level by transport, machinery and engineering groups, architects, museum volunteers, heritage practitioners, tourists, donors, educators and visitors. These strong attachments to the site are represented in national and State awards, listings, high visitation and long-standing campaigns for retention of the buildings and use.

The positive, sustained response from millions of visitors since 1988 suggests that the relationship between buildings in the complex is a key reason for the broad and enduring appeal of the visitor experience.

Integrity/Intactness:

The remains of the Ultimo Tramways Power House principally comprise four interconnected buildings which were the Engine Room and Turbine Hall, the (2nd) Boiler House, the Office Building and the Switch House.

The former Ultimo Power House complex has been substantially altered since its historic use and was a derelict asset open to the sky when acquired and transformed into the MAAS / Powerhouse Museum in 1981 - 1988. After the closure in 1964 the main heritage brick buildings, including the Boiler Room and Turbine Hall, were largely stripped of remaining equipment and all associated moveable heritage elements, with new floors laid, roofing elements, and demolition of significant core elements (such as the Boiler Room chimneys in 1977)...

Equipment from the power station phase has mostly been removed from the interiors and exteriors of the buildings and the buildings survive largely as external shells, adapted to the new use as a Museum.

The remaining features, including overhead gantry cranes in the Engine Room and Turbine Hall, The base of the Boiler House chimneys, floor tiling in the Engine Room, decorative stonework of the Office and Switch House, aid the legibility and interpretation of former use.

There are engineering relics (surviving): the overhead travelling cranes and exposed metal roof trusses - probably of steel. All of these are important in demonstrating the nature and function of the building. Their significance must be respected in any future use and adaptation.

*_The tall, roof-high stumps of two of the three brick chimneys are still in place (the upper parts having been demolished before the museum project was proposed) and in excellent condition, towering over the Boiler House. One is used as part of the museum's air-conditioning system, and the other houses stairs that allow access to the roof.

All that remains of the old boiler house on the eastern side of the Office Building is the remains of the first chimney stack and the flashing outline of the gable roof in the brickwork of the second boiler house. Decorative stonework and brickwork on the northern facade of the Office Building are still in very good condition.

The Engine Room retains many features; the overhead Case gantry cranes remain intact and in place; the white wall tiles were retained, and the floor was finished with tiles carefully matched to the originals; a hole in the eastern wall remains where a pipe carried steam from the Boiler House, and nearby there is a counter-weighted mechanism on the wall that once supported the pipe; the spherical glass light shades are reproductions of those seen in early photographs of the room; the switchboard gallery on the northern wall is mostly original, including one of two staircases and the cast-iron columns with decorative brackets that support the cast-iron floor plates; the other staircase and the wooden balustrades are reproductions. These remaining features inform how the space operated.

The viewing window from the Switch House, which allowed control staff to keep watch over the generating equipment, is still in place. Decorative stonework and brickwork on the on the Switch House are still in very good condition.

The overhead Goninan gantry crane that served the Turbine Hall is still in place, complete with the high-level rails along which it ran.

While not visible (underground), the Water Cooling System and Manifold are an integral component of the power station. The system is underground and is not visible. Underground conduits possibly built of sandstone taking cool water to the Powerhouse from Darling Harbour water's edge and hot water from the Powerhouse to the water's edge. Remains of the engineering equipment/manifold of this cooling system are located in the carpark of the Novotel accessed from Murray Street.
Two of the underground tunnels, which brought cooling water from Darling Harbour to condense steam, and returned the warm water to its source, are still in use as part of the museum's air-conditioning system.

Assessment criteria:

Items are assessed against the State Heritage Register (SHR) Criteria to determine the level of significance. Refer to the Listings below for the level of statutory protection.

Recommended management:

There may be some threat to original or early fabric and 1980s additions with the proposed repurposing of the site. This includes a risk of partial demolition of building fabric to remove large scale collections items along with demolition of the Wran Building and Galleria. It is unknown what the plans are for the interior gantry cranes.

Recommendations

Management Category	Description	Date Updated
Statutory Instrument	Nominate for State Heritage Register (SHR)	

Recommended Management	Review a Conservation Management Plan (CMP)	
Recommended Management	Prepare a maintenance schedule or guidelines	
Recommended Management	Carry out interpretation, promotion and/or education	

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazet Page
Heritage Act - State Heritage Register	Ultimo Power House	02045	04 Sep 20	199	
Heritage Act - Under consideration for SHR/IHO listing	Heritage Council consideration of a nomination for		04 Oct 23		

Heritage Act - s.170 NSW State agency heritage register	Water Cooling System and Manifold				
Heritage Act - s.170 NSW State agency heritage register	The Darling Harbour Rail Corridor				
Local Environmental Plan	Powerhouse Museum former Warehouse Buildings, incl	12031			
Local Environmental Plan	Former Ultimo Post Office including interior	12030			
National Trust of Australia register	Former Ultimo Tram Depot Tram Shed (Powerhouse Mus	S10611			
National Trust of Australia register	Ultimo Power House (Stage Two)	S11648	24 Oct 15		
Royal Australian Institute of Architects register	1988 Museum Building and Courtyard Wran Building 1	4701884			

Institution of Engineers (NSW) Historic Engineering Marker	Powerhouse Museum National Engineering Marker				
Register of the National Estate	Ultimo Post Office	2381			
Register of the National Estate	The Powerhouse Museum (stage 1) (Harwood Building)	100691	27 Oct 98		
Register of the National Estate	The Powerhouse Museum (Stage 2)	100690			

References, internet links & images

Type	Author	Year	Title	Intern Links
Written	AMBS Ecology & Heritage	2018	Historical Archaeological Assessment	

Written	Architectural Projects	2003	Conservation Management Plan: The Powerhouse Museum	
Written	Aurecon	2022	Powerhouse Ultimo: Conservation Management Plan Engagement 'What we heard' Consultation Report	
Written	Brassil, Tony	2019	Ultimo Tram Depot (The Harwood Building), History and Significance2019	
Written	Coast History and Heritage	2022	Draft Aboriginal Overview - Powerhouse, Ultimo	
Written	Curio Projects P/L	2024	Powerhouse Ultimo - Conservatoin Management Plan 2022 - revised (2024)	
Written	Curio Projects P/L	2022	Powerhouse Ultimo - Conservation Management Plan 2022	
Written	Curio Projects P/L	2020	Aboriginal Due Diligence Heritage Assessment Report	

Written	Design 5 Architects, with Lionel Glendenning and Richard Johnson		Powerhouse Museum Design Principles (draft)	
Written	Don Godden and Associates	1984	Ultimo Power House - History and Technology	
Written	Fitzgerald, Shirley and Golder, H.	1994	Pyrmont & Ultimo under siege	
Written	Glendenning, Lionel	1982	The Power House Ultimo	
Written	Godden Mackay P/L	1994	Tramway Workshops, Depots and Substations - Survey and Assessment	
Written	Godden, D.; Higginbotham, E; Pinder, J.; Whittaker, R; Young.		The History and Technology of the Ultimo Power House Sydney - a report to the Government Architect's Branch	
Written	Institution of Engineers, Australia	1994	Nomination of Ultimo Power House as a site for an Historic Engineering Marker	View d

Written	Lonergan, Peter and Chan, Hugo	2020	Powerhouse Museum, Ultimo. Independent heritage assessment commissioned by the Heritage Council of NSW	
Written	Matthews, M.R.	1982	Pyrmont & Ultimo: a History	
Written	Winkworth, Kylie	2019	Policy, Power and the Cultural and Heritage Values of the Powerhouse Museum	
Written	Wood, C.	1988	'Powerhouse'	

Note: internet links may be to web pages, documents or images.

(Click on thumbnail for full size image and image details)

Data source

The information for this entry comes from the following source:

Name: Heritage NSW

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