

Engineering Heritage

Inner Brisbane

A Walk / Drive Tour



Engineers Australia

Queensland Division

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Acknowledgment is given to the John Oxley Library for use of the photograph of the Story Bridge on the cover. The Story Bridge is one of the nineteen items in Queensland to receive Engineering Heritage recognition at the date of publication of this 2015 revision, and one of the ten Engineering Wonders of Queensland.

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Introduction

In 1981, Engineers Australia's Queensland Heritage Panel (EHA[Q] as it was then named) published Brisbane's first engineering heritage trail. Since then, Brisbane has recognised that it retains some outstanding engineering heritage assets. Three of these, the Story Bridge, Cairncross Dock and the northern terminus at Roma Street of the Grafton to Brisbane Standard Gauge Railway, have been accorded Engineering Heritage Recognition by Engineering Heritage Australia. Several (marked * in this text) have been listed in the Queensland Heritage Register, the Brisbane City Council Heritage Register or by the National Trust of Queensland.

Since 1981, some of our heritage assets have been destroyed, while the heritage values of others have been recognised.

Engineering Heritage Queensland (EHQ) hopes that this revised and reprinted second edition of its illustrated walk-drive tour will enrich the understanding and enjoyment of Brisbane's engineering heritage and history for the tourist, student, researcher and resident alike.

Numbers in parentheses in the text show map locations of the heritage sites.

To start the tour

Drive to **Wickham Terrace** from College Road or Leichardt Street. The Terrace turns 90° (towards the south) at Leichardt Street and veers left eastwards at the top of Albert Street. Follow it and park as close as possible to the Tower Mill Hotel.

On the way, notice – or walk back to inspect more closely – on the Wickham Terrace footway (opposite Twine Street), one of four remaining hexagonal reinforced concrete drainage vents * **(1)**. Constructed in the 'Monier System', they are relics of Brisbane's first use of reinforced concrete, erected in c. 1902 to vent 'sectional' sewers designed to carry sullage (bath, laundry and kitchen wastes) and to be flushed by stormwater to the river or the nearest creek. This vent is situated adjacent to the Roma Street Parklands.

On the western side of Wickham Terrace before it veers left is one, and in Wickham Park just after the Terrace veers left are two reinforced concrete frameworks of the City's World War II air raid shelters **(2)**.

The Brisbane City Council adopted an innovative design for its public air raid shelters such that after the War, the brick walls around them could be removed leaving a concrete cantilever roof structure suitable for bus shelters and other shade structures. Many other such shelters still exist, e.g. in Albert Park and at North Quay (William Street), as well as further afield.

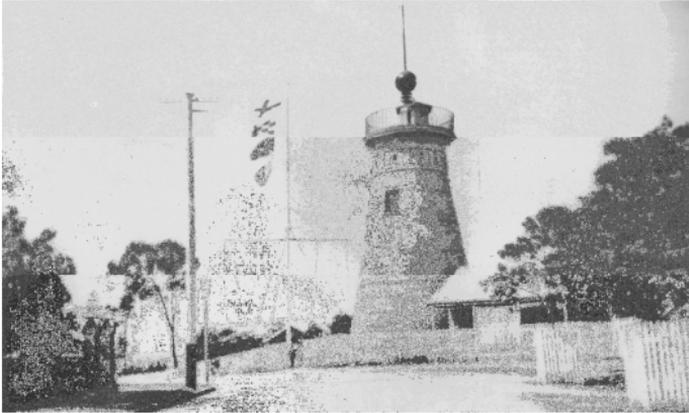
On the kerbside 50 metres before the Windmill and opposite the Metro Hotel Tower Mill is a cast iron standpipe **(3)**. Cast by Evans Anderson Phelan & Co. of Kangaroo Point in about 1916, it is the last visible reminder of the salt-water street flushing system which operated from 1916 to around 1922. The pump was near the William Jolly Bridge site, and the reservoir is under the triangular traffic island opposite St. Andrew's Hospital. In c. 1970 Brisbane City Council ceiled the underground tank and installed BCC electrical Substation No. 194 here.

The Windmill * **(4)**, 1828, in Wickham Terrace, is one of Brisbane's two oldest remaining building and engineering works. Convict-built as a tower mill (as opposed to a post mill) of stone and brick, it was used for milling grain to supply flour and maize meal for the Moreton Bay penal settlement. There were two sets of millstones, one powered by a treadmill and the other by the windmill sails. The sails were tended from a perimeter gallery situated about one-third of the way up the tower. The wind-operated mechanism would not function when first installed and, in 1837, Queensland's first civil engineer, Andrew Petrie, was one of a succession of people called on to rectify it. With the advent of free settlement in 1842, the mill fell into disuse. The building became a signal station for shipping in 1861 and subsequently a lookout station for the fire brigade (c. 1890-1922).

A time-ball was mounted on top of the Tower. Until c. 1960, it signalled the time at 1.00 pm daily (except Sundays) and is still visible on the top of the tower's lookout cabin. Between 1866 and 1894,

a cannon was fired to mark 1.00pm rather than the time-ball. The Tower was used for pioneering experiments on radio in the 1920s and television in the 1930s.

The Brisbane City Council carried out major restoration work on the Tower in 2009.



The 1828 Tower Mill observatory and signal station c. 1910: a telephone post, a gas street light and stone kerb and channel are evident in the left foreground [JOL negative 185525]

Behind the Windmill are two covered water supply service reservoirs * **(5)**. The smaller, designed by Engineering Supervisor Charles Sigley of the Board of Waterworks, was built in 1871; the larger in 1882. Constructed in locally produced brick and fed by gravity from Enoggera Dam, they were balancing reservoirs for the first reticulated water supply in Brisbane and remained in service until 1962. The last of the original reticulation mains in use, a 5 inch (125mm) diameter cast iron pipe running under the centre of George Street, was retired in 1969.

In 2014 the larger reservoir was temporarily fitted out as a venue for public visits, as well as performances by the Underground Opera Company.

Walk further along Wickham Terrace to King Edward Park **(5a)**, named in the early 20th century to honour King Edward VII. Of note is the long flight of stairs – Jacobs Ladder – leading down to Ann Street and another WWII air raid shelter structure. The Park is the site of many contemporary sculptures.

Return to your vehicle and drive down Wickham

Terrace passing on your left the wrought iron verandahs of the Astor Metropole Hotel **(5b)** and the brick fronted United Services Club **(5c)**, established in 1892 as an Officers Club. Cross Edward Street, passing the Wickham Terrace Car Park* **(6)** on the right.

Thiess Bros Pty Ltd constructed stage 1 of this multi-storey car park in 1959–60 to a structural design by consulting engineers McDonald Wagner and Priddle for Brisbane City Architect James Birrell. Pan formwork was adopted for the pre-stressed floor members, this innovation enabling significant economy in construction and elegance in appearance. The same forms were used for the addition of two further storeys, increasing the capacity from 480 to 620 cars, in 1974.

Continue along Wickham Terrace to Turbot Street, moving as soon as possible to the right-hand lane. On the corner of Wickham Terrace and Wharf Streets is All Saints Church * **(6a)**, classified by the National Trust. The present structure of pink porphyry from Windsor quarries dates from 1869. The interior contains a fine example of hammer-beam roof construction, a rarity in Australia.

Turn right at the next traffic signal into **Wharf Street** and then 90° right again at the next intersection into **Ann Street**. Keeping to the left lane, drive two blocks along Ann Street passing at 333 Ann Street the brick facade of the Heritage Listed RS Exton Building * **(6b)** constructed in 1907 as the warehouse and principal base of Brisbane's then major painter, decorator and glazier company.

Continue past the 1901 Brisbane Central Railway Station * **(7)** on the right.

The first building on this site was a small 'timber and tin' structure, opened in 1889 when the line from Roma Street Station terminated here. The tunnel to Brunswick Street Station was opened in the next year, connecting Central Station to the northern rail network. The station was one of several major constructions completed when A.B. Brady, MInstCE, was both Government Architect and Engineer for Bridges (positions he held from 1892 to 1922). A notable feature of the station was an arched roof – of corrugated iron and glass inserts supported by steel trusses – over the platforms. This was removed in 1966 during a

refurbishment. Another loss of original fabric and scale occurred when the elegant Ann Street portico was modified to accommodate a widening of Ann Street.

An electro-pneumatic signalling system was introduced in 1904, the first of its type in Australia.

Electrical switches activated compressed air valves to change points and signals to their required position, replacing the heavy manually operated levers and linkages of previous systems.

By 1915, six platforms had been provided to accommodate the many workers who relied on the railways as their major form of transport. Tall buildings constructed to utilise the air space over the railway crowded the Central Station site by 1974.

Diesel locomotives replaced steam in the 1960s and were succeeded by electric trains from 1978.



Central Railway Station, completed 1901 [JOL negative 157261]

Turn left into and travel down **Edward Street** and on the corner of Queen Street note the former AMP Insurance Company building * **(7a)**, erected in 1934. The company's motto "Amicus certus in re incerta" is visible on the Queen Street facade. From 1942 to 1945 it housed the headquarters of General Douglas MacArthur, the American Commander-in Chief of all allied forces in the South-west Pacific in WWII. The building now houses a holiday apartment complex, and, on the eighth floor, the MacArthur Museum Brisbane, open to the public on selected days. Continuing down Edward Street, turn left into **Elizabeth Street** and halfway along in the next block pass on

the left hand side the rear extension of the GPO Telegraph section where the still existing building housed the Central Telephone Exchange **(7b)** from about 1900 to 1929.

A plaque on the Telstra telephone exchange building at 284 Elizabeth Street on the corner of the private laneway commemorates the nearby sites of the 1888 and 1889 Barton, White & Co power stations in Edison Lane (see p. 36), the first to provide public electricity supply in Brisbane. Their first customer was 110V DC lighting in the Brisbane General Post Office. This installation by pioneering electrical engineer Edward Barton also contained company offices and workshops.



Central Telephone Exchange Building and Technical Staff photographed in 1920 [Photo courtesy of Telstra Museum]

Opposite is the Pugin Chapel **(7c)** the first Cathedral Church of St Stephen constructed between 1848 and 1850. The design was by British Victorian architect AW Pugin. It is Brisbane's oldest church and the city's third oldest building. It was extensively restored in the late 1990s.

Continue along Elizabeth Street and turn around the fig tree into **Eagle Street**, then right into **Mary Street** and left into **Edward Street**. Cross Margaret Street and pause near the entrance to the City Botanic Gardens at the Alice Street corner.

For over 60 years, the block bounded by Edward, Alice, Margaret and Albert Streets was the centre of heavy engineering in Brisbane. On the right, the red brick building dated 1895 was the bulk store of R.R. Smellie and Company * **(8)**, well known 19th century engineers, ship builders and machinery merchants. On the left is the former Port Office, headquarters of the Queensland Harbours and Marine Department for over a century. Originally constructed in 1880 and designed by the Queensland Colonial Architect, F.D.G. Stanley, it was built by notable early Brisbane contractor, John Petrie. All floods in the Brisbane River are measured on the Port Office gauge (now called the City gauge), the two largest on record being within a fortnight in February 1893, when flood levels reached 29 feet (9m) above low tide level.

Turn right into **Alice Street**.

On the corner was Smellie's main building. It later accommodated the Brisbane State Industrial High School. The old building which can be seen from Alice Street immediately beyond Smellie's building was once a store and office for A. Sargeant and Company * **(9)**, another important Brisbane engineering company, which celebrated its centenary in 1981 as ANI-Sargeant.



Telephone poles, a street light, Smellie's machinery depot, a flood and an unusual observation post in Edward Street, February 1893 [JOL negative 74951]

Drive up Alice Street, keeping in the right-hand

lane. At the second intersection, kerbside on **George Street** outside the Queensland Club premises on the right, is one of nine remaining inner city electricity supply footpath pillars **(10)**, a feature of low-rise inner city development.

The housing for this one was cast by Balmer and Crowther, Iron and Brass Founders, Brisbane. Most of these distribution control switch pillars were installed by the City Electric Light (CEL) Company between 1900 and the mid-1950s. All the pillars are still functional, enabling control of circuits in their vicinity.

At the left along Alice Street lies the Queensland University of Technology **(10a)**, situated on the site of the Brisbane Central Technical College from 1915 to 1965, and also the University of Queensland campus from 1910 until its move to St Lucia which commenced in 1949 and continued until the mid-1970s. The original building occupied by UQ on this site was the first Government House * **(10b)**, designed by Charles Tiffin and built by Joshua Jeays of sandstone from Goodna and porphyry from Windsor. It was occupied in May 1862 by the State's first Governor, Sir George Ferguson Bowen, and was home to a total of 11 Governors over 48 years. It was the subject of major restoration in 2009.

At the third set of traffic signals in Alice Street, opposite Parliament House, turn right into **William Street**. Drive across Margaret Street and park in William Street.



William Street c. 1873 viewed from Parliament House, showing the first permanent Victoria Bridge under construction, with Pettigrew's sawmill in the left foreground [JOL negative 163181]

On the left in William Street was the site of William

Pettigrew's 1856 sawmill, the first steam-powered sawmill in Brisbane.



The William Street Power Station of the CEL Co. Ltd functioned from 1910 to 1931; a wharf in South Brisbane, Brisbane's first port, is across the river in the background [JOL negative 39182]

A later use of the site was for the City Electric Light Company power station, which operated between 1910 and 1931 using coal railed from Ipswich to Roma St. & electric-truck delivery along William St.

**BRISBANE SAW MILLS,
WILLIAM STREET, BRISBANE.**

THE following are the prices of Pine and Hardwood Timber at this mill—
 Pine flooring, weather, and lining boards, scantling, and battens, at 16s. 6d. per 100 feet. Boards 12 in. x 1 in. at 17s. 6d. Boards wider charged extra, at the rate of 1d. per foot for every four inches.

Hardwood scantling, at 22s. per 100 feet, for lengths not above 14 feet; 14 to 18 feet, at 23s.; 18 to 22 feet, at 24s.

Hardwood Boards, at 24s. per 100 feet.

Flooring and lining, planed, 21s. 9d.

Ditto and ditto, planed, tongued, and grooved, 22s.

Boards, 12 inches x 1 inch, chamfered, rab., and planed, 23s. 6d.

CHEAP BOARDS.

4-inch at 3d. per foot	1-inch at 4d. per foot	11-inch at 6½d. per foot
4-inch at 3½d. ditto	1½-inch at 4½d. ditto	2-inch at 7d. ditto
5-inch at 3½d. ditto	1½-inch at 5½d. ditto	

HARDWOOD Palings, 6 feet long, at 11s. per 100.

VINE tresselling, 1½-inch by 4-inch or thereby, at 22s. per 1000 lineal feet.

GATES made any practicable size and pattern to order.

CUT firewood, delivered within three quarters of a mile, at 6s. per load.

COAL, at 20s. per ton; delivered, 24s.

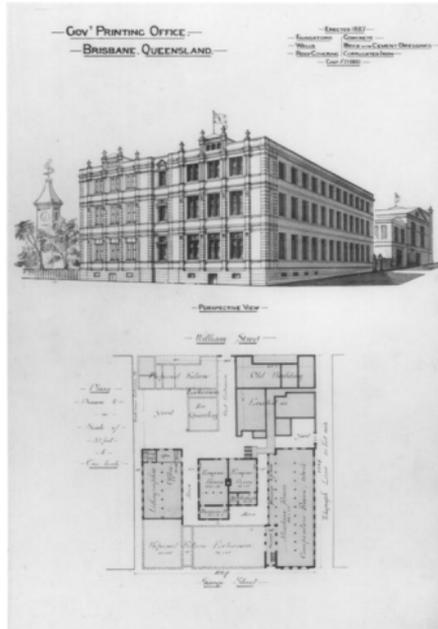
WM. PETTIGREW.

Brisbane, 1st December, 1851.

Advertisement for Brisbane's first steam-powered sawmill, established in 1856 [JOL negative 64896]

A further 150m on the right is the former Government Printing Office * **(11)**, 1872, which can be identified by the high Gothic arches on the facade. Brisbane's first Government electric power station commenced in 1883 at the Government Printing Office by the Edison Co USA to supply 110V DC lighting to composing and publishing rooms . To provide for further expansion a new power station was located on a site at the rear of the Printing Office and completed by 1886 under the supervision of consulting electrical engineer Edward Barton. This provided not only the Printing Office, but also to provide new electric lighting to replace the gas lights in the Queensland Parliament via new 110V DC underground cables along William St, called "Edison Street Tubes", samples of which are held by Queensland Museum.

This power station was decommissioned in 1909, but the building survived with other uses until demolition in 1986. There is a Queensland Engineering Heritage commemorative plaque on site, and also details of buildings on the site which pre-dated the 1883 power station, including the Penal Settlement's Commandant's cottage, built in 1825.



The Government Printing Office as designed, showing the engine rooms [JOL negative 139909]

On the northern side of **Stephens Lane** (formerly Telegraph Lane) the first Electric Telegraph Office was established in 1861. This site was previously occupied by the church of the Rev. John Dunmore

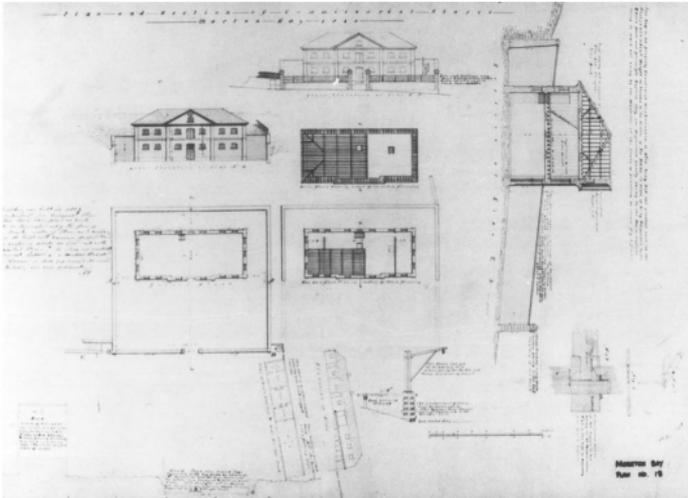
Lang and is now part of the Conrad Hotel.



Electric Telegraph Office (Lang's Church) and Govt. Printery buildings. Photo courtesy of Telstra Museum.

On the left opposite is the Commissariat Store * **(12)**, convict-built in 1828–29 to store the food, clothing and tools used at the convict settlement. It is the headquarters of the Royal Historical Society of Queensland. Andrew Petrie drew plans of the building in 1840. The building has been used mainly as a store, but has also been an immigrant hostel (1850s), police barracks and library archive store. The upper storey was added in 1912. The building now houses a museum and is open for inspection. Constructed from porphyry stone with some sandstone, it has many of the original components still visible. The original timber bearers and beams can be seen; the timbers show a progression of timber milling techniques from pit saw to modern circular saw. Most of the bars placed over the windows to secure the stores are original. The glass was added around the 1860s.

The front of the building faces the river, as stores were delivered from the wharf close by. The original sandstone retaining wall below William Street, some 6m high, collapsed during the January 2011 floods, and has since been completely reconstructed. The Store is one of the most significant convict-built structures to remain in Queensland, the others being the Wickham Terrace Windmill and the convict jetty at Dunwich on Stradbroke Island.



Plan and section of Commissariat Stores and wharf, Moreton Bay (constructed 1829, drawn 1840) [JOL negative 139910]

Continue along William Street, noting the gas light standards **(12a)** outside the Conrad Hotel in William Street, and pause opposite Queen's Park on the right.

In August 1924 the Queensland Government applied for an 'A' class broadcasting licence (i.e. subsidised by licence fees) and in September that year let a contract to Amalgamated Wireless (Australia) (AWA) for the transmission equipment. The Queensland Radio Service, with call sign 4QG, commenced broadcasting on 27 July 1925 on a wavelength of 385m with 500W of power. By April 1926, the service was improved, with permanent studios, a new 5kW transmitter, and an upgraded aerial on top of the eight-storey building **(13)**, on the corner of Elizabeth and George Streets across George Street from Queen's Park. This building was Brisbane's first Government high-rise office building constructed over a seven year period from 1913. It was to be the headquarters of the Queensland Government Savings Bank, but the Commonwealth Bank took over its role. It had several State Government tenants until sold to private owners.

The roof of the building was adorned with two square lattice towers 30m high and 39m apart supporting the aerial. Each tower had 5m crossarms to hold the aerial wires. The station initially carried advertising as well as being

supported by licence fees. In 1930, the station was taken over by the Australian Broadcasting Company, the forerunner of the Australian Broadcasting Commission (ABC) formed in 1932. The Post Master General's Department carried out all broadcast engineering from 1930. The towers were a prominent city landmark until May 1942 when three city radio station transmitters, 4QG, 4QR and 4BK, were removed to suburban sites as a defence precaution as the radio signals could be used for guidance by hostile aircraft. The three stations surrounded General MacArthur's headquarters in the AMP building mentioned earlier. The ABC transmission facility was relocated to Bald Hills, 24km north of Brisbane.



*View in c.
1927, showing
twin 4QG twin
aerial support
masts, each
30m high,*

*(JOL
Neg.203899)*

After crossing Elizabeth Street, turn left and drive over the **Victoria Bridge (14)** to South Brisbane, turning left immediately at the end of the bridge (before reaching the traffic lights at Grey Street). Park in the surrounding streets or in one of the nearby public car parks.

Climb the steps to the former road level of the abutment of the 197 Victoria Bridge * **(15)** to read the plaque that gives a brief history of the bridges. Note the section of tram tracks set in the bitumen on the abutment.

The abutment is all that remains of three previous bridges built to connect Queen Street to Melbourne Street. The first crossing was a temporary wooden bridge opened in 1865 to facilitate the construction

of the first permanent bridge. It collapsed during a minor flood in 1867. The first permanent Victoria Bridge, of wrought iron with cast iron piers and sandstone abutments, was opened for traffic in 1874 but was destroyed by the first 1893 flood.



The 1874 Victoria Bridge in February 1893: good news for ferry operators (view from the north bank) [JOL negative 91660]



The 1893 demolition by flood of Victoria Bridge severed every type of engineering service: tram rails, water main, gas main and telephone (view from the south bank) [JOL negative 55983]

The second permanent bridge was formally opened for traffic in June 1897; the first electric trams ran across the new bridge on 3 July 1897. By 1943, the bridge had suffered considerably from a lack of maintenance and overload. In 1947, the removal of part of the concrete slab that had been substituted for the original timber deck in 1917 reduced the bridge's dead load. Load limits were imposed but it was apparent that the bridge had become obsolete.

The present Victoria Bridge **(14)**, which employs pre-stressed concrete box girders, has two spans of 85m and a centre span of 142m, and was opened to traffic in August 1969. It was designed by the Co-ordinator-General's Department and constructed by Hornibrook Construction Pty Ltd. The south bank just downstream was the heart of the original

Port of Brisbane, lined with wharves until 1970, after which the area was re-developed, first for the 1988 World Expo, then as South Bank Parkland.

The Riverside Expressway **(16)**, on piers on the north side of the South Brisbane Reach of the Brisbane River across the river from South Bank Parkland, was one of five major inner-city road projects of the early 1970s.

The Expressway extends from the William Jolly (formerly the Grey Street) Bridge **(19)** along the South Brisbane Reach to Gardens Point and then across the Captain Cook Bridge **(23)** to the Stanley Street interchange in South Brisbane. Planning and design started in 1965 in the Department of the Co-ordinator-General after the completion of the Brisbane Transportation Study of 1964–65, by Wilbur Smith and Associates of the United States and under the supervision of engineers including Humphrey Brameld, John Gralton, Jack Hardman and Erik Finger.



The Captain Cook Bridge under construction, with the Riverside Expressway in the background. This bridge, and the first section of the Riverside Expressway, opened in early 1973 [Queensland Roads, March 2009]

The Captain Cook Bridge **(23)** was designed to carry 43,000 vehicles per day. The estimated cost in 1968 was \$24 million. Work started on the project under three main contracts awarded in 1969 to Thiess Bros (the southern approach and the Stanley–Vulture Streets interchange), Transfield (the bridge) and McDougall-Ireland (the South Brisbane Reach superstructure). The lowest level of the expressway (6.8m above mean sea

level) is at the Victoria Bridge underpass. After the commissioning of the expressway in early 1973, the 1974 flood occurred without affecting expressway traffic.

Immediately across Melbourne Street and fronting the Brisbane River are the Queensland Museum and Sciencentre **(17)**, the Art Gallery, the State Library and the Gallery of Modern Art (GOMA). The Museum is open seven days a week (except for several public holidays), with free admission. Its collection includes a diversity of heritage engineering items, some of which are displayed on a changing basis. Specialist collections include railway, maritime, road, and aviation transport; science and technology in society; and audio-visual technology.

Of the aircraft held by the museum, the most important is the Avro Avian Cirrus in which pioneer Queensland aviator Bert Hinkler made the first solo flight from England to Australia in 1928.



Bert Hinkler's Avro Avian Cirrus aeroplane in the former Queensland Museum Building on Gregory Terrace [JOL Negative 194151]

The John Oxley Library **(18)**, on the 4th floor of the Queensland State Library, is a prime research facility for early Brisbane and Queensland history. It houses a large collection of books, manuscripts, photographs and some engineering records and has similar opening hours to the Museum.

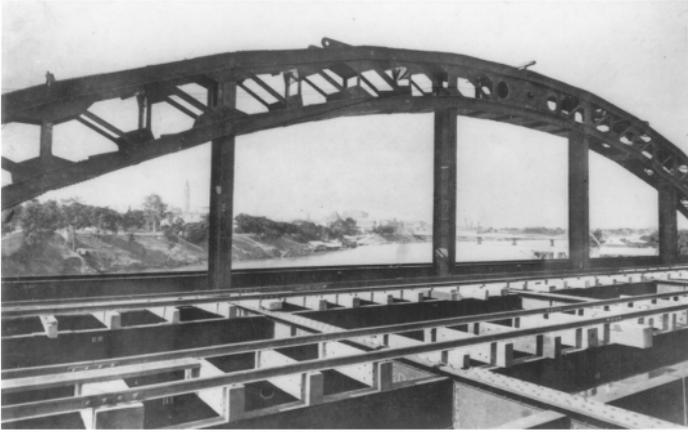
Return to the vehicle and drive west along **Stanley Street** taking the "Exit to **Montague Road**" at the State Library, pass GOMA and drive under the William Jolly Bridge * **(19)** southern approach

spans and park in the next two blocks of Montague Road. Walk back under the William Jolly Bridge to Kurilpa Point and view the Kurilpa Bridge (**19a**), opened to pedestrian and bicycle traffic in October 2009. The bridge is a multiple-mast, cable-stay structure based on principles of tensegrity, an architectural and engineering system in which the structural integrity is a synergy between balanced tension and compression components. This produces a lightweight yet strong and stable structure. Its appearance, with a network of steel masts seemingly held in suspension by a delicate cross stitching of high wire tensioned cables, presents an artistic array of cables and flying struts recalling the ropes and spars of sailing ships and boats; or perhaps dancers at the nearby Queensland Performing Arts Centre. Baulderstone Pty Ltd was selected to design and construct the bridge and local design consultants Cox Rayner Architects and ARUP Engineers, formed part of the design team.

Proceed along the **riverside walk** under the most southerly span (arch-supported) of the 1932 William Jolly Bridge (**19**) and the 1978 Merivale Bridge (**20**).

In 1932, the newly formed Greater Brisbane Council, under its first Lord Mayor, William Jolly, constructed the Grey Street Bridge (since re-named for that Mayor). It was designed in 1927 by a team of Brisbane engineers led by J. Baldwin and supervised by A.E. Harding Frew. They used a Swiss approach to reinforced concrete in which the contractor Manuel Hornibrook constructed six 66.4m steel arches which were then encased in concrete. The method used little formwork and both the steel and concrete took deck and traffic loads. The steel arches were raised into position only days before the February 1931 flood. The approach spans used sprayed concrete (gunite).

The bridge's foundations were formed using pneumatic caissons, one of the earliest uses of this method in Australia. The bridge was designed for two events that never eventuated: the central thickening under the bridge was to support two tram lines; also, the short arch on the south bank was to cross an avenue to mirror Coronation Drive. The bridge was opened in 1932, the same year as the Sydney Harbour Bridge.



The 1897 Victoria Bridge and the recently completed City Hall seen through an arch of the Grey Street (later William Jolly) Bridge during construction in 1931 [JOL negative 63830]

Upstream of the William Jolly Bridge * **(19)** are the 133m span inclined arches of the Merivale Bridge **(20)**. This railway bridge carries both narrow gauge Queensland Rail and standard gauge interstate trains, requiring three rails instead of the usual two. A bridge was designed for this location and some drilling was performed in 1889; however, the depression of the 1890s halted the South Coast line at South Brisbane for almost a century. The project was re-examined six times before the design was commissioned in 1972. The bridge was opened in 1978 and cut the distance between South Brisbane and Roma Street stations from 21km to 1.2km! One of the design considerations was to locate the bridge out of the shipping lane and to enable the piers to be able to withstand a sideswipe from the coral barge Cementco on its regular trips (since ceased) to the Darra cement works (since closed and the area re-developed).

The bridge, with its 754m of pre-stressed concrete approaches, was designed and supervised by the Brisbane firm of Cameron, McNamara and Partners under the direction of John Snelling. John Christsen was the design manager and Ken Ross the leader for the main span design. Transfield was the contractor for the link, which cost \$21 million in 1978.

Across the river, downstream and for a very short distance upstream of the northern abutment of the Merivale Bridge, the 1887 Mayor Hipwood ornamental brick wall and wrought iron fence **(20a)** can be seen. This was built on a mass concrete infill of a major subsidence in early 1887 that cut River Road (re-named Coronation Drive in 1938). Contractor George E. Willcocks built the works to the design of City Engineer Thomas Kirk.



Merivale Railway Bridge, completed 1978: viewed from Coronation Drive [JOL negative 94511]

Immediately upstream of the Merivale Rail Bridge **(20)** is the Go Between Bridge **(20b)**. Construction in the hands of the Hale Street Link Alliance - the Brisbane City Council, Bouygues Construction, Hyder, Macmahon and Seymour Whyte - started in June 2008 and the bridge was opened for traffic in mid-2010. It comprises 2 separate decks, and in form is close to that of the existing Victoria Bridge

Return along the short section of **Merivale Street** to **Montague Road**. Drive along Montague road and turn left into **Merivale Street**. Cross Peel Street and turn left at **Melbourne Street**, taking care to use the right (non-bus) half of the carriageway. Turn right into **Grey Street** and proceed past the South Brisbane Railway Station * **(21)**.

As will be noted later in the tour, the first South Brisbane Station was built near the Dry Dock in 1884. It was built as an offshoot of the line from the vast Woollongabba rail yards and it also served the wharves and industrial areas nearby. By 1891, the site of South Brisbane Station had

been shifted to its present location on an embankment high enough to enable a flood-free crossing of the Brisbane River. That crossing took another 87 years to eventuate.

In 1930, the route to Sydney on standard gauge rail, via Kyogle and the famous spiral loop, was opened and an interstate station was built on what is now the Convention Centre site. This station continued in use by interstate travellers until 1978, when the standard gauge line was extended across the River via the Merivale Bridge to the present interstate terminus at Roma Street Station. The interstate rail line from Grafton to South Brisbane has received Engineers Australia's National Engineering Heritage Landmark recognition.

Continue to the end of Grey Street. Turn half left into **Vulture Street** and left again into **Dock Street** to park in Sidon Street or Stanley Street near the entrance to the Queensland Maritime Museum **(22)**.

This museum is arguably Australia's most authentically equipped maritime museum. It incorporates numerous items of marine engineering heritage including the tug Forceful, the frigate Diamantina and the South Brisbane Dry Dock. It is open every day except a few public holidays each year. The entrance road crosses a cutting of a railway line which once served the South Brisbane wharves.

The South Brisbane Dry Dock* is Queensland's first dry dock. It was designed in 1875 by William Nisbet, Engineer for Harbours and Rivers, built by J and A Overend and commissioned in 1881. English Portland cement, Victorian granite, local sandstone and porphyry were used in the construction. RR Smellie and Co. fabricated the caisson (floating gate). The dock was extended in 1887 in unlined open cut. During World War II, it was used extensively for docking naval ships, including US submarines. The Department of Harbours and Marine operated the dock until 1973. The original caisson has been replaced by a solid concrete wall across the entrance to the dock.

The dock holds the River Class frigate (formerly HMAS) Diamantina. Built by Walkers Limited of Maryborough, Diamantina was launched in 1945.

She was used briefly for war duties, notably for three surrender ceremonies in September 1945, then for oceanographic surveys until being paid off in 1979 and steaming to South Brisbane. Diamantina is fitted with two four-cylinder triple expansion reciprocating engines and has two Admiralty three-drum boilers. Several of her cabins have been adapted as museum display areas. Her radio equipment is still fully functional, as is most of her machinery, including the main engines and boilers.

The 288 ton coal-fired tug Forceful steamed from Glasgow to Brisbane in 1925. She was used in the Brisbane River and in Queensland waters, until acquired by the Museum in 1971.

Many marine engines, both restored and model, are on display in the museum, along with scale models of sailing ships and other memorabilia in one of Brisbane's earliest remaining industrial sites. More details can be found on the Museum's website.



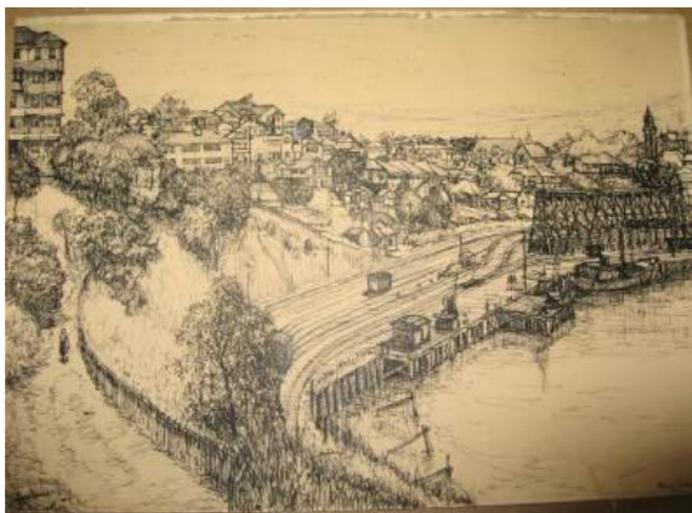
A ship in South Brisbane Dry Dock, 1964 [JOL Negative 201594]

The first South Brisbane passenger railway station, built in 1884 and called Stanley Street, was located within the Museum reserve, between the Dry Dock and Dock Street, with one end of the platform at Stanley Street.

Passing over the Maritime Museum land and joining the QUT site on the north bank to Sidon Street on the south bank is the 450m long Goodwill Bridge, **(22a)** a pedestrian and cycle bridge opened in 2001. It was a project of Cox Rayner architects, Ove Arup & Partners engineers, with John Holland Pty. Ltd. the contractor.

Drive down **Dock Street** into **Lower River Terrace**. Stop in one of the parking bays near the Captain Cook Bridge **(23)** and walk along the **Cliffs Boardwalk**.

Upstream, under and for a short distance downstream of the Captain Cook Bridge are the remains of Brisbane's Coal Wharf. Four large cylindrical loading crane bases **(24)** can be seen close offshore in the River. The riverside flat and the wharf were occupied from 1884 until the 1940s by railway marshalling yards for the coal trade.



The Coal Wharf, a view in November 1950 [Pen and ink illustration by Thomas N Mitchell, courtesy of Robyn Black]

Further downstream are extensive man-made cliffs **(25)**, the result of a century of quarrying. "Brisbane Porphyry" (vitrified volcanic tuff) was quarried here from the 1860s onwards for the dry dock, river revetment walls, etc. The quarry was operated by the Department of Harbours and Marine until the 1960s and was also the site of an

hydraulic model laboratory used to design port structures. It is now the site for training rock climbers.

About 250m downstream of the bridge is the outfall of the 3m diameter Leopard Street tunnel **(26)**. This tunnel was driven along the line of Leopard Street in 1890 to drain a chain of water holes on which the Woolloongabba railway yards were located, near the Cricket Ground. A further 750m along the walk, at the downstream end of the quarry, is where in 1826 in the vicinity of the later Naval Stores, Commandant Logan first quarried stone for his building works across the river at North Brisbane. The remaining one of two Queensland Naval Stores * **(27)**, dates from 1887. The Royal Australian Navy Reserve vacated this site in 1959 and it was occupied by the Army until 1984. In 1987, the No 1 store burned down, leaving only its lower floor which had been used for gunnery training. The No 2 store remains and now houses the Riverlife Adventure Centre. There are two interpretative panels, remains of the concrete slipway with its inset steel rails and a short section of timber wharfage on which are examples of large anchors and chains.

Return to Lower River Terrace. Drive up under the southern span of the bridge. Turn up **Ellis Street**, then turn left into **Leopard Street**. Park in **River Terrace** near the circular lookout shelter - Scout Place - on the left shortly after Walmsley Street. Walk to the lookout for a different view of the five items described above.

Continue along River Terrace. Turn half left at the traffic signals into **Main Street**. Take the left turn lane. At the start of the bridge approach (Thornton Street), veer left and continue down to the end of Main Street, parking in **Holman Street**, along the southern boundary of John Burke Park.

Along the western (City) end of Holman Street were the engineering works of Evans Anderson Phelan & Co., occupying much of what is now John Burke Park. This Company built many steam locomotives between 1890 and 1927. The locomotives were delivered under their own steam - usually in pairs, on sets of tracks leap-frogged along Main Street - to the Woolloongabba railway yards.

In John Burke Park, near the intersection of Holman and Main Streets, there is a Story Board setting out a brief history of the Shipping Company after whom the Park is named.

From John Burke Park, view the Historic Engineering Marker plaque **(28)** awarded in 1988 to the Story Bridge * **(29)** by Engineers Australia. After completion of the Sydney Harbour Bridge in 1932, the Queensland Government appointed Dr JJC Bradfield to be consulting engineer for this bridge. It was designed and supervised by JA (later Sir James) Holt and constructed by a consortium of established Queensland companies – Hornibrook and Evans Deakin – formed especially for this unemployment relief project. It was the largest steel bridge designed and built by Australians, with the steelwork fabricated at the Evans Deakin Company works at Rocklea. The main structure consists of a 282m river span (comprising 2 cantilever arms and a suspended span, all of equal length) and two anchor spans, each 82m in length. It was opened to traffic in July 1940.



Story Bridge approaching completion (1940): Evans Anderson Phelan & Co. works at left, City Hall tower at centre, Circular Quay wharves at right [JOL negative 150513]

Return up along **Main Street**, turn left at **Rotherham Street**, drive under the bridge approach and turn right along **Deakin Street**.

The re-developed areas between Darragh Street and Cairns Street were previously the Evans Deakin shipbuilding yards, established in 1940 and closed in 1975. The Company began by building ships to meet Australia's defence needs in WWII. Over 80 large vessels, including an oil-drilling rig, were constructed. The Dockside marina **(30)** was formerly a large dry dock for ship construction, built by the State Government and Evans Deakin between 1964 and 1967. It is on the site of a slip built by Hugh Moar in 1881. Evans Deakin used Moar's slip from 1940 until work started on the dry dock in 1964.

A ship built by the company, the RW Miller, was at the fitting out berth in the river when the 1974 flood struck Brisbane. It was cut loose from its moorings by the force of the flood and valiant efforts were needed by Marine personnel and tug operators to prevent its being lost.

Turn left at the roundabout at **Cairns Street** and park nearby. Walk to the Ferryman's Bridge - 100m from the roundabout on the left - for a closer view of the marina. Return via Deakin, Rotherham and Main Streets to **Thornton Street**. Turn left 180° into **Bradfield Highway** - one of the shortest Highways in Australia - to cross the bridge. Keep to the left lane on the bridge, exiting to the left down **Ivory Street** and thence via **Boundary, Adelaide, Queen** and **Eagle Streets** to **Charlotte Street**.

There are several items of interest in this part of the drive. Adelaide Street skirts the site where the first gas works was established in 1864. In Queen Street, note the cast iron railing **(31)** on the left, cast in 1882 by Smith and Forrester Limited, another early Brisbane company.

The small park at the junction of Queen and Eagle streets contains the 1879 Drinking Fountain * **(32)**, dedicated to volunteer firefighter James Mooney who died while fighting a fire in Queen Street in March 1877. It is made from Spring Hill porphyry, Murphys Creek sandstone and imported granite and marble. It has a number of engineering associations, being designed by Brisbane's City Engineer from 1875 to 1886, W. H. Chambers. The Aldermen listed on the plaque include the prominent engineers and contractors, William Pettigrew, John Sinclair, and Alfred Doorey.

At Charlotte Street, park on the street or in the parking station. Proceed to the **riverside walkway**.

Downstream along the riverside walkway from Alice Street, the Contract No. 1 Stormwater Drainage Outfall at the end of Charlotte Street is now obscured by later riverside developments. It was the discharge point of an early major drainage scheme designed by Engineer for Harbours and Rivers, WD Nisbet, and built between 1875 and 1877. It drained Big Creek (also known as Wheat Creek), whose upper reaches were the source of Brisbane's water supply from 1829 to 1866. The original, finely detailed porphyry headwall was prematurely demolished in 1989.

Continue along the riverside walkway and view the Story Bridge.

Leave the walkway at the Brisbane Customs House * **(33)**. This impressive example of Victorian Free Classical Style architecture was constructed in the period 1886 - 1889 and replaced an earlier single storey brick structure in the same vicinity. It shows two storeys on its Queen Street frontage and three storeys to the river. A feature is the copper-sheathed dome over the impressive Long Room. Customs activities, taken over by the Commonwealth in 1901, ceased in this building in 1988 and it re-opened in 1994 as a CBD presence for the University of Queensland.



*The imposing new Brisbane Customs House in 1889
[JOL image 100069]*

Continue up its right hand side to a rough, stone-slabbed path that leads through a small gate. On the

left is a long porphyry wall * **(31)**. This coursed rubble wall was built by Henry Patten in 1881 to permit the extension of Queen Street and is topped by the cast iron railings referred to previously. Buttresses were added to the northern end of the wall in 1887 to stabilise it.

Returning to the vehicle, drive up Charlotte Street and turn right into **George Street** and park near the Adelaide Street intersection. Look at the Brisbane City Hall **(34)**, constructed from 1924 and beginning to be occupied from late 1927. Engineering design input to the structure was by RJ McWilliam.



*Brisbane City Hall at its official opening, 8 April 1930
[JOL negative 31184]*

In 2010 the City Hall was closed for a major restoration, re-opening in 2014. In the nearby King George Square underground Busway Station there is displayed a short restored section of the ovoid Wheat Creek culvert, constructed in 1861 from Brisbane Tuff (porphyry) to drain storm water from Albert Street to the Brisbane River.

This completes the tour. Perhaps you would like explore some, perhaps all, of the engineering and industrial heritage sites in the wider Brisbane area listed on the following pages.

Engineering and Industrial Heritage Sites in Outer Brisbane

Public Access	UBD Ref
Hornibrook Highway * (remnant), Brighton	100 N8
Shorncliffe Pier, Park Parade, Shorncliffe	111 F6
Brick chimney at the Prince Charles Hospital, Webster Road, Chermside	119 N15
Fokker trimotor aircraft Southern Cross, Kingsford Smith Memorial, Correa Street, Brisbane Airport	121 Q20
Tramways Museum, Tramway Street, Ferny Grove	137 L3
Newmarket Brickworks Chimney*, Mina Parade, Alderley	139 F12
Gateway Bridges, recently named the Sir Leo Hielscher Bridges, Gateway Arterial Road	141 M20
Fort Lytton National Park*, Lytton Road, Lytton	142 R5
Old mine shafts, Sir Samuel Griffith Drive, Mt Coot-tha	157 P13
Otis Steam Engine (ex-Patterson's Sawmill), Oakman Park, Moggill Road, Toowong	158 Q20
Paddington Water Tower*, Garfield Drive, Paddington	158 R6
Gas Stripping Tower*, Davies Park, Riverside Drive, West End	159 E15
Circular Brick chimney at the Mater Hospital, Clarence Street, Woolloongabba	159 Q19
Brisbane Gas Company (Boral) gasholder*, Longlands Street, Newstead	160 E3
Former New Farm Power Station, now Powerhouse Theatre, Lamington Street, New Farm	160 J10
Lake Manchester, Lake Manchester Road, Lake Manchester	173 D1
Albert (rail) and Walter Taylor (road) Bridges plus Jack Pesch Bridge for pedestrians and bicycles, Coonan Street, Indooroopilly	178 K7
Steam Roller, Graceville Memorial Park, Oxley Road, Graceville	178 L13
Archerfield Airport, Beatty Road, Archerfield	199 J17

Public Access	UBD Ref
The Workshops Rail Museum, North Street, North Ipswich	213 E13
Wolston Park Hospital Power House*, Court Road, Wacol	216 R9
Private property: possible access by prior arrangement	
Bald Hills Radio Transmission Station, 99 Kluver Street, Bald Hills [contact Broadcast Australia at www.broadcaustralia.com.au]	109 J1
Gold Creek Dam, Gold Creek Road, Brookfield [contact Seqwater]	136 L14
Bulimba Power Station, Paringa Road, Murarrie [contact Visyboard]	142 B18
Enoggera Dam, Waterworks Road, The Gap [contact Seqwater]	157 G1
XXXX Brewery, Milton Road, Milton: a steam-powered ammonia compressor is visible from Milton Road [contact Lion Nathan Australia Pty Ltd]	159 F10
Cairncross Graving Dock, Thynne Road, Colmslie [contact Forgacs Cairncross] The Dock has received Engineering Heritage recognition.	161 B1.
Mt Crosby water treatment works, Mt Crosby Road, Mt Crosby [contact Seqwater]	174 F18
University of Queensland Mine, Isles Road, Indooroopilly	178 F6
Mt Crosby pumping station and weir, Stumers Road, Mt Crosby [contact Seqwater]	194 E1

* denotes a heritage-listed site

Useful Contacts

Engineering Heritage Queensland hopes that you have found the tour interesting and enjoyable. Further information on Brisbane's engineering and industrial history may be obtained from:

Australian Railway Historical Society –
Queensland Division
www.arhs-qld.org.au
GPO Box 682, Brisbane Q 4001

Brisbane History Group
www.brisbanehistory.asn.au
Box 12, Kelvin Grove DC Q 4051 Tel: 3351 6371

Brisbane Tramway Museum
www.brisbanetramwaymuseum.org
Tramway Street, Ferny Grove
Telephone 3351 1776

Engineering Heritage Queensland
www.engineersaustralia.org.au/engineering-heritage-queensland-ehq
Engineering House
447 Upper Edward Street, Brisbane Q 4000
Telephone 3226 3002

National Trust of Queensland
www.nationaltrust.org.au/qld/Home
95 William Street, Brisbane Q 4000
Telephone 3223 6666

Queensland Maritime Museum
www.maritimemuseum.com.au
412 Stanley Street, South Brisbane Q 4101
Telephone 3844 5361

Queensland Museum
www.qm.qld.gov.au
Corner of Grey & Melbourne Streets, South Bank,
South Brisbane Q 4101
Telephone 3840 7555

Queensland Women's Historical
Association
www.miegunyah.org
'Miegunyah'
35 Jordan Terrace, Bowen Hills Q 4006
Telephone 3252 2979

Royal Historical Society of Queensland
www.queenslandhistory.org
Commissariat Store, William Street, Brisbane
Telephone 3221 4198

Telstra Museum
www.telemuseum.org/index-2.html
Cnr Oriel & Sandgate Roads, Clayfield Q 4011
Telephone 3862 2958

Transport & Main Roads Heritage Centre
www.tmr.qld.gov.au/Community-and-
environment/Research-and-education/Heritage-
centre.aspx
2-22 Mutze Street, Toowoomba
Telephone 4633 2506

Suggested Further Reading

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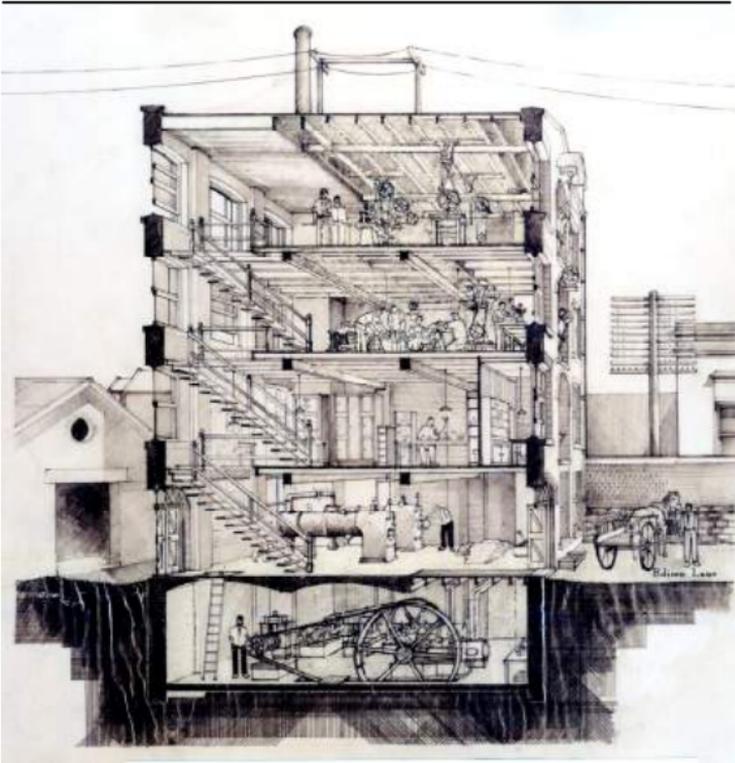
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Barton ,White & Company's first permanent power station and works in Telegraph (Later Edison) Lane behind the GPO – in use from 1889 to c 1990.

Top floor: Fitters' Shop with overhead line shafting. The cathead hoist outside the window is lowering a fan manufactured in the building.

2nd Floor: Workshop – overhead line shafting operated by an electric motor bolted at ceiling level near the far wall. The men appear to be assembling fans.

1st Floor: Offices and Stores

Ground Floor: Boiler Room with stacked wood fuel.

Basement: Engine room and dynamo, with ladder-only access and a trench in the floor for the flywheel/pulley and belt. The 'duckboard' allowed the attendant to duck through the gap.

(Artists impression of the power station , workshops, & factory by Mark Whitmore 1988 for the publication "Edward Barton –1858-1942 Pioneer Electrical Engineer " by SA Prentice)

