



# THE STORY BRIDGE

Jennifer Moran describes the history of Brisbane's Story Bridge and its design by distinguished engineer Dr John Bradfield

If you walk from the anchor pier to the main south pier of Brisbane's Story Bridge on Kangaroo Point, you hear an echo to the left and a percussive beat to the right. In the mid distance, there is the rolling thunder of trucks, and a resonant 'boom ... boom' counts the cars crossing expansion joints. At night, the best spot to appreciate the bridge is from the river walkway. Lit along its frame, its clunky metal acquires shadowed grace and the moving lights of cars signal the romance of cities, their seductive rush.

The plaque on the west side of the south pier offers its credentials: 'The Story Bridge, opened on 6 July, 1940, is the largest steel cantilever bridge in Australia'. It was unveiled by the then Lord Mayor of Brisbane, Jim Soorley, on 15 June 1999 to mark the final payment for the bridge on that date.

In the National Library of Australia's collection, there are several photographs and drawings of the Story Bridge. Among Frank Hurley's work, there is a series of aerial photographs of Brisbane featuring the bridge, as well as one at street level of the city buildings with the bridge between them, probably taken in the early 1940s. Geoffrey Powell's 1939 photograph of the Story

## AN ENGINEERING FEAT

Bridge construction, shot from the northern shore, shows the first section reaching across the river from Kangaroo Point.

Even though Charles Coulter's sketch of the bridge from the 1940s shows some damage, like little spot fires, it provides an interesting counterpoint to a drawing by Dr John Job Crew Bradfield, dated around 1933, which is washed with light and shadow. In the Bradfield drawing, Brisbane City Hall rises behind the bridge; now, of course, it is hidden by skyscrapers. Some of the other buildings in his drawing are still recognisable, such as Customs House and the sheds along the water. The bridge is the focus, the perspectives are almost counterintuitive.

But even more fascinating than this drawing are the sketches with Bradfield's papers that are held in the Library. A pencil drawing, with an unattributed, handwritten note saying 'These could be the original "Pencil on paper" sketches of the bridge', is amongst these papers.

Dr Bradfield, a distinguished engineer, was responsible for the design of the Story Bridge. The original designer of the Sydney Harbour Bridge, though this claim was later disputed by some, Bradfield had an extensive list of other engineering feats to his credit when, in December 1933, he was hired as consultant engineer for the Bureau of

above:  
J.J.C. Bradfield (1867–1943)  
*Story Bridge across the Brisbane River, Queensland*  
c.1933  
wash drawing; 56.0 x 137.0 cm  
Pictures Collection  
nla.pic-an5812829

below:  
H.C. Krutli  
*Portrait of Dr Bradfield 1920s*  
b&w photograph; 16.4 x 10.6 cm  
Pictures Collection  
nla.pic-an23278893





Geoffrey Powell (1918–1989)  
*Construction of the Story  
Bridge, Brisbane, 1939*  
gelatin silver photograph  
21.0 x 32.9 cm  
Pictures Collection  
nla.pic-vn3305745

Industry, charged with the construction of a proposed bridge across the Brisbane River.

Bradfield was a Queenslander, even though he spent much of his working life elsewhere. He was born at Sandgate in 1867 and attended Ipswich Grammar School, where he was dux and won a Queensland Government University Exhibition. He studied engineering at the University of Sydney and then returned to Brisbane where he worked for the railways as a draftsman and designed a footbridge at Roma Street Station. Two years later, he was retrenched and moved back to Sydney where he was hired as a draughtsman by the New South Wales Department of Public Works. He was made assistant engineer in 1909 and chief engineer for metropolitan railway construction in 1913, a position he held until 1930. He represented the government in its dealings with the contractors and in the supervision of the construction of the Sydney Harbour Bridge. He retired in 1933.

At the time Brisbane urgently needed more bridges. In 1925, the newly inaugurated Greater Brisbane Council had appointed a commission to investigate the need for bridges and tunnels across the river. There were only two bridges across the river then—Victoria Bridge which crossed from the south bank to near Queen Street in the city and the Albert Railway Bridge at Indooroopilly. The commission had

recommended 11 crossings including two tramway tunnels.

In 1930, according to Michael Moy's *Story Bridge: Idea to Icon* (2005), Dorman Long and Company, which had built Sydney Harbour Bridge, approached the Queensland Country and National Government with a proposal to build and operate a toll bridge between Kangaroo Point and Bowen Terrace. However, this was not pursued. A few years later, the new Labor Government, trying to counter unemployment during the Depression,

committed to three building works: the Somerset Dam, the relocation of the university from the city to St Lucia and a river crossing at Kangaroo Point.

With a population of 299 782 in Greater Brisbane (according to the 1933 census), Bradfield, in his role as consultant engineer, had to consider the likely volumes of traffic for the bridge from surrounding suburbs, as well as make projections 60 years into the future.

He proposed a cantilever bridge, a stable and reliable option given the geology of the area. On the northern approach at Petrie Bight, he noted, the riverbank was concave with high, steep cliffs formed of Brisbane schist and tuff (volcanic ash compacted into rock). On the Kangaroo Point side, the riverbank was convex and the rock, also schist and tuff, extended below water level.

The minimum clear span of the bridge had to be 'not less than 924 feet [282 metres]' between the main piers to leave the water clear for shipping. The steep gradient that was required for a high bridge to accommodate all shipping forced a small height compromise, but Bradfield was happy with his recommended 100 feet (30.5 metres) above the water.

The tender 'for the construction, erection and completion of Cantilever Bridge and Approaches across the Brisbane River at Kangaroo Point' was won by Evans Deakin–Hornibrook Constructions Pty Ltd, which

described itself in tender documents as a 'purely Queensland Company financed by Queensland Capital and representative of Queensland Engineering enterprise'.

The company also undertook to procure nearly all the raw materials, with the exception of the steel, from sources within Queensland, and the steel fabrication 'in its entirety would be carried out in Queensland'. Their patriotism might have won them friends but it was their competitive pricing and their ability to do the job that won them the tender. The price quoted for the job was £1 125 000 with four lanes for traffic, £1 150 000 with six lanes. By April 1935, they had the contract. The first sod was turned on 24 May that year by the Premier of Queensland, William Forgan Smith.

Up to that point, all documents refer to the bridge as the Brisbane River Bridge but the invitation to the sod-turning called it the Jubilee Bridge. Later, it was named the King George V Memorial Bridge before finally being christened the Story Bridge to honour the long-serving public servant and University of Queensland vice-chancellor, John Douglas Story.

Bradfield's contribution to engineering in Australia is recognised with the naming of the Bradfield Highway over the Sydney Harbour Bridge. But another, more personal glimpse of his character is to be found in his papers. His practical work was buttressed by

a romantic heart and an eye for aesthetics. Supporting his design for the Story Bridge, he wrote:

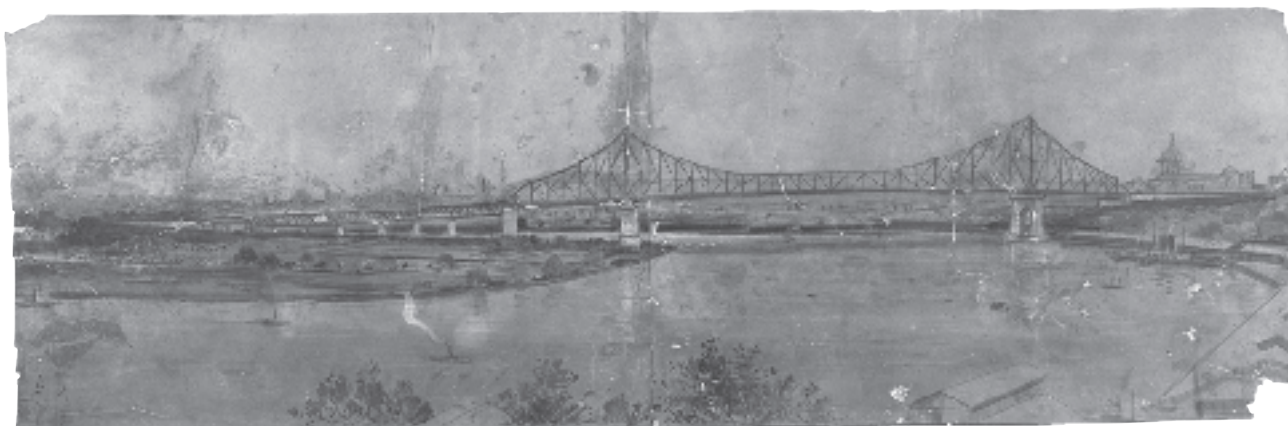
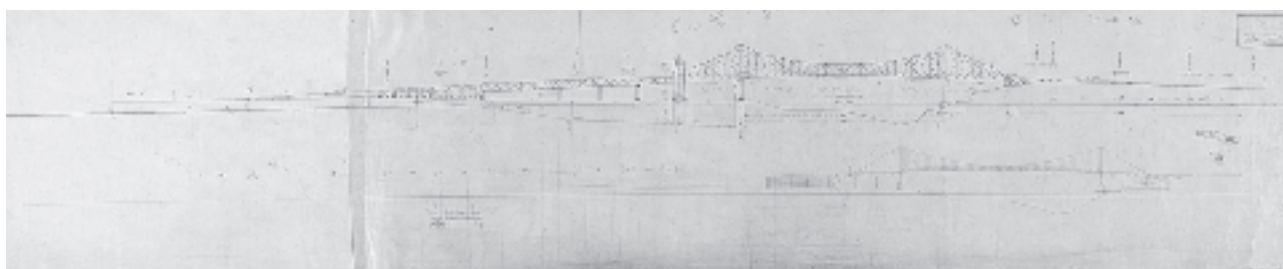
Tree-clad hills encircle the city, here and there they tower above the level of the range—sturdy shoulders with graceful curves, which must surely express that the cantilever type of bridge, with its lofty towers and powerful river arms supporting the level span over the centre of the waterway, its back spans and anchor piers linking the bridge with either shore, will best harmonise with the picturesque and rugged beauty of Brisbane's skyline.

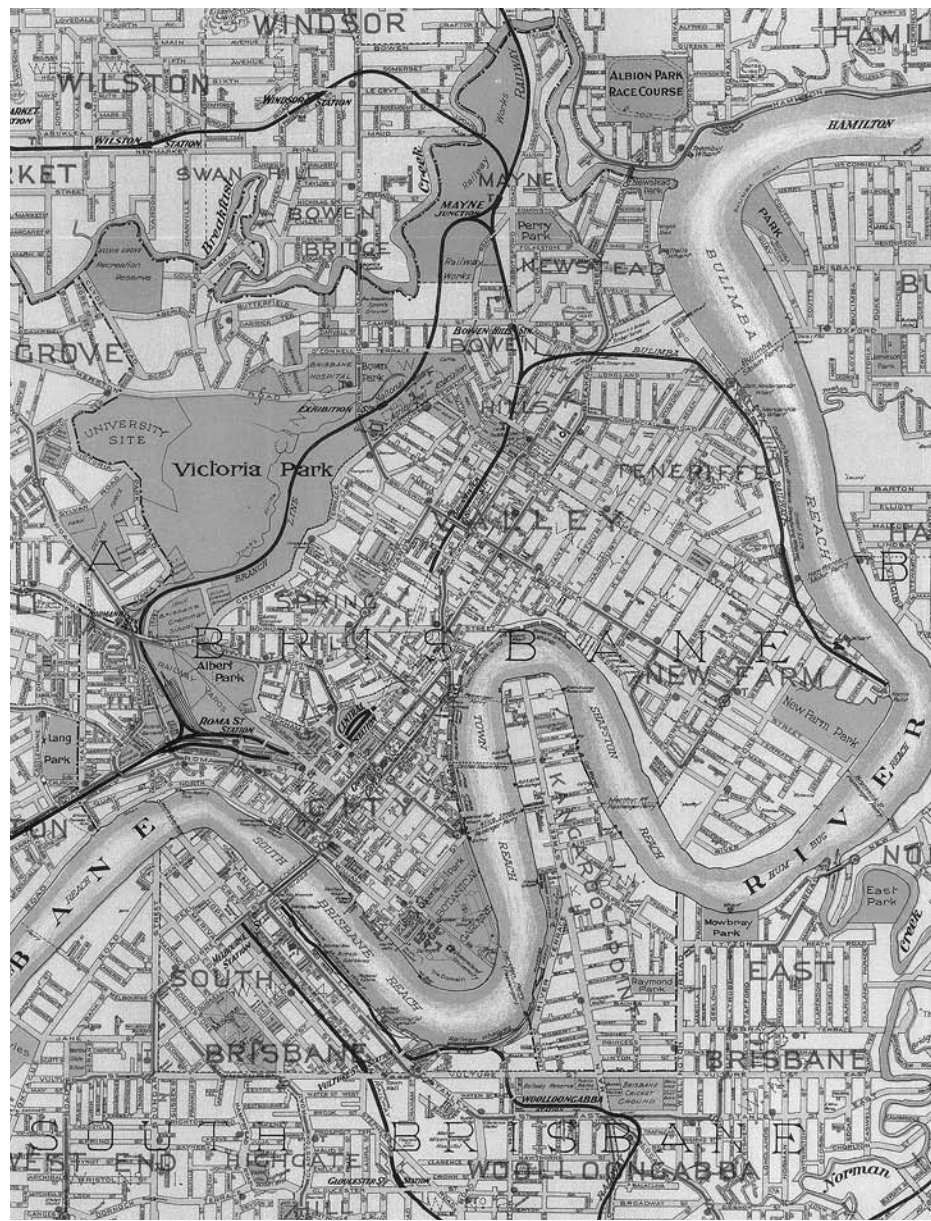
To set the background for his vision, Bradfield, in his account *The Story of the King George the Fifth Memorial Bridge Brisbane: 1. The Site and the Materials in the Making*, sub-titled *The Story of the Brisbane River Bridge From Romance to Reality*, takes the reader on a tour through constellations, geology, evolution, design and the property of metals. He quotes the Bible, mythology and poetry and the volume is liberally decorated with photographs, illustrations and maps. How he must have enjoyed the rainbow appearing as the two outstretched sections were finally joined across the Brisbane River.

But standing at the foot of the southern pier, it is Bradfield's engineering skills, rather than his flights of whimsy, that one appreciates. As Moy notes in *Story Bridge*:

above:  
J.J.C. Bradfield (1867–1943)  
Sketch of the planned bridge,  
c.1934  
Papers of John Job Crew  
Bradfield, 1908–1943  
Manuscripts Collection  
MS 4712/folio box 1

below:  
Charles Coulter (1864–1956)  
*The Story Bridge at Kangaroo  
Point, Brisbane River* 1940s  
wash drawing; 36.2 x 111.2 cm  
Pictures Collection  
nla.pic-an5776545





right:  
Gordon and Gotch  
(Queensland), and Simpson,  
Halligan & Co. Ltd  
*Map of Brisbane and Suburbs*  
c.1920 (detail)  
coloured map; 97.2 x 71.5 cm  
Maps Collection  
nla.map-rm3133

below:  
The Government of Queensland  
Program for the sod-turning  
ceremony, 1935, and Bradfield's  
invitation to the official  
opening of the Story Bridge,  
1940  
Papers of John Job Crew  
Bradfield, 1908–1943  
Manuscripts Collection  
MS 4712/4/11

*Idea to Icon*, the foundations for that pier  
reach 40 metres below the park.

pumped air into the lock. Once the airlock  
pressure reached that of the working chamber  
below, the workers would exit via another hatch  
and climb down a ladder to the workface.

Open excavation to that depth was  
not an option because water seeping  
through the silt and sand would  
have filled the hole to river level.  
Work on this and the four smaller  
piers to the south was accomplished  
with an ingenious pneumatic caisson  
technique, utilising an upright hollow  
reinforced concrete cylinder with an  
airlock at the top and a steel blade  
around the circumference at the  
bottom.

Workers inside the cylinder would  
excavate the silt and sand which  
would be pumped outside while the  
weight of the cylinder would cause  
the blade to work its way down. In  
order to prevent water from entering  
from the river, the air inside the  
cylinder was pressurised. At the start  
of their shift up to 10 workers would  
enter the airlock from the top, close  
the hatch, and wait as compressors

At the end of the shift, workers would  
stay in the airlock for a period of time  
to decompress in much the same way  
that divers decompress when returning  
to the water's surface. At the deepest  
part of the excavation, Moy reports,  
a working chamber pressure of almost  
four atmospheres was required which  
necessitated 11 minutes of  
compression and one hour and 43  
minutes of decompression for workers,  
discomforts modern users of the Story  
Bridge might ponder as they watch  
fireworks shoot light from it, or as  
they climb adventurously to the top  
of its steel arms.

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