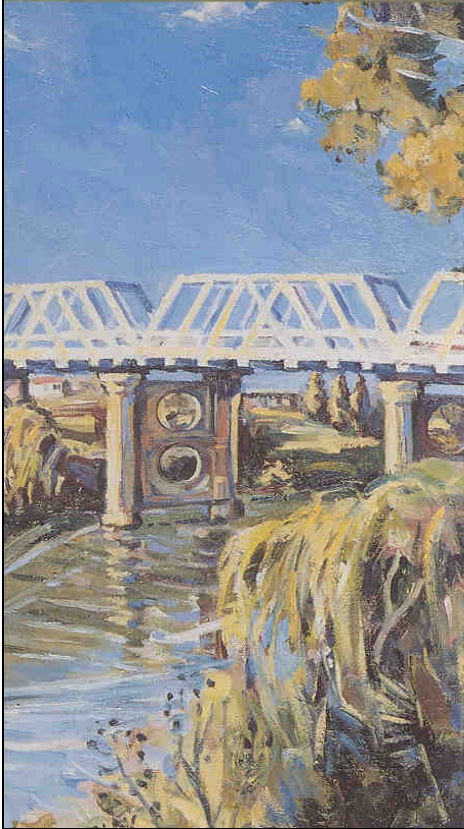


self-guided tour

# Historic Bridges of the Hunter Valley



## Timber Truss Bridges

### Allan design

- A1 Hunter River at Morpeth, 1898
- A2 Paterson River at Hinton, 1901
- A3 Paterson River at Woodville, Dunmore Bridge, 1899
- A4 Paterson River at Vacy, 1896

### DeBurgh design

- B1 Black Creek, Wilderness Road east of Rothbury, 1904
- B2 Webbers Creek, Singleton to Gresford Road, 1902
- B3 Glennies Creek, North Singleton. Turn right into Bridgman Road then 13.8km to Stony Creek Road left 3.4km right into Middle Falbrook Road then 0.6km to bridge, 1904

### Dare design

- D1 Williams River at Dungog, Cooreei Bridge, 1906
- D2 Rouchel Brook, 2 sites east of Aberdeen, 1930
- D3 Hunter River, north west of Scone at Moonan Flat, on road to Gloucester via Gundy, 1929

### Old PWD design

- O1 Williams River at Clarencetown on the road to Limeburners Creek, 1880
- O2 Karuah River at Monderai on road from Dungog to Gloucester, 1882

## Iron Lattice Bridges

- I1 Paterson River, south of Paterson, 1887
- I2 Hunter River, north of Branxton, Elderslie Bridge, 1891
- I3 Hunter River, Singleton west, Redbourneberry Bridge 1891
- I4 Hunter River, north edge of Muswellbrook, 1881
- I5 Hunter River, Aberdeen, Fitzgerald Bridge, 1893

## Lift Bridges

- L1 Hunter River at Hexham, steel truss, 1952
- L2 Paterson River at Hinton, 1901
- L3 Paterson River at Woodville, Dunmore Bridge, 1899

## Steel Trusses

- S1 Hunter River, NW of Lochinvar, Luskintyre Bridge, 1905
- S2 Hunter River at Singleton, Dunolly Ford Bridge, 1905
- S3 Goulburn River, west of Denman, 1956
- S4 Hunter River South Arm, Tourle Street Mayfield, 1965
- S5 Hunter River, north of Denman, 1956
- S6 Goulburn River, Sandy Hollow, 1961

## Concrete Bridges

- C1 Hunter River at Hexham, next to lift bridge, 1987
- C2 Williams River, Raymond Terrace road to Maitland, 1965
- C3 Hunter River, Kooragang Island, Stockton Bridge, 1972

# Crossing the Hunter River system

In the early 1800s access was by sea to Newcastle at the mouth of the Hunter River then upstream to Morpeth where wharves were built and a branch railway connection was made in 1864. The smaller craft plied the northern tributaries, the Paterson and Williams Rivers.

By land, first access was well to the west by Howes Line (Putty Road) via Bulga (1820) followed by the shorter convict-built Great North Road (1830) via Wollombi to Singleton and Morpeth.

The earliest industry was cedar-getting, with logs being floated down the rivers. Soon after this, farming the rich alluvial soils began and pastoral properties were established in the Upper Hunter and in the North West of NSW, hence the need for better roads and river crossings to move produce and wool to ports and markets.

The main road (New England Highway) kept to the south side of the Hunter River and the first bridges, in the 1820s, were over Ironbark Creek near Hexham and over Wallis Creek near Maitland.

The railway from Newcastle reached Maitland in 1858 and Singleton in 1863 where it crossed the Hunter River in 1866 on a 5-span laminated timber arch bridge, sharing one half with the main road.

Progressively, bridges were built to give access to the other sides of the Hunter, north at Maitland via the Belmore Bridge in 1899 and west of Muswellbrook in 1881 (I4).

From the 1860s a variety of bridges, mostly timber, were built across the Paterson and Williams Rivers and their tributaries to eliminate the hazardous fords and toll-paying punts.



A typical DeBurgh truss



A typical Dare composite truss

## Timber truss road bridges

Timber trusses were the mainstay of the NSW road system from 1860 to 1920 because iron and steel were expensive imports, and the indigenous hardwoods were 3 to 5 times stronger and far more durable than the pines used in the USA.

During that 60 year period over 400 timber truss bridges were built, which gave the name the 'Timber Bridge State' to NSW.

There were 5 stages in the development of these trusses, from the traditional to the scientific.

- The old PWD truss (1860–86) was virtually a copy of the European truss, based on the designs of architect Andrea Palladio c1550.

Their main faults were: the use of large single pieces of timber, the double depth chords at mid span and no allowance for shrinkage of the Australian hardwoods, which caused the truss to sag.

- J A McDonald's design between 1886 and 1894 had some useful improvements.
- Percy Allan completely rethought the whole process in 1894. Using the American Howe truss layout and with proper structural design, he achieved a truss that was simpler to build, used shorter timbers and with better joint details was easier to maintain. The vertical iron rods could be screwed up regularly to keep the joints tight and rain water was more readily shed from his trusses. Allan trusses were built until 1930.





*This large 1899 timber truss bridge at Woodville (A3) is one of only 2 overhead braced Allen trusses in service, the other is the nearby Morpeth Bridge (A1)*

A flaw with these trusses was the timber bottom tension members, where steel would have been better.

Allan's first design had a maximum span of only 27.3m (90ft) and these trusses were not tall enough for overhead bracing. By 1895 he had produced designs for tall timber truss bridges spanning up to 47m (154ft).

- E M DeBurgh produced a composite Pratt truss in 1899, in which all tension members were made of steel and all compression members remained timber. It has the diagonals in tension, using iron rods, with timber for the short vertical compression members. Along the bottom chord he used steel pins to engage the looped ends of the diagonal rods. These trusses were built up to 1905.
- Harvey Dare reworked Allan's design to produce a composite Howe truss without pins, and this successful Howe truss design was built from 1905 to 1936.



*Percy Allan (1861-1930) was involved with more than 600 bridge projects*



*E M DeBurgh (1863-1929) designed bridges and Burrenjack Dam*



*The 1881 bridge at Muswellbrook (I4)*

### Iron lattice bridges

Despite the dominance of timber bridges, there were rivers whose sizes and flood histories required much larger spans in order to maximise the clear waterway. From 1870 to 1893 lattice bridges from England and Belgium were the choice for these major bridges both for road and rail. The spans varied between 27.4m (90ft) and 55.5m (182ft). The Hunter Region has more than any other area, four over the Hunter River and one over the Paterson River.

There were only two styles built; up till 1886 the bridges were deep and had vertical ends as seen in the above illustration, then J A McDonald revised the design and produced a shallower depth and introduced graceful curved ends as shown below.



*When McMillan, Britton & Kell were contracted to duplicate the bridges at Aberdeen (I5), they chose to match the appearance of the 1893 lattice bridge (right) with a welded Warren truss completed in 1986.*



*The Dunmore Bridge designed by Percy Allan (A3)*

### Lift bridges

Lift bridges, where a horizontal deck segment is raised vertically between towers, are one way of providing passage for ships on navigable waterways. The Hunter River was navigable as far as Morpeth by the early 1800s. The Paterson and Williams Rivers were also navigable.

Toll ferries were common for crossing navigable rivers, but where traffic volume demanded a bridge, it had to have a movable span. The first such bridge was the Dunmore Bridge, a sliding span bridge at Woodville on the Paterson River opened in 1864. Its replacement, which opened in 1899 was designed by Percy Allan.

The next lift bridge was opened in February 1901 a short distance downstream at Hinton.

Ironically, the busiest ferry crossing was the last to be bridged, over the Hunter River at Hexham. A high level bridge with adequate clearance at high tide would have required long approach ramps, as expensive as the bridge itself, and so was delayed for many years. Eventually the heavy traffic flow on the Pacific Highway up the North Coast required a bridge but colliers supplying coal to Sydney used the river. The compromise was a low-level bridge with a lift span, opened in December 1952 (L1).

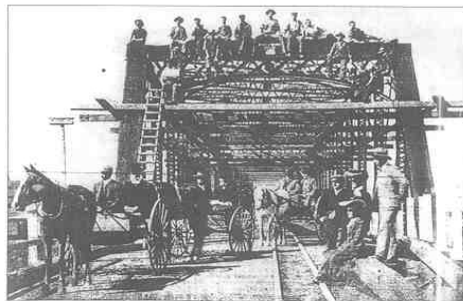
Although the colliers have been superseded by rail haulage, the lift bridge still operates to allow tourist cruisers to pass through at high tides.



*The Luskintyre Bridge (S1)*

### Steel trusses

In the 1890s the railways began to use steel trusses for new lines and replacement bridges even though it was an expensive import, and again for the major bridges on the North Coast Railway 1910–22. Road bridges were still dominated by timber but two pioneering steel road trusses were built over the Hunter River at Luskintyre (S1) and at Singleton (S2). Both bridges were completed in 1905 and were built to the Pratt system. These two trusses were light but strong, with spans of 60.1m (200ft) at Luskintyre and 46.9m (154ft) at Singleton.



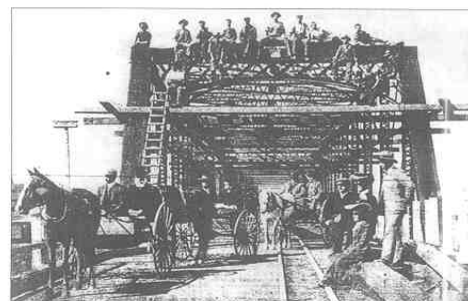
*Opening of the Dunolly Ford Bridge, (S2), Singleton  
9 September 1905*



*The Luskintyre Bridge (S1)*

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*Opening of the Dunolly Ford Bridge, (S2), Singleton  
9 September 1905*

### Self-guided tour

This self-guided tour of the Hunter Valley describes a number of significant surviving bridges in and adjacent to the Hunter Valley, from the 1880 timber trusses at Clarendontown over the Williams River to the recent prestressed concrete bridges such as that at Hexham, completed in 1987.

You can drive to all these bridges and they can be photographed from around their sites, although positions depend on light and river conditions.

**Bridges and sites noted in this guide are used for traffic and may not be readily accessible by foot. You should only view them from accessible and safe locations.**



*One of the oldest PWD timber truss bridges,  
Clarendontown Bridge (O1)*

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