

McFarlane Bridge over the Clarence River South Arm

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Item

Name of Item	McFarlane Bridge over the Clarence River South Arm
Item Number	4300642
Type of Item	Built
Item Sub-Type	Pre-1930 Metal Road Bridges
Roadloc	
Address	**** Regional Road 152 1 km south of Maclean 2463
Local Government Area	****
Owner	Local Government
Current Use	Road bridge
Former Use	Road bridge

Statement of significance

Statement of significance	<p>The McFarlane Bridge, completed in 1906, is of State significance.</p> <p>Historically, the Bridge is significant due to its early date of construction for the 'new' American adaptation of moveable span bridges in the state. In its completeness and sound condition, this 1906 bascule-type bridge demonstrates the influence of American bridge design across NSW and Australia.</p> <p>The 'Coraki' design of a bascule bridge is a significant example of the creative and technical force behind early bridge engineers and designers in NSW and Australia. This Bridge is understood to be one of two of the oldest surviving bascule type bridges in NSW (Fraser 1985) and one of only five ever built. The Bridge is also representative of one of the first steel rolling weight bascule bridges in NSW (Dare 1903). Its relationship with the Glebe Bridge at Coraki is also significant, in that although both bridges are built on the same design, the approach spans at McFarlanes Bridge are longer and have resulted in design changes specific to this Bridge.</p>
Date Significance Updated	15 August 2005

Description

Designer	Possibly Harvey Dare
Builder	Mountney and Company
Construction years	1905 - 1906
Physical description	<p>McFarlane Bridge is a 1906 bascule type bridge with steel truss girder opening span, steel tower span and long timber approaches (15 spans in all).</p> <p>Opening span - This span is constructed from truss style steel girders forming the outside girders of the span while the inner girders are actually 'double-compound' timber girders. This span pivots on pier 11 with the other end resting on pier 12. Pier 11 is a steel cylinder which also holds the bulk of the tower, while pier 12 is a concrete Monier pier.</p> <p>Tower span - The tower span is a riveted steel lattice structure with overhead bracing. The counterbalances at the top are only empty replica drums and the wire ropes which hold them are in poor condition. The external girders in this span are 'flat' lattice girders, while the inner girders and stringers are made from timber. The stringers are apparently round members (logs) with the tops flattened off them. The original drawings however depict them as square cut (sawn) timber members. The cross-girders are web plate steel girders. Pier 11, which is the main pier for this span, has the metal cylinder piles which are apparently filled with concrete spalls (chips). On the upstream side of this span there is a small access deck/platform where the lift operator would have once stood to wind the handle to open the Bridge. Pier 10 holding the smaller end of the truss is a Monier pier like pier 12.</p> <p>Abutment A (Maclean side) - The abutment has been replaced with concrete piles, headstock and sheeting. Timber girders remain on the first approach span leading out from it.</p> <p>Approach spans at A end - Pier 1 has been replaced with concrete piles and headstock but the girders and the double or compound corbels remain in timber as does the rest of the decking system. The compound corbels are components that have been included in the design on the Bridge due to its long spans, which are 14m in length and therefore require extra support. The remaining piers up to pier 9 are made from cast iron which have had concrete collars placed at water level to reduce corrosion.</p> <p>Abutment B and approaches (Grafton side) - This abutment has also been completely replaced with concrete as above. The piers along this approach span are the same as those described for abutment A. The approaches at</p>

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	<p>both ends are 5 girders in width.</p> <p>The original timber guard rails remain along the full length of the Bridge.</p>
Physical Condition and/or Archaeological Potential	Original condition assessment: 'Sound and stable. The archaeological potential of the area around the Bridge is considered to be moderate.' (Last updated: 6/12/2000.) 2007-08 condition update: 'Fair-Good.' (Last updated: 17/4/09.)
Modifications and dates	Tower span - The counterbalances at the top are only empty replica drums and the wire ropes which hold them are in poor condition. Date unknown. Abutment A (Maclean side) - The abutment has been replaced with concrete piles, headstock and sheeting. Date unknown. Approach spans at A end - Pier 1 has been replaced with concrete piles and headstock. The remaining piers up to pier 9 are made from cast iron which have had concrete collars placed at water level to reduce corrosion. The addition of the concrete collars was the result of the salt water which started to leach the carbon out of the iron piers, causing some corrosion. Dates unknown. Abutment B and approaches (Grafton side) - This abutment has also been completely replaced with concrete as above. Many of the timbers in both approach spans have been replaced recently. It was noted that the downstream side of this Bridge has a more recent set of steel piles added to carry a water main. Dates unknown.
Date condition updated	17 April 2009

History

Historical notes	<p>According to The Clarence River Advocate quoted (3/4/1906) the McFarlane Bridge was the fourth of the new or rolling weight type bascule bridges built in NSW. This style of bascule bridge was introduced in the early twentieth century during a phase of adoption of American bridge building technology (Fraser 1985:9). This American design adaptation was significant as it improved control and balance at all stages of opening and closing (Fraser 1985:9). The two designs represent differing solutions to the counterweight problem posed by bascule bridges a constant counterweight creates problems in closing the once-opened bridge. The earlier NSW bascule-type bridges, built in the early 1890s at Gladstone, Camden Haven and Kinchela, were designed by J.A. McDonald.</p> <p>The 'new' type of bascule became known as the 'Coraki' type. Their introduction, was part of the changeover to American bridge technology around 1900 (Fraser 1985: 10). Fraser describe this design as follows:</p> <p>The rollers have constant weight, but as they move down the curved track, the tension in the lifting rope decreases. The whole arrangement was more sophisticated and expensive than McDonald's scheme but was better suited to the larger moveable spans of Dare's design and, most importantly, the operating time was halved. The surviving examples of this type of bascule bridge are at Coraki and Maclean on the far north coast and the 1922 bridge over the Murrumbidgee River near Carrathool (Fraser 1985:10).</p> <p>The association between the Glebe and McFarlane Bridges is of some interest. Both these Bridges are based on the same design plan, in fact the design of the 'Coraki' style bascule bridge was initially drawn up for McFarlane Bridge. However, the Glebe Bridge was completed in 1905 while McFarlane was completed a year later. Both were erected by the same company. Material gathered so far, however, suggests that Mountney and Co constructed the ironwork for the McFarlane Bridge, while that for the Glebe Bridge was built by the Government. Perhaps it was the cost of the proposed metalwork which delayed the acceptance of Mountney and Co's tender. Fraser has commented that prior to the 1916 establishment of the steelworks at Newcastle, metal bridges were very expensive projects, which is why prior to 1916, timber bridges outnumbered metal bridges by about eight to one (Fraser 1986:1). This may account for why the original tender for the Glebe Bridge appears to have been altered so that the metalwork construction was undertaken by the Government instead of the contractor.</p>
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Listings

Heritage Listing	Reference Number	Gazette Number	Gazette Page
Heritage Act - s.170 NSW State agency heritage register			
Regional Environmental Plan	Sch 3	8	243
National Trust of Australia register	2045		
Local Environmental Plan	SHL Reg. No. 1990081	81	2389

Assessment of Significance

Historical Significance	McFarlane Bridge is significant for its historic associations with the expansion of the New South Wales Road network. It has the ability to demonstrate the adoption of American bridge design and technology in the Australian domain. This Bridge is significant in its ability to demonstrate the modifications of overseas designs to suit the Australian landscape and environment. These modifications to the counterweight mechanism proved successful and this bascule type design was to become known as the 'Coraki' type. McFarlane Bridge is also significant for its association with Mr Henry Harvey Dare, a prominent bridge design engineer in the NSW Department of Public Works during the early 20th century. The Bridge is significant as its is considered to be the forth bascule - type moveable span bridge built in NSW, and one of three built using an American design adaptation for the counter weight mechanism (Fraser 1985). It is also likely to be the one of two of the oldest surviving bascule type bridge in the state and one of the first with the steel rolling counter weight mechanism. It is significant for its relationship with the Glebe Bridge at Coraki. Both McFarlane and Glebe Bridges were based on the same design. The original plans were drawn up for McFarlane Bridge, although the Glebe Bridge was completed first. The McFarlane Bridge was also designed with double corbels due to its long approach spans.
Historical Association	****
Aesthetic/Technical Significance	The Bridge is aesthetically significant as its steel truss tower and counter weight are an identifiable feature in the surrounding rural landscape. The design of the counter weight can also be regarded as significant for its ability to demonstrate the creative input of early engineers in Australia and their ability to draw inspiration from American bridge design, but to modify and adapt them to suit the needs of the Australian landscape.
Social Significance	The McFarlane Bridge has local significance to the community. The Maclean District Historical Society recognises its importance in providing a main connection between the township of Lawrence via Woodford Island to Maclean, which is the service centre for the Lower Clarence.
Research Significance	The Bridge is important in its ability to demonstrate the influence and adaptation of American bridge design in the evolution and expansion of NSW historic road network. The construction of this Bridge required the cutting away of a substantial amount of earth on the hill between the Presbyterian Manse and the old school site (Refer to McFarlane 1980) and reflects the technical effort required to construct this Bridge.
Rarity	McFarlane Bridge is significant as it is understood to represent one of two of the oldest surviving bascule type bridges in NSW (Fraser 1985:10).
Representativeness	McFarlane Bridge is significant in its ability to represent one of the first steel rolling weight bascule bridges built in NSW, along with the Glebe Bridge at Coraki (Dare 1903:70).

Integrity/Intactness	McFarlane Bridge is significant because of its integrity and good condition, which contributes to its ability to demonstrate aspects to its technology, design and style in bridge construction.
Assessed Significance	State

References

Type	Author	Year	Title
Written	Fraser, D.	1986	The First Sixty Years of Metal Bridges in New South Wales The Institution of Engineers, Australia
Written	McFarlane, J	1980	A History of the Clarence River District, 1837-1915
Written	Fraser, D.	1985	Moveable Span Bridges in New South wales Prior to 1915
Written	O'Connor, C.	1985	Spanning Two Centuries: Historic Bridges of Australia
Written	Dare, H.H	1903	Recent Road-Bridge Practice in New South Wales

Study details

Title	Year	Author	Inspected by	Guidelines used
Heritage Assessment of McFarlanes Bridge over the Clarence River South Arm	2000	Austral Archaeology Pty Ltd	Martin Rowney	Yes
Study of Heritage Sig. of pre 1930 RTA Controlled Metal Road Bridges in NSW	2001	Cardno MBK		Yes

Custom fields

RTA Region	Northern
Bridge Number	2537
CARMS File Number	****
Property Number	Bridge
Conservation Management Plan	CMP completed

Images



View from Up-stream



View from Abut A approach





General view



Additional Photograph (pipe)

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