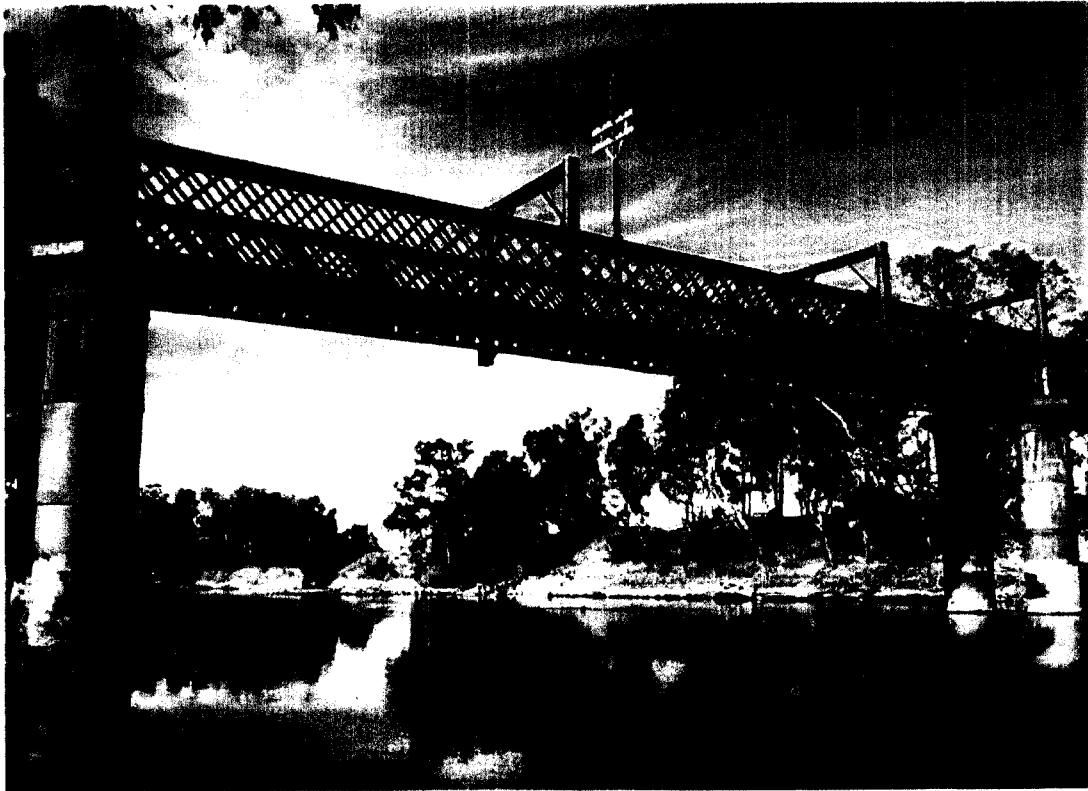


RAIL Infrastructure Corporation
CORPORATION



Wagga - Murrumbidgee River U/B (1881)

**Coordinator General of Rail Audit of Wrought Iron
Bridges and Nominated Structures**

**Rail Infrastructure Corporation
May 2003**

Coordinator General of Rail Audit of Wrought Iron Bridges and Nominated Structures

1. Introduction:

The Minister for Transport Services has requested an audit of wrought iron bridges and nominated structures, the Terms of Reference for which were provided to RIC on 15 April 2003.

The Terms of Reference originally included:

Part A - An investigation into the closure of the Menangle Bridge. This investigation was later referred to the ICAC and now is a separate investigation.

Part B - Subsequently defined as referring to nine major wrought iron underbridges in country NSW and the Stanwell Park Viaduct (a brick arch structure) on the Illawarra Line, as described in the RIC CEO's letter of 24 April 2003.

A meeting between the CGoR and RIC on 2 May 2003 confirmed the scope of Part B. This report refers to Part B only of the Terms of Reference.

RIC engaged independent consultants URS Australia Pty Ltd to review the nine wrought iron structures and Cardno MBK Pty Ltd for the Stanwell Park Viaduct on the basis of expertise and past experience with these or similar structures.

At the time of this report, the Cardo MBK review of the Stanwell Park Viaduct was incomplete. The preliminary report from Cardno MBK is now anticipated on 23 May 2003. The information relating to Stanwell Park Viaduct in this report is from internal RIC sources.

2. Nine Wrought Iron Underbridges:

RIC owns and maintains 31 wrought iron underbridges, 25 of which are located across regional NSW. The remaining six are located in the Sydney metropolitan area. Two of these underbridges (Narrandera and Pymont) are on disused lines.

The nine wrought iron underbridges included in the CGoR's audit are at Bathurst, Wagga Wagga, Tamworth, Woolbrook, Wellington, Dubbo, Albury, Joppa Junction and Cowra. Joppa Junction is a Pratt deck truss structure, the remainder are of an older, lattice truss design, manufactured in England and transported to Australia in the late 1800's. Dubbo, Albury and Cowra are of the later "Second Generation", type, and the remainder of the lattice trusses being "First Generation" designs.

Over recent years, RIC and its predecessors have commissioned a range of investigations and reports on these structures. These reports are being assessed separately by RIC's Menangle Bridge Team as part of an investigation on opportunities to improve the management of bridges within RIC. The most relevant of these reports were made available to RIC's consultant URS as part of this investigation.

URS inspected the nine wrought iron underbridges over a three-week period from 23 April to 13 May 2003, in the company of RIC regional staff. URS were provided with a copy of the most recent bridge examination reports for each structure and other relevant documents. A copy of each of the URS reports is attached as Appendix 2.

The main findings of the report can be summarised as:

- All current RIC speed and load restrictions on these structures were verified as appropriate by URS.
- Urgent testing of welds in vicinity of cross girder connection at Wagga was recommended (in progress at time of report).
- For the first generation lattice trusses, either twice weekly or monthly inspection of cracks/loose rivets at ends of cross girders recommended.
- Further assessment of arches at Albury, Cowra and Dubbo.
- Specific repairs were noted for the superstructure or piers of each of the structures. These repair requirements are to be actioned by the RIC Access Division.
- A timeframe for renewal was provided for these structures where appropriate. These timeframes generally conform to RIC's current renewal plans.
- The paintwork for the structures (with the exception of Tamworth, Albury and Joppa Junction) was generally noted as being in fair to poor condition and full cleaning, followed by re-painting, will be required if the bridges are not renewed in the nominated timeframes.

The attached table (Appendix 1) summarises the main requirements for each location.

3. Stanwell Park Viaduct:

The independent review of the Stanwell Park Viaduct has been delayed due to the workload of key personnel in consultants Cardno MBK. Site inspections are planned for 15 May 2003, with a draft report anticipated by 23 May 2003.

RIC has prepared a "Fact Sheet" for this structure, outlining its current status. A copy of this Fact Sheet is attached as Appendix 3.

The 1997 report by consultants MBK "Investigation of Long Term Monitoring Requirements For Stanwell Park Viaduct Illawarra Line 56.8km" has also been reviewed.

The results of the current Cardno MBK investigation will be provided as soon as they become available.

4. Conclusions:

The independent review of the nine wrought iron bridges undertaken by URS has confirmed that the operating parameters (load limits/speed restrictions) are appropriate for the condition of these structures. Observations made by URS of further repair work or analysis are being referred to appropriate RIC managers to address. RIC has committed to addressing these issues as a matter of priority.

Further analysis of the arch support capacity for Albury, Cowra and Dubbo will be undertaken by RIC to address the issues raised by URS regarding these arches.

The Stanwell Park Viaduct investigation is still in progress, with a draft report anticipated on 23 May 2003. The report will be forwarded to the CGoR, with RIC comments, when received.

Appendices:

1. Summary of URS report findings
2. URS Reports for:
 - Bathurst
 - Wagga
 - Tamworth
 - Woolbrook
 - Wellington
 - Dubbo
 - Albury
 - Joppa Junction
 - Cowra
3. Stanwell Park Viaduct Fact Sheet

Appendix 1. Summary of URS Report Findings

Location	Defects	Repairs/further work required	RIC's indicative renewal program
Bathurst Macquarie River U/B	<ul style="list-style-type: none"> corrosion top/bottom chords of trusses loose rivets cross girders cracked/corroded piers cracked painting required adequacy of bracing? 	<ul style="list-style-type: none"> check substructure capacity investigate bracing monitor cracks and loose rivets in cross girder end connections patch paint renew within 5-10 years 	<ul style="list-style-type: none"> Replace by June 2006
Wagga Wagga Murrumbidgee River U/B	<ul style="list-style-type: none"> fatigue cracks cross girder end connections bearings/piers in poor condition cracks at rivet/bolt locations on cross girders where stringers are attached 	<ul style="list-style-type: none"> test top flange plates for cracks near arches test a sample (5%) of welds on web plates of cross girders monitor cracks and loose rivets in cross girder end connections monitor cracks in caissons 	<ul style="list-style-type: none"> Replace by June 2005
Tamworth Peel River U/B	<ul style="list-style-type: none"> bracing damaged by earthmoving equipment fatigue cracks at cross girder end connections. 	<ul style="list-style-type: none"> patch paint repair damaged brace monitor crack in bottom chord cross girder monitor cracks and loose rivets in cross girder end connections 	<ul style="list-style-type: none"> To be determined, beyond 2010
Woolbrook Macdonald River U/B	<ul style="list-style-type: none"> fatigue cracks at cross girder end connections paint in poor condition 	<ul style="list-style-type: none"> paint monitor cracks and loose rivets in cross girder end connections 	<ul style="list-style-type: none"> To be determined, beyond 2010

Appendix 1. Summary of URS Report Findings

Location	Defects	Repairs/further work required	RIC's indicative renewal program
Wellington Macquarie River U/B	<ul style="list-style-type: none"> • extensive corrosion • paint in poor condition • approach span, main and cross girders in poor condition with severe rust • cross bracing under strength • extensive fatigue cracks at end connections of cross girders 	<ul style="list-style-type: none"> • patch paint • replace badly deteriorated cross girders • strength review of cross bracing and chord splices • monitor cracks and loose rivets in cross girder end connections • renew before 2009, repaint if not replaced within 10 years 	<ul style="list-style-type: none"> • Replace by June 2007
Dubbo Macquarie River U/B	<ul style="list-style-type: none"> • extensive corrosion bottom chords main girders • arches in poor condition • pier no.1 cracked • paint in poor condition 	<ul style="list-style-type: none"> • strengthen pier No.1 by strapping • assess strength of arches, cross bracing and truss chord splices • replace loose or fractured bolts/rivets at cross girder end connections • patch paint, repaint if not replaced within 10 years • recommend replacement 5-10 years 	<ul style="list-style-type: none"> • To be determined, beyond 2010

Appendix 1. Summary of URS Report Findings

Location	Defects	Repairs/further work required	RIC's indicative renewal program
Albury Murray River U/B	<ul style="list-style-type: none"> possible strengthening of arches needed (review required) 33 loose rivets broad gauge track stringers and transoms in poor condition 	<ul style="list-style-type: none"> minor works only review arch capacity patch paint pack/clamp bracing monitor cracks and loose rivets in cross girder end connections replace within 10-15 years 	<ul style="list-style-type: none"> To be determined, beyond 2010
Joppa Junction Run of Waters Creek U/B	<ul style="list-style-type: none"> transoms split (cut in wrong plane) pumping reported of trestle minor corrosion only noted No.1 girder damage to bottom flange plate 	<ul style="list-style-type: none"> replace transoms inspect pumping trestle analyse impact of bottom flange damage 	<ul style="list-style-type: none"> To be determined, beyond 2010
Cowra Lachlan River U/B	<ul style="list-style-type: none"> Connections of arches to top chords heavily corroded. Paint in very poor condition 	<ul style="list-style-type: none"> Replace loose or fractures bolts/rivets at cross girder end connections. Assess strength of arches, cross bracing and truss chord splices 	<ul style="list-style-type: none"> To be determined, beyond 2010