Heritage Council of NSW

Timber Truss Road Bridges of NSW:
review of Roads and Traffic Authority’s
proposed approach to conservation

July 2011
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There will never be any need to erect any monument to their work, because that monument is to be found in stone, steel, brick and concrete already in every part of the State, permanent testimony to all that is best in the history of Government in New South Wales.

NSW Premier J J Cahill on the centenary of the Public Works Department, August 1956

This statement by Premier Cahill applies equally well to the timber truss bridges constructed over the crucial years of the State’s development from 1861 to 1936; it encapsulates the special place the bridges have in the heritage of NSW.

Timber Truss Bridges Committee

July 2011
## Contents:

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preamble</strong></td>
<td>iv</td>
</tr>
<tr>
<td><strong>Executive Summary</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>1.0 Introduction</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>2.0 Historical Overview</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>3.0 Policy and Legislative Issues</strong></td>
<td>8</td>
</tr>
<tr>
<td>3.1 Total Asset Management</td>
<td>8</td>
</tr>
<tr>
<td>3.2 Objectives of the Heritage Act</td>
<td>9</td>
</tr>
<tr>
<td>3.3 De-listing Items from the State Heritage Register</td>
<td>9</td>
</tr>
<tr>
<td><strong>4.0 Committee consultation</strong></td>
<td>10</td>
</tr>
<tr>
<td>4.1 Communication with Stakeholders</td>
<td>10</td>
</tr>
<tr>
<td>4.2 Communication with Professionals</td>
<td>10</td>
</tr>
<tr>
<td><strong>5.0 RTA Approach</strong></td>
<td>11</td>
</tr>
<tr>
<td>5.1 McMillan Briton and Kell Analysis</td>
<td>11</td>
</tr>
<tr>
<td>5.2 Influencing Factors</td>
<td>11</td>
</tr>
<tr>
<td>5.2.1 Road Classification System</td>
<td>11</td>
</tr>
<tr>
<td>5.2.2 Loading Demands</td>
<td>11</td>
</tr>
<tr>
<td>5.2.3 Modern Road Demands</td>
<td>12</td>
</tr>
<tr>
<td>5.2.4 Affordability</td>
<td>13</td>
</tr>
<tr>
<td>5.2.5 Availability of Timber</td>
<td>14</td>
</tr>
<tr>
<td><strong>6.0 RTA Methodology for the strategy</strong></td>
<td>14</td>
</tr>
<tr>
<td>6.1 Managing Redundant Bridges</td>
<td>14</td>
</tr>
<tr>
<td>6.2 Assessment Process</td>
<td>15</td>
</tr>
<tr>
<td>6.2.1 Four Step Assessment</td>
<td>15</td>
</tr>
<tr>
<td><strong>7.0 RTA’s Conclusions</strong></td>
<td>16</td>
</tr>
<tr>
<td>7.1 Principles Underpinning the Review</td>
<td>16</td>
</tr>
<tr>
<td>7.2 Proposals for Conservation and Divesting</td>
<td>17</td>
</tr>
<tr>
<td>7.2.1 Proposed Portfolio for Conservation</td>
<td>17</td>
</tr>
<tr>
<td>7.2.2 Proposed Portfolio for Divesting from the RTA's Portfolio</td>
<td>17</td>
</tr>
<tr>
<td><strong>8.0 Committee Findings</strong></td>
<td>17</td>
</tr>
<tr>
<td>8.1 Quality of RTA Report</td>
<td>17</td>
</tr>
<tr>
<td>8.2 Comments on RTA Proposals</td>
<td>17</td>
</tr>
</tbody>
</table>
8.2.1 General Comment 17
8.2.2 Modern Loading and Road Demands 19
8.2.3 Representative Samples 20
8.2.4 Scale of Divesting Proposal 20

8.3 Particular Issues 20
8.3.1 Funding 20
8.3.2 Lift Span Bridges 21
8.3.3 Individual Bridges: Wallaby Rocks, Five Day Creek, Coorei 24
8.3.4 Nomination of Bridges to State Heritage Register 25
8.3.5 Heritage and Conservation Engineering 25

8.4 De-listing and Decommissioning 25
8.4.1 De-listing 25
8.4.2 Redundant Bridge Options 26
8.4.3 Consultation with Stakeholders 27

8.5 Survival of the Species 27
8.6 Commemorating Timber Truss Bridges 27

9.0 Conclusions and Recommendations 28

Annexures
A. National Trust NSW: comments on RTA’s report
B. Australia ICOMOS: comments on RTA’s report
C. Sydney Engineering Heritage Committee: comments on RTA’s report, 29 April and 12 May 2011.
D. RTA report, “Table 5: Application of the sensitivity analysis to the RTA timber truss bridges …” —the “Traffic Light Table” and “Timber Truss Bridges: Replacement List—consolidated details”.
E. Higher Mass Limits (HML) Network NSW: Index Map.
F. Higher Mass Limits (HML) Network NSW: Map 6 (South West corner of State).
Preamble

At its meeting in February 2011 the Heritage Council received a report from the Roads and Traffic Authority (RTA), entitled *Timber Truss Road Bridges—A Strategic Approach to Conservation*, proposing its strategic approach to the conservation of timber truss road bridges. To assist its review of the document Council formed a Committee comprising Mr Don Godden as Chair, Mr Michael Clarke and the Government Architect with staff of the Heritage Branch, to review the document and to advise the Heritage Council.

The Committee’s report follows.
Executive Summary

It is in the nature of infrastructure to become obsolete. Certainly, the biophysical realities that determined, say, a 19th century stock route, may survive in a present-day freeway, but it’s the particulars that tend to vanish. In this case, timber truss road bridges, once the indispensable technology of inland expansion—now, ‘pinch-points’ and ‘bottle-necks’, embarrassments to a burgeoning, national road transport system, face a challenging future.

Timber truss bridges are important functional elements of the built environments and scenery of local communities. As a ‘collection’, they created New South Wales’s reputation as “the timber bridge state” and contribute significantly to the appeal of country tourism. They form a tangible record of a segment of the state’s engineering history and the evolution of its road and transport system.

The maintenance cycle for timber is more rapid than for more modern materials. The large, old-growth hardwood trees that originally furnished timber for bridge construction are increasingly in short supply. The increasing size, weight and speed of commercial vehicles have overtaken the original design capacities of many timber bridges. Not all bridges are of equal heritage value and conservation is more feasible for some bridges than for others.

Some of the difficulties in managing these significant heritage items originate beyond the control of the individual states and agencies responsible for their conservation. In many instances operational demands are set at the Commonwealth level by the Council of Australian Governments (COAG) and the National Transport Commission.

The Roads and Traffic Authority’s (RTA’s) proposed timber truss road bridge conservation strategy seeks to come to terms both ethically and functionally, with these realities. It’s a tall order and the RTA has wrestled with it in admirable fashion.

Of the 62 timber truss bridges remaining in New South Wales, 14 are under the control of local government councils, with the other 48 being in the RTA’s portfolio, 29 of which are on the State Heritage Register (SHR).

The RTA’s strategy for the conservation of its timber truss bridges proposes:

- Retention of 25 of the bridges, comprising:
  - 17 bridges on the SHR;
  - the nomination of three of the bridges on its Heritage and Conservation Register (under Section 170 of the Heritage Act) to the SHR; and
  - five other bridges on its Section 170 Register.

- Divestment of 23 bridges, comprising:
  - 12 from the SHR; and
  - 11 from the RTA’s Section 170 Register.

In its review, the Timber Truss Bridges Committee sought comments on the strategy from the National Trust NSW, Australia ICOMOS, Engineers Australia, the History Council of NSW and the Royal Australian Historical Society. Expert advice was obtained from Dr Don Fraser and Mr Brian Pearson and Mr Ray Wedgewood (both former Chief Engineers [Bridges] of the RTA).
The Committee also engaged Mr Mark Tilley, currently Principle Engineer, Bridges and Structures of GHD engineering consultants, and former RTA bridge engineer for the Hunter Region, to provide independent comment on the strategy.

The results of the Committee’s review, detailed in the body of this report may be summarised as follows:

*Timber Truss Road Bridges—A Strategic Approach to Conservation* is a thorough, informative and conscientious document.

The strategy should be evaluated in the context of the State Government’s Total Asset Management (TAM) policy:

> **Total Asset Management** focuses assets on the delivery of an agency’s primary service responsibilities.

> Organizations that have control of heritage assets also have a second service obligation. While they use the assets in delivering their primary service, they are also responsible for the stewardship of the assets and protection of their significance for future generations.

> Agencies must ensure both that the purposes of the Government’s Total Asset Management policies, procedures and performance standards are met and that relevant heritage legislation is complied with.

> The management of heritage issues should be viewed as an essential part of the management of the assets, rather than another problem and cost impost. Sustainable management of heritage values should be treated by an agency as part of its core business (emphasis added).

Although, in considering operability simultaneously with heritage significance, the RTA’s methodology departs from usual Burra Charter practice, the nature and context of timber truss road bridges offer no clearly feasible alternative approach.

While each successive advance in timber truss bridge engineering brought improvements in performance, durability and ease of maintenance—factors which are of historic and heritage significance—these distinctions are largely irrelevant in terms of the current demands of the road system.

The Committee does not dispute that the maximum load limit to which a timber truss bridge of any type, can be upgraded is 42.5 tonnes. That said, such bridges are currently performing well at that standard and do not fail frequently as might otherwise be expected.

It therefore makes sense to maintain serviceable bridges in the best possible condition, even if they are slated for eventual replacement, as the demands currently envisaged may not in fact eventuate, as or when predicted.

It is acknowledged that load capacity is not the only constraint on the operability of timber truss bridges. Most are single lane and they are vulnerable to flood, fire, vandalism, and damage from excessive speed, braking and impact. While risk assessment must be included in management strategies and the various management measures may mitigate these threats, none can preclude them absolutely.
The strategy considers options for managing redundant bridges, but their transfer to local government, adaptive re-use, relocation and retention out-of-service (‘orphaned’), would rely on the particular circumstances of each, and would rarely be feasible. Where none of these options is feasible the RTA considers that archival recording and interpretive assessment followed by demolition and replacement is the only remaining option; in this the Committee concurs.

The strategy relies in some instances on a recommendation contained in the Heritage Act Review, that ‘representative samples’ of various classes of heritage items be identified in agencies’ Section 170 registers. However, this recommendation was not, in fact, adopted. The ‘representative sample’ argument should not be a prime determining factor in deciding the number of bridges of any given type to be retained.

It is noted that timber truss bridges which make up only 1% of RTA bridges, reportedly consume 20% of the RTA’s bridge maintenance budget. Nevertheless, the RTA has statutory and TAM policy obligations to conserve its heritage assets. Consequently, the argument that maintenance of the timber truss bridges is unsustainable from a cost point of view is questionable, as the amount expended is a small part of the RTA’s overall budget.

In the event, the long term survival of a sample of timber truss bridges will probably depend on those under the control of local government and those maintained by the RTA for local use. Consideration therefore needs to be given to ensuring that a number of these are placed on the SHR so a sample of the timber truss bridge type will be retained for posterity and that suitable arrangements are made for their maintenance and conservation.

General
1. Subject to adoption of recommendations below relevant to the Roads and Traffic Authority’s (RTA’s) proposed strategy, the Committee recommends that the Heritage Council advise the RTA its strategy document is an appropriate basis on which to proceed to community consultation and notification processes required by the Heritage Act.

2. The Heritage Council should endorse this review and use it in its deliberations on the future management of timber truss bridges.

Administrative
3. Decisions taken by the RTA should be made in the context of both the Heritage Act and the Government’s Total Asset Management policies.

4. The RTA should provide to the Heritage Council a case for de-listing of any bridge on the State Heritage Register (SHR) before a budgetary allocation is sought for its replacement and in sufficient time for the Heritage Council to make its position known to the RTA.

RTA’s proposals
5. While it is desirable that the portfolio of retained bridges should be representative of as many of the different features and heritage values of timber truss bridges as possible, the selection of a representative sample should not be a prime determining factor in deciding the number of bridges of any given type to be retained.
6. Where the RTA plans to transfer ownership of a bridge to a local council an endowment fund should be established to allow the council to maintain and conserve the bridge in the long term.

7. Because of their significance lift span bridges should receive special consideration for conservation as they have a special place in the history of river navigation, as features in the landscape and as heritage tourist attractions.¹

8. The Committee proposes that further consideration should be given to the long term retention and conservation of the Barham and Tooleybuc lift span bridges and of Carrathool, the only remaining bascule bridge associated with timber truss spans (all of which are on the SHR) because of their significance.

9. While noting that the RTA proposes nominating Cobram, Landsdowne and Briner bridges to the SHR, the Committee recommends that the RTA also assesses Waroo, Rawsonville, Scabbing Flat, Beryl and Paytens bridges as possible nominees for inclusion on the SHR, and advises the Heritage Council of the outcome.

Other recommendations

10. Conservation Management Plans (CMPs) should be prepared for all bridges which are to be retained and conserved beyond 2016. These CMPs should be reviewed every five years.

11. The RTA should make special budgetary provisions for the conservation of timber truss bridges in order to honour its conservation, heritage and total asset management obligations.

12. The RTA should ensure that only accredited heritage and conservation engineers make decisions affecting the significance and structural integrity of timber truss bridges.

13. The RTA should be asked to explain to the Heritage Council the condition of Five-day Creek Bridge, an item on the SHR.

14. A quality commemorative book should be prepared on NSW’s timber truss bridges, similar to Victoria’s “Wooden Wonders”.

“Timber truss bridges are virtually unique to NSW. There are few, if any, remaining in service in other states.”
Brian Pearson
Chief Engineer (Bridges)
February 1987

¹ Only six lift span bridges remain throughout the State: Tooleybuc, Swan Hill, Barham, and Cobram on the Murray; and Hinton and Dunmore on the Paterson. All are on the SHR except for Cobram, which the RTA proposes to nominate. While Swan Hill and Cobram are being by-passed, the RTA proposes retaining them for local traffic.
1.0 Introduction
Between 1861 and 1936, some 407\(^1\) timber truss bridges were constructed in NSW, of which 62 remain, with 48 being under the care and control of the Roads and Traffic Authority (RTA) and 14 under the care and control of local councils.

The bridges as a class and many individually, are a significant part of the State’s heritage with 29 being on the State Heritage Register. Their heritage significance predominately relates to:

- their demonstration of the part the bridges played in the development of NSW;
- their demonstration of the development of timber truss bridge design and technology from 1861 until other materials became economical and available around 1936;
- their association with the four eminent colonial engineers, William C Bennett, John A McDonald, Percy Allan and Ernest Macartney de Burgh, and with Harvey Dare; and
- their place as significant features in the landscape.

The bridges, which were originally designed to carry a 16 ton traction engine can meet this load without modification. The current general access limit is 42.5 tonnes which the bridges can meet if adapted with modern materials. However, the Council of Australian Governments (COAG) is pressing strongly for the adoption of “Higher Mass Limits” (HML) of 45.5 tonnes which are already common internationally. Timber truss bridges cannot be upgraded to meet this load even using modern materials. Additionally, national freight route limits of 55–65 tonnes are emerging, which timber truss bridges could not carry without high risk of failure.

Not only do timber truss bridges have barely adequate load-bearing capacities for the current 42.5 tonne limit, but most are single lane and thus constitute constrictions (pinch points) on the road network. Additionally, they are vulnerable to a range of hazards—flood, fire, vandalism and damage from vehicles through overloading, excessive speed, braking and impact. They are also expensive to maintain compared with more modern structures and reportedly, currently consume 20% of the RTA’s bridge maintenance budget. This is claimed to be unsustainable.

As the RTA asserts that its “responsibilities include providing safe, reliable, unrestricted and sustainable access along its roads and across the associated bridges”\(^2\), there can thus be a conflict between its core operational responsibility and its other core obligations under the Heritage Act and Government’s Total Asset Management policy.

The RTA’s stated purpose of its report is therefore, “to review its portfolio of timber truss bridges and to determine a set of bridges ... for long-term conservation that can meet the evolving operational needs of the NSW road network, while providing an appropriate set of these bridges for heritage conservation”.

2.0 Historical Overview\(^3\)
From the beginning of European settlement in 1788 the development of NSW involved the construction of tracks and roads that inevitably required bridges for crossing rivers and streams. Naturally, local materials were used—essentially stone and timber, with knowledge of their properties being developed from experience until scientific strength

\(^1\) Numbers quoted by various sources range from 403 to 409.
\(^2\) RTA report page ES 1
\(^3\) Drawn substantially from ‘Evolution of the Timber Truss Bridge in NSW’ by Dr Don Fraser and ‘Timber Truss Road Bridges – a strategic approach to conservation’, NSW Roads and Traffic Authority.
testing of ‘Colonial woods’ was commenced in 1886 by Professor William Warren using the imported Greenwood and Batley testing machine.

In 1859 a standard timber truss bridge design was developed for road bridges by William C Bennett, Chief Engineer and Commissioner for Roads. It was relatively low cost, being constructed from local hardwoods such as ironbark rather than the expensive imported iron and allowed rapid expansion of the burgeoning road network. The design was modeled on the Palladio\textsuperscript{4} truss and has become known as the “Old PWD Truss”, of which 147 were constructed between 1870 and 1886.

The Old PWD truss was the first in a five stage evolution of the timber truss road bridge in New South Wales: the Old PWD, McDonald, Allan, de Burgh and Dare, with the last four being named after their designers who were all eminent engineers of the NSW Department of Public Works (PWD).

As the Old PWD had some structural faults and was expensive to maintain, in 1884 John A McDonald the PWD Engineer for Bridges produced an improved design to rectify the worst of the problems and to cater for increased loadings. McDonald also pioneered the new technology of composite construction whereby a mix of timber and steel members was used to their best structural advantage. Ninety-one McDonald bridges were built between 1884 and 1894.

In the early 1890s Percy Allan, Assistant Bridge Engineer began a comprehensive redesign of the timber truss bridge using data on the strengths of Australian timbers, from Professor Warren’s testing program at Sydney University and from experiences in constructing and maintaining the previous designs. He chose the American Howe truss and developed a cost-effective design now known as the “Allan Truss”. He used marketable lengths of timber, minimised the adverse effects of water collecting in joints, countered the effects of the high shrinkage of Australian hardwoods and devised ways of replacing defective members without taking the bridge out of service. The Allan truss had the ability to carry 50\% more load than its predecessors but with 20\% less material. One hundred and five Allan truss bridges were constructed between 1893 and 1927.

In 1899 Ernest Macartney de Burgh further developed the concept of composite construction pioneered by McDonald into another viable standard design. He used the American Pratt truss with timber for the top chord and the vertical members, iron rods for the diagonals and a bottom chord member made from structural steel sections, plus the American practice of using single steel pins at each of the bottom chord joints.

While de Burgh’s design promised great economies in maintenance, the inclusion of pinned joints hindered some aspects of maintenance and future strengthening. Consequently, the design was only used for a short period from 1900 to 1905 during which 20 such bridges were built.

Despite the drawbacks of the de Burgh design the advantages of composite construction were clearly recognised. Harvey Dare’s reworking of the Allan truss was the most successful composite truss. In it he substituted a pair of steel channels for the timber bottom chord and redesigned the bottom chord joints to eliminate the pins of the de Burgh truss. He achieved further simplicity in member replacements, thereby creating the most cost-effective timber truss at the end of this evolutionary process. The Dare truss bridges have the highest survival rate of the five truss types. Forty-four Dare truss bridges were constructed between 1905 and 1936.

\textsuperscript{4} Italian architect Andrea Palladio (1508-1580).
By 1936, around 407 timber truss bridges had been built (although the RTA understands only 290 were in service at any one time) and had become such a characteristic feature of the road network that New South Wales was referred to as “The timber bridge State”. However, during the 1920s the increasing availability of locally produced steel allowed a gradual changeover to steel truss construction.

Of the 400-odd timber truss bridges built, only 62 remain in total.

Table 1  NSW timber truss bridges broken down by truss type and classification, from RTA’s Timber Truss Road Bridges—a strategic approach to conservation, with “Period” column added

<table>
<thead>
<tr>
<th>Truss type</th>
<th>Period</th>
<th>Number built</th>
<th>Current RTA population</th>
<th>RTA SHR</th>
<th>RTA Non-SHR</th>
</tr>
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<tr>
<td>Old PWD</td>
<td>1861–1886</td>
<td>147</td>
<td>2</td>
<td>1%</td>
<td>2</td>
</tr>
<tr>
<td>McDonald</td>
<td>1884–1894</td>
<td>91</td>
<td>5</td>
<td>5%</td>
<td>5</td>
</tr>
<tr>
<td>Allan</td>
<td>1893–1927</td>
<td>105</td>
<td>19</td>
<td>18%</td>
<td>11</td>
</tr>
<tr>
<td>De Burgh</td>
<td>1899–1905</td>
<td>20</td>
<td>9</td>
<td>45%</td>
<td>5</td>
</tr>
<tr>
<td>Dare</td>
<td>1906–1936</td>
<td>44</td>
<td>13</td>
<td>29%</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Original</strong></td>
<td></td>
<td><strong>407</strong></td>
<td><strong>48</strong></td>
<td><strong>12%</strong></td>
<td><strong>29</strong></td>
</tr>
<tr>
<td><strong>Total Originally In-Service</strong></td>
<td></td>
<td><strong>290</strong></td>
<td></td>
<td></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

Note A: The 407 bridges are road bridges. Not included are an additional 15 timber arch bridges nor any railway bridges. The timber arch bridges were covered in the MBK study, making a total of 422 bridges in the study.

Note B: One bridge (Five Day Creek) on the State Heritage Register is now bypassed and not currently in use.

Note C: 2 of the 19 non-SHR bridges are now bypassed and not currently in use (Gundaroo and Thornes). [This note C is in error: the total in the last column should be 20, and Cobram, Mungindi and Boonanga, non-SHR bridges, are also “already replaced”; the last two are indicated as such in the RTA’s table ‘Timber truss bridges —replacement list—consolidated details’, Annexure D – TTB Committee comment].
3.0 Policy and Legislative Issues

3.1 Total Asset Management

In reviewing the RTA’s proposal for conservation of timber truss bridges the Committee has kept in mind the requirements of the Government’s policy on total asset management.

The NSW Government Asset Management Committee (GAMC) was established in 1998 to bring together NSW Government agencies and asset experts to ensure a “whole of government” approach to asset management and office accommodation planning.

The Committee is chaired by the Director General, Department of Premier and Cabinet and the members comprise the heads of NSW Treasury, Department of Services, Technology and Administration, Department of Justice and Attorney...
General, Roads and Traffic Authority, Department of Planning and Sydney Catchment Authority. NSW Treasury provides executive support and a dedicated secretariat.\(^5\)

It is noted that the head of the RTA is a member of the GAMC.

Total Asset management focuses assets on the delivery of an agency's primary service responsibilities.

Organizations that have control of heritage assets also have a second service obligation. While they use the assets in delivering their primary service, they are also responsible for the stewardship of the assets and protection of their significance for future generations.

Agencies must ensure both that the purposes of the Government’s Total Asset Management policies, procedures and performance standards are met and that relevant heritage legislation is complied with.

The management of heritage issues should be viewed as an essential part of the management of the assets, rather than another problem and cost impost. Sustainable management of heritage values should be treated by an agency as part of its core business.\(^6\)

### 3.2 Objectives of the Heritage Act

Section 3 of the Heritage Act outlines its objects:

(a) to promote an understanding of the State’s heritage,
(b) to encourage the conservation of the State’s heritage,
(c) to provide for the identification and registration of items of state heritage significance,
(d) to provide for the interim protection of items of State heritage significance,
(e) to encourage the adaptive reuse of items of State heritage significance,
(f) to constitute the Heritage Council of New South Wales and confer on it functions, relating to the State’s heritage,
(g) to assist owners with the conservation of items of State heritage significance.

### 3.3 De-listing Items from the State Heritage Register

The Minister may approve, on the recommendation of the Heritage Council, the de-listing of an item from the State Heritage Register. Section 38 of the Heritage Act 1977 provides for the removal of items:

(a) if the Minister is of the opinion that the item is not of State heritage significance, or
(b) if the Minister is of the opinion that the long-term conservation of the item is not necessary and that either or both of the following apply to the item:
   (i) the listing renders the item incapable of reasonable or economic use,
   (ii) the listing causes undue financial hardship to the owner, mortgagee or lessee of the item or the land on which the item is situated.


4.0 Committee Consultation

4.1 Communication with Stakeholders
Copies of the RTA’s strategy report were distributed in confidence for comment to:
- The National Trust NSW
- Australia ICOMOS
- Engineers Australia
- The History Council of NSW
- Royal Australian Historical Society

Responses were received from ICOMOS, National Trust and Engineers Australia (Annexures A, B & C)

4.2 Communication with Professionals
Expert advice and comment was sought from:
- Dr Don Fraser, bridge expert and
- Messrs Brian Pearson and Ray Wedgewood, former Chief Bridge Engineers of the RTA.

Comments received as written responses, and those made in discussion with bridge experts, have been incorporated in the Committee’s conclusions & recommendations.

The Committee engaged Mr Mark Tilley, Principal Engineer, Bridges and Structures of GHD engineering consultants, who was formerly the RTA’s bridge engineer for the Hunter Region, to provide independent comment on:
1. the accuracy of the data presented in the report;
2. any opportunities for flexibility in the RTA’s ‘traffic light’ analysis;
3. any options for retention of individual bridges that may merit closer consideration than they have received; and in addition
4. some commentary on the NSW Heritage Office’s ability to negotiate, especially with respect to the five bridges in the Central Western Region identified for retention, and other bridges that might also benefit from concessions or retention.

During and after the meeting with Mr Tilley on 29 March, the following was also requested:
5. Commentary on the condition and rating of the bridges, including why this is important for conservation time frames.
6. Provision of a history of highway loading versus design code loads and some comments on Higher Mass Limit (HML) routes.
7. Discussion on each truss types strengths and weaknesses. This will be covered by Brian Pearson’s work and additional commentary.
8. Provision of a personal view of each bridge’s engineering heritage value by ranking. This will not be in accordance with the Burra Charter but provide a sounding board from a heritage and conservation engineer with a very strong knowledge, interest and commitment to timber truss bridges in NSW.

The Committee also met with officers of the RTA and its heritage consultant Mr Mac North on 31 March, 2010.

The Committee has met twelve times since 24 February, 2011.
5.0 RTA Approach

5.1 McMillan Briton and Kell (MBK) Analysis
The MBK study of relative heritage significance of all timber truss road bridges in NSW was completed in 1998. At the time there was a total of 82 bridges—58 in RTA control and 24 in the hands of local government.

This study forms the basis for determining the heritage significance of bridges in the current RTA strategic approach to conservation. The MBK study ranked the bridges according to their assessed significance and placed them into one of four categories. When the SHR was established in 1999, the number of categories was reduced to three (National significance, Local significance and State significance) and a total of 29 of the most significant timber truss bridges were placed on the SHR.

To arrive at their final ranking each bridge was scored numerically for a range of values which reflected significance assessment criteria. These values included technical significance, historical significance, social significance, aesthetic significance, and regionality.

The MBK study was extremely thorough and its methodology was sound. However it is somewhat dated and when the information from it was used by the RTA in developing its strategy that information was 13 years old.

5.2 Influencing Factors

5.2.1 Road Classification System
To a lay-person, statements about the “road classification system” and what constitutes “classified roads” are confusing, with the term being used loosely. Under the “system” all roads are in fact “classified”. However, the RTA seems to restrict the term to all arterial roads, i.e. those which provide state and national benefits, giving them the title “ Classified Roads”.

The RTA has legislative responsibility for funding the Classified Roads. It manages these in two forms:
1. State Roads, the primary arterial roads that the RTA manages directly.
2. Regional Roads which provide a sub-arterial function supporting the State Roads. For management of these, the RTA provides funding grants to assist Councils.

Local Roads comprise those roads not classified under the Roads Act 1993 and some classified roads that now provide for only local access and communication. These roads are the responsibility of local government authorities with only limited funding assistance from the State Government.

5.2.2 Loading Demands
While the RTA regulates the use of NSW roads by heavy vehicles, the framework is established and driven by national heavy vehicle legislation to provide uniformity and consistency across all Australian jurisdictions.

Operational requirements for all roads in NSW require road availability for "general access" heavy vehicles, as prescribed by nationally consistent regulatory vehicle load limits. These limits are essentially equivalent to a 42.5
tonne semi-trailer, with consistent and prescribed tolerances for overloading, to provide a factor of safety. Lower loading requirements can be established where operational requirements permit, or where unusual operational requirements or constraints enable a lower loading.

In addition to general access trucks, longer multi-trailer trucks are now using certain routes. These allow even greater total mass by adding an extra one to two trailers behind the semi-trailer, and the trucks need more road-space. Gross combination masses of the order of 100 tonnes are currently operating on the western slopes and plains. Ten bridges (Swan Hill, Barham, Tooleybuc, Boonanga, Coonamit, Mungindi, Gee Gee, Rawsonville, Warroo and Carrathool) are already at risk due to narrow width from large multi-combination trucks. (The foregoing information from the RTA report would appear to be somewhat dated as in a table the RTA provided to the Committee [Annexure D] it states that Boonanga and Mungindi have been “already replaced”). The risk also pertains to the future route requirements for three other bridges on the western slopes and plains—Beryl, Paytens and Scabbing Flat.

The operational requirements for Classified Roads are anticipated to be subject to significant and ongoing future change with the Council of Australian Governments (COAG) overseeing national reforms for improved transport efficiency. In turn, the National Transport Commission is increasing the permitted length and mass of trucks and creating new higher mass vehicle configurations that create greater stresses on bridges without increasing vehicle length.

COAG is driving adoption of "Higher Mass Limits" (HML) equivalent to a 45.5 tonne semi-trailer as a new national general access regulatory limit. NSW is under strong national pressure to move from the existing 42.5 tonne to the new proposed 45.5 tonne HML.

In addition, NSW legislation has already enabled the establishment of much higher regulatory limits, so the future road network is likely to be comprised of routes having different regulatory limits and different access prices. Under this regime, some route-specific limits are currently moving to at least 55 tonne semi-trailers.

The emerging future operational requirements for Classified Roads would require acceptance in excess of 55 tonne semi-trailer equivalents. Emerging Regulatory Limits will be multi-tiered with different routes having different limits and access prices. For example, the existing 42.5 tonne national general access base will be superimposed with specific routes allowing say 55 tonnes and others say 65 tonnes. As trucks get heavier, the risks to assets and safety increase.

5.2.3 Modern Road Demands
Timber truss road bridges are 19th century infrastructure operating in an environment far in excess of their structural design capacity, with their narrow width creating great structural risk from multi-combination trucks.

Timber truss bridges were originally designed for approximately a 16 tonne vehicle load. As their structural designs are not "fail-safe", i.e. lacking redundancy, they can collapse suddenly under modern loads. Higher speeds
can also result in sudden braking by heavy vehicles causing extreme forces that could lead to structural damage and possibly collapse.

The iron material of some components is brittle and subject to sudden failure. Some designs placed cast iron through the timbers making it more vulnerable to corrosion and difficult if not impossible to inspect. Both the Old PWD and MacDonald trusses are more prone to sudden collapse because of iron bolts inside the timber girders. In them, a bolt can corrode, become overloaded and fail much more easily than if it were steel. For example, in 1981 a bridge in apparently good condition at Palmers Channel on the Maclean to Yamba Road, collapsed when an iron bolt snapped.

Only five of the RTA’s 48 bridges are able to operate for two-way travel: Holmans, Colemans, Bulga, Coorei and Morpeth. Single lane operation creates significant safety risks as well as loss of service efficiency.

The heavier weight, higher speed and greater frequency of traffic on the existing bridges also create much higher wear-and-tear, irrespective of loading issues. Thus the remaining timber bridges:
- cannot accept the emerging modern vertical and horizontal loads from general access heavy vehicles, without structural modification;
- require more frequent maintenance, including substantial periodic reconstruction; and
- are very expensive to maintain compared to more modern bridges.

Timber bridges cannot be modified to achieve the full requirements of the 1976 T44 standard that underpins the current 42.5 tonne general access regulatory limits and cannot be modified to accept (existing) HML loads, let alone the Emerging Regulatory Limits.

5.2.4 Affordability

In March 2009 the then Minister for Roads sought a review by the RTA in conjunction with the NSW Heritage Branch to:
- expedite delays on heritage planning approvals for works on timber bridges;
- ensure the maintenance budget is appropriately allocated across all of the RTA’s road assets; and
- provide RTA with planning certainty.

Amongst other things, the Minister in his correspondence indicated concern over the relative safety of timber truss bridges, the potential network limitations that they present and the disproportionate high cost and frequency of their maintenance. He stated that 20% of the available bridge maintenance funds were being used on only 1% of the total RTA bridge assets across the state and that this was not sustainable.

Historically, expenditure levels have been around $25 million per annum but were insufficient to provide an adequate level of service. In 2010/11 approximately $40 million was invested in timber truss bridge maintenance.

Even if structurally upgraded, the traffic demands from these bridges would still require a major rehabilitation every 5 to 7 years if they are used by motorised traffic and every 20 years if used by pedestrians and cyclists or are
orphaned. The average cost of rehabilitation after the capital upgrades is $4.7 million.

By comparison, if the bridges were new modern structures, the average annual funding requirement for the foreseeable future would be less than $1 million for the entire 48 bridges.

5.2.5 Availability of Timber
For some years the perceived scarcity of high-quality hardwood timber has been cited as a substantial impediment to the maintenance of timber truss bridges, noting that some of the key timbers required had to be derived from 80-200 year old trees. However, the RTA in its report\(^7\) indicates it is developing a *Long-term Timber Procurement Strategy* and the latest advice to it indicates that short term needs can be met from NSW public native forests, but there is likely to be a long-term shortfall for the large-section, long, premium timbers. The RTA feels that this shortfall can be managed through various measures and is therefore confident that with improved planning certainty from this review, a long-term sustainable arrangement can be developed with forest/plantation providers to ensure secure appropriate timber supplies in perpetuity.

6.0 RTA Methodology for the Strategy
At the Committee’s meeting with the RTA on 31 March 2011 it was mentioned that the strategy is the culmination of some 14 years’ work to come to terms with the challenge of timber truss bridges, and that the strategy aims explicitly to avoid haphazard incremental attrition of the bridges. Accordingly, it has attempted to present a whole-of-portfolio asset solution, but needs Heritage Council endorsement so that the strategy can form the basis for public consultation and, ultimately, decision-making.

6.1 Managing Redundant Bridges
In developing its strategy, the RTA considered five options for managing redundant bridges\(^8\):

- **Transfer to local government** was not considered viable because recipients would not have the requisite financial or skills resources for effective management of the bridges.

- **Adaptive reuses** to carry light local traffic, cyclists, pedestrians or utilities would only be a real possibility in urban areas. Such opportunities are rare as most of the bridges are in a non-urban environment and many are in remote locations. The only possibility identified was Swan Hill that will be adaptively re-used for cyclists, light traffic and pedestrians. However, it is stated that Cobram "will soon be in use by pedestrians and cyclists ..."\(^9\) thus making two such bridges.

- **Relocation** would only be considered in exceptional circumstances. The RTA claims that essentially it requires the bridge to be dismantled and almost completely reconstructed in new materials. Further, an appropriate site would need to be available at the time of relocation and, if the bridge does not have significant use it is unlikely to receive appropriate maintenance.

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\(^7\) RTA report, *Availability of Timber*, page 15.
\(^8\) pages 16 to 18 of RTA report.
\(^9\) RTA report, Appendix 1 – DeBurgh - 5
Retention as an ‘orphaned’ structure was considered the least desirable option as without serving a useful purpose the bridge would be neglected, become unsafe and have to be demolished.

Demolition and replacement after archival recording and establishment of interpretation capability was considered to be the only option where a bridge has no identifiable prospects for transfer, relocation, adaptive reuse or retention as an orphan structure.

6.2 Assessment Process
6.2.1 Four Step Assessment
In conducting its review the RTA applied the following four-step assessment process\(^\text{10}\) to identify a portfolio of bridges that best met long-term conservation and infrastructure service needs:
- Step 1—Operability Test
- Step 2—Sensitivity Analysis
- Step 3—Representative Sampling
- Step 4—Balancing Analysis

The Operability Test analysed each bridge against a range of critical operational factors to determine its ability to perform at an appropriate level into the future with the assessment being based on the current and expected route function. Emerging Regulatory Limits are expected generally to apply to most of the Classified Roads and potentially some unclassified roads ("local access" roads). Where operating requirements for current “general access” trucks are sufficient, those bridges will still need structural modification.

“Operationally unsuitable” bridges are those which must be able to carry loads in excess of the bridge engineering standard associated with current general access trucks (above 42.5 tonnes and as high as 65 tonnes). It is not possible to upgrade any existing timber truss bridge to meet that requirement.

The Sensitivity Analysis is a multi-criteria analysis that examined five key heritage and five key operational factors for each bridge. The purpose was to differentiate between similar bridges and to rank them relative to each other. The results of the analysis were shown in tables. Table 5 has for simplicity been termed the “Traffic Light Table” because of the colouring used to distinguish between significant factors, and Table 6 differentiates bridges based on medium and positive factors.

The RTA’s traffic light table and the expanded version requested by the Committee are at Annexure D.

Representative Sampling checked that a sample of each bridge style in the population was present that adequately represented the heritage significance of the bridges both collectively and individually.

Where possible, bridges selected were those identified as “operable” and which have fewer red\(^\text{11}\) factors identified in the Sensitivity Analysis. If there were gaps in the sample, “operationally unsuitable” bridges with the greatest adaptive reuse potential could be considered for retention. The sample looked

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\(^{10}\) RTA report pp 26-31
\(^{11}\) RTA report page 35. Table 5, Application of the sensitivity analysis to the RTA timber truss bridges, ordered by number of ‘green’ values, Annexure D
for bridges which were both operable and which had the greatest number of medium or positive factors (green or yellow\textsuperscript{12}) from the Sensitivity Analysis.

The categories used were:

- Historical representation
- Technical representation
- Social visibility
- Aesthetic visibility
- Spatial (i.e. geographical) distribution

The **Balancing Analysis** checked whether the representative sample reconciled with other government policy requirements.

The RTA’s report states that: *“This (the Balancing Analysis) entailed consultation with the Heritage Branch of the Department of Planning, considering the NSW Government’s response to the Heritage Act review and other matters relevant to heritage asset management”. Officers of the Branch have confirmed that the discussions referred to did not include the concept of representative sampling. In its report the RTA makes a number of critical references to the absence of guidelines for representative sampling. However, while the identification of a “representative sample” of heritage assets in Section 170 registers was a recommendation of the Heritage Act Review, it was not adopted.*

### 7.0 RTA’s Conclusions

#### 7.1 Principles Underpinning the Review

At *“4.3 Principles underpinning this Review”* in its report, the RTA has given the following undertakings:

> “The RTA commits to the following:
>  
> - *The RTA recognises that timber truss bridges are an important component of the history of NSW.*
> - *The RTA believes that the best way to conserve a timber truss bridge is for the bridge to remain in service.*
> - *The RTA will conserve a selection of the remaining timber truss bridges for each of the five truss types.*
> - *The RTA will develop Conservation Management Plans for the remaining timber truss bridges and complementary Interpretation and Communications Strategy regarding their heritage significance.*
> - *The RTA will ensure that the final portfolio of timber truss bridges is conserved and maintained into the future in accordance with the requirements of relevant legislation and within resources available via government budgetary processes and priorities.*
> - *The RTA will engage in a process of ensuring the long-term supply of suitable timber for bridge maintenance, in consultation with Forests NSW and the timber industry, and develop the specialist skills required for their continued maintenance.*
> - *The RTA will report the condition of its timber bridge heritage assets in its Annual Report*.”

\textsuperscript{12} Ibid
However this must be read in the context of the comment in the RTA’s conclusions that:

“There is an undeniable long-term risk that these (24) operable bridges may themselves come out of service as traffic demands increase further or rural economies change, but the present analysis gives some direction to required function and required upgrading works in the next 10-15 years”.

In other words, the proposed strategy has only a 10 to 15 year horizon.

7.2 Proposals for Conservation and Divesting

7.2.1 Proposed Portfolio for Conservation

The proposed portfolio of bridges for conservation consists of 25 bridges, i.e. 24 operable bridges plus Swan Hill. The 25 bridges comprise:

- seventeen bridges on the SHR;
- three bridges on its S. 170 Register to be nominated to the SHR; and
- five other bridges on its S. 170 Register.

7.2.2 Proposed Portfolio for Divesting from the RTA’s Portfolio

The portfolio of bridges proposed for divesting from the RTA’s heritage portfolio comprises 23 bridges deemed “inoperable”. The RTA expects none to be able to meet the future operating requirements and none to be feasible for adaptive reuse. The 23 bridges proposed for divestment consist of:

- twelve from the SHR; and
- eleven from its S.170 Register.

These bridges will be progressively replaced as funding permits with modern ones over the next 10 - 15 years. Options for transfer to separate owners, e.g. local government would be separately addressed at the time.

8.0 Committee Findings

8.1 Quality of RTA Report

As well as the operational requirements for the bridges there are sections in the report on the financial implications of conserving the bridges, the necessity for a supply of suitable hardwood for members (commented on at 5.2.5), as well as the skilled labour component for the maintenance of these bridges. Although the Committee does not agree with all of the findings encapsulated in the report, it recognizes the effort that has gone into producing the document and congratulates the RTA on the thoroughness of the work.

8.2 Comments on RTA Proposals

8.2.1 General Comment

Timber truss bridges, 407 of which were constructed in NSW between 1861 and 1936 and of which 62 remain, are as a class, and many individually, a significant part of the State’s heritage, with 29 being on the State Heritage Register.

The main issues that have given rise to the RTA’s proposed conservation strategy have been traversed in the Introduction and are in essence:
• The imminent upgrading of the current general access limit for roads. At present this is 42.5 tonnes (which the bridges can meet if adapted) but it is being upgraded to “Higher Mass Limits” (HML) of 45.5 tonnes (to which timber bridges cannot be upgraded), with emerging national freight route limits of 55–65 tonnes, which timber truss bridges could not carry without high risk of failure.
• Most timber truss bridges are single lane and are thus constrictions (pinch points) on the road network.
• The bridges are vulnerable to a range of hazards—flood, fire, vandalism and damage from vehicles through overloading, excessive speed, braking and impact.
• The bridges are expensive to maintain compared with more modern structures and reportedly consume 20% of the RTA’s bridge maintenance budget.

The approach adopted in considering first and foremost the operational issues affecting the NSW road network and their implications for the management of individual bridges, before moving to consider the bridges’ heritage significance, is a significant departure from the Burra Charter. However, it is a positive step towards a workable approach to the conservation and management of the heritage-significant timber truss bridges of NSW.

The strategy is thus weighted towards operational factors, the requirements of the National Road Network, pinch points (ie narrow and one lane bridges) and inadequate bridge capacities. There are few, if any, feasible alternatives to this approach, given the particular challenges presented by timber truss road bridges.

This innovative methodology, however, should not be uncritically extrapolated to other classes of heritage items.

In preparing its strategy the RTA asserts that it has considered restricting routes and load limits with each bridge having been assessed in terms of detour time. While the RTA tries to monitor loads using weighbridges, other factors in bridge loading are weight-in-motion, gross vehicle mass and axle-loading. Coupled with this is the problem that it is nigh impossible to guard against ‘cowboy’ drivers who in overloading, exceeding speed limits and possibly braking suddenly, can impose greater than designed-for-loads on a bridge—apart from causing damage due to impact.

Archival recording and interpretation of significance are, in this instance, complementary, not identical activities. Too often in the past, the archival recording that has been a condition for the inevitable demolition of significant heritage assets has produced records of exclusively documentary and scholarly interest. While they may comply with the letter of the Heritage Branch guidelines, they are relatively inaccessible to the general public (you have to know about them) and tend to emphasise technical detail, rather than to evoke the genius loci of the items they record. As long as the remaining timber truss bridges of NSW stand, there is an opportunity to create not just an academic record of their particulars, but also a celebration and commemoration of the significant phase they exemplify in the state’s
development. The Committee addresses this opportunity in its recommendations.

### 8.2.2 Modern Loading and Road Demands

The Committee agrees with the RTA’s comment that:

> The RTA’s extant timber truss bridge population has substantial heritage significance. However, the bridges suffer inherent design limitations that when combined with their location within the road network prevent either their viable operation or provide a greatly reduced level of service and a high operating risk. In particular their exposure to modern large multi-combination trucks is of strong concern.

Consequent upon this and the high cost of maintaining the bridges, the RTA devised a four step process to identify the various factors and considerations which bear on their long term upgrading and conservation, with the object of establishing a "balance between infrastructure provision and heritage conservation".

While there is no doubt that truck mass will continue to increase and the road network will be progressively upgraded for increased efficiency in the movement of goods, the RTA’s report provides no indication of the existing Higher Mass Limits (HML) network, nor of the transport routes that might be upgraded in future. However, maps showing HML routes and relevant information such as fact sheets have been found on the RTA’s website. The maps called “IAP (Intelligent Access Program) maps” are updated on a quarterly basis.

The maps do not show HML routes running over a number of the bridges proposed for divesting. However, operators can request HML “access on any road not yet approved for HML within the HML access zone” set by the NSW Government. This will tend to expose many bridges to the possibility of loadings not presently indicated by the maps. Presumably, the RTA also makes planning predictions about which routes might be upgraded. These, together with information flowing from interactions with interstate and Commonwealth authorities, may give rise to assumptions about Emerging Regulatory Limits well in excess of the T44 standard, and thus to the RTA’s concern that they can’t be met by various bridges.

While this may be prudent planning, it would be unwise to agree to the replacement of bridges on the possibility that “allowance should be made for B triples to run to every farm gate”—a comment reported to have been made by a senior officer at an RTA meeting.

It should be a requirement that any proposal to de-list a bridge must be accompanied by definitive evidence that it could not cope with the transport loadings and traffic currently existing, or about to be experienced, and that its retention by any of the measures discussed at 6.1 would be impractical. This is especially important as 12 of the bridges proposed for divesting from the RTA’s portfolio are listed on the SHR.

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15 RTA report page 60.
16 Examples at Annexures E and F
8.2.3 Representative Samples

The RTA’s strategy relies to an extent on a recommendation contained in the Heritage Act Review, that ‘representative samples’ of various classes of heritage items be identified in agencies’ Section 170 registers. However, this recommendation was not in fact adopted. Consequently, while it is desirable that the portfolio of retained bridges should be representative of as many of the different features and heritage values of timber truss bridges devised over the 75 years the class developed, that should not be a prime determining factor in deciding the number of bridges of any given type to be retained.

8.2.4 Scale of Divesting Proposal

In 1987 there were 97 timber truss bridges in the “timber bridge State”. By the time of the MBK study in 1998, there were 82 bridges—58 under RTA control and 24 under local government. This had reduced to 62 in 2010 (including 14 in local council care) with 29 on the SHR. The RTA’s strategy proposes divesting 23 bridges from its portfolio of 48, leaving 20 on the SHR and a total of 39 bridges in the State, with some 14 of these no doubt under threat, because of the paucity of councils’ finances.

This represents a severe diminution of these heritage assets and constitutes another reason for any application to remove a bridge from the SHR, to be soundly based on necessity and to be rigorously evaluated.

8.3 Particular Issues

8.3.1 Funding

It may be claimed that maintenance cost was not a factor used in the “Four Step Assessment Process” to select the bridges for divestment, and as a consequence, those for retention. However, emphasis in the RTA’s report on the cost of maintaining the bridges and the statement by the former Minister for Roads which gave impetus to the report, that the cost of maintaining timber truss bridges is “not sustainable”, suggests that the cost of maintaining its heritage bridges, was a motivating factor in developing the RTA’s strategy and maybe in its decision-making.

The RTA claims that the “current level of expenditure in timber truss bridges is seriously compromising bridge maintenance and replacement needs across the remainder of the State’s bridge stock and hence the RTA’s ability to manage risks to these and other road infrastructure assets. Moreover, this current level of spending on RTA’s timber truss bridges is still not sufficient to provide an adequate level of service with many on sub-arterial and local access roads subject to temporary bracing or detours in response to bridge closure.

“From RTA’s perspective the ongoing management of the current portfolio of 48 bridges is not sustainable from an operational, risk, financial management and heritage conservation perspective”17.

While the Committee accepts that the allocation of priorities and funds is the RTA’s prerogative, the RTA has both statutory and TAM policy obligations to

17 RTA report, page ES2
conserve its heritage assets. Further, in terms of the totality of the RTA’s budget, the amount expended on timber truss bridges is small—it is hardly one of the Pareto\textsuperscript{18} 20\% items. Inclusion of the comment about “sustainability” from a financial management point of view in the last paragraph of the RTA’s statement, above, seems to indicate more an attitude to heritage conservation, rather than a desire for significant budgetary savings that might be achieved by axing heritage bridges without clear justification on other grounds.

8.3.2 Lift Span Bridges
Lift span bridges are a significant feature of ‘riverscapes’; they are landmarks analogous to the church steeples of the English countryside.

Carrathool, a 1922 Allan Truss bridge, designated as having a ‘lift span’, is actually the last remaining RTA bridge in NSW with a bascule (hinged) span, associated with timber truss spans\textsuperscript{19}.

Only six timber truss bridges remain in NSW that have spans lifted from four towers,

- four are on the Murray, at Swan Hill (Allan 1896), Cobram (De Burgh 1902), Barham (De Burgh 1905) and Tooleybuc (Allan 1925); and
- two are on the Paterson, Dunmore (Allan1899) and Hinton (Allan 1901).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2.jpg}
\caption{Hinton Bridge from Phoenix Park \hspace{1cm} (Photograph: Michael Clarke)}
\end{figure}

\textsuperscript{18} Vilfredo Federico Damaso Pareto (1848–1923) was an Italian engineer, sociologist, economist, and philosopher. The Pareto principle (also known as the 80–20 rule and the law of the vital few) states that, for many events, roughly 80\% of the effects come from 20\% of the causes.

\textsuperscript{19} RTA report, Appendix 1 – Allan -33
All, including Carrathool, are on the SHR except for Cobram which is on Berrigan Shire's Local Environmental Plan (LEP), but which is proposed by the RTA for SHR listing. Although their statements of significance vary in style, detail and emphasis, in essence they identify the bridges as being of historic, aesthetic, associative, rare, technical and group significance. The bridges are also recognised as landmarks, with the lift spans regarded as significant in their own right.

The provision of lift spans was essential to ensure the uninterrupted passage of river traffic that was so vital to the river economies. This was especially so along the Murray and Murrumbidgee because of large, and at times prolonged, elevations in water levels.

While the Murray bridges may be on heavy-vehicle transport routes, (which is the prime rationale for their proposed replacement) they are also on the Valley’s tourist trails, with heritage tourism increasing in popularity. Thus, they are important components of the tourism experience of the nearby towns. This not only reinforces the significance of the bridges as a group and individually, but the significance of their towers for their landmark qualities.

The Committee therefore considers that lift span bridges should be regarded as a sub-category and receive special consideration for their retention. However, if a bridge has to be replaced and cannot be adapted to another purpose, retention of the lift span and its possible adaptive re-use should be carefully and innovatively explored; one possibility could be to link it to the walkway of the replacement bridge, if it is adjacent.

In the RTA’s proposal, Barham and Tooleybuc (both on the SHR) are marked for de-listing and eventual replacement, which would leave only two lift spans on the Murray—Swan Hill and Cobram. The latter has already been by-passed but advice is that it and Swan Hill are being retained for use by pedestrians and cyclists.20,21

The Committee considers that the Barham bridge, being on the edge of the town and linking Barham with Koondrook in Victoria, could also be used by local traffic and should be retained like Swan Hill and Cobram. This would be especially appropriate if the replacement bridge is on a town by-pass.

On the other hand, adaptive re-use of Tooleybuc where the town has a population of only 180, may seem impractical. However, the bridge should be considered for conservation and use by local and tourist traffic, especially if a new bridge by-passes the town at some distance.

Should Barham and Tooleybuc be retained in addition to Swan Hill and Cobram, the four bridges that cover a distance along the river of around 350 kilometres by road22 would remain as heritage landmarks. These State heritage-significant structures would stand into the future as tourist assets and evoke both the part bridges played in trade between Victoria and NSW and the thriving river traffic, whose passage required the installation of the lift spans. The retention of all four would be particularly important to the

20 Table ES-2 page ES 10 of the RTA report and Table 4 page 29.
21 Appendix 1 – DeBurgh - 5
22 Map at p.24
Riverina region as the nearest timber truss bridges with lift spans of similar type, are on the Paterson River about 700 km distant. With the conversion of Swan Hill and Cobram (and possibly Barham and Tooleybuc) for use by pedestrians, cyclists and possibly light traffic, the Paterson bridges would become the only two similar lift span timber truss bridges that carry normal vehicular traffic.

Figure 3 Murray River Crossings and Historic Sites (Source: RTA brochure, Bridging the Murray River, Albury to Swan Hill regions annotated by Michael Clarke)

The significance of the Carrathool bascule span has been mentioned above. However, according to the RTA\textsuperscript{23}, some uncertainty remains regarding its future operability because of “the emergence of, and widespread access for large multi-combination trucks on the western slopes and plains”. It is understood the bridge is on a local road—not on a main road or highway, so its upgrading to carry B triples is hardly certain. If in the future, “uncertainty” becomes “inevitability”, special and robust consideration will need to be given to agreeing to its replacement as it is the only remaining bascule bridge in the State associated with timber truss spans. Meanwhile, as protection, a load limit should be placed and monitored on both the road and the bridge.

It might be noted that the statements in the RTA’s Appendix 1, DeBurgh page 5, that “The bridge (Cobram) was by-passed by a high level concrete bridge in 2002” and “The lift span remains in operation to service the needs of tall vessels ...” are not strictly correct. The 2002 bridge is not high level and significantly

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\textsuperscript{23} Timber Truss Road Bridges – a strategic approach to conservation, RTA, p. 60
reduces waterway clearance, and while the lift span may remain in operation it would only need to be lifted to the level of clearance permitted by the adjacent new concrete bridge, as illustrated in Figure 4, below.

![Cobram Bridges—Old and New](image)

**Figure 4 Cobram Bridges—Old and New**  
(Photograph: Brian Pearson)

### 8.3.3 Individual Bridges

**Wallaby Rocks Bridge:** Wallaby Rocks Bridge (on the SHR) over the Turon River on the Sofala-Hill End road is cited by the RTA as “operationally unsuitable” as the route “is required to meet emerging regulatory limits well in excess of the T44 standard”\(^{24}\). The Committee feels that within the foreseeable future it is unlikely B triples will run on that long gravel road and that it is unlikely to be upgraded to in excess of the T44 standard thereby requiring replacement of the bridge, or by 2022 as indicated by the RTA in its table provided to the Committee\(^{25}\). Further, the bridge is on an historic road and is likely to be highly valued by the community. The Committee has been advised that the bridge is in very good condition having been “restored by the RTA’s best timber bridge foreman and should last 50 years” without significant maintenance.

**Five Day Creek Bridge** was by-passed around 8 to 10 years ago and it has been reported that even when the replacement was under construction the bridge was in a poor condition, and has since deteriorated further. The bridge is still on the SHR and only now is the RTA mentioning that it proposes to seek its de-listing and removal. It would thus seem the RTA has neglected its obligation to maintain an item on the SHR to an acceptable standard and should be asked to advise the Heritage Council of the circumstances.

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\(^{24}\) RTA report, Appendix 1 – Allan

\(^{25}\) Annexure D Timber truss bridges – replacement list – consolidated details
Coorei Bridge at Dungog, a two-lane bridge and thus unlikely to be a bad “pinch point” is also on the SHR and is proposed for de-listing. Such action should not occur without consultation and the support of the local community, which is likely to value the bridge. In fact the significance of the bridge to the local community has possibly been enhanced since the increased popularity of the Dungog film festival.

8.3.4 Nomination of Bridges to State Heritage Register
In preparing its proposed portfolio for conservation, the RTA has indicated it will nominate the Section 170 Cobram, Landsdowne and Briner bridges to the SHR.

Having regard to the proposed divestment of seven of the presently surviving 13 Dare truss bridges and the fact that three Dares are proposed for conservation only “on an interim basis” as are two Allan truss bridges, the Committee recommends that the RTA also assesses the Section 170 Waroo, Rawsonville, Scabbing Flat, Beryl and Paytens bridges as possible nominees for inclusion on the SHR, and advise the Heritage Council of the outcome.

8.3.5 Heritage and Conservation Engineering
The Committee feels that the RTA should actively seek to have a succession of engineers qualified as Heritage and Conservation Engineers by Engineers Australia under its procedures, which provide accreditation for professional engineers competent in that field. And further, that only accredited Heritage and Conservation Engineers should be permitted to make decisions affecting the heritage and structural integrity of timber truss bridges.

It might be noted that while in its presentation to the Heritage Council the RTA spoke about training engineers in heritage conservation at Sydney University, this does not of itself guarantee that a suitably qualified Heritage Engineer would be involved in bridge conservation work.

It is also recommended that the heritage and conservation tasks related to timber truss bridges should be clearly communicated on the RTA’s Form 62R for Bridge Rehabilitations rather than being a perfunctory input.

8.4 De-listing and Decommissioning
8.4.1 De-listing
As road network planning can change there is potential for bridges to be demolished unnecessarily, if that occurs ahead of firm decision-making.

Further, as it is unlikely that the increased regulatory limits would be reached at the same time for all the subject bridges, the bridges should not be considered as a group, but each must be dealt with individually and closer to the time when their replacement is being determined.

The RTA should provide to the Heritage Council, a case for de-listing of any bridge on the State Heritage Register (SHR) before a budgetary allocation is sought for its replacement and in sufficient time for the Heritage Council to make its position known to the RTA. The proposal should include a draft of the case for de-listing.

The RTA will also need to be cognisant of the lead time involved in processing de-listing applications (including advertisement for public comment) and provide for this in its programming.

To comply with de-listing conditions, each bridge proposed for de-listing would need a separate submission addressing the relevant issues.

### 8.4.2 Redundant Bridges Options

The Committee has examined the RTA’s assessment at pages 16 to 18 of its report, of five options for managing redundant bridges. While in general the Committee agrees with the RTA, it feels that Barham and possibly Tooleybuc should be retained in a similar way to Cobram and Swan Hill (refer to the comment above at 8.3.2 Lift Span Bridges).

While it could be argued that retention of Barham and possibly Tooleybuc may be “uneconomic” from an operational point of view, it must be recognised that the conservation of heritage structures is a legitimate expense in satisfying an authority’s obligations under the NSW Heritage Act and the Government’s Total Asset Management Policy.

In its review of management options for redundant bridges the RTA has recognised that recipient councils will not have the requisite financial or skills resources for effective management of the bridges.

The lack of skilled resources could be overcome by the RTA acting as contractor to councils; if needs be it could increase the size of its workforce to that commensurate with the volume of work, at little if any cost to itself.

The prime inhibitor to the acceptance by local government of the transfer of redundant bridges is lack of adequate finance. On page 17 of its report the RTA mentions what appears to be its expectation that a council can manage a transferred bridge effectively with the gift of funds equivalent to the cost of demolition, for investment into the conservation of the bridge. But the RTA cites the case of the Hampden Bridge at Wagga Wagga as a failure of this process:

> “Wagga Wagga City Councils' Hampden Bridge (identified as of national significance in the 1998 MBK study) is now closed and understood to be in a poor state of repair”.

The Committee feels that the Hampden Bridge experience proves the futility of such one-off arrangements and is strongly of the view they are unrealistic. The Committee recommends that in future, the transfer of a timber truss bridge to a third party should be accompanied by an endowment fund that will ensure its conservation in perpetuity.

As mentioned above, Hampden Bridge was identified in the 1998 MBK study as being of National significance. However, it had been by-passed, and handed over to Council in 1995. Consequently and unfortunately, it was not placed on the SHR together with 29 other bridges following the MBK study.

In respect of bridges which have no identifiable future use, the Committee notes the RTA’s commitment that such bridges will be archivally recorded.\(^27\)

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\(^27\) RTA report, *Demolition and replacement after archival recording and establishment of interpretation capability*, page 18.
The Committee considers that this commitment should be incorporated in the conservation management plan for each individual bridge in the RTA’s portfolio and should be included as a requirement in its bridge management manual.

8.4.3 Consultation with Stakeholders
In the Committee’s discussion with officers of the RTA, it was agreed that extensive consultation on its report would be required with stakeholders including affected communities, Engineers Australia, National Trust and ICOMOS, before the Heritage Council could determine its final position with respect to the proposed strategy. It was further agreed that a summary report should be prepared for the purpose, which would include acknowledgment of the heritage significance of the bridges, a summary of the methodology, a firm commitment to the conservation of the remaining bridges, and a commitment to individual nominations being made to the Heritage Council for removal of the bridges from the SHR and for demolitions, only when the needs arise.

8.5 Survival of the “Species”
In the long term, the survival of a sample of timber truss bridges will depend on the conservation of those not on heavy transport routes—predominately those under the control of local government councils or those RTA bridges adapted by it for local use. This is borne out by the RTA in its Conclusions, where it says:

“There is an undeniable long-term risk that these (24) operable bridges may themselves come out of service as traffic demands increase further or rural economies change, but the present analysis gives some direction to required function and required upgrading works in the next 10-15 years”.

However, because of the high cost and the paucity of skills, the retention of a sample (mainly by councils) of the 407 bridges originally constructed, will need to be funded by other than ratepayers, with most likely, the physical maintenance carried out by a central pool of skilled tradesmen under the direction of accredited heritage and conservation engineers.

While a study of this avenue for the long term survival of the bridges is beyond the scope of this review, it should be undertaken urgently with a view to the development and implementation of an appropriate strategy. Urgency is emphasised because of the age of the bridges, the lack of relevant council finances and the fact that only 14 council bridges remain.

These bridges should be closely considered for inclusion on the SHR, with ‘rarity’ being an important criterion.

8.6 Commemorating Timber Truss Bridges
The Committee strongly feels that a book should be produced on timber truss bridges similar to Victoria’s Wooden Wonders. This will serve to celebrate and commemorate the history and significance of these bridges for posterity as inevitably, the majority will eventually be lost. The publication could be a joint project with the Australian Rail Track Corporation, whose few remaining timber truss rail bridges face a similar fate. Timber truss bridges are among the most significant and impressive timber structures in NSW and bespeak an era which,
although their numbers may inevitably dwindle, need not vanish from public consciousness and the historical record.

9.0 Conclusions and Recommendations
The Committee acknowledges the inherent conflicts between the RTA’s obligations to manage its heritage assets and its need to provide for the increasing transport loads using the State’s road network. While it concurs substantially with the RTA’s proposals for the conservation of its timber truss road bridges, the Committee considers there should be some amendment of the proposals to safeguard and conserve these heritage assets. The Committee’s recommendations for divestment and retention of the bridges are summarised in the following table, Bridges under consideration … It has also identified the following opportunities for achieving conservation outcomes additional to, or in place of, those envisaged in the strategy:

General
1. Subject to adoption of recommendations below relevant to the Roads and Traffic Authority’s (RTA’s) proposed strategy, the Committee recommends that the Heritage Council advise the RTA its strategy document is an appropriate basis on which to proceed to community consultation and notification processes required by the Heritage Act.

2. The Heritage Council should endorse this review and use it in its deliberations on the future management of timber truss bridges.

Administrative
3. Decisions taken by the RTA should be made in the context of both the Heritage Act and the Government’s Total Asset Management policies.

4. The RTA should provide to the Heritage Council a case for de-listing of any bridge on the State Heritage Register (SHR) before a budgetary allocation is sought for its replacement and in sufficient time for the Heritage Council to make its position known to the RTA.

RTA’s proposals
5. While it is desirable that the portfolio of retained bridges should be representative of as many of the different features and heritage values of timber truss bridges as possible, the selection of a representative sample should not be a prime determining factor in deciding the number of bridges of any given type to be retained.

6. Where the RTA plans to transfer ownership of a bridge to a local council an endowment fund should be established to allow the council to maintain and conserve the bridge in the long term.

7. Because of their significance lift span bridges should receive special consideration for conservation as they have a special place in the history of river navigation, as features in the landscape and as heritage tourist attractions.¹

8. The Committee proposes that further consideration should be given to the long term retention and conservation of the Barham and Tooleybuc lift span bridges and of Carrathool, the only remaining bascule bridge
associated with timber truss spans (all of which are on the SHR) because of their significance.

9. While noting that the RTA proposes nominating Cobram, Landsdowne and Briner bridges to the SHR, the Committee recommends that the RTA also assesses Waroo, Rawsonville, Scabbing Flat, Beryl and Paytens bridges as possible nominees for inclusion on the SHR, and advises the Heritage Council of the outcome.

Other recommendations

10. Conservation Management Plans (CMPs) should be prepared for all bridges which are to be retained and conserved beyond 2016. These CMPs should be reviewed every five years.

11. The RTA should make special budgetary provisions for the conservation of timber truss bridges in order to honour its conservation, heritage and total asset management obligations.

12. The RTA should ensure that only accredited heritage and conservation engineers make decisions affecting the significance and structural integrity of timber truss bridges.

13. The RTA should be asked to explain to the Heritage Council the condition of Five-day Creek Bridge, an item on the SHR.

14. A quality commemorative book should be prepared on NSW’s timber truss bridges, similar to Victoria’s “Wooden Wonders”.

“Timber truss bridges are virtually unique to NSW. There are few, if any, remaining in service in other states.”

Brian Pearson
Chief Engineer (Bridges)
February 1987

1 Only six lift span bridges remain throughout the State: Tooleybuc, Swan Hill, Barham, and Cobram on the Murray; and Hinton and Dunmore on the Paterson. All are on the SHR except for Cobram, which the RTA proposes to nominate. While Swan Hill and Cobram are being by-passed, the RTA proposes retaining them for local traffic.
<table>
<thead>
<tr>
<th>Bridge name</th>
<th>Truss type</th>
<th># spans</th>
<th>Location</th>
<th>Council</th>
<th>SHR Listed?</th>
<th>Road Classification</th>
<th>Expected Route Requirement</th>
<th>OA’s Assessment</th>
<th>Committee’s Recommendations</th>
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<tbody>
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<td>T44</td>
<td>Operable</td>
<td>Retain &amp; conserve</td>
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<td>Old PWD</td>
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<td>Karuah River, Maitland - Buckets Way</td>
<td>Great Lakes</td>
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<td>Boonango</td>
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<td>Y</td>
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<td>T44</td>
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<td>Bridge name</td>
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<td># spans</td>
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<td>Road Classification</td>
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<td>Operability</td>
<td>RTA’s Assessment</td>
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<td>T44</td>
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<td>Beckers</td>
<td>De Burgh</td>
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<td>De Burgh</td>
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<td>McDonald River at St. Albans, Wisemans Ferry to Walloba</td>
<td>Hawkesbury</td>
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<td>T44</td>
<td>Operable Retain &amp; conserve</td>
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<td>Cobram</td>
<td>De Burgh</td>
<td>2 + lift</td>
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<td>Berrigan</td>
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<td>Regional</td>
<td>&gt; T44</td>
<td>Operable via adaptive reuse Retain for local traffic &amp; conserve</td>
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<td>Barham</td>
<td>De Burgh</td>
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<td>T44</td>
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<td>Coorei</td>
<td>Dare</td>
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<td>Bulga</td>
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Notes:
1. Adapted from Table 4, page 29 of the RTA's Timber Truss Bridge Report, Nov 2010.
2. The RTA’s table incorrectly named Crookwell, Holmans (Gooloogong), Lansdowne and Middle Falbrook as McDonald bridges when they are in fact De Burgh bridges.
3. While in the RTA’s Table 4 only Gundaroo, Thornes and Five Day Creek were shaded as having been "removed from service", Cobram has already been by-passed and the RTA's table "Timber truss bridges – replacement list – consolidated details" (Annexure D) shows Boonanga and Mungindi "already replaced", as well as Gundaroo, Thornes and Five Day Creek.
4. * the Committee accepts that these bridges may eventually need to be replaced but prior to firm decisions being made and budget allocations being sought, there should be consultation with relevant local communities and advice to the Heritage Council, as per Recommendation 4 of this report.
5. # the Committee accepts that these bridges, currently on the RTA's S.170 Register, may eventually need to be replaced but recommends that prior to firm decisions being made and budget allocations being sought, there should be consultation with relevant local communities.
Annexures

A. National Trust NSW: comments on RTA’s report

B. Australia ICOMOS: comments on RTA’s report

C. Sydney Engineering Heritage Committee: comments on RTA’s report, 29 April and 12 May 2011.

D. RTA report, “Table 5: Application of the sensitivity analysis to the RTA timber truss bridges ...” – the ‘Traffic Light Table’ and “Timber Truss Bridges: Replacement List – consolidated details”.

E. Higher Mass Limits (HML) Network NSW: Index Map.

F. Higher Mass Limits (HML) Network NSW: Map 6 (South West corner of NSW).
Annexure A

Mr D M Godden
The Chair
RTA Timber Truss Bridge Conservation Strategy Subcommittee
NSW Heritage Office
Locked Bag 9020,
Parramatta NSW 2124
ATT: Mr W H Nethery

12 May, 2011

Dear Mr Godden

The Trust has reviewed the content of the RTA Timber Truss Road Bridges – A Strategic Approach to Conservation (the Strategy) and, generally, commends the RTA for the scope and quality of the Strategy. As you are aware, the Trust has advocated a structured approach to the management of the RTA’s heritage assets, particularly the timber truss road bridges, for many years. This Strategy presents a reasoned analysis of the significance and conservation management issues for this important class of heritage items and proposes an approach to their conservation based upon this analysis.

The Trust acknowledges that the retention and maintenance of timber truss bridges on main roads presents difficulties for the RTA, particularly in the light of increasing axle loads and the consequently higher performance standards required of road infrastructure. Nonetheless, the heritage importance of these bridges is universally recognised and there remains the expectation of the community that the RTA should manage these assets in a way that recognises their significance and conserves their values. Consequently, whilst the process and intent of the report is commendable, the Trust is concerned that the Strategy is largely an analysis of the constraints upon long-term conservation and does not investigate opportunities for conservation in the light of these constraints. The Strategy envisages only a limited set of possible outcomes based upon the RTA’s existing situation and requirements, where it is clear from the analysis that altering any of the pre-existing conditions (such as, for example, additional specialist funding from Government or the opening of an alternative road route) could change the conclusions of the analysis.

The Trust’s detailed response to the Strategy can be summarised as two primary issues.

Firstly, the report identifies that there are 14 timber truss bridges under the care and control of local councils. These fourteen bridges are not included within the Strategy’s analysis and do not form a component of the proposed conservation strategy. Nonetheless, the potential transfer of RTA bridges to local council control is offered as a divestment option. It has been the Trust’s experience that, without substantial support from the RTA, local councils do not have the resources to maintain timber truss bridges and, when presented with a need for refurbishment of a timber bridge, will almost without exception move to replace the timber bridge. Unless the RTA actively includes these bridges within its overall considerations, these bridges are almost certainly to be demolished at some time in the future. Appreciating the jurisdictional issues, it would seem sensible for the RTA to include these other bridges within this analysis, to provide a more complete picture of the available stock of bridges and the conservation options available. Further, for the purposes of a state-wide conservation strategy for a class of items and in recognition of the reality that the RTA usually performs any work to
such Bridges on behalf of the local councils in any case, it is suggested that the RTA formalise its role and adopt these bridges into the Strategy and its outcomes.

Secondly, the Strategy identifies twenty-three bridges for divestment, without addressing what this means beyond demolition (with some salvage of components) or transfer to another responsible authority such as a local council. Whilst acknowledging that the present Strategy’s primary focus is the management of the RTA’s assets, there are many more potential outcomes for divested bridges than are canvassed in this report and this Strategy remains incomplete without a plan for ‘divestment’ which provides opportunities for conservation beyond demolition and ‘cannibalisation’ for spare parts.

For example, where bridges are to be replaced and removed in accordance with this strategy, relocation and reuse becomes a more acceptable fall-back conservation strategy than demolition alone. Opportunities for reuse in low-stress situations, such as for pedestrian footbridges, should be pursued, including for example, a partnership with the NPWS. One local Council is known to have been very keen in the past to re-establish an Allan Truss bridge as a pedestrian footbridge in a large urban park but has been stymied by the costs involved. While these approaches may involve additional short-term costs to the RTA, the long-term cultural benefits would justify this investment, whilst allowing the RTA to focus upon its management of main roads. It is relevant that such practices have precedents in NSW, with, for example, the three truss sections of the old Iron Cove Bridge reused on local roads in central western NSW in the 1950s.

These suggestions are not raised lightly, as it is the traditional, principled objective that heritage items are conserved in situ. However, the Strategy clearly identifies that, irrespective of such principles, practical constraints will lead to a substantial number of the present stock of timber truss bridges being ultimately demolished as they are, or will eventually become, functionally inadequate for their purpose. In this context, a wider range of conservation options must therefore be considered.

The Trust would add that there are known major problems with any conservation strategy that does not maintain a bridge as a functional crossing structure. Conservation of timber bridge sections as static displays in parkland (eg Cowra Bridge) has not been a successful approach, as the structure has eventually decayed and been removed and converted into furniture. Transfer to Council of a bypassed bridge has been successful only where there is an existing need for a pedestrian bridge and the slow decay of the Hampden Bridge at Wagga Wagga is a regrettable case in point. The Trust remains seriously concerned by the current fate of the Mailon Suspension Bridge.

Consequently, the Trust’s overall response to the Strategy is that, acknowledging the standard of work that has been undertaken to reach this stage, it remains yet an important step in the process of developing a Conservation Strategy, rather than, as it is at present, an “Approach to Conservation”.

The Trust would welcome an opportunity to discuss its concerns with the NSW Heritage Council further and to continue to assist in the development of the RTA’s heritage management policies.

Yours faithfully

[Signature]

Graham Quint
Advocacy Manager
28 April 2011

Bill Nethery
Heritage Council of NSW
Locked bag 5020
Parramatta NSW 2124

By email: Bill.Nethery@planning.nsw.gov.au

Dear Bill,

Comment in Response to: *Timber Truss Road Bridges: A Strategic Approach to Conservation*

Australia ICOMOS appreciates the invitation to comment on the report *Timber Truss Road Bridges: A Strategic Approach to Conservation*, prepared by the RTA to provide a basis for the future use and management of these bridges. The membership of Australia ICOMOS includes many engineers and other specialists with a considerable knowledge of timber bridges, and we therefore invited responses to the report from our members. We received a number of responses, both generic in response to the broad policy approach of the report, and specific in response to the engineering issues that arise in conserving these structures.

The RTA is to be commended for undertaking such a strategic study. We understand that its position is to focus on operational issues while acknowledging heritage significance, and for examining a full spectrum of options to reconcile these issues.

Australia ICOMOS recognises the challenges of retaining these historic structures designed for a lesser load for use by increasingly large heavy vehicles, and the problems of single lane bridges with the critical timber trusses being exposed to accidental damage. These issues can be managed in some circumstances by load limits and speed limits, but not without serious challenge on major roads.

The report argues that the conservation of timber bridges consumes disproportionately more resources than other bridge types and given limited funds redirects funds from the maintenance of other bridges. We note also that the availability or lack of high-quality hardwood timber for bridge maintenance is a substantial concern, but are reassured that the RTA seems to be putting in place strategies to ensure that adequate hardwood timber supplies would be come available in the long term.

Nevertheless, we are concerned about the implications of the approach proposed in the report. It is clear that the outcome the RTA is seeking is to develop a strategy for creating a portfolio of timber bridges that it can manage. The basis for management is whether a bridge is ‘operable’ or not, where this term means suitable for continued use within the road network. However, whether or not a bridge is ‘operable’ should not be the only criteria for determining the future use of these structures, particularly as the RTA has a community expectation and a statutory obligation under the NSW Heritage Act for the proper management of publicly owned heritage assets for the people of NSW.
Under the Burra Charter process the establishment of heritage significance is the essential first step in formulating policies for the management of heritage assets. However we note that the report includes the following statement: “In reassessing the timber truss bridge portfolio, it is necessary to acknowledge that these listings occurred in a manner which lacked the scrutiny and rigour of the listing processes now in use by, the Heritage Council and the Minister for Planning”.

There now seems therefore an opportunity for a rigorous reassessment of the heritage significance of the 48 or so timber truss bridges currently making up its portfolio (we understand that the report relies on the last such study which was undertaken by MBK in 1988, but during the interim it is reasonable to expect that the number, condition and significance of the bridges would warrant a reassessment).

We urge therefore that the work already done to assess the portfolio under the ‘operable’ criterion be supplemented by a more thorough review of the 1998 MBK study to determine the heritage significance of the bridges (with an emphasis on their comparative significance), and that the recommendations for retention or divestment be revised accordingly.

In undertaking this review, we suggest that full consideration be given to the range of techniques that is available for enhancing the load carrying capacity and longevity of these bridges, notwithstanding that these techniques require the introduction of modern materials and/or detailing. The unobtrusive introduction of steel into the timber trusses is a legitimate action to retain a modern function for the bridges concerned, and may be regarded as a limited form of adaptive reuse which is widely accepted for heritage buildings. It may be argued that the integrity of the original structure is diminished from a historic perspective, but this is a price that the community on balance is prepared to accept for its retention in use.

We are also concerned that the report is strongly directed towards the retention of ‘a representative sample of the population’, which the report argues is consistent with NSW heritage policy. This approach would in all likelihood result in bridges that are heritage significance at the NSW state level being given primary consideration for retention, which is an appropriate strategy. However, the approach could also result in the loss of less significant bridges that are nonetheless highly valued by their local communities.

Thank you again for allowing Australia ICOMOS to comment on the report. We hope that we have been able to make a useful contribution to what is an important discussion for the future of our engineering heritage.

Yours sincerely

Mr Anthony Coupe
Vice-President, Australia ICOMOS
29th April 2011

Mr Don Godden  
Chairman  
RTA Timber Truss Review Sub-Committee  
Heritage Council of New South Wales  
3 Marist Place  
Parramatta NSW 2150

E: Bill.nethery@planning.nsw.gov.au

Dear Sir,

Ref: Conservation and Management of RTA Timber Truss Road Bridges

Thank you for seeking the input of Engineers Australia with regard to the RTA Timber Truss Strategy. We have reviewed the document via an internal sub-committee and provide the following response.

1. We have ‘in-principle’ agreement with the general approach, which is to find an optimum balance between operational and heritage needs to provide a sustainable heritage outcome.

2. We have a concern that this strategy should have appropriate constraints regarding its durability. Our concern is that the State has already lost a large number of timber truss road bridges (not all within RTA jurisdiction) and we would not wish to see the stock diminish beyond that identified in this strategy. We would be concerned if another strategy were to emerge within a few years which sought to further dilute the number to be conserved and recommend that any encroachment refers to this.

3. We understand that a number of the timber truss bridges on local roads were transferred to the RTA from local councils.

This strategy should recognise that these bridges are to remain under RTA control and that any future reversion back to local authority ownerships should not reduce the conservation outcomes.
4. We note that some of the bridges proposed for divestment include liftspans (Barham and Tooleibuc) and one bridge classified as ‘interim’ (Carathool).

We believe that lift-spans need to have some additional consideration with regard to ongoing operational capability and whether or not they can be retained in-use, notwithstanding lack of operational capacity in the timber approach spans. For example, could the lift spans be incorporated into a new bridge.

It is not clear that the operational capacity of lift-spans has been addressed.

It appears that some significant lift spans may become collateral casualties of the loss of adjacent timber trusses and that the justification for removal of lift spans needs to be more clearly demonstrated.

5. We have some concerns with regards to the status of the bridges ‘to be preserved on an interim basis’ (Refer Table ES-2). It appears that as soon as operational requirements change (Page ES7) they would be divested.

This will potentially significantly reduce the representation of Dare Trusses for example.

6. The significant reduction in bridges proposed for retention and conservation makes the issue of risk of bridge loss as a result of fire, flood, vehicle impact or accidental over-loading more critical.

The Future Conservation Management Plans (Ref Next Steps on ES9) will need to recognise these issues for individual bridges with incorporation of risk mitigation strategies (e.g. fuel reduction).

7. We note that multi span bridges are regarded as having greater significance than single or double span.

This does have the affect however of increasing long term conservation costs. When considering a bridge in perpetuity it will have to have ongoing timber replacement and consequently bridge costs relate closely to overall volume of timber.

Whilst we do not know the sensitivity of the analysis to this factor there may be an argument towards conserving three single span bridges as opposed to one three span bridge. We suggest a review of the effect of this decision.

8. We strongly endorse the need for an Interpretation and Communications strategy (Ref ES9 Next Steps).

Currently the conservation efforts put in place by the RTA do not appear to be matched by sufficient interpretation to allow a public appreciation of the significance of these structures.

Such work includes the need to create spaces to allow drivers to stop safely off the road.

9. Bridges identified as being divested should have the mitigation of impacts carried out by the RTA prior to divestment. If the bridges are returned to local authorities prior to archival recording or interpretation there is a strong likelihood that these will not be done.

10. The future Conservation Management Plans need to be quite specific with regard to an element by element approach to bridge repair and replacement. We would suggest that they
concentrate in particular on producing documents that will be of use ‘in the field’ for those carrying out bridge works.

11. We have some concerns that two bridges maybe of slightly higher significance than indicated and could have re-consideration. We refer to Payters and Carathool.

In summary we endorse the principle and broadly agree with the process.
We recommend that implementation of the next stages are carried through (Ref Next Steps on E39) and that endorsement is conditional on the next stages proceeding.
We also have concerns that there is not a continuous creep in bridge loss as operational needs change.
It may be necessary to now “hold the line” notwithstanding future operational issues.
We trust that this is of assistance.

Yours sincerely,

Simon Wiltshire
Chair
Engineering Heritage Committee
Sydney Division, Engineers Australia
12th May 2011

Mr Don Godden
Chairman
RTA Timber Truss Review Sub-Committee
Heritage Council of New South Wales
3 Marist Place
Parramatta NSW 2150

E: Bill.nethery@planning.nsw.gov.au

Dear Sir,

Ref: Conservation and Management of RTA Timber Truss Road Bridges

Further to our letter of 29th April 2011 regarding the RTA Timber Truss Strategy, Engineers Australia would like to provide some further comments which reinforce the issues referred to in that letter.

1. We believe that liftspans should have separate heritage assessments specific to the lift span. We understand that the liftspan at Tooleybuc, for example, is in working order and is operated frequently in association with tourist trips on the Murray River. The future of liftspans has perhaps become a little confused with the fate of the adjacent timber trusses without sufficient detailed assessment.

2. We recommend that any endorsement of the strategy should require that the removal of bridges from the SHR and any demolitions be subject to individual nominations to the Heritage Council when the needs arise.

3. If any bridges revert back to local Council ownership in the future, we recommend that there should be provision for adequate funding to ensure an appropriate heritage outcome. For bridges which are proposed for retention on the State Heritage Register this should include funding sufficient for ongoing maintenance. For other bridges the funding should be at least sufficient for archival recording and interpretation.

We trust that this is of assistance.

Yours sincerely,

Simon Wiltshire
Chair
Engineering Heritage Committee
Sydney Division, Engineers Australia

Lvl 3, 8 Thomas Street, Chatswood NSW 2067 or PO Box 1389, Chatswood NSW 2065
Phone 61 2 94109600, Fax 61 2 9410 8000
Web Page: www.sydneym.officeaustralia.org.au

Email: sydney@engineersaustralia.org.au
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**Footnotes:**
- **P1.1** refers to the primary unit number.
- **P1.2** refers to the secondary unit number.
- **Owen Bridge** and **New Bridge** are located on the same road in Meigs County.
- The length and width are approximate values.
- The remarks column indicates the reason for replacement or any other relevant information.
Annexure E

Higher Mass Limits (HML) Network NSW: Index Map

INTELLIGENT ACCESS PROGRAM (IAP)  
HIGHER MASS LIMITS (HML) NETWORK - NSW

The maps provide details on the roads approved for:
- HML Short Combinations;
- HML B-Doubles;
- HML Road Trains

To view a map, click on the number to select the map number to be viewed.

Detailed maps of towns and suburbs can be viewed by clicking on designated areas contained in red boxes.
Higher Mass Limits (HML) Network NSW: Map 6 (South West corner of State)