de Burgh truss bridges

**Period of construction:** 1899 to 1905  
**Similar to American Pratt Truss design**  
**Pin jointed**  
**Number built:** 20  
**Number remaining:** Nine within RTA ownership, five of which are listed on the State Heritage Register (an additional de Burgh truss is controlled by local government).

**Advantages of design**

de Burgh’s designs included improvements consistent with the Pratt system and all the successful features of the 1893 Allan truss bridges.

The case for composite construction was effectively summarised by one of de Burgh’s colleagues, Harvey Dare. He pointed out that by 1900, composite construction in America had been superseded by all-steel construction aided by a large increase in steel production across the USA. In New South Wales, however, conditions were quite different. Steel was still an expensive import and therefore was in limited supply. By contrast, Australian timbers were superior to those in the USA, both in strength and durability. Therefore, composite construction offered a compromise between all-timber and all-steel structures.

Two types of composite trusses were developed: the Pratt type by de Burgh in 1899, and the Howe type by Dare in 1903.

**Defining features of de Burgh truss design and ‘sub types’**

The bottom chords of the de Burgh truss spans are constructed with continuous parallel steel plates that are strengthened by lattice box sections within the end panels. The steel plate elements of the chord are spliced together by riveted twin fishplates. The box sections within the end panels consist of steel angles that are riveted to the inner faces of the plate and then fixed together by horizontal cross lattice bracing.

**Figure 1**  
*Schematic design of a de Burgh Truss (derived from MBK 1998)*

The top chord consists of twin timber members of dimensions 300 millimetres by 300 millimetres (12 x 12 inches) spaced approximately 100 millimetres apart. The chord contains four twin members, bolted together with flanged steel fish plates (or splice plates) on the outer faces of the timbers to form a continuous beam.
de Burgh truss – number of spans (20 built)

<table>
<thead>
<tr>
<th>Number of spans</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tr>
<td>Number built</td>
<td>11</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Sub types (measures variation in the design of de Burgh truss bridges)

Four distinct sub-types can be identified within the class.

- **Type 1 – underbridge type**

  The example below shows the de Burgh’s Bridge over the Lane Cove River which was built in 1901 and replaced in 1994.

- **Type 2 – early de Burgh trusses with sloping end members**

  Two examples were built but neither survive. The bridge over the Macintyre River at Inverell which was replaced in 1983 is shown below.
• Type 3 – with iron rod diagonals attached to the outside face of the bottom chord

One example was built and still survives today: St Albans Bridge. This variation enabled the construction of longer truss spans than those used in Type 2 and 4 bridges. St Albans Bridge features the longest truss spans (118 feet) ever built for a conventional (non overhead-braced type) timber truss bridge.

• Type 4 – ‘Standard’ design

Lack any of the details or variations identified in other groups. Sixteen examples were built, with nine surviving and eight remaining under RTA control.

Configurations

Configurations exist incorporating a vertical lift span. Two examples were built and two survive: Barham Bridge, Cobram Bridge (both on the Murray River and under RTA control).

de Burgh truss bridges and their future operability

<table>
<thead>
<tr>
<th>Operational bridges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Lansdowne</td>
</tr>
<tr>
<td>St Albans</td>
</tr>
<tr>
<td>Middle Falbrook</td>
</tr>
<tr>
<td>Cobram</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operationally unsuitable bridges to be replaced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Beckers</td>
</tr>
<tr>
<td>Crookwell</td>
</tr>
<tr>
<td>Holman</td>
</tr>
<tr>
<td>Barham</td>
</tr>
<tr>
<td>Tabulam</td>
</tr>
</tbody>
</table>
Standard modifications required to bring de Burgh truss bridges up to a reasonable level of risk using the T44 Standard

Truss span
- Replacement of all wrought iron rod diagonals with higher strength steel rods designed to carry the T44 design load.
- Installation of additional sway braces to provide lateral support for the truss at each panel point and prevent compression buckling of top chord.
- Replacement of all timber cross girders with extended steel cross girders to improve pitching of sway braces for improved lateral support.
- Replacement of timber planking with structurally appropriate heritage-sympathetic decking.
- Installation of additional timber packing pieces in the timber top chords and verticals.
- Replacement of the wrought iron splice plates in the top chords with mild steel plates.

Approach spans
- Replacement of approach span decks with timber concrete composite decks.

Substructure
- Replacement of timber piles below ground with steel and/or reinforced concrete piles and pile caps forming the sill for the piers.
- Replacement of existing timber piers and abutments with modern heritage-sympathetic design and materials.

Railing
- Replacement with structurally and dimensionally appropriate heritage-sympathetic design and material for the entire length of the bridge.
Cobram Bridge

**Description**

<table>
<thead>
<tr>
<th>Truss type</th>
<th>de Burgh</th>
<th>Road</th>
<th>Former MR226</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of spans</td>
<td>2+lift span</td>
<td>Location</td>
<td>Cobram-Barooga</td>
</tr>
<tr>
<td>Sub-type</td>
<td>Standard</td>
<td>RTA region</td>
<td>South-west</td>
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<tr>
<td>Built</td>
<td>1902</td>
<td>RTA bridge number</td>
<td>3247</td>
</tr>
<tr>
<td>Assessed significance (MBK)</td>
<td>State</td>
<td>Local government</td>
<td>Berrigan Shire</td>
</tr>
<tr>
<td>SHR listed</td>
<td>No</td>
<td>Daily traffic [AADT]</td>
<td>0 (pedestrian bridge)</td>
</tr>
</tbody>
</table>

Cobram Bridge is a two-span de Burgh truss bridge with a lift span located on the former road that connected the border towns of Cobram (NSW) and Barooga (Victoria). The bridge was bypassed by a high level concrete bridge in 2002.

The bridge no longer carries motorised traffic and will soon be in use by pedestrians and cyclists travelling between parkland on either side of the Murray. Four timber beam approach spans were recently removed and replaced with a ramp to accommodate this new function and retain it within the road network. The lift span remains in operation to service the needs of tall vessels travelling along the Murray River.

**Analysis of heritage and operational factors**

**Service requirements:** Cobram Bridge no longer carries motorised traffic and therefore sits outside heavy vehicle operability standards for long-term future road network planning. However, as a bridge in use within the road network, its operability standards are focussed on pedestrian and cyclist requirements as reflected in cyclist and pedestrian policies, road safety policies and negligence duty of care standards.

Cobram Bridge has been partially upgraded in the past. This work included replacement of timber girders with steel girders on approach spans in the 1980s.

Cobram Bridge is not listed on the State Heritage Register (SHR), although it is listed on the Heritage Victoria Database. It was ranked 24th in the 1998 MBK timber truss bridge study. As it was in the process of being duplicated, it was not entered on the SHR.
Conservation strategy – Cobram Bridge

Cobram Bridge is being modified to ensure its adaptive reuse to meet pedestrian and cyclist road traffic operability requirements. Regular maintenance will be required to maintain its serviceability as the bridge ages.

Proposed future conservation works

- Cyclical maintenance.
- Interpretation of the bridge in neighbouring parkland.

Conservation outcomes

The retention of this structure would ensure that the oldest surviving example of a de Burgh truss bridge in NSW is conserved. Conservation would be achieved by maintenance to the structure to offset material deterioration. Cobram Bridge is one of four de Burgh truss bridges – and the only de Burgh truss bridge with a lift span – in the operable RTA timber truss bridge portfolio.
Lansdowne Bridge

Description

<table>
<thead>
<tr>
<th>Truss type</th>
<th>de Burgh</th>
<th>Road</th>
<th>Goulburn-Bungonia Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of spans</td>
<td>1</td>
<td>Location</td>
<td>Goulburn</td>
</tr>
<tr>
<td>Sub-type</td>
<td>Standard</td>
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<td>Southern</td>
</tr>
<tr>
<td>Built</td>
<td>1902</td>
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<td>Assessed</td>
<td>Local</td>
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<td>significance(MBK)</td>
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<tr>
<td>SHR listed</td>
<td>No</td>
<td>Daily traffic [AADT]</td>
<td>875</td>
</tr>
</tbody>
</table>

Lansdowne Bridge is a single-span de Burgh truss located on the Goulburn-Bungonia Road five kilometres from Goulburn town centre. The bridge is located in an area which previously had a high concentration of timber truss bridges.

Analysis of heritage and operational factors

Service requirements: The bridge is required to meet the current regulatory limits for general access trucks (ie to within a reasonable level of risks using the T44 Standard which is the design standard for bridges carrying a 42.5 tonne semi-trailer or equivalent). Upgrading works to meet this standard will be planned for in the future.

Lansdowne Bridge is not listed on the State Heritage Register. It was ranked 52nd in the 1998 MBK timber truss bridge study and this is recognised in the timber truss bridge conservation strategy sensitivity test.
Conservation strategy – Lansdowne Bridge

Lansdowne Bridge can be upgraded to meet operability requirements, given its location on the road network. Future strengthening and modification will be required to maintain this operability standard as the bridge ages.

Proposed future conservation works

- Cyclical maintenance.
- Interpretation of the bridge.
- Nomination to the State Heritage Register.

Truss span
- Replacement of all wrought iron rod truss diagonals with higher strength steel rods designed to carry the T44 design load.
- Installation of additional sway braces to provide lateral support for the truss at each panel point and prevent compression buckling of top chord of truss.
- Replacement of all timber cross girders with extended steel cross girders to improve pitching of sway braces for improved lateral support.
- Replacement of timber planking with structurally appropriate heritage-sympathetic decking.
- Installation of additional timber packing pieces in the timber top chords and verticals.
- Replacement of the wrought iron splice plates in the top chords with mild steel plates.

Approach spans
- Replacement of approach span decks with timber concrete composite decks.

Substructure
- Replacement of timber piles below ground with steel and/or reinforced concrete piles and pile caps forming the sill for the piers.
- Replacement of existing timber piers and abutments with modern heritage-sympathetic design and materials.

Railing:
- Replacement with structurally and dimensionally appropriate heritage-sympathetic design and materials for the entire length of the bridge.

Conservation outcomes

The retention of this structure would ensure that a timber truss bridge remains in operation in the Goulburn area, which previously had a high concentration of heritage bridges. Conservation would be achieved by maintenance and necessary upgrades to the structure to offset material deterioration. Lansdowne Bridge is one of four de Burgh truss bridges and the only single-span de Burgh truss bridge in the operable RTA timber truss bridge portfolio.
Beckers Bridge over Webbers Creek, Gresford West

Description

<table>
<thead>
<tr>
<th>Truss type</th>
<th>de Burgh</th>
<th>Road</th>
<th>MR 128</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of spans</td>
<td>1</td>
<td>Location</td>
<td>Gresford West</td>
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<tr>
<td>Sub-type</td>
<td>Standard</td>
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<td>SHR listed</td>
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</tbody>
</table>

Beckers Bridge is a single-span de Burgh truss bridge located on the Gresford-Glendon Brook Road, 10 kilometres from Gresford West and away from any local community. It is in a picturesque and accessible setting.

Analysis of heritage and operational factors

Service requirements: The bridge is required to meet emerging regulatory limits well in excess of the T44 Standard. The bridge cannot be upgraded to achieve the required standard and therefore will need to be eventually replaced with a modern bridge in order to meet capacity requirements.

In 2006, in order to facilitate maintenance and inspection of the underside of the deck, a ‘Standard Exemption: Minor Works’ was approved for installation of monorails for maintenance gantry.

In 2009, following deterioration in timber piles and sheetings at abutments and instability in abutment earth fill, a Section 60 approval was granted for the replacement of existing timber abutments with reinforced concrete elements.

Beckers Bridge is listed on the State Heritage Register. It was ranked 33rd in the 1998 MBK timber truss bridge study and this is recognised in timber truss bridge conservation strategy sensitivity test.
Conservation strategy – Beckers Bridge

As Beckers Bridge cannot be upgraded to meet its future operating requirements, it will be duplicated in accordance with network upgrading priorities. The bridge cannot meet these load limits through upgrading. It does not have any unique characteristics that are not represented elsewhere among retained bridges. As a result the bridge cannot be retained in use the RTA’s timber truss bridge portfolio. If required to be retained as a redundant structure it would attract minimum resources to support due diligence requirements and its existing fabric would be retained.

Proposed future conservation works

Mitigation of impacts

- Archival recording of the bridge.
- Interpretation of the bridge.
- Salvage of the timbers for use in other bridge rehabilitation works.

Conservation outcomes

The conservation strategy proposes retaining four de Burgh trusses including one single-span bridge.

Beckers Bridge does not bear any unique or outstanding design characteristics that cannot be viewed in other de Burgh truss bridges, meaning its removal and replacement would not result in a loss of the representativeness of the RTA’s timber truss bridge collection. Lansdowne Bridge is a similar single-span de Burgh truss bridge that will be retained.
Clarence River Road Bridge, Tabulam

Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
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<td>Truss type</td>
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<td>Built</td>
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</tr>
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<td>Assessed significance (MBK)</td>
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<td>SHR listed</td>
<td>SHR 01461</td>
</tr>
<tr>
<td>Road</td>
<td>SH16</td>
</tr>
<tr>
<td>Location</td>
<td>Tabulam</td>
</tr>
<tr>
<td>RTA region</td>
<td>Northern</td>
</tr>
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<td>RTA bridge number</td>
<td>2266</td>
</tr>
<tr>
<td>Local government</td>
<td>Kyogle Council</td>
</tr>
<tr>
<td>Daily traffic [AADT]</td>
<td>900</td>
</tr>
</tbody>
</table>

The Clarence River Bridge at Tabulam is a five-span de Burgh truss located on the Bruxner Highway (State Highway 16). The bridge spans a major river on a historically important highway.

The bridge is notable as the longest remaining timber truss road bridge with five spans to traverse the flood plain. Only six bridges had five or more truss spans of the more than 400 built.

Analysis of heritage and operational factors

Service requirements: The route on which the bridge is located is required to meet emerging regulatory limits well in excess of the T44 Standard. The bridge cannot be upgraded to achieve the required operational requirements and therefore will need to be eventually replaced with a modern bridge in order to meet capacity requirements.

Tabulam Bridge was partially upgraded in 1998/9. This work included replacement of half of the poor condition timber cross girders with steel cross girders.

In 2006, a ‘Standard Exemption: Minor Works’ was approved for replacement of timber piles below ground with steel and/or concrete piles and caps with streamlined sills for two approach span piers.
The Clarence River Bridge at Tabulam is listed on the State Heritage Register. It was ranked 6th in the 1998 MBK timber truss bridge study and this is recognised in timber truss bridge conservation strategy sensitivity test.

Conservation strategy – Tabulam Bridge, Clarence River

Due to the load limit route requirements, Clarence River Bridge will need to be duplicated in accordance with network upgrading priorities by a new bridge. The bridge is unique due to its length, but does not have any truss characteristics that are not represented elsewhere among operable bridges. As a result, the bridge cannot be retained for use in the RTA’s timber truss bridge portfolio. If required to be retained as a redundant structure it would attract minimum resources to support due diligence requirements and its existing fabric would be retained.

Proposed future conservation works

Mitigation of impacts
- Archival recording of the bridge.
- Interpretation of the bridge.
- Salvage of the timbers for use in other bridge rehabilitation works.

Conservation outcomes

Four de Burgh truss bridges are operable.

The outstanding design characteristic of this bridge is its length and number of truss spans. The truss form used on the bridge is of the ‘Standard’ type which can be seen in other examples. Its removal and replacement would not result in a loss of the representativeness of the RTA’s timber truss bridge collection.
St Albans Bridge

Description

<table>
<thead>
<tr>
<th>Truss type</th>
<th>de Burgh</th>
<th>Road</th>
<th>MR181</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of spans</td>
<td>2</td>
<td>Location</td>
<td>St Albans</td>
</tr>
<tr>
<td>Sub-type</td>
<td>External hanger rods</td>
<td>RTA Region</td>
<td>Sydney</td>
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<td>Built</td>
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<td>413</td>
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<td>State</td>
<td>Local government</td>
<td>Hawkesbury City</td>
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<tr>
<td>SHR listed</td>
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<td>Daily traffic [AADT]</td>
<td>700</td>
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</table>

St Albans Bridge is a single-span de Burgh truss located on the St Albans Road. The bridge forms a gateway to the historic town of St Albans and is incorporated into a Heritage Conservation Area.

Analysis of heritage and operational factors

Service requirements: The bridge is required to meet the current regulatory limits for general access trucks (ie to within a reasonable level of risk using the T44 Standard which is the design standard for bridges carrying a 42.5 tonne semi-trailer or equivalent). Upgrading works to meet this standard will be planned for in the future.

St Albans Bridge was partially upgraded in 2001. A Section 60 was approved for the following work:
- Replacement of timber planking with a stress laminated timber (SLT) decking system.
- Replacement of all timber cross girders with steel cross girders.

In 2005, another Section 60 was approved for the replacement of timber piles below ground with steel and/or concrete piles and caps with streamlined sills for two approach span piers and anchoring of Pier A.

St Albans Bridge is listed on the State Heritage Register (SHR). It was ranked 7th in the 1998 MBK timber truss bridge study and this is recognised in the timber truss bridge conservation strategy sensitivity test.
Conservation strategy – St Albans Bridge

St Albans Bridge can be upgraded to achieve operability requirements, given its location on the road network. Future strengthening and modification will be required to maintain this operability standard as the bridge ages.

Proposed future conservation works
- Cyclical maintenance.
- Interpretation of the bridge.

Truss span
- Replacement of all wrought iron rod truss diagonals with higher strength steel rods designed to carry the T44 design load.
- Installation of additional sway braces to provide lateral support for the truss at each panel point and prevent compression buckling of top chord of the truss.
- Replacement of all timber cross girders with extended steel cross girders to improve pitching of sway braces for improved lateral support.
- Installation of additional timber packing pieces in the timber top chords and verticals.
- Replacement of the wrought iron splice plates in the top chords with mild steel plates.

Approach spans
- Replacement of approach span decks with timber concrete composite decks or Stressed Laminated Deck as appropriate.

Railing
- Replacement with structurally and dimensionally appropriate heritage-sympathetic design and materials for the entire length of the bridge.

Conservation outcomes

The retention of this structure would ensure that the only built example of a de Burgh truss bridge built with external hanger rods (sub-type 3) is conserved. This is particularly important considering the previous loss of all examples of sub-types 1 and 2. de Burgh achieved far more innovation in design with the timber truss form in his relatively brief career as Chief Bridge Engineer than McDonald, Allan or Dare. Conservation of this example would enable this innovation to be better understood.

The bridge serves as a gateway entry to the township of St. Albans and is incorporated into a Heritage Conservation Area. The bridge can be appreciated in something close to its original setting when built in 1903. Conservation would be achieved by maintenance and necessary upgrades to the structure to offset material deterioration. St Albans Bridge is one of four de Burgh truss bridges, and one of three two-span de Burgh truss bridges, in the operable RTA timber truss bridge portfolio.
Truss Bridge over Crookwell River

Description

<table>
<thead>
<tr>
<th>Truss type</th>
<th>de Burgh</th>
<th>Road</th>
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<tr>
<td>Number of spans</td>
<td>1</td>
<td>Location</td>
<td>Crookwell North</td>
</tr>
<tr>
<td>Sub-type</td>
<td>Standard</td>
<td>RTA region</td>
<td>Southern</td>
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<tr>
<td>Built</td>
<td>1903</td>
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<td>Local</td>
<td>Local government</td>
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<td>SHR listed</td>
<td>No</td>
<td>Daily traffic [AADT]</td>
<td>900</td>
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</tbody>
</table>

Crookwell River Bridge is a single-span de Burgh truss located on the Goulburn to Ilford Road (Main Road 54), one kilometre from Crookwell. The lack of approach spans makes this structure appear peculiar and it is low lying and lacks landscape value as a result.

Analysis of heritage and operational factors

Service requirements: The route on which the bridge is located is required to meet emerging regulatory limits well in excess of the T44 Standard. The bridge cannot be upgraded to achieve the required standard and therefore will need to be eventually replaced with a modern bridge in order to meet capacity requirements.

Crookwell Bridge was partially upgraded in 1999. This work included the replacement of original rivets with bolted elements in one section of the bottom chord, following damage by a ‘High Mass Vehicle’.

Crookwell River Bridge is not listed on the State Heritage Register. It was ranked 54th in the 1998 MBK timber truss bridge study and this is recognised in timber truss bridge conservation strategy sensitivity test.

Conservation strategy – Crookwell

Due to the route load limit requirements for Crookwell River Bridge it will be duplicated in accordance with network upgrading priorities. It does not have any unique characteristics that are
not represented elsewhere among retained bridges. As a result, the bridge cannot be retained in use within the RTA's timber truss bridge portfolio. If required to be retained as a redundant structure it would attract minimum resources to support due diligence requirements and its existing fabric would be retained.

Recent conservation works
- Cyclic maintenance in 2004.
- Repainted in heritage colour scheme in 2005.

Proposed future conservation works

Mitigation of impacts
- Archival recording of the bridge.
- Interpretation of the bridge.
- Salvage of the timbers for use in other bridge rehabilitation works.
- Removal from the RTA’s Section 170 register when replacement is required.

Conservation outcomes

There are four operable de Burgh truss bridges including one single-span bridge (Lansdowne).

Crookwell River Bridge does not bear any unique or outstanding design characteristics that cannot be viewed in other de Burgh truss bridges, meaning its removal and replacement would not result in a loss of the representativeness of the RTA’s timber truss bridge collection.
Middle Falbrook Bridge over Glennies Creek

Description

<table>
<thead>
<tr>
<th>Truss type</th>
<th>de Burgh</th>
<th>Road</th>
<th>Rixs Creek-Falbrook Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of spans</td>
<td>2</td>
<td>Location</td>
<td>Middle Falbrook</td>
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<td>Sub-type</td>
<td>Standard</td>
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<td>Built</td>
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<td>SHR listed</td>
<td>SHR 01474</td>
<td>Daily traffic [AADT]</td>
<td>214</td>
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</tbody>
</table>

Middle Falbrook Bridge is a two-span de Burgh truss located on the Rixs Creek-Falbrook [local] Road, 10 kilometres from a local community. Middle Falbrook Bridge is one of only two timber truss bridges built with Monier concrete pipe piers. It is the only surviving example.

Analysis of heritage and operational factors

Service requirements: The bridge is required to meet the current regulatory limits for general access trucks (ie to within a reasonable level of risks using the T44 Standard which is the design standard for bridges carrying a 42.5 tonne semi-trailer or equivalent). Upgrading works to meet this standard will be planned in future.

In 2009, following deterioration in timber piles and sheetings at abutments and instability in abutment earth fill, a Section 60 approval was granted for the replacement of existing timber abutment A with reinforced concrete elements.

Middle Falbrook Bridge is listed on the State Heritage Register. It was ranked 31st in the 1998 MBK timber truss bridge study and this is recognised in the timber truss bridge conservation strategy sensitivity test.
Conservation strategy – Middle Falbrook

Middle Falbrook Bridge can be upgraded to meet operability requirements, given its location on the road network. Future strengthening and modification will be required to maintain this operability standard as the bridge ages.

Proposed future conservation works

- Cyclical maintenance.
- Interpretation of the bridge.

Truss span
- Replacement of all wrought iron rod truss diagonals with higher strength steel rods designed to carry the T44 design load.
- Installation of additional sway braces to provide lateral support for the truss at each panel point and prevent compression buckling of top chord of truss.
- Replacement of all timber cross girders with extended steel cross girders to improve pitching of sway braces for improved lateral support.
- Replacement of timber planking with structurally appropriate heritage-sympathetic decking.
- Installation of additional timber packing pieces in the timber top chords and verticals.
- Replacement of the wrought iron splice plates in the top chords with mild steel plates.

Approach spans
- Replacement of approach span decks with timber concrete composite decks.

Substructure
- Replacement of timber piles below ground with steel and/or reinforced concrete piles and pile caps forming the sill for the piers.
- Replacement of existing timber abutment B with reinforced concrete elements.

Railing
- Replacement with structurally and dimensionally appropriate heritage-sympathetic design and materials for the entire length of the bridge.

Conservation outcomes

The retention of this structure would ensure that the only surviving example (of two built) of a timber truss bridge supported by Monier pipe piers is conserved. The pier fabric does not have any bearing on the truss design beyond the method of connection and support of the deck. The isolated use of these piers may be attributable to the presence of a local supplier in the region. This detail therefore reflects a geographic difference in the manner of timber truss bridge design.

Conservation would be achieved by maintenance and necessary upgrades to the structure to offset material deterioration. Middle Falbrook Bridge is one of four de Burgh truss bridges, and one of three two-span de Burgh truss bridges, in the operable RTA timber truss bridge portfolio.
Holman Bridge over Lachlan River at Gooloogong

Description

<table>
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<th>Truss type</th>
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<th>Road</th>
<th>MR237</th>
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Holman Bridge is a single-span de Burgh truss bridge located on Main Road 237, one kilometre from Gooloogong. The bridge features concrete wall piers which are more commonly associated with contemporary steel trusses.

Analysis of heritage and operational factors

Service requirements: The bridge is required to meet emerging regulatory limits well in excess of the T44 Standard which is the design standard for bridges carrying a 62 tonne semi-trailer or equivalent. The bridge cannot be upgraded to achieve the required standard and therefore will need to be eventually replaced with a modern bridge in order to meet capacity requirements.

Holman Bridge is not listed on the State Heritage Register, although it is significant at a local level. It was ranked 70th in the 1998 MBK timber truss bridge study and this is recognised in the timber truss bridge conservation strategy sensitivity test.

The use of concrete wall piers is rare among timber truss bridges, but is more common among the steel truss bridges being built during this period. The pier fabric does not have any bearing on the truss design beyond the method of connection and support of the deck.
Conservation strategy – Holman Bridge

Due to the route load limit requirements for Holman Bridge it will be duplicated in accordance with network upgrading priorities. It does not have any unique characteristics that are not represented elsewhere among retained bridges. As a result, the bridge cannot be retained in use within the RTA’s timber truss bridge portfolio. If required to be retained as a redundant structure it would attract minimum resources to support due diligence requirements and its existing fabric would be retained.

Proposed future conservation works

Mitigation of impacts
- Archival recording of the bridge.
- Interpretation of the bridge.
- Salvage of the timbers for use in other bridge rehabilitation works.
- Remove from the RTA’s Section 170 register when replacement is required.

Conservation outcomes

There are four operable de Burgh truss bridges including one single-span bridge (Lansdowne).

Holman Bridge does not bear any unique or outstanding design characteristics that cannot be viewed in other de Burgh truss bridges, meaning its removal and replacement would not result in a loss of the representativeness of the RTA’s timber truss bridge collection.
Barham Bridge

Description

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Barham Bridge is a two-span de Burgh truss bridge with a lift span located on Main Road 237, carrying a very high volume of traffic. The bridge provides a gateway and visual landmark between Barham and Koondrook, and NSW and Victoria.

Analysis of heritage and operational factors

Service requirements: The bridge is required to meet the emerging regulatory limits well in excess of the T44 Standard. The bridge cannot be upgraded to achieve the required standard and therefore will need to be eventually replaced with a modern bridge in order to meet capacity requirements.

In 2009, following deterioration in timber piles and sheetings at abutment A due to scouring of the riverbank, a Section 60 approval was granted for the following:

- Replacement of existing timber abutment A with reinforced concrete elements.
- Replacement of approach span decks with steel concrete composite decks.

Barham Bridge is listed on both the State Heritage Register and the Heritage Victoria Database. It was ranked 22nd in the 1998 MBK timber truss bridge study and this is recognised in the timber truss bridge conservation strategy sensitivity test.

Conservation strategy – Barham Bridge

Due to the route load limit requirements for Barham Bridge it will be duplicated in accordance with network upgrading priorities. It does not have any unique characteristics that are not represented elsewhere among retained bridges. Cobram Bridge is, in many respects, identical to
Barham Bridge. As a result, the bridge cannot be retained in use within the RTA's timber truss bridge portfolio. If required to be retained as a redundant structure it would attract minimum resources to support due diligence requirements and its existing fabric would be retained.

**Proposed future conservation works**

Mitigation of impacts
- Archival recording of the bridge.
- Interpretation of the bridge.
- Salvage of the timbers for use in other bridge rehabilitation works.

**Conservation outcomes**

There are four operable de Burgh truss bridges including one single-span bridge (Lansdowne).

Barham Bridge does not bear any unique or outstanding design characteristics that cannot be viewed in other de Burgh truss bridges, meaning its removal and replacement would not result in a loss of the representativeness of the RTA’s timber truss bridge collection.