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Cuttagee Bridge Heritage Assessment

Report prepared for BVSC by Pip Giovanelli

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EXECUTIVE SUMMARY

In June 2021 Bega Valley Shire Council engaged heritage consultant Pip Giovanelli to undertake a Heritage Assessment of the existing Cuttagee Bridge.

Copies of original plans dating back to 1892, articles from Trove and other relevant documentation enabled a reliable history of Cuttagee Bridge to be prepared. The bridge was assessed against NSW Heritage Criteria to provide the following summary Statement of Significance

> The Cuttagee Bridge is of historic interest as one of a group constructed in the later part to the 19th century to facilitate transport between Tilba Tilba, Tanja and the port at Bermagui. Designed by the NSW Public Works Department in 1892 it was one of many that used the 'simple beam' structural system. Built from native Australian hardwoods, the bridge was extended twice in response to shifting sands and suffered major flood damage in 1934 and again in 1974.
>
> It was recognised as a component of a significant tourist drive as early as 1934 by the NRMA Touring Department and continues to be valued in like manner by many of the local community as well as visiting tourists. The bridge is considered to have aesthetic value for its traditional character, its setting within the immediate landscape as well as being a component of the drive between Bermagui and Tanja. It is highly valued by the local community who consider that many of the bridge's characteristics align with their own values and way of life.
>
> Timber bridges of this type and period are coming to the end of their functional life and are being replaced with modern concrete structures, and consequently bridges such as Cuttagee are becoming increasingly rare.

The report summarises the attributes that contribute to Cuttagee Bridge's heritage value and looks at five other restored or replacement bridges that address heritage attributes in differing ways.

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1 History of Cuttagee Bridge

1.1 Historical context

By the latter half of the 19th Century much of the land south of Cuttagee Lake that was not reserved for forests had been taken up by European settlers. JE Gowing purchased freehold land from the Polack family at Murrah in 1858 and Samuel Wilton selected land at Cuttagee in about the 1870s. Produce included butter, pigs, wattle bark and timber for Sydney tanneries and mills. Transport to market was by boat although options were limited. Before the land was cleared and the rivers silted up, Cuttagee Lake was accessible to smaller sailing vessels of less than 90 ft in length that were chartered by squatters to take produce to markets (Hearn p11). Tracks headed south and west from Murrah to Tathra and Bega, but transport still had to cross the Bega River. The transport difficulties for farmers and timber getters between Cuttagee Lake and the Bega River constrained their ability to market their produce.

The site for Bermagui was proclaimed in 1868, at which time most transport was by sea. Gold was discovered at Montreal goldfield in 1880 and a wharf built on the north side of the Bermagui River the same year. To provide for increasing trade and passenger transport, and the larger boats of the Illawarra Steam Navigation Company (ISNC) a deep-sea wharf was constructed in Horseshoe Bay in 1887. The first bridge across the Bermagui River opened in 1888 at which time the population in the town was approximately 200 adults and 40 children. Transport between Tilba Tilba and Bermagui wharf was often thwarted by the need to cross the mouth at Wallaga Lake until a causeway and bridge were built in 1894 (Hearn). The same challenges confronted those south of Cuttagee Lake.

Early parish maps indicate that the road from Murrah to Bega was surveyed and fairly well established in comparison to the track from Murrah to the ford across the Cuttagee Lake entrance - the section south of the lake being more of a dotted track along the beach rather than a surveyed and formed road. On the north side of the ford, across the lake entrance, the road reserve was surveyed through to Bermagui. The ford was obviously problematic and constrained by tides, storms and the difficulty of moving heavy loads across soft sand.

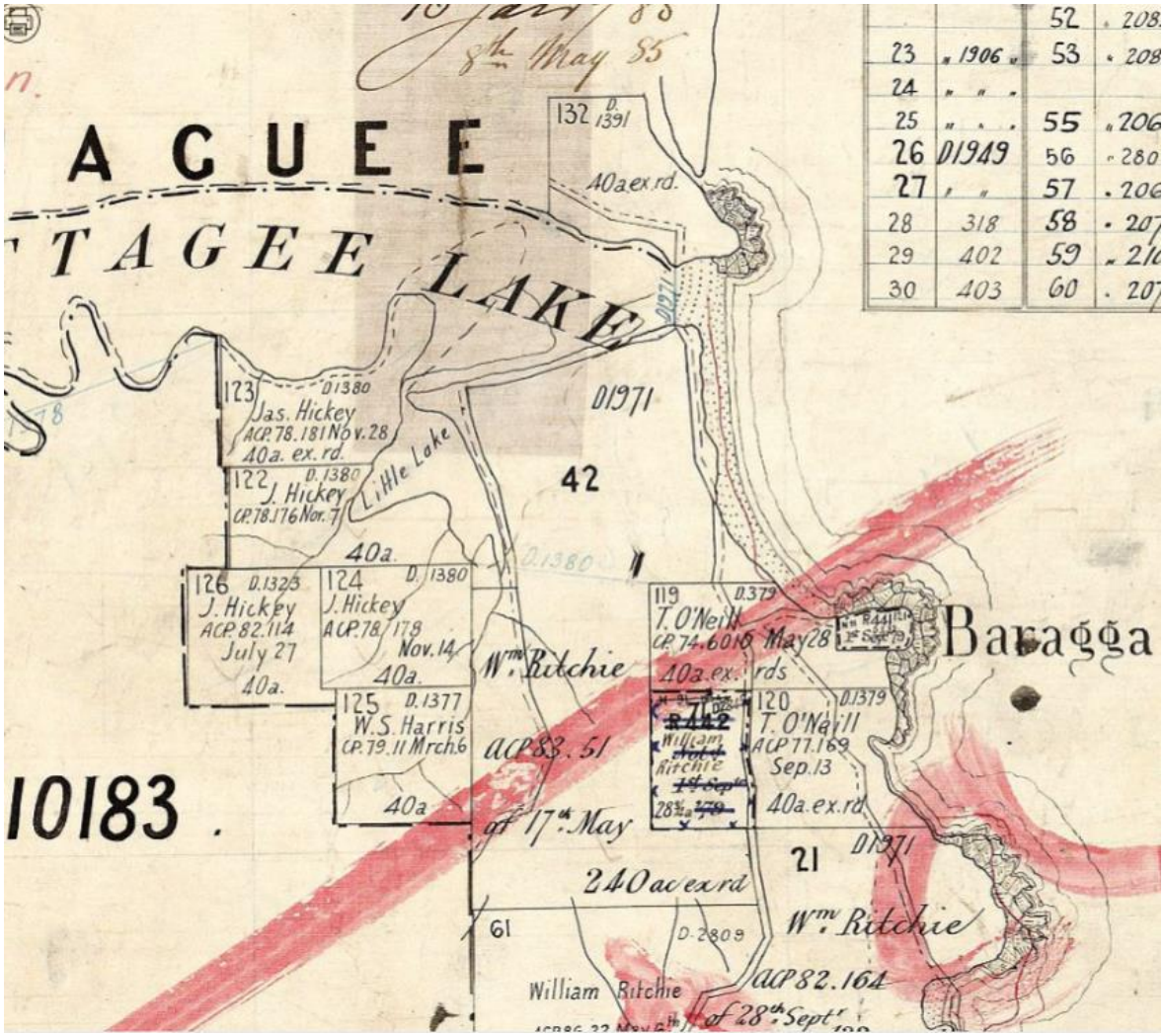
To overcome these challenges, which were by no means peculiar to Cuttage Lake, a bridge was designed by the Department of Public Works - Roads and Bridges and Sewerage Branch in 1892 (and presumed to have been opened in 1893). This was a period of extensive public works with many road and railway bridges being constructed. Most of these were constructed from timber, and most were ‘simple girder’ bridges like that at Cuttagee, rather than truss bridges such as the New Buildings Bridge over Towamba River (built 1921).

In 1861 the NSW parliament decreed that local materials and labour should be used wherever practicable in government-funded construction. Steel and iron were in short supply

and expensive and had to be imported. Even after the State's first steelworks were set up in Lithgow in 1878, steel continued to be in short supply until some years after the end of the Great War of 1914–18. (Timber Bridge Management, RTA report 2002)

During this period bridge structures in America and Europe moved to all-steel trusses because steel was readily and dependably available and their timbers had lesser quality, strength and durability. But in Australia the abundance of good timber and its relatively low cost, compared to steel and masonry or concrete, meant that timber remained the dominant construction material for bridges in the late 19th and early 20th centuries. This was particularly so in New South Wales, with its abundant supplies of superior hardwoods. By 1902, approximately 3,700 timber beam bridges [for both road and rail] had been built, making up 87% of the bridge population of the day. The construction of these bridges substantially improved road transport in the State and made a major contribution to economic activity, particularly in the agricultural sector. (Timber Bridge Management, RTA report 2002)

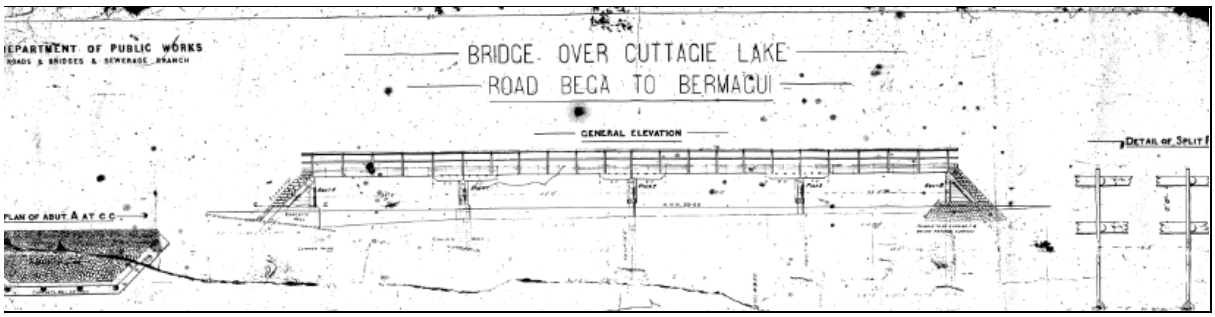
Within a short period of time, multi-span timber bridges were built at Wallaga Lake, Bermagui River, Cuttagee Lake and Murrah River. The smaller bridges at Barragoot, Wapengo and Sandy Creek are likely to have been built at much the same time allowing a reliable road network from Tilba Tilba, via Bermagui to Bega and Tathra linking population, production and ports.



Murrah Parish Map circa 1885 showing road reserves north and south of Cuttagee Lake entrance.

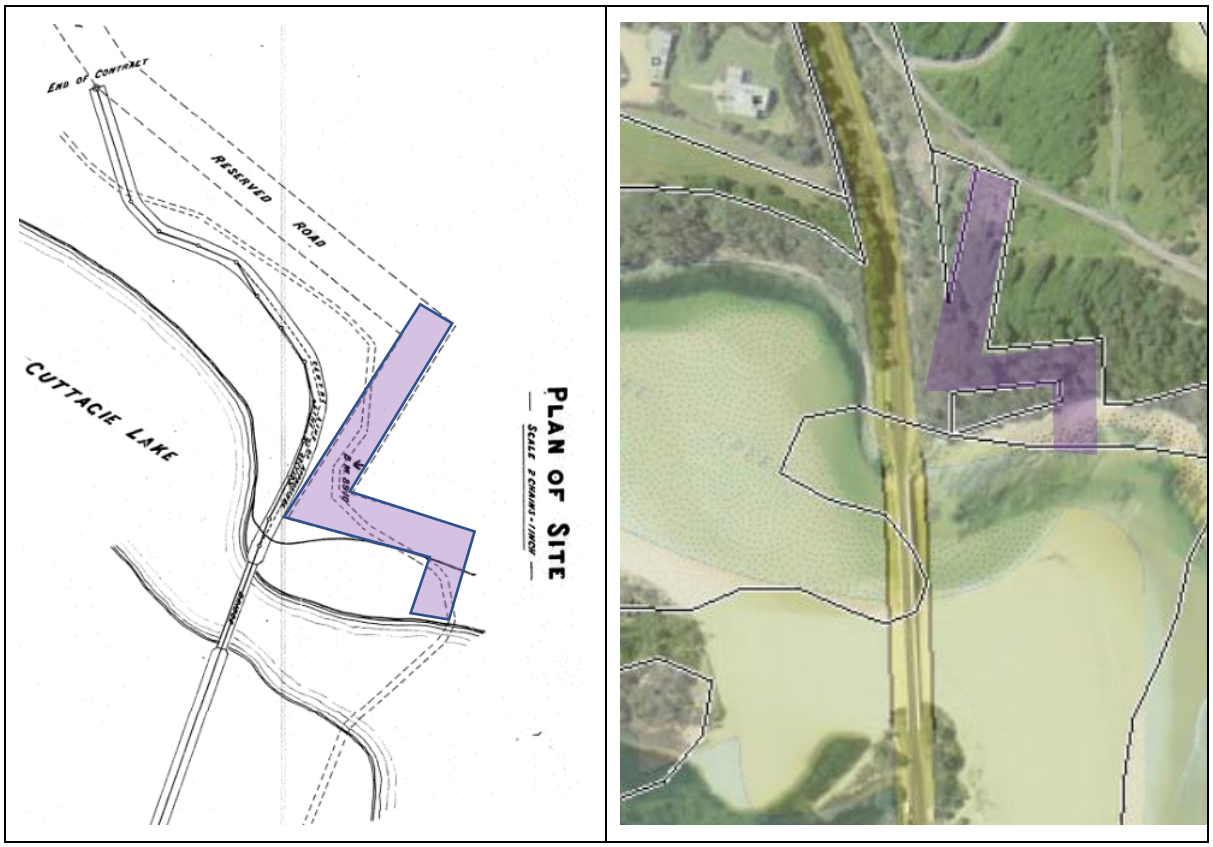
1.2 The first bridge over Cuttagee Lake – a four span bridge (1892-93)

The first bridge was only 4 spans long (130ft), supported by three sets of piers and an abutment at either end. The north abutment (Bermagui end) was in approximately the same position as the current bridge and the south abutment was where the fourth set of piers from the north currently is. The bridge was less than half its current length.



General elevation of the proposed bridge over Cuttagee Lake, 1892. Part of the set of plans prepared for its construction by the Department of Public Works, Roads and Bridges and Sewerage Branch.

The site plan included on the 1892 set of drawings shows the old track that enabled a crossing of the estuary when the conditions were favourable. The track was within a surveyed Road Reserve that remains evident in current Lot and DP boundaries



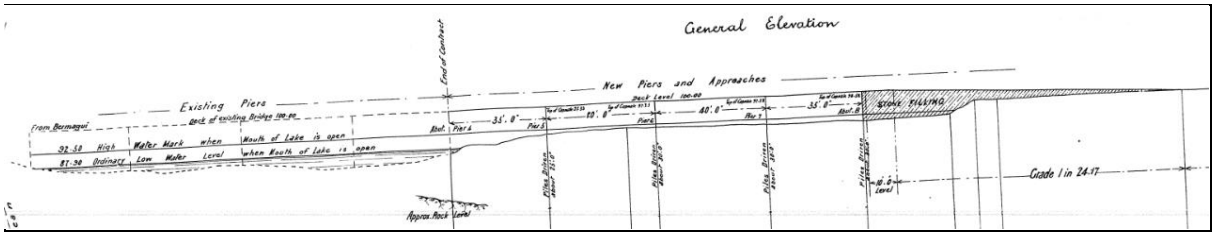
Detail of the northern approach road showing the historic track and earlier road reserve shaded mauve for clarity on both the 1892 Cuttagee Bridge plan and the 2021 SIX Maps view of the bridge and surroundings, with property boundaries highlighted.

1.3 Extension of first bridge to eight spans (1898)

The southern approach to the four-span bridge was on what turned out to be an unstable sand spit and only six years after the bridge was built it became necessary to double its length to a total of 8 spans. What had been the southern abutment was adapted to become pier 4, and additional piers were added to become piers 5, 6 and 7. A new southern abutment was formed 35 feet beyond Pier 7, to make a bridge of 8 spans in total with a combined length of 280 feet. The plan shows the bedrock level at pier 4 descending to the south. The width of the former abutment at pier 4 was retained even though it was considerably wider than the bridge deck. The southern abutment was backfilled with rock to provide an easy gradient down to natural ground level.

Unfortunately, there was no accessible bedrock on which to 'found' the new piers or the southern abutment. The timber piles had to be driven into the wet sand to the point of resistance.

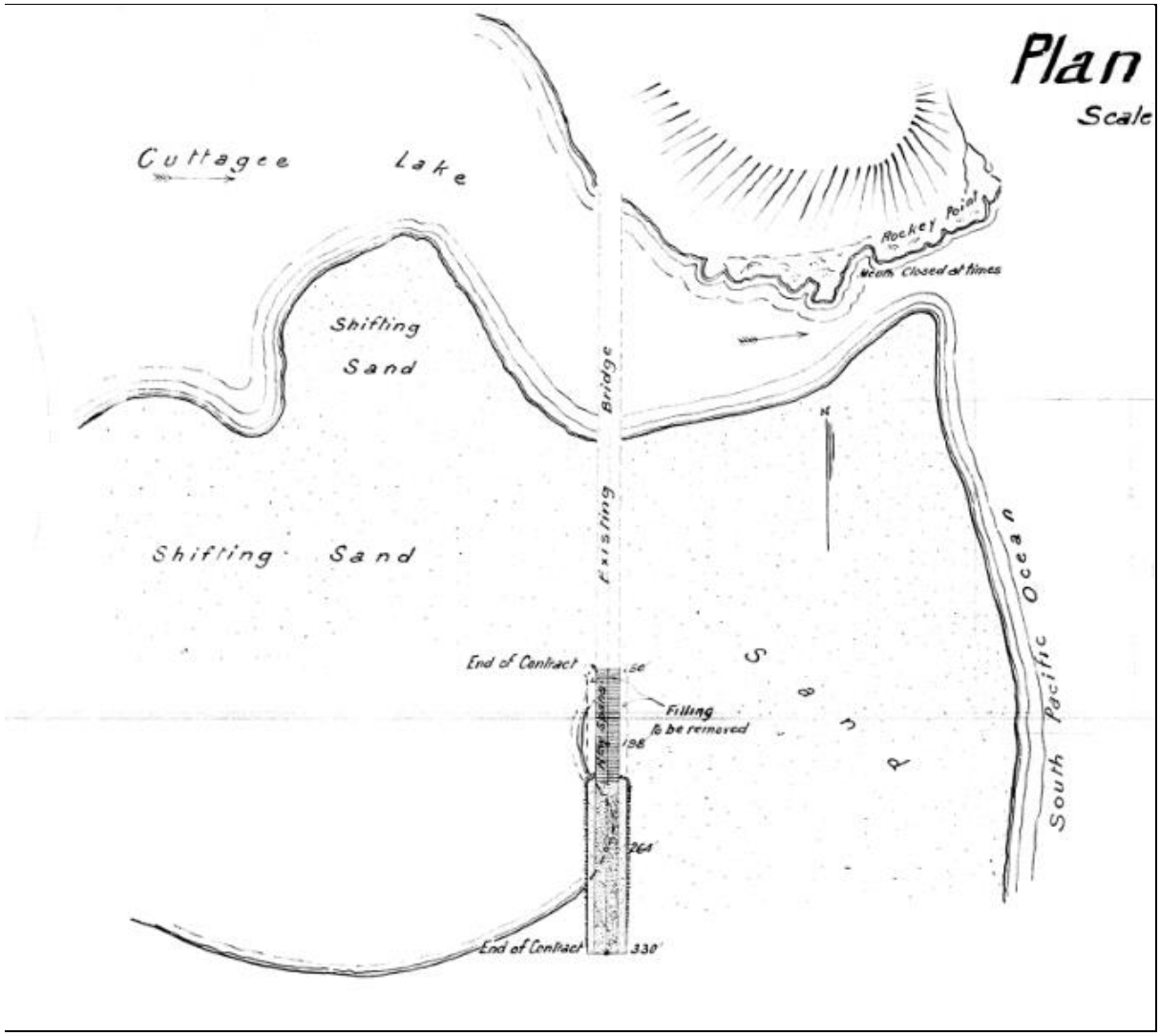
The Australian Star of Tuesday 13 Sep 1898, reported that the contract to provide '*Additional timber beam spans to bridge over Cuttagee Lake, on road Bega to Bermagui*,' had been awarded to J*. W. Stephenson of Dignam's Creek, for a sum of £498/ 17s*.



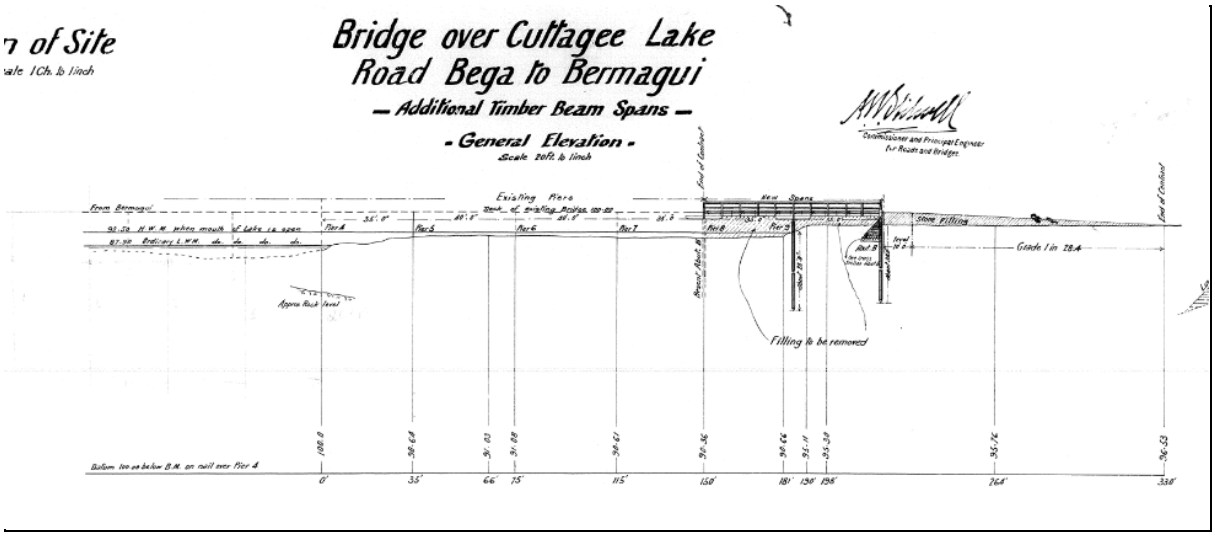
Part of the 1898 plan showing existing piers on the left hand (Bermagui) side of the elevation and the new piers and approaches on the right hand (Tanja) side of the line marked *End of Contract*. Piers 5, 6, 7 and the abutment include the notation '*piles driven'* to depths of 25 -30ft (approximately 8 – 10 metres).

1.4 Extension to a ten-span bridge (1903)

Within a few years there were further problems with the southern abutment which seems to have eroded or become unstable as a result of shifting sands and water levels. To remedy the situation the bridge was extended a further two spans. The stone filling under the old abutment was removed and a new stone-filled gradient added beyond the southern abutment. The work contract was awarded to Jakob Nybeck, Bega for a sum of £236 10s Od, and notified in the press on Tuesday 20 Oct 1903. At completion of that stage the bridge was a total of ten spans in length, which it has remained.



The site plan that accompanied the contract for the additional two southern spans shows the water level on the lake side extending under the southern approach and that the contract included building up the southern gradient to overcome the issue.



Bridge Over Cuttagee Lake, Additional Bridge Spans, General Elevation. Date obscured. Source BVSC O drive 4981-06. The drawing style closely matches that of the earlier plan that was dated 28/9/98 and is presumably drawn by the same person.

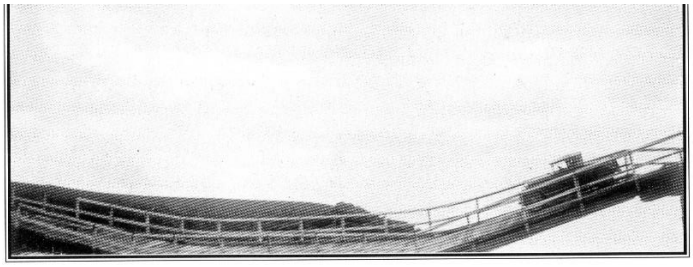
1.5 Collapse of original four spans and reconstruction in concrete and steel (1934)

In 1934 bad weather caused the collapse of piers 2 and 3 as can be seen in the images below.

Cuttagee bridge looking south following collapse of spans 2 and 3 during heavy storms in 1934.

'*The piles on the upstream of Cuttagee Bridge were undermined, tipping the bridge sideways so that it could be used only by light traffic using extreme caution'*. Looking back: The floods of 1934, Bega District News 23 MARCH 2018.

West elevation of collapsed bridge.1934. Source Murrah Hall Committee



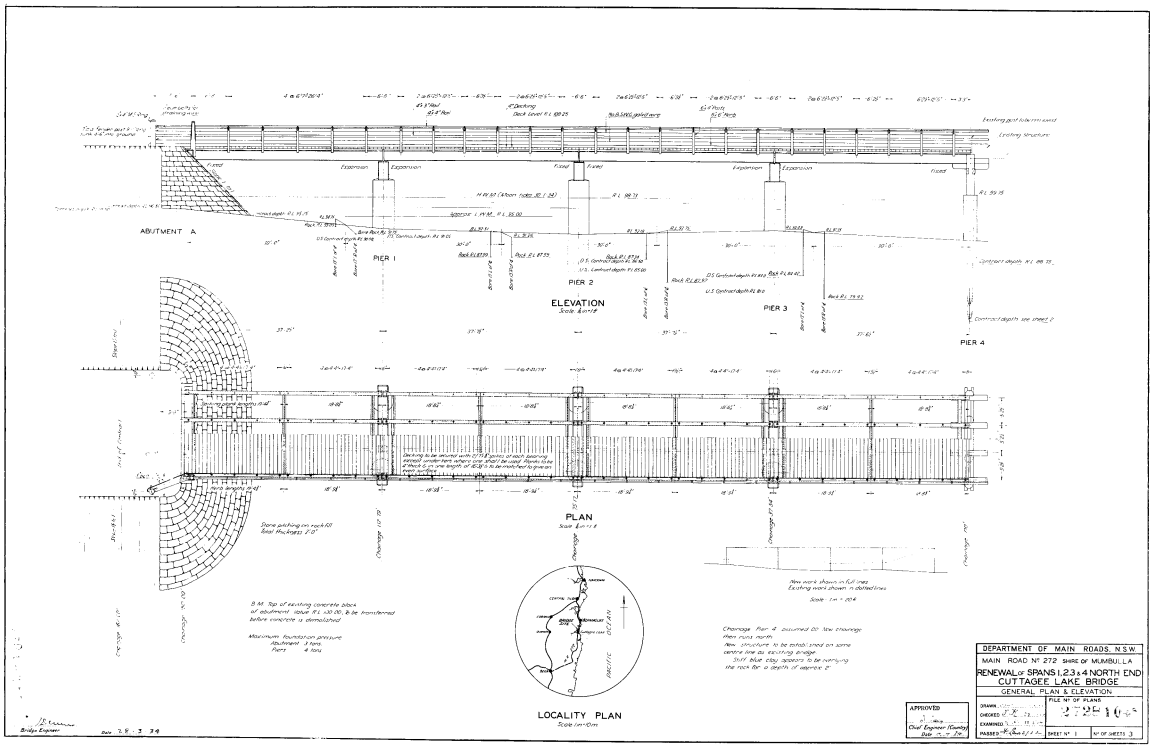
West elevation with car. Source: *Pictorial History of the Bega Valley Shire,* H Swinbourne and J Winters

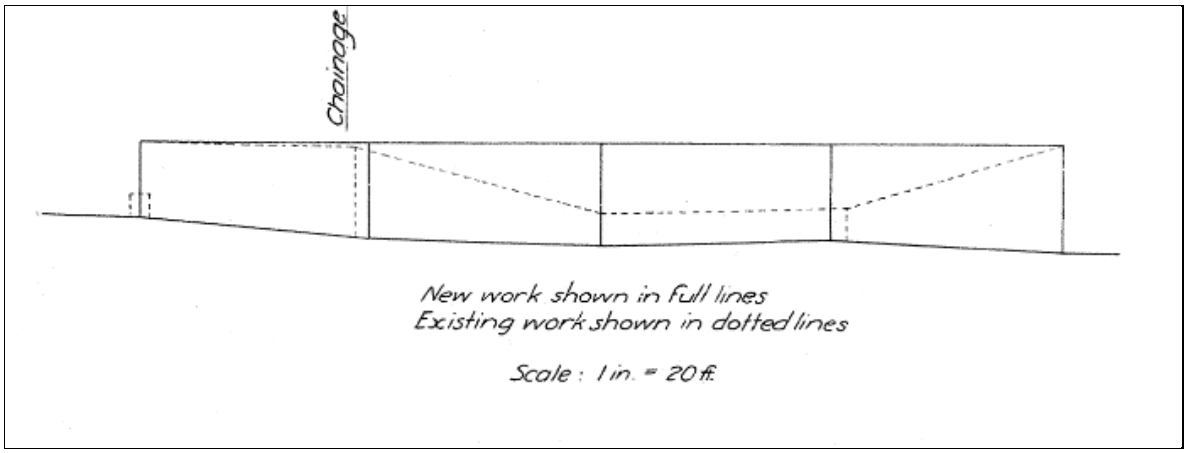
The NRMA of the day ran a series of notices in local papers across NSW advising of the bridge collapse:

> *CUTTAGEE BRIDGE.*
>
> *The N.R.M.A. Touring Department has been advised that repair work is in progress on Cuttagee Bridge, between Bermagui and Bega, and that the detour at the present time is almost impassable. During the summer months, this road appeals to motorists, as it keeps close to the coast for practically the whole way, and the scenery in parts is very fine. However, while the work is in progress, motorists are advised to keep to the highway through Cobargo. If it is desired to visit Bermagui, there is a fair road leaving Prince's Highway near Tilba Tilba, and going by way of Wallaga Lake to Bermagui, from which place the highway may be rejoined at Cobargo.* The Katoomba Daily Thu 31 Jan 1935.
>
> Source: https://trove.nla.gov.au/newspaper/article/193883415?searchTerm=cuttagee#

The Department of Main Roads chose to rebuild the collapsed piers in reinforced concrete and replace the timber girders that spanned the piers with four steel beams for each of the four spans. A traditional timber deck with timber side rails was fixed to the surface of the steel beams. The plans are detailed and specific regarding the deck and rails and it is fair to assume that all the timber used in the 1935 re-build was new, especially considering that timbers in the original section of bridge had

been exposed to the elements for over forty years. Before reconstruction could begin the collapsed 1892 bridge was demolished from the northern abutment to pier 4.





Renewal of Spans 1, 2, 3 & 4 North End Cuttagee Lake Bridge, General Plan and Elevation, sheet 1 of 3, drawn 27/3/1934. Source BVSC O drive 4981-02. The drawing provides a detailed plan and elevation of the proposed work from the north abutment through to pier 4. Also included is a small schematic drawing of “existing work” being the approximate shape of the collapsed section of bridge.

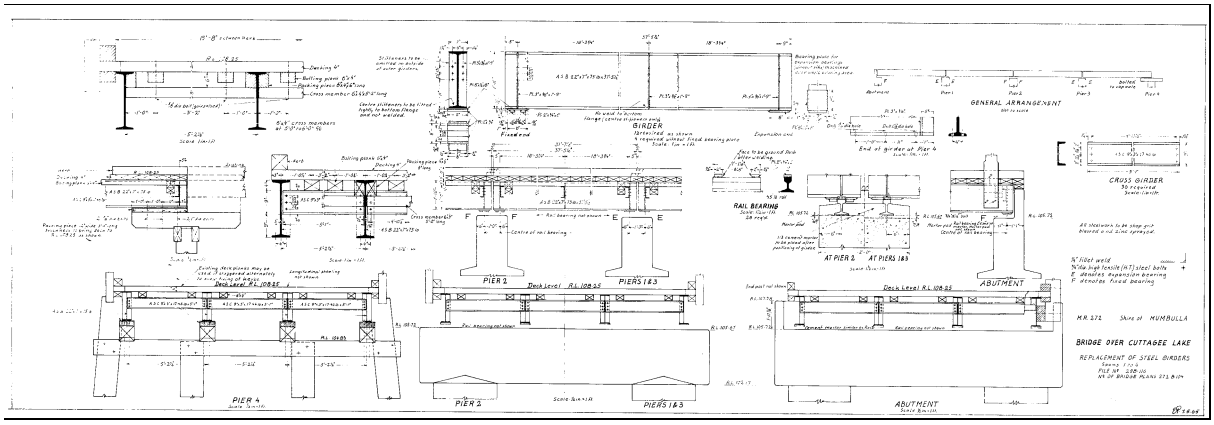
Cuttagee bridge looking north from about pier 4 showing demolition of the northern end of the bridge circa 1934-35. Source Murrah Hall Committee.

The following year the NRMA informed it readers that the Cuttagee Bridge was open.

> *The N.R.M.A. Touring Department has been advised by the Association's Bega representative that the bridge over Cuttagee Lake, on the coast road between Bermagui and Bega, is now open to traffic, construction work having been completed recently. This road affords an interesting alternative route to Prince's Highway, some fine coastal scenery being taken in on the trip. Care should be exercised, however, to wet weather*. Glen Innes Examiner, Thu 25 Jul 1935.

1.6 New steel girders (1965)

By 1965 the steel girders that had been installed to support the four northern spans of the bridge after its collapse in 1934-35 were now in need of replacement, probably due to rust.



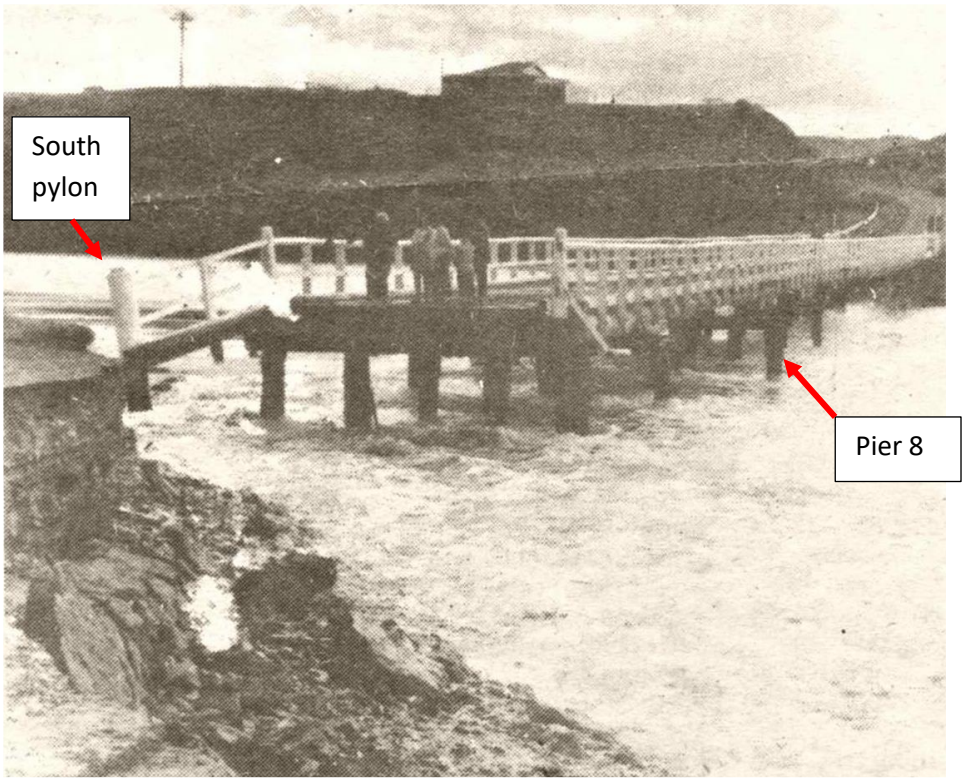
Bridge Over Cuttagee Lake, replacement of steel girders - Spans 1-4. MR 272 Shire of Mumbulla. Dated 7/6/65. Source BVSC O drive 4981 – 03.

A photograph taken in the late 1960s shows the bridge in apparently stable form but with a secondary channel forming toward its southern end. Close inspection of the photo shows apparent subsidence at pier 4 which, in the first iteration of the bridge circa 1892, was the southern abutment (note that the old timber piles were encased in concrete in 1934-5). The wider headstock on top of the piles can also be seen. Pier 8 was the southern abutment in the bridge's second iteration of 1898 and it too is wider as a consequence. There are no additional steel piles, or lateral or diagonal bracing between piles at the time of this image.

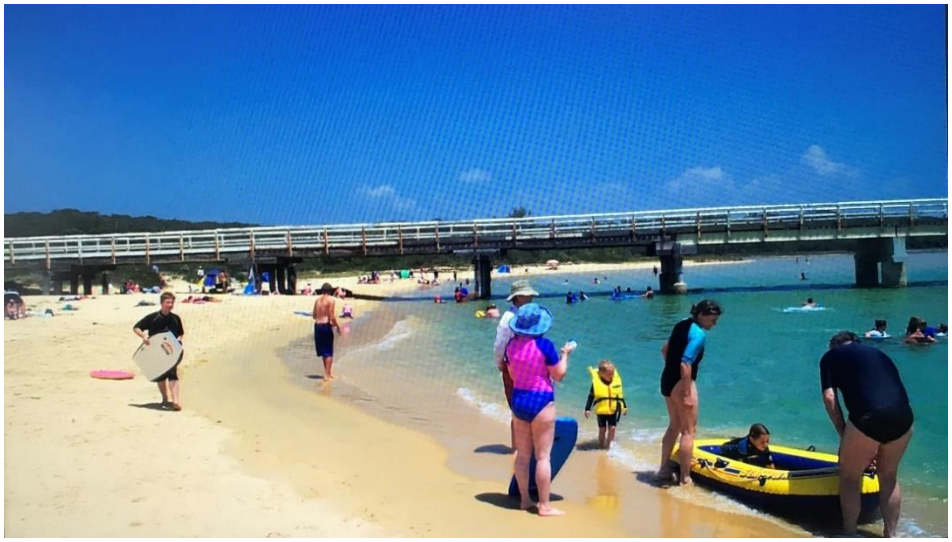
Cuttagee Bridge in the late 1960s. Photo taken by Sister Harris. Source Bermagui Historical Society.

1.7 Washout of southern abutment (1974)

Less than a decade later, in 1974, the southern abutment was washed away, leaving the pylon and guard rails hanging in space as water rushed beneath.



Cuttagee bridge 1974. Viewed from southern abutment looking north



Recreation at Cuttagee Bridge January 2004, showing popular use of lake. Source: BVSC

1.8 Pile strengthening and extensive repairs

Over recent decades there have been extensive repairs to the bridge as many of the piles and headstocks reached the end of their life. The new or recycled headstocks can be seen extending beyond the edge of the bridge, supported on additional piles. Steel piles have been driven into the sand either side of the former timber piles. Diagonal bracing and horizontal ties have been added to the piles to provide additional strength and there is evidence of numerous repairs to the decking

The RTA Timber Bridge Management Study of 2002 makes the point that

> *Timber degrades when left exposed to the elements, and therefore has a high maintenance demand if used for permanent outdoor structures. An unprotected timber structure will need to be continually rebuilt throughout its service life. A timber structure more than 50 years old will in all probability have had all its timber elements replaced at least once—and in the case of its decking, as many as four times.*

This is the case with Cuttagee along with numerous timber bridges throughout the State. The deterioration rate at Cuttagee is probably worse than many due to the fluctuating tides, severe storms and wind-blown salt spray.

View from South abutment looking north at pier 9. June 2021. Note extended headstocks, introduced steel piers, butt-spliced timber piers and rust at base of steel work.

Cuttagee Bridge girders at Span 9, photographed June 2021. The good condition of the underside of decking suggests that timbers were replaced in relatively recent times.

Typical cracking in under-beam caused by coach bolt fixing of decking. This can lead to decay and failure.

Cuttagee Bridge looking south. The many irregularities in the substructure are reflected in the 'wavey' lines of handrails, kerbing and the deck surface itself. Many timbers have decayed, and metal is rusting. June 2021

Decayed posts and kerbs. June 2021

Rusting girders. June 2021

Rusting fixings holding down kerbs, June 2021

Failing deck timber. This common problem is caused by water entering the timber via the screw holes and causing decay. June 2021.

2 Condition

It is not the role of this report to analyse the condition of the bridge, but rather to determine how its condition impacts or influences the heritage significance of the structure. Notwithstanding the above, a cursory inspection reveals the bridge is in less-than-ideal condition and that many of its members are coming to the end of their functional life. Repair, replacement, and on-going change to the fabric will be necessary if it is to continue to fulfill its role. As has happened with the pier repairs and replacements since 1934, attempts to stabilise and reinstate the structural integrity of the bridge have been pragmatic, and often done at the cost of the bridge's initial design elegance.

3 Integrity

Integrity refers to the degree to which the item has been altered from its initial designed and built form. Integrity can be applied to both the form of the item as well as the fabric. In some situations the fabric can be altered with relatively little impact on the integrity of the design, and is usually necessary where timber structures are exposed to the elements. Where elements are replaced in a like-for-like manner the structural integrity is retained. Where the new deviates from the old, integrity is weakened. Such is the case with the substructure at Cuttagee which has been extensively altered over time.

On the other hand, the deck, kerbs and handrails have been repaired and replaced like-for-like and have continued to respect the visual and functional integrity of the upper part of the bridge – the part that most travellers see when driving across.

4 Assessment against NSW Heritage Criteria

The NSW heritage assessment criteria encompass the four values in the Australia ICOMOS Burra Charter, which are commonly accepted as generic values by Australian heritage agencies and professional consultants:

- historical significance
- aesthetic significance
- scientific significance
- social significance

These basic values are expressed as a set of criteria against which an individual place, or indeed a complex of individual items can be assessed. A place does not need to meet all criteria, and often a place will meet only one criterion and still be deemed significant. If a place meets the criterion to a high degree, it may meet the threshold for entry to the local heritage schedule or the State Heritage Register. It is customary to include a summary statement of significance that clarifies the nature and degree of significance.

A copy of the NSW heritage assessment guide (Assessing Heritage Significance) can be found at https://www.heritage.nsw.gov.au/search-for-heritage/publications-and-resources/ .

4.1 NSW Heritage Criteria

Criterion (a)

An item is important in the course, or pattern, of the cultural or natural history of the local area;

The Cuttagee Bridge was one of many such bridges designed by the NSW Public Works Department and built to improve the transportation network throughout NSW in the latter part of 19th and early 20th centuries. It greatly facilitated access to ports and markets for those operators located south of Cuttagee Lake. It was effectively a link in a transport chain that included Murrah Bridge, Wapengo, Sandy Creek and various one and two span bridges over lesser creeks.

Its historic significance is confined to the local area only.

Criterion (b)

An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area);

The bridge is one of possibly thousands designed by the Public Works Department but is not known to be associated with any significant individual, unlike for example the timber truss bridges that are named after their design engineer (Allan, McDonald, Dare and de Burgh).

The Cuttagee bridge is not significant against this criterion.

Criterion (c)

An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area);

The bridge does not demonstrate a high degree of creative or technical achievement however it does have important aesthetic attributes. While different people will have different tastes, aesthetic values are generally established if they are held by a group or community. This can be demonstrated for example by an item being a regular subject of photography, or of painting or discussion, or indeed by collective agitation if the item is at risk of change or demolition. Aesthetic value can be a component of social value.

The demolition of timber bridges frequently generates concern, distress, agitation and strong feeling in community groups who mourn the loss of the item because of the way it looks, its character and its setting.

The aesthetic attributes of the Cuttagee bridge relate to the deck and above, to:

- its human scale (in this case width of deck and height of rails)
- its use of repeated elements (posts and rails, ends of deck timbers etc),
- its materiality (primarily painted timber and old metal fixings),
- its texture (wood grain, multiplicity of components, varied deck surface)
- its irregularities that show how it has aged and responded to settlement (handrails, deck kerbs, deck surface),
- Its sound when driven over (the knocking of deck boards and the ‘slap’ as the tyre moves from one deck board to another – the bridge could be said to have an ‘acoustic’).

In summary the bridge has a high degree of aesthetic value that is subtly embedded in its scale, detail and material that combine to evoke an emotive response that is held by many in the community. In this particular bridge the values are in the deck and above, not the piles and girders that have been extensively altered.

Criterion (d)

An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons;

There is a design simplicity evident in the many hundreds of timber bridges that were built like Cuttagee. They used quality Australian hardwoods, often from the local area, in a structure that was conceptually simple, and able to be built using local skills and labour. Structures that continue to demonstrate this quality sit comfortably in their landscape setting and resonate with the local community. The Cuttagee Bridge has strong social and associative values for members of the local community who have initiated a campaign for its retention.

Important values expressed recently by some community members could be summarised as the tourist, aesthetic and amenity aspects of the bridge.

Criterion (e)

An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);

Does not apply to Cuttagee Bridge

Criterion (f)

An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);

Most of the 3000 or so timber bridges for both road and rail across NSW were constructed approximately between about 1870 and 1930. In 2009 the timber bridge study undertaken for Bega Valley Council identified 65 timber bridges in the shire. Since that time a number have been burnt in bush fires or replaced as part of the Shire's on-going bridge replacement program. Most of the bridges are coming to the end of their functional life or may not meet modern codes and standards. A bridge typology that was once common across the shire is diminishing and as a consequence surviving timber bridges will become rare. It is fair to say that Cuttagee Bridge possesses endangered aspects of the Bega Valley Shire's cultural heritage.

Criterion (g)

An item is important in demonstrating the principal characteristics of a class of the local area's cultural or natural places

From the deck up, the Cuttagee bridge is a fair, if aged, example of the timber bridge type however, below the deck, it is now a poor example of the type, with multiple modifications to the piers and abutments.

4.2 Statement of Significance

The Cuttagee Bridge is of historic interest as one of a group constructed in the later part to the 19th century to facilitate transport between Tilba Tilba, Tanja and the port at Bermagui. Designed by the NSW Public Works Department in 1892 it was one of many that used the 'simple beam' structural system. Built from native Australian hardwoods, the bridge was extended twice in response to shifting sands and suffered major flood damage in 1934 and again in 1974.

It was recognised as a component of a significant tourist drive as early as 1934 by the NRMA Touring Department and continues to be valued in like manner by many of the local community as well as visiting tourists. The bridge is considered to have aesthetic value for its traditional character, its setting within the immediate landscape as well as being a component of the drive between Bermagui and Tanja. It is highly valued by the local community who consider that many of the bridge's characteristics align with their own values and way of life.

Timber bridges of this type and period are coming to the end of their functional life and are being replaced with modern concrete structures, and consequently bridges such as Cuttagee are becoming increasingly rare.

5 Examples of adaptation

This section looks at examples of bridges that have incorporated elements of bridges they replaced.

5.1 Murrah Bridge

Murrah Bridge, located south of the Cuttagee Bridge, has had all its former timber piers replaced with concrete piers and concrete headstocks. Girders, deck and rails remain in timber, although it is likely that most of the timber has been replaced over the course of the bridge's life. The bridge is a single lane wide, although there may be capacity to expand it to double-lane given the width of the concrete piers. From the tourist perspective the bridge 'reads' as a timber structure and it continues to contribute to the historic character of the scenic drive.

Murrah Bridge 2021. From the tourist perspective the bridge presents as a timber structure.

The timber upper structure is supported on relatively recent concrete piers that may be wide enough to support a second lane if the bridge needs to be widened.

5.2 Glenmurray Bridge

Located in the Kangaroo Valley on Tourist Drive 7, the Glenmurray Bridge is a two-lane concrete bridge with steel handrails modelled on traditional timber detailing. The spacing of posts and rails, the dimensions of members and the diamond top rail closely reflect timber bridge construction. The pylons comprise a short sandstone pillar followed by a bespoke steel cylinder. The railing posts are bolted onto small concrete plinths in lieu of a kerb which prevents the build-up of detritus, and visually opens the bridge to the landscape. The small amount of leaf litter on the side of the carriageway reduces the visual impact of the concrete and contributes to the bridge's rural character.

Glenmurray bridge sits well within its context. Google Image of 2021

Glenmurray Creek Bridge

Note the combination of sandstone and painted steel pylon, plus absence of concrete kerb.

5.3 Turallo Creek Bridge

The reconstructed Turallo Bridge at Bungendore is a concrete bridge that has a bevelled kerb structurally integrated into a half-height concrete wall. The white steel guard rail follows traditional details and proportions including a short obelisk pylon.

This bridge does not incorporate traditional details as successfully as the one at Glenmurray Creek.

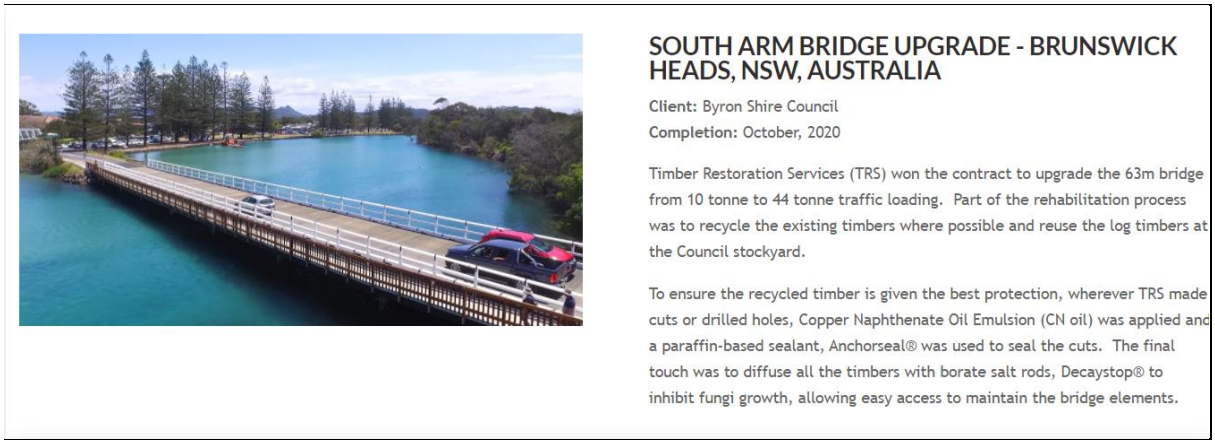
Turallo Creek, Bungendore (Palerang Shire), prior to demolition

Turallo Creek, Bungendore april 2009

5.4 Brunswick Heads Bridge

The two-lane timber bridge at Brunswick Heads is much valued by the community and seen as part of their tourist offering. The 63metre bridge was upgraded from 10 tonne to 44 tonne traffic loading. The attached pedestrian footbridge was also addressed as part of the restoration.

Brunswick Heads timber bridge. Google image capture dated January 2010



SOUTH ARM BRIDGE UPGRADE - BRUNSWICK HEADS, NSW, AUSTRALIA

Client: Byron Shire Council
Completion: October, 2020

Timber Restoration Services (TRS) won the contract to upgrade the 63m bridge from 10 tonne to 44 tonne traffic loading. Part of the rehabilitation process was to recycle the existing timbers where possible and reuse the log timbers at the Council stockyard.

To ensure the recycled timber is given the best protection, wherever TRS made cuts or drilled holes, Copper Naphthenate Oil Emulsion (CN oil) was applied and a paraffin-based sealant, Anchorseal® was used to seal the cuts. The final touch was to diffuse all the timbers with borate salt rods, Decaystop® to inhibit fungi growth, allowing easy access to maintain the bridge elements.

The road and pedestrian bridge after restoration

The historic timber railings on the vehicle bridge have been upgraded and painted. The balustrade on the pedestrian bridge has also been upgraded by changing from galvanised steel pipe to clear finished timber.

5.5 Tharwa Bridge

Tharwa bridge was designed by Percy Allen of the NSW Public Works Department and opened 1895. It utilised four pair of timber trusses supported on timber piers over the main part of the Murrumbidgee River. Simple timber girders linked the truss component to the abutments on either bank.

The timber piers were encased in concrete around the 1930s, and the whole bridge underwent major restoration in the early 1990's. The bridge retained its single width and the tight curve on the western approach. Timber girders were replaced with steel and the timber trusses fully restored using timber and steel components as per their original design. Light guage folded colorbond sheet was fitted to the top of the upper truss member to prevent weathering.

New cross-beams supporting the deck were made from a welded steel box section (painted white) that supports a modern timber deck made from laminated timber and steel through-rods.

Steel side rails reflect traditional timber design with a diamond top rail. Mesh has been added, presumably to provide for pedestrian security.

The bridge has historic significance for providing a reliable transport link across the river. It is technically significant as the first Allen's Truss bridge designed and built in NSW and has aesthetic value for its form and setting. Additionally, it has social value for the residents of Tharwa and beyond. It is on a tourist trail and is within the visual catchment of both historic Lanyon Homestead and Tharwa village.

The welded steel cross-beams support the laminated timber deck. Photo July 2021.

Tharwa bridge is one lane wide, with white painted steel rails closely modelled on traditional detail. Steel mesh is added to the rails to provide greater pedestrian security. The concrete deck on the approach spans has an asphalt surface which unifies the surface and visually ties the concrete approach spans and timber truss spans together.

6 Towards a Heritage Hybrid

The physical attributes of the Cuttagee Bridge that contribute to its heritage value can be summarised as:

- timber deck and rails,
- spacing of posts and rails,
- diamond top rail,
- timber kerb,
- white paint,
- (historic photos show black paint on straps holding top rail to posts and collars around pylon tops)
- tapered timber pylons at abutment end of railings,
- post and rail fence either side of the abutment,
- an acoustic response to vehicles (knock of timber – slap of wheel)
- traffic calming measure (a repeated comment from the community has been that the bridge required vehicles to slow down – which had a benefit for pedestrian safety and contributed to an appreciation of the scenic drive).

It is possible to suggest a bridge design that finds a balance between the above heritage values and a simply functional asset. The attributes can apply to either a single or a two-lane bridge. In the case of Cuttagee the substructure is not a major heritage component as for the most part the bridge is perceived from above.

7 References

Bermagui by the Sea, Hearn J, Penmark Press 1996

Spanning Two Centuries, O'Connor C, University of Queensland Press 1985

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Timber Bridges, Giovanelli P, Unpublished report prepared for BVSC 2009

Cuttagee Bridge Options - Investigation Report for BVSC, Marshman O'Neill Engineers 2021

Various articles from 'Trove', National Library Australia

Historic parish maps, Historical Land Records Viewer - NSW Land Registry Services

Appendix 1

Heritage Design Attributes

This section of the report seeks to provide more specific guidance on how the elements that contribute to Cuttagee Bridge's heritage character could be treated in the design of a replacement structure.

Width of the deck	Only as wide as necessary
Surface of deck	The most sympathetic heritage solution is to reconstruct a single lane timber deck. If the deck is concrete it is preferable to finish the surface in asphalt at least to the width of the carriageway. If surface must be concrete then vary the surface to reduce its monolithic appearance. eg grind or otherwise treat some or all of the surface to expose the aggregate, or incise the surface with grooves at right angles to bridge length, spaced at 150 mm centres. This latter treatment will reflect the appearance or character of multiple deck boards and provide an acoustic response when crossed by vehicles.
Kerb	Ideally the kerb would be timber. If the kerb is concrete keep size to a minimum and paint it white as per timber kerb. The Glenmurray bridge deleted the kerb altogether and there may be merits in doing this as it provides a more direct visual link between the vehicle and the landscape. Tathra bridge has a smaller concrete kerb that works well. Large kerbs such as on the Turallo bridge have no heritage connection and should be avoided.
Rails and posts	Ideally these would be timber as per traditional dimensions and spacings. If steel, retain as per traditional proportions and include diamond top rail. Consider introducing black painted tie down strap as per historic bridge as this will add interest and mitigate against uniformity of steel. See details on Brunswick Heads bridge.
Pylons	The term 'Pylons' in this document refer to the stout vertical elements at the four corners of the bridge that define the ends of the side rails. Pylons on a new bridge should replicate traditional timber bridge pylons. Ideally these will be timber, but could be painted steel eg a tapered four-sided obelisk that finishes with a round head and black collar. The Turallo bridge pylon is an alternative model, although if used at Cuttagee should be anchored at ground level. Pylons could have a bespoke treatment provided by the community which would provide an opportunity for local community engagement.
Abutment fence	Utilise same details as per bridge side rails. Anchor to pylon or provide secondary pylon. If a guard rail is required, introduce it low down and finish in white powder-coat. Fix to face of the abutment fence and anchor to pylon or secondary pylon.
Acoustic response	Use coarse aggregate in asphalt, or grooves at right angles to bridge.
Traffic calming	Bond bands of proprietary product to the road surface at the approach to the bridge. This product is used to great effect on the approach to certain roundabouts in Canberra. Speed limiting signage should also be used.

Pedestrian bridge	None of the bridges on the road between Bermagui and Tanja had pedestrian paths. In other parts of the state certain timber bridges had 'pop-outs for pedestrian refuge. It is questionable if Cuttagee warrants a separate pedestrian bridge or whether refuges would be sufficient. The addition of a timber pedestrian bridge should not be used to hide or camouflage an unsympathetic road bridge. For many travellers, the Cuttagee road bridge is seen from the road rather than the beach, and so a pedestrian bridge would not enhance the road bridge in this instance. A pedestrian bridge would have its own construction and maintenance costs which arguably would be better incorporated into the road bridge to make the latter more historically sympathetic. If a pedestrian bridge is considered necessary at Cuttagee it should be at the same level as the road bridge and utilise traditional post and rail details with the same spacings. If gaps need be no greater than 125mm, this can be achieved by using heavy gauge bronze (or similar) mesh as per the Tharwa bridge.
