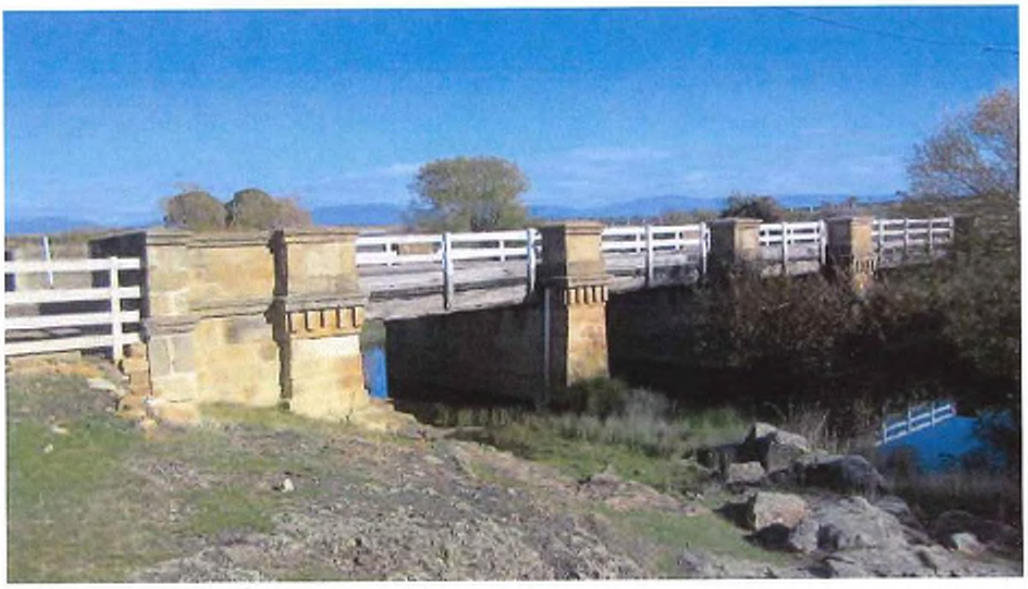
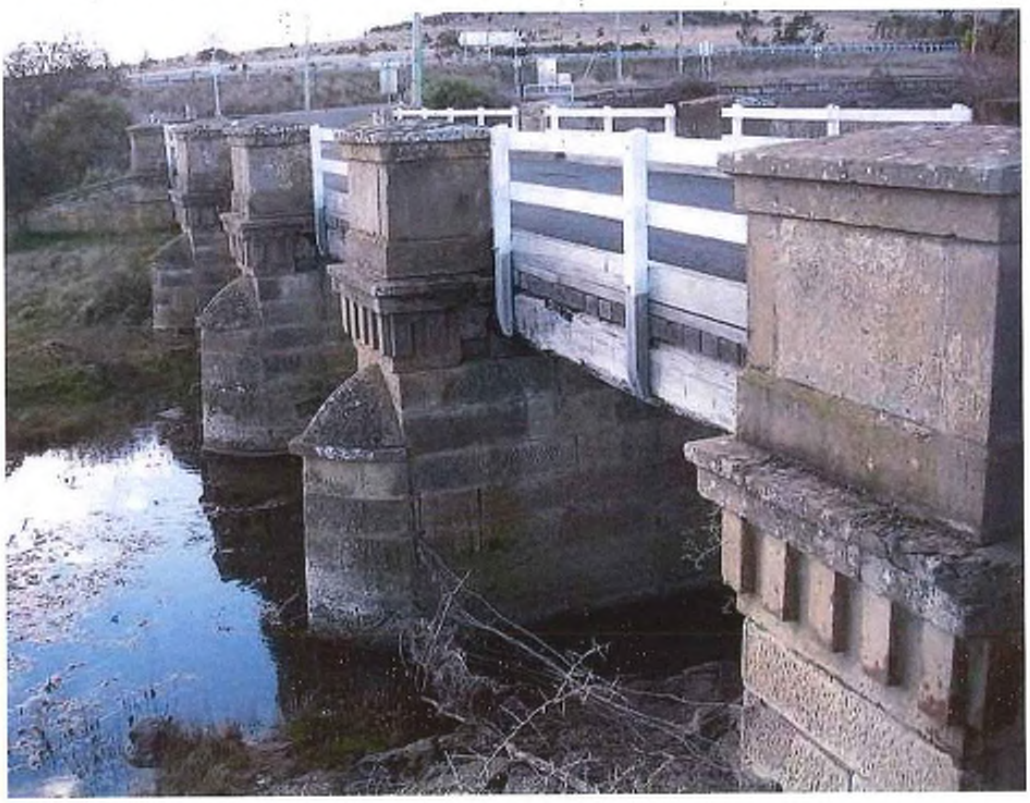
Peter Spratt
ABN 55 120 015 973



Photograph 1. NE downstream face of bridge.



Photograph 2. View of detail of upstream face.

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ABN 55 120 015 973

3. Heritage

- The Bridge is on the Tasmanian Heritage Register ID 5585. The data sheet is attached as Appendix A.
  The Registration has three criteria of significance relating to the bridge construction as-
  1. *The flat timber girder bridge is of a type favoured in Tasmanian road works from the 1840's, distinct from the masonry arch road bridges such as the one at Kempton which preceded it.*
  2. *The Tunbridge Bridge is of historical heritage significance because it is one of the oldest surviving timber spanned bridges in Australia. Unlike the road bridges at Melton Mowbray and Jericho, this bridge has retained its timber decking.*
  3. *The Tunbridge Bridge is of historic cultural heritage significance because it demonstrates the principal characteristics of a simple bridge constructed with a whole log deck laid between a series of stone piers. The decorative treatment of the stonework is of special interest.*
- Readily available Tourist information incorrectly describes the bridge as the oldest single span timber bridge in Australia.
- The historical record indicates the timbers have been replaced at intervals ranging from around 45 years for the original construction to 40 years or less for later works with other repairs in between. This implies a replacing of all of the timbers to date at least 4 times since the original construction.
- The historical record also indicates the bridge deck has been raised so that the only original materials are the stone constructions with the timbers representing an original building technique.

4. Present Condition of the Bridge.

The following comments are illustrated by photographs 3-9.

- The bridge stonework is in generally good condition.
- The sandstone is not good quality and is subject to fretting where weather and sun exposed areas have lost pointings and where water retention occurs. An air vent drain has recently been installed to my recommendation on the NE corner abutment to relieve water stress and associated stone fretting. Repointing and minor repairs were carried out to this stonework at the same time. There is no present indication of fretting.
- There is no indication of structural cracking in any of the bridge stonework.
- There is work required to make good minor pointing defects.
- Minor insert repair and crack repair is need to cracked cap stones on some stone posts.
- There is indication of movement of some of the stone posts with lateral displacement. The historic record states damage has occurred to some due to vehicle impact and works of raising the deck and of inserting large logs are likely to have moved the posts laterally where movement has been observed. It is evident that the posts would not meet current vehicle impact standards.
- Concrete infill has been inserted around log landings onto the piers and abutments and needs to be evaluated on remedial works uncovery. The posts are not supported by these concrete pieces and new work should see the original support replaced.
- The timber deck planks are rotted beyond repair and deflection of the deck bearers suggests most have rot. The timber logs, where accessible, are shown to be rotting on their top surfaces.

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Photograph 3.
NE abutment. Recent works have been to install an air vent drain behind and to do minor pointing repairs. This is the most weather and sun exposed location on the bridge and was in the worst condition. There is no present fretting but repointing needs to be done wherever defective on the whole bridge.

Photograph 4.
Damaged cap stone on post requiring repair. It is likely evidence of past vehicle impact.

Photograph 5.

View along bases of posts upstream SE side of bridge. Some posts have been displaced laterally by around 50mm.

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Photograph 6.
View of log landing onto pier. The post support has partially been removed and the later work with concrete, likely inserted when the deck was raised, is not supporting the post.

Photograph 7.
View of deflected longitudinal deck planks with deflections due to wood rot .It is likely all of the bridge timbers require replacing.
The longitudinal planking is a visual indication of how the bridge was constructed.

Photograph 8. Side view showing how the bridge was constructed. This is girder bridge construction.

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Photograph 9.

An earlier work was to prop the long span on the NW end with a timber cross beam and three timber posts. The concrete footing, one of three, is a record of that past alteration.

5. Bridge Significant Items

The items of significance are the elegant stonework and the visual views showing how a timber girder bridge was constructed.

6. Heritage Considerations

- Removal of the timbers and constructing in a different material or materials will diminish the cultural significance of the Bridge.
- The Tasmanian Heritage Council, under the Cultural Heritage Act, cannot approve a work which diminishes cultural significance unless there is no prudent or feasible alternative.
- The bridge has a history of needing expensive replacement of timbers at periods of around 30 years and likely less now that the good timber of the past is not available.
- Tasmania does not have long lasting structural timbers which are classified as Durability Class 4 as against mainland Australian timbers, some of which are Class 1. A Class 4 timber has a life span of 5 years as against 50 years for a Class 1 where in harsh unprotected locations. Even with protection, it is unlikely that better than 20 to 25 years can be achieved with presently available Tasmanian timbers.
- The prudent and feasible alternative approach must be used in evaluating options.
- The Bridge must, as a public safety requirement, meet current safety standards for operation. This is a mandatory requirement and the heritage conservation should comply with it.
- The challenge is to find an option which retains the items of significance, meets operating and maintenance requirements, and which minimises the diminishment of the bridge cultural heritage.
- An option is to use new materials for the deck but to provide timbers fixed to their visible sides to demonstrate the original construction and to have a decking appearance showing the original longitudinal planking construction.

Yours faithfully

Peter Spratt

PETER SPRATT AM

Tasmanian Heritage Register Datasheet

Tasmanian Heritage Council

103 Macquarie Street (GPO Box 618)
Hobart Tasmania 7001
Phone: 1300 850 332 (local call cost)
Fax: 6233 3186 | Email: enquiries@heritage.tas.gov.au
Web: www.heritage.tas.gov.au

Name: Tunbridge Bridge
Status: Permanently registered - Replacement entry
Tier: State

THR ID Number: 5585
Municipality: Southern Midlands Council
Date Listed: 03-February-2010

Location Addresses
Old Main RD, , Tunbridge 7120 TAS

Title References **Property Id**
2085706

Side view

Tunbridge Bridge pier

Stone blocks

Timber deck and stone pier

Roadway

Setting: This bridge spans the Blackman River at the northern end of Tunbridge. It provides a crossing for Tunbridge's Main Road, which was once the Midland Highway. It is an impressive structure encompassing a solid timber deck atop stone supports, and harks back to the period when the bridge was a key river crossing and the township was a key stopover on the major transport route between Hobart and Launceston, prior to twentieth century developments in transport and the construction of the Tunbridge bypass.

Description: The Tunbridge Bridge has three intermediate piers of picked stone with four spans. Each intermediate stone pier is topped with a short tower with corbelled top. Timber balustrades link the towers on either side of the bridge.

The deck is constructed of squared whole logs, covered with hardwood planking. At about the level of the wooden deck, stringcourses are blocked out on the piers above oblong dentils. On the upstream side only, the piers have cut waters finishing with weathered tops below the dentil course. The stonework of the bridge has been finished with strong attention to decorative detail, well in excess of the bridge's functional needs.

The bridge is subject to ongoing conservation and maintenance. A considerable number of the main supporting logs have been replaced since the 1970s, most of the remaining timberwork (deck, handrails) is subject to cyclical replacement and the stonework subject to repointing or replacement of deteriorated individual stones.

History:

The first bridge across the Blackman River, very close to the location of the present bridge, was constructed by convict road gangs working under Major Thomas Bell, Van Diemen's Land's Acting Engineer and Inspector of Public Works, who had the task of building the first line of road between Hobart and Launceston. This bridge was a primitive timber causeway about 30 metres long and was finished by 1822 (John Thompson, A Road in Van Diemen's Land, Department of Infrastructure, Resources and Energy, Hobart, 2004, p.45).

By the mid-1840s the town of Tunbridge was established; there was an inn there, a police station, a convict barracks and a few cottages. Captain Frederick Forth, the Superintendent of Public Works, had charge of repairs and rerouting of the Main Road. He had completed a lot of this work with the use of convict labour, when in July 1847 he was dismissed from his position for incompetence. At the time, the bridge across the Jordan River at Jericho was underway and Forth had developed designs and specifications for a new Blackman River bridge at Tunbridge.

The incoming Superintendent of Public Works was William Pordon Kay, whom Lt-Governor Franklin had brought out to Van Diemen's Land as Colonial Architect a few years earlier. On 12 August 1847 Kay reported to the Colonial Secretary that in his view the completion of a new bridge across the Blackman River was secondary in importance to the completion of the main road; he thought that the old timber bridge could be made passable, and that with low river levels in the summer the Tunbridge ford could be used as an alternative.

Kay recommended that when the bridge was built, the work should be carried out not by convicts but by private contract. He advised that there was a good supply of local freestone that could be quarried within a mile of the bridge site, as well as ironstone on the spot if that were required. Sawn timber, though, was double the Hobart price and lime had to be brought in from either Launceston or Bothwell.

Lt-Governor Eardley-Wilmot took Kay's advice and tenders were called. On 12 September the plan and specifications (drawn up by Forth) as well as four tenders were passed to the Colonial Secretary. It is recorded that Graham Walker was contracted to deliver 1,000 bushels of lime needed for the bridge, but the name of the successful tenderer for the actual bridge building has not come to light (TAHO: CSO 24/16/354). The bridge was probably completed in 1848.

Within a few years, the Blackman River bridge featured in the Tasmanian story of the Young Irelanders. These seven leaders of the failed 1848 uprising at Ballingarry, County Tipperary, were exiled to Van Diemen's Land , arriving between 1849 and 1850. Initially, each was sentenced to reside within a separate district of the island, the boundaries of which he was not permitted to cross. One of the rebels, Thomas O'Meagher, lived at Ross, and another, Kevin O'Doherty, lived at Oatlands in the district immediately to the south. The border between the two districts was the Blackman River, and there at the middle pier of the Blackman River Bridge at Tunbridge O'Meagher and O'Doherty used to meet on Mondays, while technically not leaving their allotted districts. At their second such meeting, the pair christened the middle pier of the bridge the Irish Pier. The Monday meetings continued for several months until they transferred to Lake Sorell, the meeting point of three districts, O'Meagher's, O'Doherty's and that of another exiled Irish rebel, John Martin, who lived at Bothwell (Thomas Francis Meagher: the Making of an Irish American (eds. John M Hearne & Rory T Cornish), Irish Academic Press, Dublin, 2005, p.106-122; Blanche M Touhill, William Smith O'Brien and His Irish Revolutionary Companions in Penal Exile, University of Missouri Press, Columbia, 1981, p.41). The meetings of O'Meagher and O'Doherty on the Blackman River Bridge at Tunbridge have been the subject of re-enactments (pers. com., Mary Ramsay, 19 Jan 2010).

The Blackman River bridge at Tunbridge was used by vehicular traffic passing between Hobart and Launceston until 1972, when the town was bypassed by the new Midland Highway. At about this time, the three bays of the bridge were supported by steel cylinders filled with concrete (Roy Smith, Early Tasmanian Bridges, self-published, Launceston, 1969, p.37). These were probably installed to support the heavy trucks which then used the road. Such trucks caused considerable damage to the bridge when it formed part of the main Hobart to Launceston road, several of its freestone blocks having been knocked into the Blackman River.

In 1973 the bridge was restored to close to its original condition, and the blocks in the river were hoisted up and replaced in their former positions (Mercury, 11 April 1973). The steel cylinders were probably removed at the same time. They were certainly no longer in place in 2009, and the bridge is now much as it was when constructed. It is often described as the oldest timber spanned bridge in Australia

(http://www.tasmaniacentral.tas.gov.au/site/page.cfm?u=245).

Constructed: c.1850

Statement of Significance: *(non-statutory summary)* The Tunbridge Bridge is of historic cultural heritage significance for its ability to demonstrate the development of the former Main Line of Road between Hobart and Launceston, the bridge being a key river crossing and stopover point on the Road from c1822 to c1970. The bridge is also of engineering significance as one of the oldest surviving timber spanned bridges in Australia , and in demonstrating engineering construction methods and detailing from the mid-nineteenth century. It also has associations with the Young Irelander rebels who were exiled to Van Diemens Land in the late 1840s. Two of their number met regularly on the bridge in 1849.

Significance:

The Heritage Council may enter a place in the Heritage Register if it meets one or more of the following criteria from the Historic Cultural Heritage Act 1995:

a) **The place is important to the course or pattern of Tasmania's history.**

The Tunbridge Bridge is of historic cultural heritage significance because it demonstrates the development of the former Main Line of Road between Hobart and Launceston, the bridge being a key river crossing and the township being a keystopover point on the Road from c1822 to c1970. It also demonstrates the working of the convict labour system in the first half of the 19th century and the evolution of public infrastructure. The flat timber girder bridge is of a type favoured in Tasmanian road works from the 1840s, distinct from the masonry arch road bridges such as the one at Kempton which preceded it.

b) **The place possesses uncommon or rare aspects of Tasmania's history.**

The Tunbridge Bridge is of historic cultural heritage significance because it is one of the oldest surviving timber-spanned bridges in Australia. Unlike the road bridges at Melton Mowbray and Jericho, this bridge has retained its timber decking.

c) **The place has the potential to yield information that will contribute to an understanding of Tasmania's history.**

d) **The place is important in demonstrating the principal characteristics of a class of place in Tasmania's history.**

The Tunbridge Bridge is of historic cultural heritage significance because it demonstrates the principal characteristics of a simple bridge constructed with a whole-log deck laid between a series of stone piers. The decorative treatment of the stonework is of special interest.

e) **The place is important in demonstrating a high degree of creative or technical achievement.**

f) **The place has a strong or special association with a particular community or cultural group for social or spiritual reasons.**

g) **The place has a special association with the life or works of a person, or group of persons, of importance in Tasmania's history.**

The Tunbridge Bridge is of historic cultural heritage significance because of its special association with the Young Irelanders, who were exiled to Van Diemen's Land following the failed rebellion of 1848. During 1849, two of their number, Thomas O'Meagher and Kevin O'Doherty, met on the bridge regularly, it being the border of the separate districts to which the pair had been exiled. These meetings have been the subject of re-enactments.

h) **The place is important in exhibiting particular aesthetic characteristics.**

PLEASE NOTE This data sheet is intended to provide sufficient information and justification for listing the place on the Heritage Register. Under the legislation, only one of the criteria needs to be met. The data sheet is not intended to be a comprehensive inventory of the heritage values of the place, there may be other heritage values of interest to the Heritage Council not currently acknowledged.

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pitt&sherry

Alterations to Blackman River Bridge Tunbridge

Additional Information

Prepared for
Department of State Growth

Client representative
Darren McConnon

Date
22 July 2021

Rev00

EXHIBITED

D2

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List of tables

Appendices

Appendix A — Blackman River Bridge B599 Structural Assessment
Appendix B — Preferred proposal drawings
Appendix C — Detailed Fabric Assessment
Appendix D — Conservation Management Plan & Heritage Impact Statement

Prepared by — Leigh Knight		**Date — 19 July 2021**
Reviewed by — Bjorn Jensen		**Date — 22 July 2022**
Authorised by — Bjorn Jensen		**Date — 22 July 2021**

Revision History

Rev No.	Description	Prepared by	Reviewed by	Authorised by	Date
00	Issued for Council	L Knight	B Jensen	B Jensen	22-7-2021

1. Purpose

The purpose of this report is to provide additional information to assist the Tasmanian Heritage Council to consider a planning permit application for alterations to the Blackman River Bridge.

2. Background

The Blackman River Bridge is located in both the Northern Midlands Council (NMC) and Southern Midlands Council (SMC) areas. Blackman River forms the boundary between both council areas.

A planning permit application was submitted to NMC in November 2020 for alterations to the portion of the bridge on the NMC side of the river. The works involve replacement of the timber superstructure with new engineered timber beams, a concrete deck and new barriers.

Also in November 2020, a separate planning permit application was submitted to the Southern Midlands Council for the bridge alterations on their side of the river.

Because the bridge is permanently listed on the Tasmanian Heritage Register as Tunbridge Bridge (Blackman River) Old Main Rd Tunbridge, Place ID 5,585, a Discretionary permit is required under the *Historic Heritage Act 1995*. SMC referred their permit application to the Tasmanian Heritage Council (THC) for consideration. THC indicated on 22 December 2021 in correspondence to SMC that it wished to be involved in determining the planning permit application, and requested additional information. This means that THC will also wish to be involved in determining the separate permit application which was submitted to NMC. This report contains the additional information that THC need to consider the NMC application.

3. Tasmanian Heritage Council requirements

The THC the following additional information in respect of the SMC application:

1. *evidence from a suitably qualified structural engineer that the historic sandstone bridge components have the structural adequacy to bear the loads of the proposed new superstructure and the intended design traffic loads;*
2. *details of any fixings required between the new superstructure and the historic sandstone substructure;*
3. *details of any conservation works required to the existing historic structures;*
4. *details of any finishes or colours proposed for the steel post-and-rail traffic barrier.*

The following comments are provided on each point to ensure the application meets THC requirements:

3.1 Structural adequacy

pitt&sherry prepared the Blackman River Bridge B599 Structural Assessment in May 2021 (Appendix A) to examine the ability of the existing bridge to be reused for future ongoing use. The assessment confirmed that the timber superstructure is considered unsuitable for vehicular loads in its present state, with rot present in all girders and extending at least 125 mm in some. The timber spreader beams (sitting on top of the piers and abutments) are also deeply rotted and collapsing under the weight of the superstructure. The deck is also in poor condition with many missing planks and rot through both layers in some places.

The sandstone substructure is in good condition – the sandstone blocks are solid and there is no evidence of significant movement or cracking in the abutments or piers. The load carrying capacity of the sandstone piers and abutments is assessed to be fully intact although some minor repairs of jointing and blockwork are necessary, particularly to the sandstone columns. The piers and abutments lacked cracking, rotation or other signs of movement after more than 170 years of service; which is a primary indication that the founding conditions are good. The existing sandstone abutments

and piers are founded on solid rock and have capacity to carry the significant vertical and horizontal loads into the future.

3.2 Details of fixings

It is proposed that the new beams bear on the existing piers/abutments by the intermediary of a cementitious mortar pad and a lime mortar pad. The lime mortar pad will be applied to the top of the competent sandstone and is intended to prevent locking of moisture into the top of the sandstone. The cementitious mortar pad is intended to competently transfer loads into the top of the substructure. Details of fixings between the substructure and proposed new superstructure are provided in Appendix B.

3.3 Conservation works required

An updated Detailed Fabric Assessment was undertaken by Peter Spratt in April 2021 (Appendix C). This assessment determined:

- There is no structural cracking and no defects requiring attention in the piers and abutments other than the pointings.
- There is substantial pointing loss in all stone faces
- There is some damage from water retention and fretting where cement mortars have been used and replacing these mortars in fretting locations is warranted

It was recommended that the following remedial works on the sandstone abutments and piers be undertaken:

- Replace and make good missing, defective and cracked stonework to posts.
- Reface stonework on eastern abutment where face fretting exceeds 15mm.
- Remove cement pointings where fretting is occurring.
- Make good defective pointings in piers and abutments.

3.4 Barrier finishes or colours

A steel traffic barrier 850 mm high is proposed and this will be painted to match the current timber barrier which is white. Dulux colour "Natural white" or similar is proposed (RGB: 238,236,229).

4. Additional information

4.1 Conservation Management Plan

A Conservation Management Plan and Heritage Impact Statement was prepared by Austral Australia ("Final" revision dated 19 July 2021). This document is attached at Appendix D. That management plan references both the detailed fabric assessment and the structural assessments mentioned in Section 2 above. Section 5.2 of the management plan provides a comparative analysis of early timber bridges and concludes that the Blackman River bridge is one of the oldest of its type in Australia. The assessment of significance in sections 5.4 – 5.6 of Appendix D concluded that:

- The bridge satisfied six of the eight criteria in the *Historic Cultural Heritage Act 1995* to be considered of State significance. One criteria was not satisfied (high degree of creative or technical achievement) and the remaining one (special association for community or group) was not assessed but was considered likely to be satisfied.
- Some elements of the bridge (sandstone features, the setting and area of archaeological potential) were assessed to have a high level of significance. This means those elements considered representative of key functions or thematic contributions of the place relating to the construction and provision of transport

infrastructure. Elements of high significance demonstrate earliness, intactness, rarity/representativeness and high aesthetic qualities and must be conserved. These elements are proposed to be conserved.

- The timber superstructure, timber railings and timber decking were assessed as having a high level of significance in terms of traditional materials, but low in terms of historic fabric. These are elements that contribute to the significance of the bridge and its setting, although have little heritage value in their own right. These elements may be recent introductions, or may have been so modified that they no longer have the ability to demonstrate their thematic context. These elements may be retained, modified or removed provided a conservation benefit can be demonstrated by the action. These are the elements that are degraded and are to be replaced.

4.2 Consideration of alternatives

An assessment of alternative proposals, including doing nothing, is present in Table 1. This indicates that leaving the bridge in its current condition is not acceptable due to the safety risks posed and the likelihood that damage to the high value sandstone structures would occur as the bridge collapses. This would also reduce the value of the bridge to the community and its significance overall. Removing the rotted elements but not replacing them would have a similar result but would offer a degree of protection to the sandstone substructure by avoiding collapse.

Replacement 'like for like' will result in an asset that is expensive to build and which has a shorter life span. This would require ongoing monitoring for condition, potential limitations on loads toward the end of the life span and is a high cost option – at each necessary point of replacement. The resultant bridge would not meet all current safety specifications and could not carry the same load, making the bridge unsuitable as a large vehicle detour in the event of emergencies or works on the highway and bridges between the northern and southern accesses to Tunbridge.

A number of deck options were considered, each offering variations in load limits, costs and lifespan. The superstructure elements are those identified as being of low significance in terms of historic fabric. This is due to the previous replacement works conducted on the bridge over its lifespan. These are the elements that the assessment of significance indicates may be modified or removed provided a conservation benefit can be demonstrated by the action. Removal of the superstructure prevents potential damage to the sandstone substructure resulting from collapse. Replacement of the superstructure will allow the continued functioning of the bridge and the external appearance proposed will be very similar to existing bridge, while offering economic and lifespan benefits. The preferred option is not the most expensive but is not the least expensive. A balance between longevity, cost and heritage considerations was sought.

The availability of a second entry to Tunbridge is valuable as it ensures access if there are any issues with the southern entry. The approach to the village via the country road and crossing the bridge complements the nature of the existing development in the north of Tunbridge. The ability to safely use the bridge is also a key consideration and the preferred option allows for the greatest achievement of compliance with current standards. If the bridge cannot be safely used there is no impetus for the repair and it is likely that the first two options would be the outcome, neither of which offers the best in terms of community needs or maintenance of heritage values.

Table 1: Assessment of alternatives

Option	Result	Pros	Cons
Do nothing	Timber superstructure will collapse over time	Least cost	No ability for the bridge to be used by the public, including pedestrians and vehicles
			Likely damage to sandstone substructure as bridge collapses
			Significant safety risk as bridge collapses
			River blockage
			Unsightly, loss of community pride
			Loss of heritage value

Option	Result	Pros	Cons
Demolish timber superstructure and leave sandstone substructure	Sandstone superstructure will stand alone for a long time to come	Low cost Retains the permanent elements of heritage values (sandstone)	No ability for the bridge to be used by the public, including pedestrians and vehicles
			Liability risk associated with the unused but retained structures
			Ongoing sandstone maintenance costs with no community benefit
			Loss of heritage value and community pride
Replace timber superstructure with new timber superstructure (log beams)	Bridge will be very similar to the original bridge and appropriate for most contemporary loads	Retains heritage values Likely lower embodied carbon than other replacement options (but reduced by the replacement frequency required)	Load carrying capacity will be limited compared with other replacement options
			Likely steel traffic barriers but with significantly reduced capacity compared with current standards
			The bridge superstructure will likely last 20-30 years (untreated) before requiring replacement again (additional lifespan can be achieved with treatment and special details but at additional cost)
			Loads will need to be limited as the bridge approaches the end of its life
			High cost
Replace timber superstructure with new treated timber (log) beams and thin concrete deck	Bridge available for use by the public and for most contemporary loads	Retains elements of heritage values (sandstone substructure and timber beams) Expected to achieve up to a 50 year life span Concrete deck provides protection to timber beams	Load carrying capacity will be limited compared with other replacement options
			Likely steel traffic barriers but with reduced capacity compared with current standards
			The bridge superstructure will likely last 20-30 years before requiring replacement again
			Timber beams will be coloured by the treatment process
			Loads will need to be limited as the bridge approaches the end of its life
			High cost of timber beams and additional cost of future replacement of the beams due to concrete deck
Replace timber superstructure with concrete formed to look like timber beams and planks	Bridge available for use by the public and for all contemporary loads	Retains elements of heritage values (sandstone substructure and the form of the existing timber elements)	Loses elements of heritage values (timber material)
		Load carrying capacity can be selected up to current standards	Likely steel traffic barriers with somewhat reduced serviceability compared with current standards

Option	Result	Pros	Cons
		Can achieve 100 year life of full bridge structure	Highest cost
Replace timber superstructure with concrete deck on glue laminated timber beams with external façade timber (current proposed design)	Bridge available for use by the public and for all contemporary loads	Retains elements of heritage values (sandstone substructure and timber beams). External appearance will be very similar to existing bridge	Loses elements of heritage values (timber deck material and form of timber beams) Likely steel traffic barriers with somewhat reduced serviceability compared with current standards Timber façade will need to be replaced periodically
		Load carrying capacity can be selected up to current standards	
		Moderate cost, especially over the long term	
		Future strengthening of beams (steel plates or carbon fibre) is possible if required	
		Easiest maintenance	
		Expected to achieve 80-100 year life of full bridge structure	

4.3 Structural adequacy

This is addressed by the *Blackman River Bridge B599 Structural Assessment* in Appendix A.

4.4 Heritage impact statement

A Conservation Management Plan has been prepared and is attached at Appendix D.

5. Conclusion

The information within, and attached to, this report provide additional detail on the proposed modifications, the basis for the design, and the impacts of the works on the structure and its heritage values.

Blackman River Bridge B599 Structural Assessment

Appendix A

pitt&sherry

Blackman River Bridge B599

Structural Assessment

Prepared for
Department of State Growth

Client representative
Darren McConnon

Date
13 May 2021

Rev00

EXHIBITED

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Prepared by — Bjorn Jensen	Bjorn Jensen	**Date** — 13 May 2021
Reviewed by — Noel Carroll		**Date** — 13 May 2021
Authorised by — Richard Cassidy	Rcassidy	**Date** — 13 May 2021

ref: T-P.20.0707.003-STR-REP-001/BHJ/mjs

Revision History

Rev No.	Description	Prepared by	Reviewed by	Authorised by	Date
00	Client issue	B. Jensen	N. Carroll	R. Cassidy	13/05/2021

ref: T-P.20.0707.003-STR-REP-001/BHJ/mjs

1. Introduction

The Blackman River Bridge at Tunbridge (Department of State Growth bridge number B599) is located at the northern end of the township, on the boundary between the LGA's of Southern Midlands Council (SMC) and Northern Midlands Council (NMC).

Due to the current condition of the bridge, Department of State Growth (DSG) commissioned pitt&sherry to provide engineering design support for a significant refurbishment. Following discussions with the two councils in late 2020, SMC requested that a Conservation Management Plan (CMP) be prepared for the bridge. At DSG's request, pitt&sherry engaged Austral Archaeology to prepare the CMP.

This report is a necessary input to the CMP.

2. The Bridge

The first iteration of the present Blackman River Bridge at Tunbridge was constructed in June 1848[1]. Initially the bridge consisted of a 3-span (equal span lengths) timber bridge with sandstone abutments and piers[2]. Between 1894 and 1897, the bridge was modified to its current arrangement, whereby the northern sandstone abutment was converted to a pier and a new abutment was constructed to create an additional span.

Figure 1 shows the location of the bridge.

Figure 1: Location of bridge (Source: LISTmap, 2021)

[1] Peter Spratt, *Blackman River Bridge, Tunbridge – Detailed Fabric Assessment*, April 2021
[2] Roy Smith, *Early Tasmanian Bridges*, 1969, Foot & Playsted

Figures 2 to 4 are images of the extant bridge and are sourced from *Blackman River Bridge (B599), Renewal of Timber Superstructure and Barriers – Concept Design Report*, pitt&sherry, October 2019.

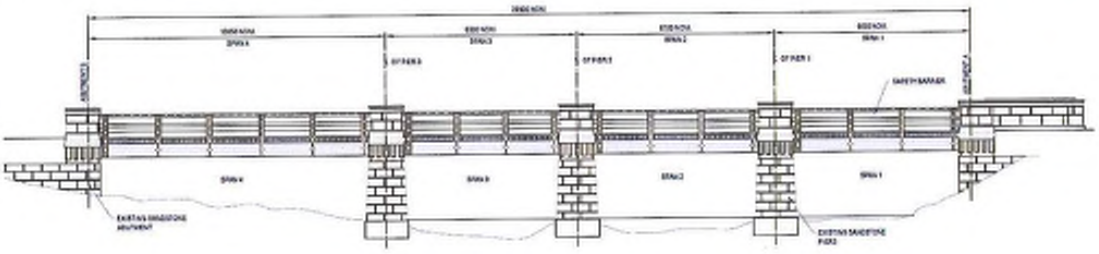

Figure 2: Elevation of existing bridge

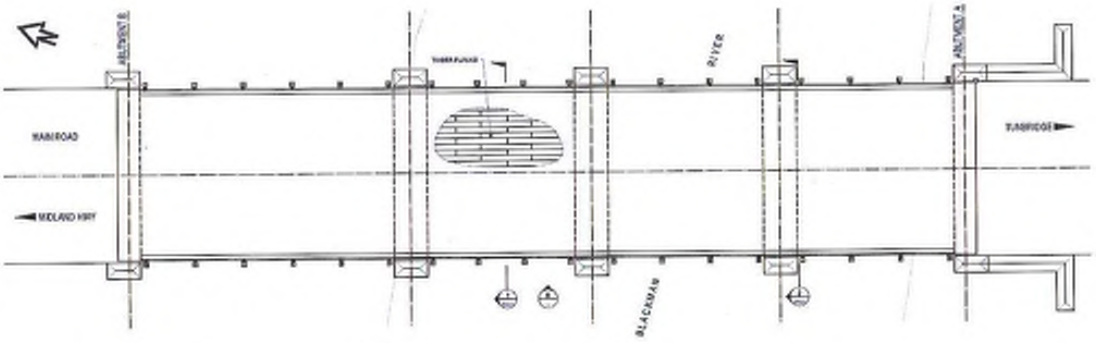

Figure 3: Plan of existing bridge

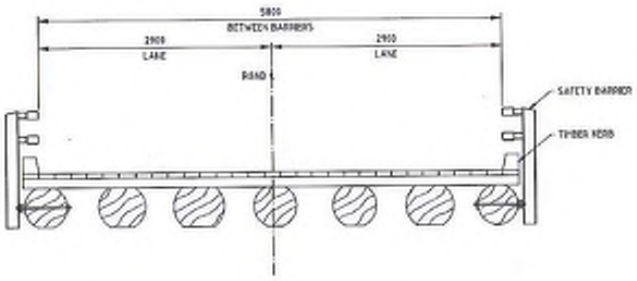

Figure 4: Cross-section of existing bridge

Since its construction, the timber and sandstone portions of the bridge have required regular maintenance and repair activities[3]. These include the following:

- Timber decking and fencing replaced 1879
- Major repairs in 1894
- Repairs in 1906-7
- Various timbers girder, decking and rails replaced between 1914-19
- Bridge declared unsafe in 1922
- Various girders and decking planks replaced between 1922-28
- Urgent repairs to bridge deck in 1933
- Decking partially replaced in 1935
- Stone abutment damaged by truck in 1938
- Extensive repairs and replacement of timber girders and decking as well as sandstone repairs between 1943-51
- More girders and decking replaced between 1956-61
- Temporary propping was installed to allow heavy loads to cross in 1962
- Permanent propping installed in 1966-67
- Damaged stonework (due to vehicle impacts) repaired in 1972
- Decking replaced in 1994
- Seven girders replaced in 2007-08; and
- The bridge was narrowed to reduce load on a damaged girder in 2014-15.

Following a report[4] prepared for DSG in 2018, the bridge was found to be unsuitable for traffic due to timber rot and was subsequently closed to all users. The bridge continues in this state to the present day.

3. Structural Assessment

This report seeks to examine the ability of the existing bridge to be reused for future ongoing use.

3.1 Timber Superstructure

From the findings of the January 2018 pitt&sherry letter, the timber superstructure is considered unsuitable for vehicular loads in its present state.

This viewpoint was further reinforced following several more recent visits to the site by pitt&sherry staff including in August 2020, December 2020 and April 2021. It is apparent that the timber rot in the beams and deck planks is progressing, as indicated in Figure 5 below.

[3] *Blackman River Bridge, Tunbridge – Historic Heritage Impact Assessment* – Austral Tasmania April 2015
[4] *B599 Blackman River Bridge Inspection Post Fire* – pitt&sherry letter to Aaron Percy – 15 January 2018

Figure 5: Condition of girder - northern span, western external girder

A series of holes drilled into various girders indicated that the rot extends, in layers, to at least 125 mm inside the girders. Although some girders are in better condition than others (in particular the internal girders are generally in better condition than external girders), all show signs of rot.

The timber spreader beams, which sit on the top of the piers and abutments and support the main girders, are deeply rotted. Due to the rot, these beams are, in places, collapsing under the weight of the superstructure above. Refer to Figure 6 below, where the spreader beam at the southern abutment is seen to be folding under load.

Figure 6: Timber girders and spreader at southern abutment

Similarly, the deck of the bridge is in very poor condition, as shown in Figure 7 below. Many top layer deck planks are missing. In some places, both layers of the deck planks are holed and the river below is visible through the deck.

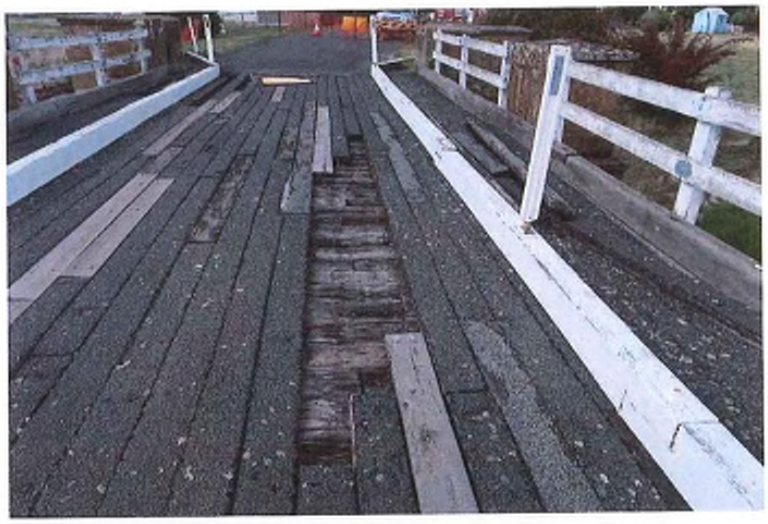

Figure 7: Deck condition

With the foregoing observations and in consideration of the previous reports, this report will not attempt to assess the load carrying capacity of the existing timber superstructure. It is assumed that the existing superstructure will be fully replaced as part of any future remediation as it does not appear economical to reuse any parts of it.

3.2 Sandstone Substructure

The sandstone substructure is in good condition. The sandstone blocks are solid and there is no evidence of significant movement or cracking in the abutments or piers, despite their use for over 170 years.

An inspection involving Peter Spratt, Edrei Stanton (Tasmanian Heritage Masonry) and Bjorn Jensen (pitt&sherry) on 1 April 2021, found that some repairs of jointing and blockwork are necessary, particularly to the sandstone columns. Nonetheless, the load carrying capacity of the sandstone piers and abutments is assessed to be fully intact. Figure 8 and Figure 9 below show examples of the sandstone substructure and its condition.

Figure 8: Southern face of the southern pier 1

Figure 9: Face of northern abutment

Advice obtained from Peter Spratt[1], utilising his extensive database of Tasmanian sandstones, indicates that the unconstrained compressive strength of the sandstone used at this bridge is likely to be in the order of 15 MPa.

During the April 2021 inspection, an assessment of the founding conditions was made. The existing condition of the piers and abutments lacked cracking, rotation or other signs of movement after more than 170 years of service; this is a primary indication that the founding conditions are good.

The southern abutment clearly sits directly on solid bedrock. Likewise, solid rock was observed around the northern abutment and northernmost pier. The area adjacent to the two southern piers is underwater and cannot be directly viewed. This area was sounded using a long steel rod and solid rock was typically indicated at 0.5 to 0.75 m below water level.

Given the above observations, it is our opinion that the existing sandstone abutments and piers are founded on solid rock and have capacity to carry the significant vertical and horizontal loads into the future.

3.3 Loading

3.3.1 Vertical loading

The current Australian Standard for bridges, AS5100, specifies several loading configurations. In addition, DSG regularly assesses existing Tasmanian bridges using other more typical heavy truck loads.

The application of vehicular loading is dependent on roadway width, as wider roads are capable of carrying 2 or more lanes of vehicles.

The width of the bridge roadway is currently approximately 5.8 m between barriers (refer to Figure 4). AS5100.2 (*Bridge Design – Part 2: Design loads)* proscribes a "design" lane width of 3.2 m, thus the existing bridge is capable of carrying only a single design lane of vehicles.

The *Standard* recommends the use of a quasi-realistic truck load known as M1600 for bridges with span lengths in the range of those at the Blackman River Bridge (refer to Figure 10).

Whilst the M1600 load is highly unlikely to ever traverse the bridge, we propose to assess the sandstone substructure for this load arrangement, as that is considered to be a conservative approach.

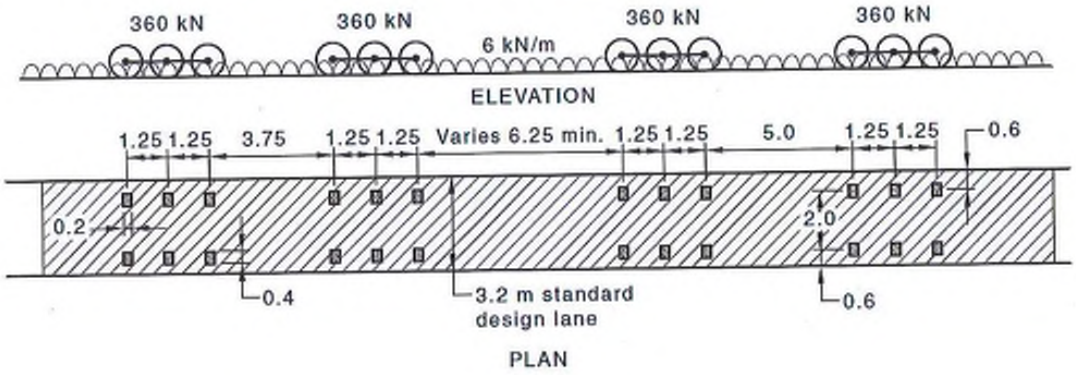

Figure 10: M1600 design vehicle load (Source: Australian Standard AS 5100.2-2017)

3.3.2 Horizontal Loading

Horizontal loading generally consists of two possible components, stream flow and braking and/or centrifugal loads.

Horizontal transverse forces due to stream flow are unlikely to significantly change into the future. Given the age of the existing structure, it has undoubtedly withstood a wide range of stream flow scenarios within its lifetime.

The consideration of horizontal loads due to centrifugal forces is not necessary for this structure, as it is not positioned on a curve.

The possibility exists for braking forces on the bridge. In accordance with AS5100.2-2017, an unfactored design braking force of 325 kN is proposed.

3.4 Structural Assessment of sub-structure

For brevity, this report considers only the load effects at the northernmost pier. Pier 3 receives the highest forces as it supports the 10.05 m span and a 6.5 m span.

The load factors to be added to this vehicle load case, along with dead load, are as shown in Table 1.

Table 1: Applicable Load Factors

	Dynamic Load Allowance*	Ultimate Load Factor
M1600 vehicle load	0.3	1.8
Dead load	0	1.2

* DLA applied only to vertical loads

3.4.1 Vertical Forces

The calculated total unfactored vertical load at the pier due to the M1600 vehicle is 590 kN. Thus, the factored ultimate load is 1380 kN. Given the spacing of the bridge girders, this load is conservatively estimated to be distributed over the equivalent of 3 beams, or 2 m width.

Over the same width, the total ultimate dead load (assuming a future concrete deck on timber beams) is estimated to be 225 kN over a 2 m width.

Hence, over the estimated 2 m width, the pier experiences an ultimate vertical load of 1605 kN = 802 kN/metre equivalent loading on the pier top surface. Assuming that this loading can be distributed reasonably evenly to the top of the pier (approximately 1.2 m wide), the loaded ultimate pressure on the top of the pier is in the order of 0.7 MPa, which is significantly less than the assumed UCS of the stone noted in Section 3.2 above. This force will spread further as it descends through the sandstone pier to the foundation rock below. Hence, in terms of carrying vertical load, the existing piers are assessed to be sufficient for future heavy vehicle loading.

Any future superstructure replacement should account for adequate load spreading from the beams into the top of the sandstone piers and abutments. Currently this is achieved by means of timber spreader beams, however the ongoing use of this same timber is clearly unsatisfactory given the amount of rot noted whilst on site. Alternative options may include timber of a more durable nature, galvanised steel or a cast in situ concrete spreader (with due consideration given to preventing moisture from accumulating at the concrete/sandstone interface).

3.4.2 Horizontal Forces

Horizontal forces due to stream flow are considered to be adequately carried by the existing piers and abutments. Given the range of stream flow forces these elements have carried in the past 170 years, without apparent degradation, it is unlikely that future forces will exceed the capacity of the sandstone substructure.

Braking forces are resisted by a combination of passive soil pressure at one abutment, along with sliding/overturning resistance at piers and abutments. The factored design braking force is 585 kN. The factored resistance to the braking forces due to the combined actions of the substructure (passive soil resistance and overturning) is estimated to be in the order of 765 kN (of which 740 kN is attributable to overturning and 35 kN is attributable to passive soil resistance). These figures are considered to be conservative in that they do not take into account the contribution of the wing walls, the mass of the columns above the deck level or mass of the vehicle itself. The sliding capacity resistance (sandstone on sandstone) is greater than the overturning resistance. These calculations assume that the deck is a monolithic structure, capable of efficient horizontal load transfer.

3.5 Traffic barriers

The Australian Standard AS5100.1 defines road barriers categories. Given the situation of this bridge, "Low performance level" barriers are considered necessary.

It is noted that, over its life, the sandstone columns projecting above the substructure of the existing bridge have been struck and moved several times by vehicular traffic. Hence it would seem that traffic barriers could serve a useful purpose both in terms of traffic safety and protection of the historic structure.

The existing traffic barriers are of timber construction and are attached to the timber deck. The barrier rails terminate each side of the sandstone columns and thus currently provide no protection to the columns. By inspection, the capacity of the existing timber barriers is not sufficient to carry the loads required for "Low performance level" barriers in accordance with the *Standard*. Neither the posts, the rails, nor the connection of the posts to the bridge deck are considered satisfactory. The barriers as constructed would likely not prevent an errant vehicle, especially not a heavy vehicle, from breaking through and plunging into the river below.

It is recommended that the existing barriers be replaced with other barriers capable of higher load capacity. Depending on the final deck configuration chosen, it may be difficult to fully achieve compliance with the "Low performance level" barrier requirements, but additional capacity, and a design that carries the rail past the sandstone columns, would significantly improve public safety and assist in the preservation of the historic structure.

Any design of future barrier will need to confirm that the additional strength or stiffness of the barrier does not have unintended negative consequences for the sandstone substructure. These may include the transfer of additional load to the substructure, resulting in sliding and/or shearing of the sandstone.

4. Conclusion

At over 170 years old, the Blackman River Bridge at Tunbridge is a significant historic structure. Nonetheless, during its lifetime, the timber portions of the bridge have been fully replaced several times. The sandstone components have been repaired in some places but are largely in their original form. Each time the timber portions of the bridge have required replacement, the serviceability of the structure has been impacted for a period of time until the bridge could be returned to a safe condition (i.e. load carrying capacity reduced or bridge completely closed, as at present).

The existing timber structure, including the existing traffic barriers, is unfit for purpose in nearly all aspects. The bridge is currently closed to both vehicles and pedestrians and this is justified due to rotting girders and rotting or missing deck planks. It is recommended that all timber components of the bridge be replaced.

The sandstone sub-structure of the bridge is in very good condition given its age. There is no evidence of structural degradation in the sandstone sub-structure, although we note that the recent *Detailed Fabric Assessment*, recommends that preventative maintenance should be carried out to the sandstone elements.

The sandstone sub-structure, along with its foundations, is considered to have adequate vertical strength to carry contemporary loads. The design of any superstructure replacement should provide for adequate spreading of loads under beams, preferably using a structural material that is more degradation resistant than the existing timber spreader beams. The use of in situ cast concrete spreaders would not only allow such load spread but also permit the top of the piers and abutments to be well tied together, thus reducing the risk of future movement degrading the sandstone. It will be necessary to give careful consideration to avoiding future degradation to the sandstone by preventing the movement of moisture.

The sandstone substructure has sufficient capacity to resist expected horizontal loads due to stream flow and vehicles braking.

The existing timber traffic rails are unfit for purpose and should be replaced as part of any future superstructure replacement. Future "Low performance level" barriers may not fully comply with Australian Standards or DSG requirements but should provide the best outcome possible for traffic safety and protection of the sandstone bridge columns.

In summary, it is our opinion that the existing sandstone substructure has sufficient capacity to carry contemporary traffic loads, but that special consideration should be given to the design of the interface between the superstructure and the piers/abutments to prevent long term damage to the sandstone. The sandstone substructure, along with any future superstructure, should continue to be inspected regularly to allow early intervention should degradation become evident.

pitt&sherry

Blackman River Bridge B599 Structural Assessment

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Brisbane
Hobart
Launceston
Newcastle
Devonport

ref: T-P.20.0707.003-STR-REP-001-Rev00/BHJ/mjs

Preferred proposal drawings

Appendix B

Tasmanian Government

BLACKMAN RIVER BRIDGE (B599)

MAIN ROAD TUNBRIDGE

BRIDGEWORKS

DESIGN

pitt&sherry

SETOUT REVIEW NAME ..... SIGNED ..... DATE	DESIGNED NAME ..... SIGNED ..... DATE	THESE DRAWINGS HAVE BEEN CHECKED, TAKEN TO SITE AND VERIFIED THAT THEY ARE APPROPRIATE FOR SITE CONDITIONS AND CONSTRAINTS. THE DRAWINGS ARE RECOMMENDED FOR ACCEPTANCE. DESIGN MANAGER (DESIGN ORGANISATION) ..... SIGNED ..... DATE	I CERTIFY THESE DRAWINGS HAVE BEEN PREPARED IN ACCORDANCE WITH THE BRIEF AND AS DETAILED IN THE FINAL DESIGN REPORT. PRINCIPAL (DESIGN ORGANISATION) ..... SIGNED ..... DATE	Department of State Growth THESE DRAWINGS HAVE BEEN PREPARED IN ACCORDANCE WITH THE DESIGN BRIEF AND PROJECT SCOPE. THE DRAWINGS ARE RECOMMENDED FOR ACCEPTANCE. PROJECT MANAGER ..... SIGNED ..... DATE ..... ACCEPTED MANAGER ..... SIGNED ..... DATE	CONTRACT No.	DRAWING HB20239-S1000	PRINTED DATE 24-Jun-21, 5:05 PM	No. of SHEETS *
STRUCTURAL REVIEW NAME R. CASSIDY ..... SIGNED ..... DATE	DESIGN REVIEW NAME R. CASSIDY ..... SIGNED ..... DATE				REGISTRATION NUMBER ROAD LINK No. START: FINISH:		SHEET No. 1000 REVISION B

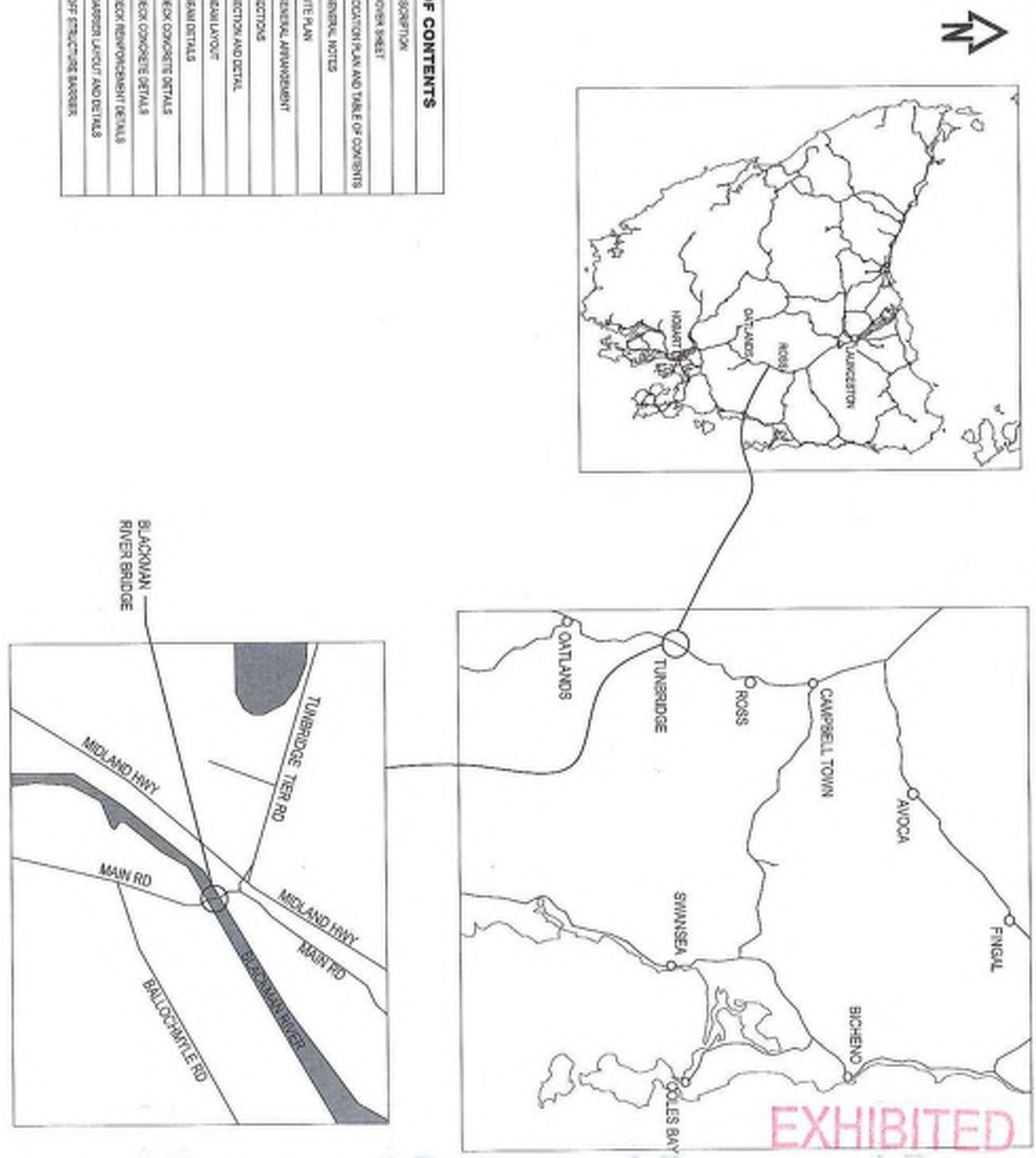

TABLE OF CONTENTS

NUMBER	REVISION	DESCRIPTION
HB20236-S1000	B	COVER SHEET
HB20236-S1001	C	LOCATION PLAN AND TABLE OF CONTENTS
HB20236-S1002	B	GENERAL NOTES
HB20236-S1003	C	SITE PLAN
HB20236-S1004	C	GENERAL ARRANGEMENT
HB20236-S1005	C	SECTIONS
HB20236-S1006	C	SECTION AND DETAIL
HB20236-S1007	B	BEAM LAYOUT
HB20236-S1008	B	BEAM DETAILS
HB20236-S1009	B	DECK CONCRETE DETAILS
HB20236-S1010	B	DECK CONCRETE DETAILS
HB20236-S1011	B	DECK REINFORCEMENT DETAILS
HB20236-S1012	B	BARRIER LAYOUT AND DETAILS
HB20236-S1013	B	OFF STRUCTURE BARRIER

No.	Amendment Description	Initials	Date
C	REISSUED FOR DEVELOPMENT APPROVAL	B.J.	24/06/2021
B	ISSUED FOR CLIENT REVIEW	M.R.	11/12/2020
A	ISSUED FOR DEVELOPMENT APPROVAL	R.C.	26/08/2020

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SCALES
NTS

pitt&sherry

Tasmanian Government

DESIGNED ....
REVIEWED ....

Department of State Growth
BLACKMAN RIVER BRIDGE (B595)
MAIN ROAD TUNBRIDGE
BRIDGEWORKS

LOCATION PLAN AND TABL[illegible] CONTENTS

CONTRACT No.	DRAWING	PRINTED DATE	SHEET No.
	HB20236-S1001	24-Jun-21, 11:59 AM	1001

REGISTRATION NUMBER

REVISION C

GENERAL

G1. CONTRACTOR SHALL CONFIRM ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK.
G2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STRUCTURE IN A STABLE CONDITION AND ENSURING NO PART BE OVERSTRESSED DURING CONSTRUCTION ACTIVITIES.
G3. WORKMANSHIP AND MATERIALS FOR ALL WORKS (TEMPORARY OR OTHERWISE) ARE TO BE IN ACCORDANCE WITH (IN ORDER OF PRECEDENCE) THE PROJECT SPECIFICATION, THE DRAWINGS, DEPARTMENT OF STATE GROWTH STANDARD SPECIFICATIONS AND THE BRIDGE DESIGN CODE.
G4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY WORKS.
G5. THE CONTRACTOR SHALL ONLY BUILD FROM DRAWINGS WITH THE STATUS "FOR CONSTRUCTION". DRAWINGS HAVING ANY OTHER STATUS, INCLUDING "ISSUED FOR TENDER", "DRAFT" OR "FOR APPROVAL" ARE SUBJECT TO CHANGE.

DESIGN SPECIFICATIONS

BRIDGE DESIGN STANDARD : AS5100-2017
DESIGN LOADS:

DESIGN LANE VEHICLE	LLD	DLA	ACCOMPANYING VEHICLE	LLF	DLA	ALF
SM1600	1.8	0.35	NIL	-	-	-
PBS-3A HML (PBS RV2)	2	0.4	PBS-3A HML (PBS RV2)	2	0.4	0.8
PLATFORM RV28	1.5	0.4	NIL	-	-	-
PLATFORM RV28	1.5	0.4	NIL	-	-	-
SPV RV6	1.6	0.4	NIL	-	-	-

BARRIERS ARE DESIGNED FOR LOW LEVEL BARRIER PERFORMANCE.

DIMENSIONS

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. REDUCED LEVELS, CHAINAGES & COORDINATES ARE ALL IN METRES. ALL LEVELS ARE TO AUSTRALIAN HEIGHT DATUM.
3. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
4. ANY DISCREPANCIES SHALL BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE DESIGNERS.
5. ALL CHAINAGES REFER TO THE ROAD DESIGN LINE AND ARE IN METRES.

GLUE-LAMINATED BEAM NOTES

1. ALL TIMBER BEAMS SHALL BE GRADE GL18, BE SOURCED FROM A REPUTABLE SUPPLIER, BE CONSTRUCTED IN ACCORDANCE WITH AS 1328.1 AND HAVE THE FOLLOWING MINIMUM PROPERTIES:

MODULUS OF ELASTICITY (E)	18500	MPa
CHARACTERISTIC BENDING STRENGTH (fb)	45	MPa
CHARACTERISTIC SHEAR STRENGTH (fs)	5	MPa
CHARACTERISTIC COMPRESSIVE STRENGTH (fc)	45	MPa
CHARACTERISTIC TENSILE STRENGTH (ft)	25	MPa

2. ALL PROPERTIES NOT PROVIDED IN THE ABOVE TABLE MUST COMPLY WITH THE HIGHEST VALUES PROVIDED IN AS5100.5:2017, AS1720.1:2010 AND THE SPECIFICATION.
3. ALL TIMBER BEAMS SHALL BE TREATED IN ACCORDANCE WITH AS1604.1 FOR HAZARD CLASS H4
4. ALL BEAMS TO BE STRENGTH GROUP SD1, SD2 OR SD3.
5. ALL BEAMS TO BE JOINT GROUP JD4, JD2 OR JD3.
6. ALL GLUE-LAMINATED BEAMS SHALL BE BONDED WITH TYPE1 ADHESIVE IN ACCORDANCE WITH AS/NZS 1328.1.

CONCRETE NOTES

1. MAXIMUM AGGREGATE SIZE SHALL BE 20 mm UNLESS NOTED OTHERWISE
2. CONCRETE FOR DECK ELEMENTS SHALL BE GRADE VR40/50, HAVE A MINIMUM COMPRESSIVE STRENGTH OF 50 MPa AT 28 DAYS AND HAVE A MINIMUM COVER OF 40mm
3. EXPOSURE CLASSIFICATION B1

STRUCTURAL STEELWORK

SW1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE NOTES, THE SPECIFICATION AND AS5100.
SW2. WELDING SHALL BE PERFORMED BY A QUALIFIED OPERATOR IN ACCORDANCE WITH AS 1554.
SW3. STRUCTURAL STEEL SHALL BE GRADE 300, UNO.
SW4. BOLT AND NUTS TO AS 1252 CLASS 8.8/S, UNO. WASHERS TO AS 1252.
SW5. STEEL PLATE SHALL BE GRADE 300 AND COMPLY WITH AS 3678, UNO.
SW6. ALL BOLTS, NUTS AND WASHERS TO BE HOT DIPPED GALVANISED.
SW7. ALL WELDS TO BE 6mm CONTINUOUS FILLET WELDS UNO.
SW8. GALVANIZING SHALL COMPLY WITH AS/NZS 4680.
SW9. WELDING SHALL BE CATEGORY SP TO COMPLY WITH AS/NZS 1554 PART 1.
SW10. ALL STRUCTURAL STEELWORK SHALL BE HOT DIP GALVANIZED AFTER FABRICATION

REINFORCEMENT

1. ALL REINFORCEMENT IS DESIGNATED AS FOLLOWS UNLESS IT IS DESCRIBED FULLY IN ACCORDANCE WITH AS 4671 SECTION 5.

SYMBOL	DESCRIPTION	TYPE TO AS 4671
SL	MESH-SQUARE GRID	D500L
RL	MESH-RECTANGULAR GRID	D500L
R	PLAIN BARS	P250N
S	DEFORMED BARS	D250N
N	DEFORMED BARS	D500N

2. ALL REINFORCEMENT IS DESIGNATED AS FOLLOWS:
   e.g. 8-N12-150 T
   - THE NUMBER PRECEDING THE BAR SYMBOL (8) IS THE NUMBER OF BARS
   - THE NUMBER FOLLOWING THE BAR SYMBOL (12) IS THE NOMINAL BAR DIAMETER IN MILLIMETRES
   - THE NUMBER FOLLOWING THE 'DASH' (150) IS THE SPACING IN MILLIMETRES
   - THE LETTER FOLLOWING THE SPACING (T) IS THE LOCATION OF THE BAR IN THE ELEMENT AS FOLLOWS:

T	TOP
B	BOTTOM
NF	NEAR FACE
FF	FAR FACE
EF	EACH FACE
LV	LENGTH VARIES

STRUCTURAL ELEMENT CODES
A : ABUTMENT
W : WINGWALLS
C : COLUMNS
B : BEAMS
H : CROSSHEAD
S : SLAB
R : RUN ON SLAB
T : TRAFFIC BARRIER
P : PILES

3. REINFORCEMENT SPACING NOT SHOWN SHALL BE TAKEN AS EQUAL.
4. REINFORCING BAR SHOWN ON THESE DRAWINGS ARE DIAGRAMMATIC ONLY. IT IS NOT NECESSARILY SHOWN IN TRUE PROJECTION.
5. BARS SHOWN MAY REPRESENT MORE THAN ONE LENGTH AND/OR PROFILE.
6. BARS MAY NOT BE SHOWN IN TRUE POSITION FOR CLARITY.
7. ALL HOOKS, BENDS AND COGS ARE STANDARD AND SHALL BE IN ACCORDANCE WITH AS5100 BRIDGE DESIGN 2017 UNLESS NOTED OTHERWISE.
8. ALL REINFORCEMENT IS DIMENSIONED OUT-TO-OUT ALONG EACH STRAIGHT PORTION OF THE BAR.
9. WELDING OF REINFORCEMENT NOT PERMITTED UNLESS NOTED OTHERWISE.

LAP LENGTHS FOR REINFORCEMENT

1. LAPS AND OTHER SPLICES IN REINFORCEMENT SHALL ONLY BE MADE AT THE POSITION SHOWN ON THE DRAWINGS, UNLESS ALTERNATIVE OR EXTRA LOCATIONS ARE APPROVED IN WRITING BY THE DESIGNERS. LAP LENGTHS SHALL BE AS TABULATED BELOW UNLESS SHOWN OTHERWISE ON THE DRAWINGS:

LAP LENGTHS FOR REINFORCEMENT (CONTINUED)

BAR DIAMETER	MIN. LAP LENGTH
12	450
16	600
20	800
24	1000
28	1200
32	1500

(NOTE: THE MINIMUM LAP LENGTH SHOWN SHALL BE INCREASED BY 30% FOR HORIZONTAL BARS WITH 300mm OR MORE CONCRETE CAST BELOW THE BAR.)
2. REINFORCEMENT SPLICES SHALL BE STAGGERED AND NO MORE THAN 50% OF SPLICES SHALL BE AT ANY ONE SECTION UNLESS SHOWN OTHERWISE.
3. WHERE MORE THAN HALF THE BARS ARE SPLICED AT ANY ONE SECTION, THE SPLICE LENGTHS SHALL BE INCREASED BY 30%.

SITE SAFETY

SS1. ALL WORK SITES CAN BE POTENTIALLY HAZARDOUS TO PEOPLE, PROPERTY AND EQUIPMENT. ALL PEOPLE WHO ARE AUTHORISED TO BE ON A WORK SITE MUST CAREFULLY CONSIDER, DOCUMENT AND ADOPT SUITABLE SAFE WORK PROCEDURES FOR ALL REQUIRED ACTIVITIES.

SS2. CURRENT LEGISLATION: CURRENT LEGISLATION REQUIRES THAT ALL PERSONS ARE TO CONSIDER THEIR ACTIONS OR INACTION ON THE HEALTH AND SAFETY OF OTHERS AND THEMSELVES.

SS3. THE CONTRACTOR SHALL ABIDE WITH AND IS BOUND BY THE CURRENT SAFE WORK AUSTRALIA ACT, REGULATIONS AND CODES OF PRACTICE ISSUED BY STATE GOVERNMENTS AND / OR THEIR AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMPLEMENTATION, DOCUMENTATION AND MAINTENANCE OF WORK SAFETY PROCEDURES AND OTHER RELEVANT DOCUMENTATION. THE CONTRACTOR SHALL ENSURE THAT ALL SUB CONTRACTORS AND OTHER AUTHORISED PEOPLE COMPLY WITH THE ABOVE.

SS4. THE CONTRACTOR SHALL BE ALERT AND PROACTIVE TO IDENTIFY HAZARDS AND MANAGE THE ASSOCIATED RISKS TO ELIMINATE THEM OR MINIMISE THEM TO AN AGREED RISK LEVEL.

SS5. THE CONTRACTOR SHALL CONSULT WITH THE ENGINEER IF THERE IS ANY PERCEIVED RISK RELATING TO THE DESIGN OR CONSTRUCTION OF THE DESIGN. THE CONTRACTOR SHALL ENGAGE SUITABLY QUALIFIED ENGINEERS TO CERTIFY ALL TEMPORARY STRUCTURAL WORKS.

SS6. THE CONTRACTOR SHALL ENGAGE WITH THE SUBCONTRACTOR AND OTHER AUTHORISED PEOPLE WHO USE THE SITE TO IDENTIFY THEIR RISKY WORK PROCEDURES AND OTHER ACTIVITIES.

SS7. SUBCONTRACTORS AND OTHER AUTHORISED PEOPLE SHALL PROVIDE DOCUMENTATION ABOUT THEIR RISK ASSESSMENTS AND RISK MINIMISATION.

SS8. PUBLIC SAFETY: A LIVE SITE THAT HAS WORK UNDERWAY OR IS UNATTENDED HAS A STRONG ATTRACTION TO THE PUBLIC IN GENERAL. THE CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO PREVENT UNAUTHORISED PEOPLE ENTERING THE SITE. EXCAVATIONS, STRUCTURES AND ACCESS EQUIPMENT SHALL BE LEFT IN A SECURE MANNER AS IS REASONABLY PRACTICABLE TO PREVENT ANY UNAUTHORISED PEOPLE FROM ENTERING, CLIMBING OR FALLING. THE SITE SHALL HAVE CLEAR WARNING SIGNS N APPROPRIATE LOCATIONS, E.G. - "DANGER KEEP OUT" AND BE SECURELY BARRICADED AND WHEN UNATTENDED LEFT IN A LOCKED CONDITION AS IS REASONABLY PRACTICABLE.

SS9. SPECIFIC ATTENTION SHALL BE PAID TO RISKY ACTIVITIES INCLUDING BUT NOT LIMITED TO: SITE ESTABLISHMENT DEMOLITION, RECYCLING AND REMOVAL
TEMPORARY WORKS EXCAVATION AND TRENCHING
- CONSTRUCTION PROCESSES TRIPS AND FALLS (GENERAL) WORKING AT HEIGHT
WORKING OVER WATER.

REFER ALSO TO THE PROJECT SID REPORT

SAFETY IN DESIGN (SID)

SD1. SID GENERALLY
THIS STRUCTURE HAS BEEN DESIGNED TO ELIMINATE HAZARDS TO HEALTH AND SAFETY WHEREVER POSSIBLE. WHERE THIS HAS NOT BEEN POSSIBLE, THE RISK TO HEALTH AND SAFETY OF PERSONS HAS BEEN MINIMISED TO BE REASONABLY PRACTICABLE FOR THE LIFE OF THE STRUCTURE.

SD2. WORK HEALTH AND SAFETY:
THE CONTRACTOR SHALL ENSURE THAT THE CONSTRUCTION OF THIS PROJECT IS CARRIED OUT UNDER A WORK HEALTH AND SAFETY CO-ORDINATION PLAN AND COMPLIANT WITH ANY 'SAFETY IN THE WORKPLACE LEGISLATION APPLICABLE IN THE STATE IN WHICH THE WORK IS CARRIED OUT.

SD3. IDENTIFY HAZARDS:
THE CONTRACTOR SHALL MAKE EVERY EFFORT TO ENSURE THAT ALL PERSONS WHO ENTER THE CONSTRUCTION SITE ARE MADE AWARE ABOUT THE RISK OF HAZARDS AND POTENTIAL HAZARDS WHICH MAY OCCUR ON THE SITE. ANY SUCH HAZARD SHALL BE ISOLATED AND CLEARLY IDENTIFIED. THE CORRECT LEVEL OF TRAINING SHALL BE MANDATORY BEFORE ANY PERSON ENTERS THE CONSTRUCTION AREA. ALL PERSONS SHALL WEAR THE APPROPRIATE SAFETY PROTECTION APPAREL SPECIFIED BY THE CONTRACTOR BEFORE ENTERING THE SITE. A QUALIFIED GUIDE SHALL ACCOMPANY ALL NEW CONSTRUCTION WORKERS DURING THEIR INITIATION AND ALL SITE VISITORS WHILE ON THE SITE.

SD4. STABILITY OF THE STRUCTURE:
TEMPORARY MEASURES ARE REQUIRED DURING CONSTRUCTION AND DEMOLITION TO ENSURE THE STABILITY OF THE STRUCTURE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND THE CONTRACTOR'S ERECTION DESIGN ENGINEER TO TAKE ALL MEASURES NECESSARY TO MAINTAIN STRUCTURAL INTEGRITY DURING ALL PHASES OF DECONSTRUCTION AND CONSTRUCTION. TEMPORARY SUPPORT IS EXPECTED TO BE NECESSARY.

SD5. TEMPORARY SUPPORT REQUIRED:
CONCRETE FORMWORK TO FACILITATE CONCRETE PLACEMENT
TIMBER ELEMENTS
STATIC OR OPERATING PLANT AND EQUIPMENT
STORED MATERIALS
STABILITY OF THE EXISTING STRUCTURE.

SD6. SPECIALIST CONTRACTOR:
SOME ACTIVITIES REQUIRED TO BE CARRIED OUT DURING THE CONSTRUCTION ARE NOT CONSIDERED TO BE NORMAL BUILDING PRACTICE. THEREFORE ENGAGEMENT OF A SPECIALIST CONTRACTOR, IS EXPECTED TO BE NECESSARY FOR THE FOLLOWING ACTIVITIES, BUT NOT LIMITED TO:

LIFTING AND PLACEMENT OF HEAVY ELEMENTS
USE OF HAZARDOUS MATERIALS
USE OF HEAVY EQUIPMENT
DEMOLITION WORKS
DRILLING
ANCHOR INSTALLATION
WORK NEAR LIVE EQUIPMENT, INCLUDING COMMS AND WATER SUPPLY.

ELASTOMERIC BEARING PADS

1. ALL ELASTOMERIC BEARINGS SHALL BE SOURCED FROM A REPUTABLE SUPPLIER, COMPLY WITH AS5100.4 AND THE SPECIFICATION AND HAVE THE FOLLOWING MINIMUM PROPERTIES:

HARDNESS	60	IRHD +/- 5
ELASTIC MODULUS (G)	0.8	MPa
SHEAR MODULUS (G)	0.9	MPa
BULK MODULUS (B)	2000	MPa
ULTIMATE TENSILE STRENGTH (Fu)	3.6	MPa
ELONGATION AT BREAK	475	%

2. ALL PROPERTIES NOT PROVIDED IN THE ABOVE TABLE MUST COMPLY WITH THE HIGHEST VALUES PROVIDED IN AS5100.4 AND THE SPECIFICATION.

No.	Amendment Description	Initials	Date
B	ISSUED FOR DEVELOPMENT APPROVAL	B.J.	24/06/2021
A	ISSUED FOR CLIENT REVIEW	M.R.	11/12/2020

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SCALES
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pitt&sherry

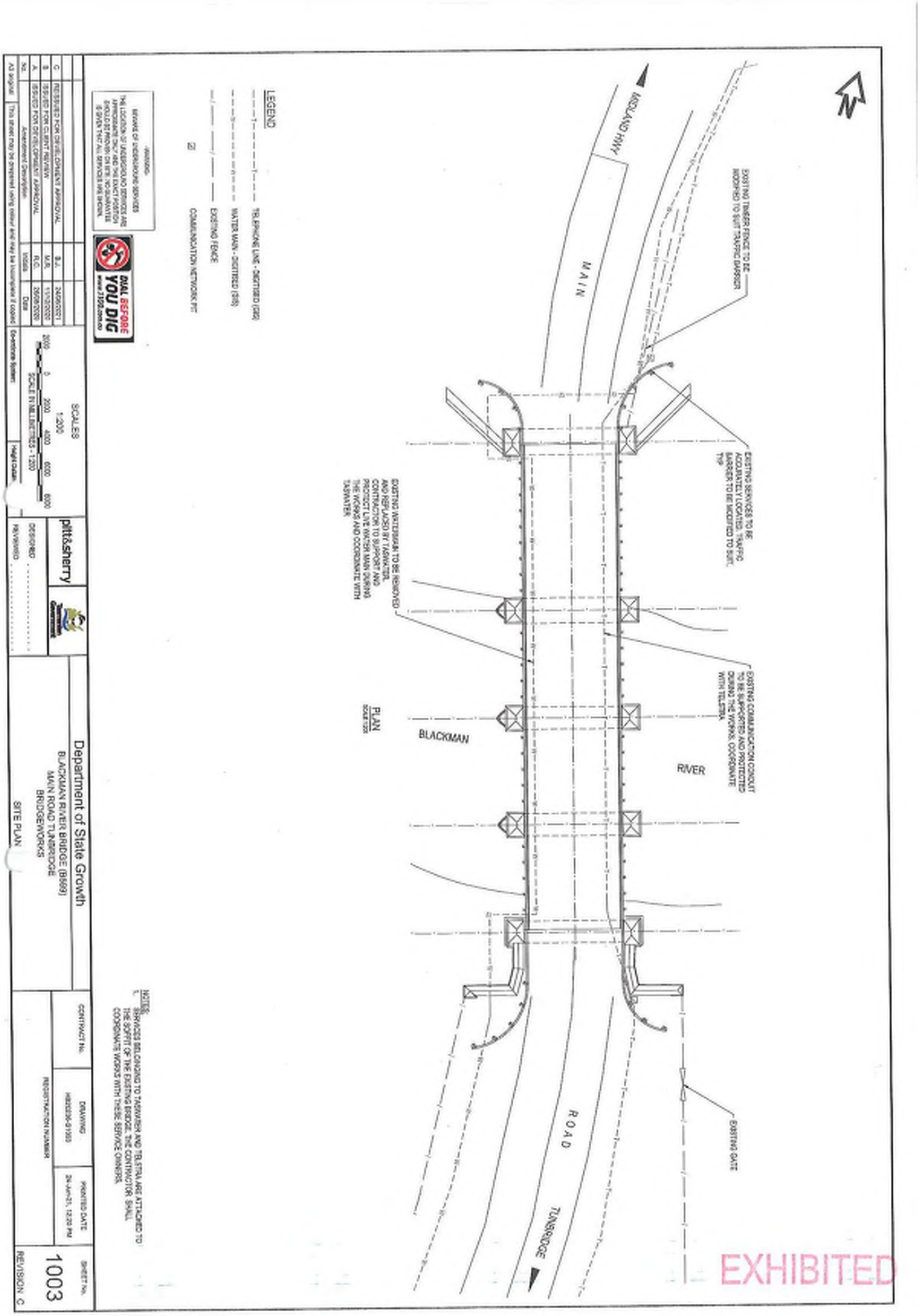
DESIGNED .....
REVIEWED .....

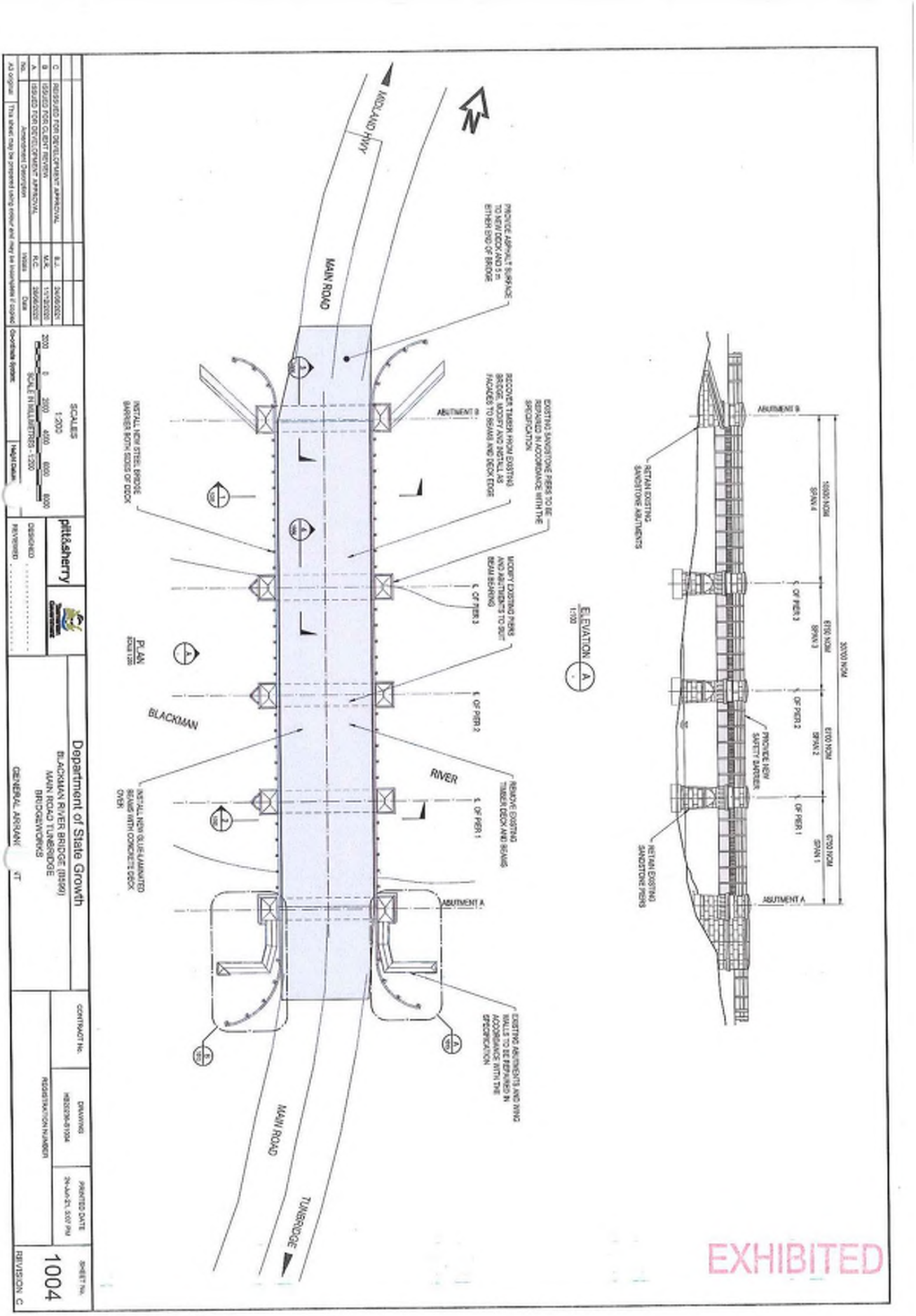
Department of State Growth
BLACKMAN RIVER BRIDGE (B599)
MAIN ROAD TUNBRIDGE
BRIDGEWORKS
GENERAL NOTES

CONTRACT No.	DRAWING	PRINTED DATE	SHEET No.
	HB20236-B1002	24-Jun-21, 11:59 AM	1002

REGISTRATION NUMBER

REVISION B


EXISTING TIMBER FENCE TO BE MODIFIED TO SUIT TRAFFIC BARRIER
EXISTING SERVICES TO BE ACCURATELY LOCATED. TRAFFIC BARRIER TO BE MODIFIED TO SUIT.
TYP
EXISTING COMMUNICATION CONDUIT TO BE SUPPORTED AND PROTECTED DURING THE WORKS. COORDINATE WITH TELSTRA
EXISTING WATERMAIN TO BE REMOVED AND REPLACED BY TASWATER. CONTRACTOR TO SUPPORT AND PROTECT LIVE WATER MAIN DURING THE WORKS AND COORDINATE WITH TASWATER
PLAN
BLACKMAN
RIVER
MAIN ROAD
TUNNBRIDGE
EXISTING GATE
EXHIBITED
LEGEND
TELEPHONE LINE - DIGITISED (DIS)
WATER MAIN - DIGITISED (DIS)
EXISTING FENCE
COMMUNICATION NETWORK PIT
NOTES:
1. SERVICES BELONGING TO TASWATER AND TELSTRA ARE ATTACHED TO THE SOFFIT OF THE EXISTING BRIDGE. THE CONTRACTOR SHALL COORDINATE WORKS WITH THESE SERVICE OWNERS.
SCALES
1:200
SCALE IN MILLIMETRES - 1:200
pitt&sherry
Department of State Growth
BLACKMAN RIVER BRIDGE (B569)
MAIN ROAD TUNNBRIDGE
BRIDGEWORKS
SITE PLAN
CONTRACT No.
DRAWING
H8283B-01003
PRINTED DATE
SHEET No.
1003
REVISION C


MIDLAND HWY
MAIN ROAD
PROVIDE ASPHALT SURFACE TO NEW DECK AND 5 m EITHER END OF BRIDGE
ABUTMENT B
RECOVER TIMBER FROM EXISTING BRIDGE, MODIFY AND INSTALL AS FACADES TO REMAIN ANG DECK EDGE
EXISTING SANDSTONE PIERS TO BE REPAIRED IN ACCORDANCE WITH THE SPECIFICATION
INSTALL NEW STEEL BRIDGE BARRIER BOTH SIDES OF DECK
MODIFY EXISTING PIERS AND ABUTMENTS TO SUIT BEAM BEARING
℄ OF PIER 3
℄ OF PIER 2
℄ OF PIER 1
ABUTMENT A
PLAN
BLACKMAN
RIVER
REMOVE EXISTING TIMBER DECK AND BEAMS
INSTALL NEW GLULAM/MATED BEAMS WITH CONCRETE DECK OVER
EXISTING ABUTMENTS AND WING WALLS TO BE REPAIRED IN ACCORDANCE WITH THE SPECIFICATION
MAIN ROAD
TUNBRIDGE
ELEVATION
ABUTMENT B
RETAIN EXISTING SANDSTONE ABUTMENTS
10000 NOM
SPAN 4
6700 NOM
SPAN 3
6700 NOM
SPAN 2
6700 NOM
SPAN 1
33700 NOM
PROVIDE NEW SAFETY BARRIER
RETAIN EXISTING SANDSTONE PIERS
ABUTMENT A
EXHIBITED
Department of State Growth
BLACKMAN RIVER BRIDGE (B1599)
MAIN ROAD TUNBRIDGE
BRIDGEWORKS
GENERAL ARRANGEMENT
pitt&sherry
SCALES
1:200
SCALE IN MILLIMETRES - 1:200
DESIGNED
REVIEWED
CONTRACT No.
DRAWING
1004
PRINTED DATE
REVISION C
SHEET No.
REGISTRATION NUMBER
Amendment Description
ISSUED FOR DEVELOPMENT APPROVAL
ISSUED FOR CLIENT REVIEW
REISSUED FOR DEVELOPMENT APPROVAL
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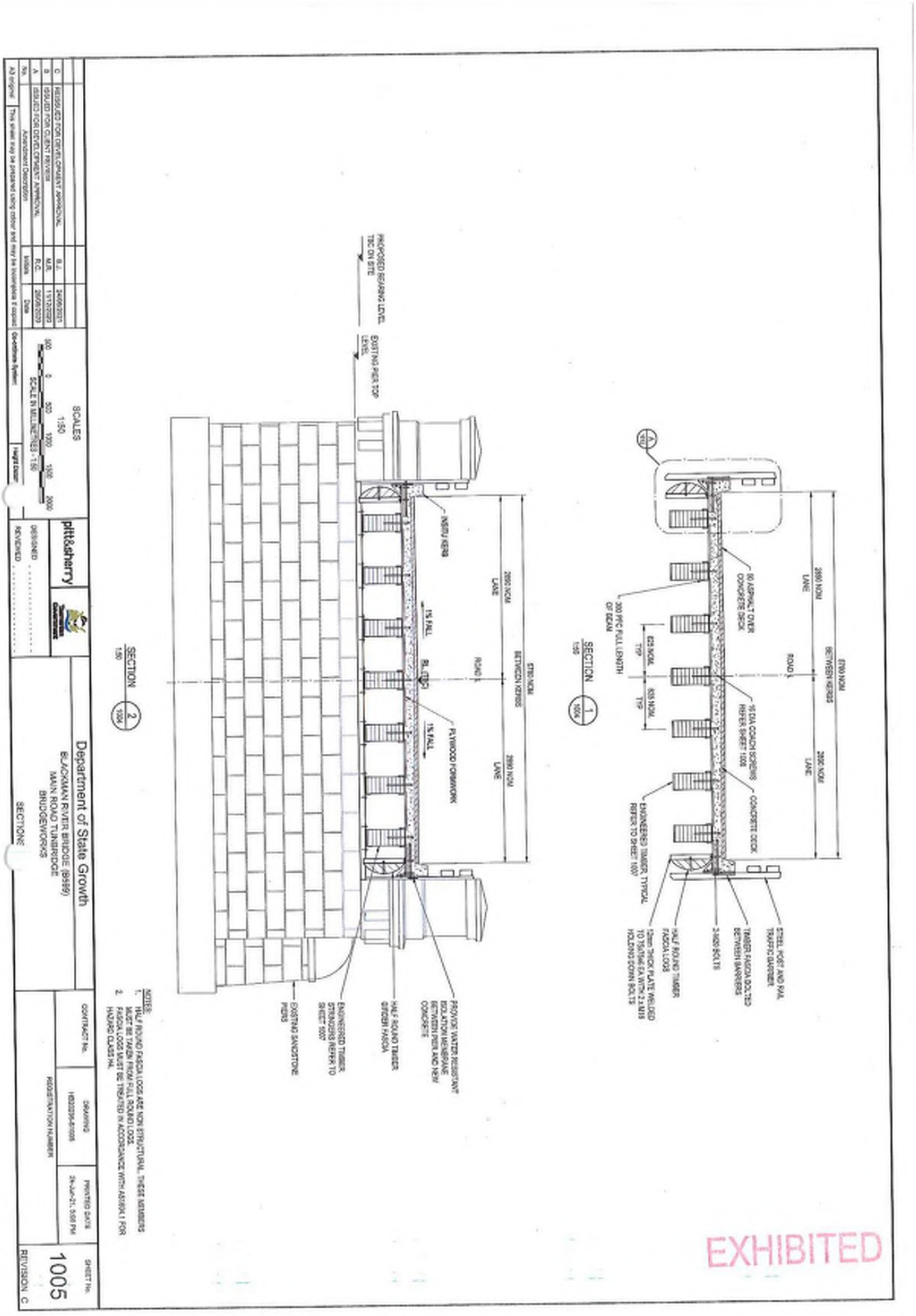
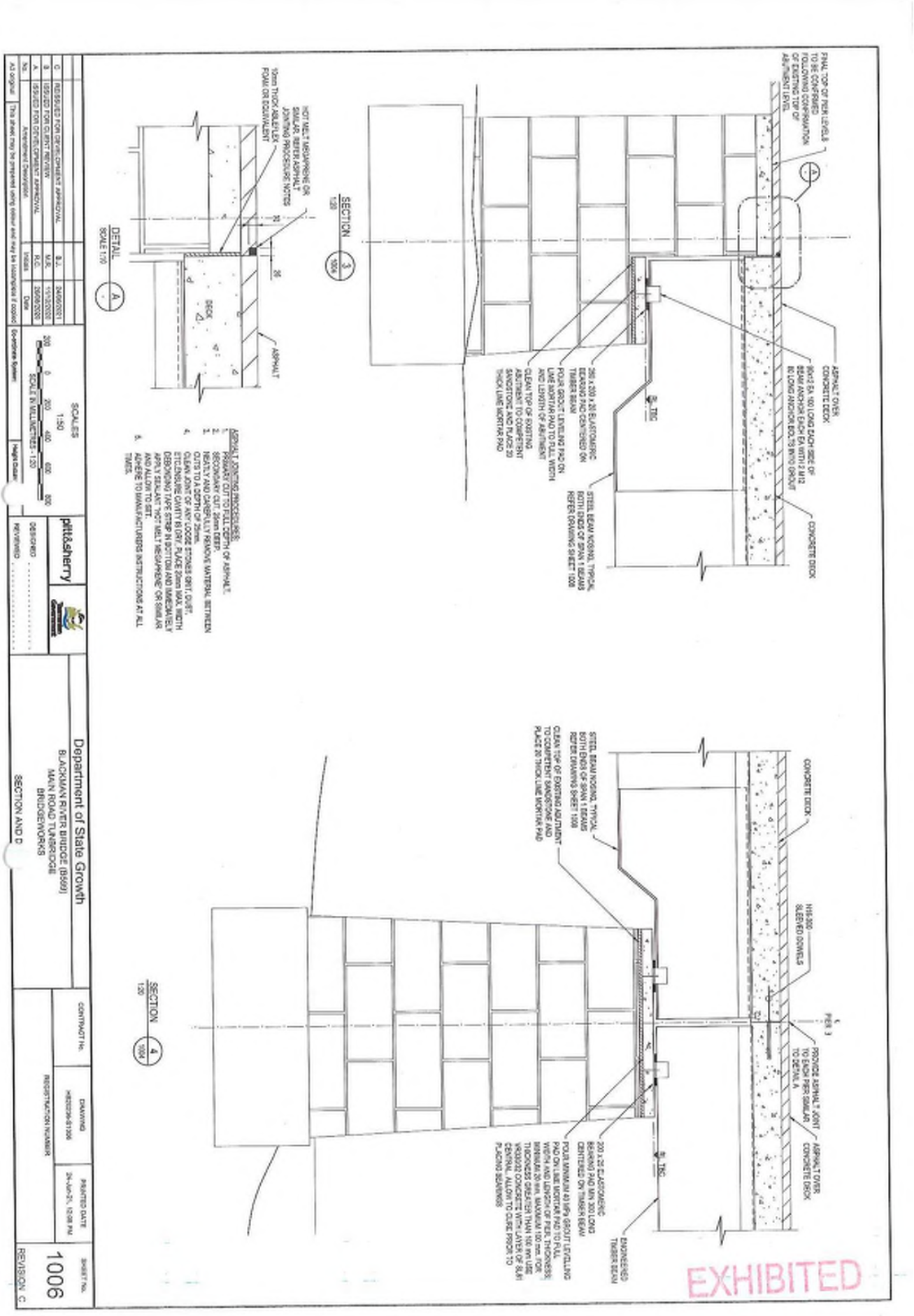
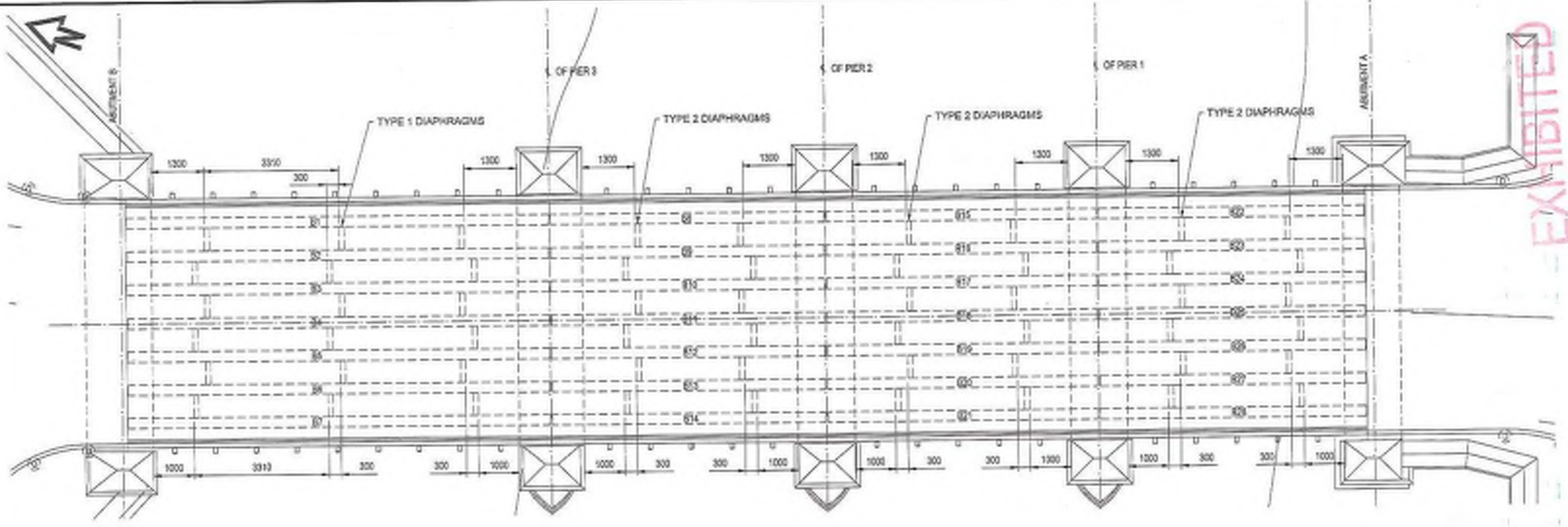

EXHIBITED
Department of State Growth
BLACKMAN RIVER BRIDGE (B999)
MAIN ROAD TUNBRIDGE
BRIDGEWORKS
SECTIONS
pitt&sherry
SCALES
1:50
1:100
SCALE IN MILLIMETRES - 1:50
CONTRACT No.
DRAWING
PRINTED DATE
RIDGE/STATION NUMBER
SHEET No.
1005
REVISION C
SECTION 2
SECTION 1
NOTES:
1. HALF ROUND FASCIA LOGS ARE NON STRUCTURAL. THESE MEMBERS MUST BE TAKEN FROM FULL ROUND LOGS.
FASCIA LOGS MUST BE TREATED IN ACCORDANCE WITH AS1604.1 FOR HAZARD CLASS H4.
2.
PROVIDE WATER RESISTANT ISOLATION MEMBRANE BETWEEN PIER AND NEW CONCRETE
HALF ROUND TIMBER GIRDER FASCIA
ENGINEERED TIMBER STRINGERS REFER TO SHEET 1007
EXISTING SANDSTONE PIERS
PLYWOOD FORMWORK
INSITU KERB
PROPOSED BEARING LEVEL TBC ON SITE
EXISTING PIER TOP LEVEL
1% FALL
RL TBC
STEEL POST AND RAIL TRAFFIC BARRIER
TIMBER FASCIA DOUBLED BETWEEN BARRIERS
2-M36 BOLTS
HALF ROUND TIMBER FASCIA LOGS
12mm THICK PLATE WELDED TO TAPHE BARS WITH 2-M16 HOLDING DOWN BOLTS
ENGINEERED TIMBER, TYPICAL REFER TO SHEET 1007
CONCRETE DECK
90 DIA COACH SCREWS REFER SHEET 1006
90 ASPHALT OVER CONCRETE DECK
300 PFC FULL LENGTH OF BEAM
625 NOM. TYP
838 NOM. TYP
8700 NOM BETWEEN KERBS
2890 NOM LANE
ROAD
5780 NOM BETWEEN KERBS
2890 NOM LANE
ROAD
2890 NOM LANE


EXHIBITED
Department of State Growth
BLACKMAN RIVER BRIDGE (B569)
MAIN ROAD TUNBRIDGE
BRIDGEWORKS
SECTION AND D
pitt&sherry
SCALES
1:50
1006
REVISION C



PLAN
SCALE 1:100

BEAM SCHEDULE

SPAN 1				SPAN 2				SPAN 3				SPAN 4			
BEAM NUMBER	BEAM DEPTH (mm)	BEAM WIDTH (mm)	BEAM LENGTH (mm)	BEAM NUMBER	BEAM DEPTH (mm)	BEAM WIDTH (mm)	BEAM LENGTH (mm)	BEAM NUMBER	BEAM DEPTH (mm)	BEAM WIDTH (mm)	BEAM LENGTH (mm)	BEAM NUMBER	BEAM DEPTH (mm)	BEAM WIDTH (mm)	BEAM LENGTH (mm)
B1	825	260	10350	B8	600	260	6700	B15	600	260	6620	B22	600	260	6530
B2	825	260	10350	B9	600	260	6700	B16	600	260	6620	B23	600	260	6530
B3	825	260	10350	B10	600	260	6700	B17	600	260	6620	B24	600	260	6530
B4	825	260	10350	B11	600	260	6700	B18	600	260	6620	B25	600	260	6530
B5	825	260	10350	B12	600	260	6700	B19	600	260	6620	B26	600	260	6530
B6	825	260	10350	B13	600	260	6700	B20	600	260	6620	B27	600	260	6530
B7	825	260	10350	B14	600	260	6700	B21	600	260	6620	B28	600	260	6530

DIAPHRAGM SCHEDULE

DIAPHRAGM	DIAPHRAGM DEPTH (mm)	DIAPHRAGM WIDTH (mm)	DIAPHRAGM LENGTH (mm)
1	625	120	545
2	400	120	545

NOTES:
1. FOR DIAPHRAGM DETAILS REFER SHEET 1008.
2. ALL BEAMS TO HAVE 10mm HDG PRIOR TO INSTALLATION OF CONCRETE DECK.

No.	Amendment Description	Initials	Date
B	ISSUED FOR DEVELOPMENT APPROVAL	B.J.	24/06/2021
A	ISSUED FOR CLIENT REVIEW	M.R.	11/12/2020

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SCALES 1:100
1000 0 1000 2000 3000 4000
SCALE IN MILLIMETRES - 1:100

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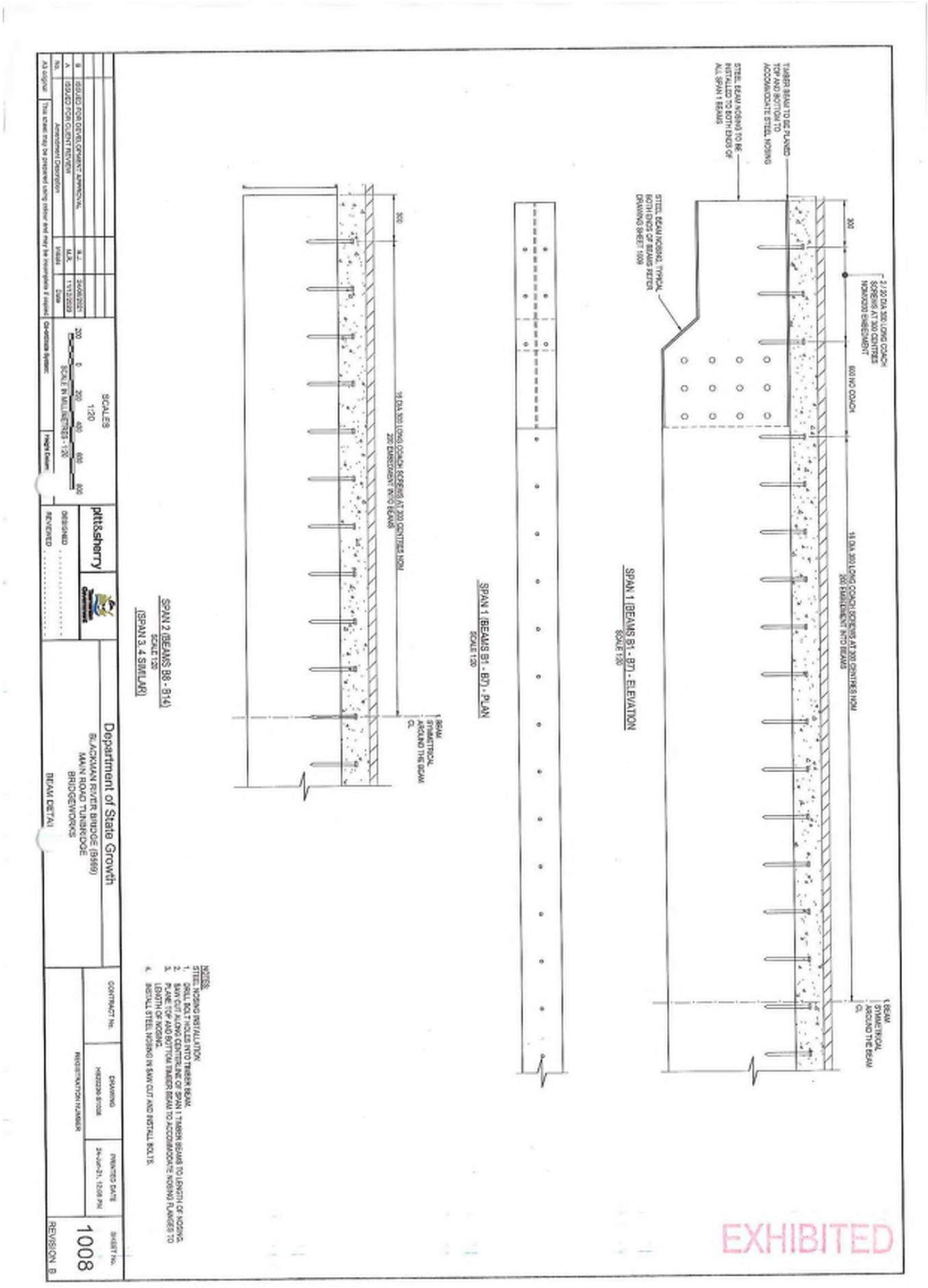
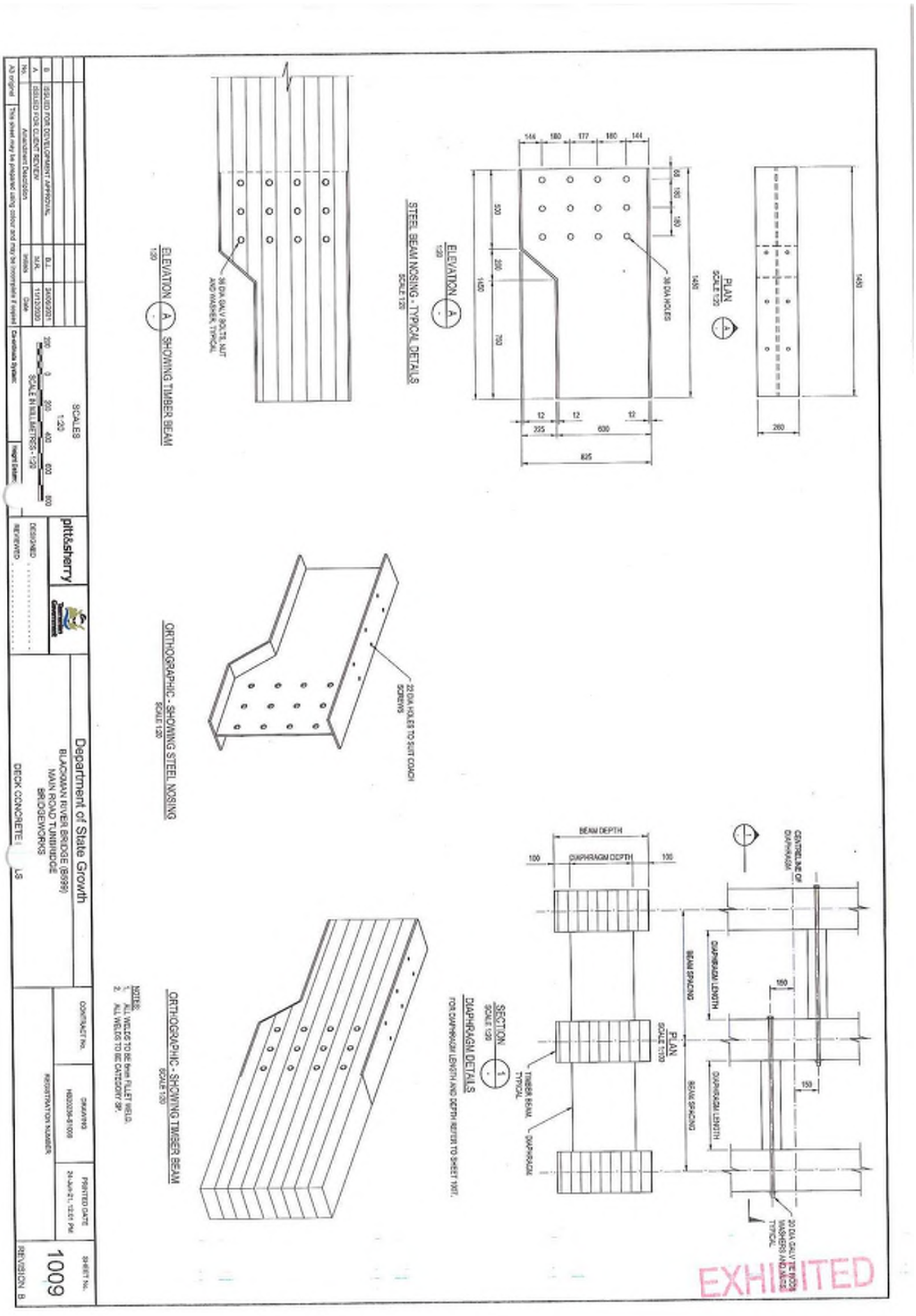
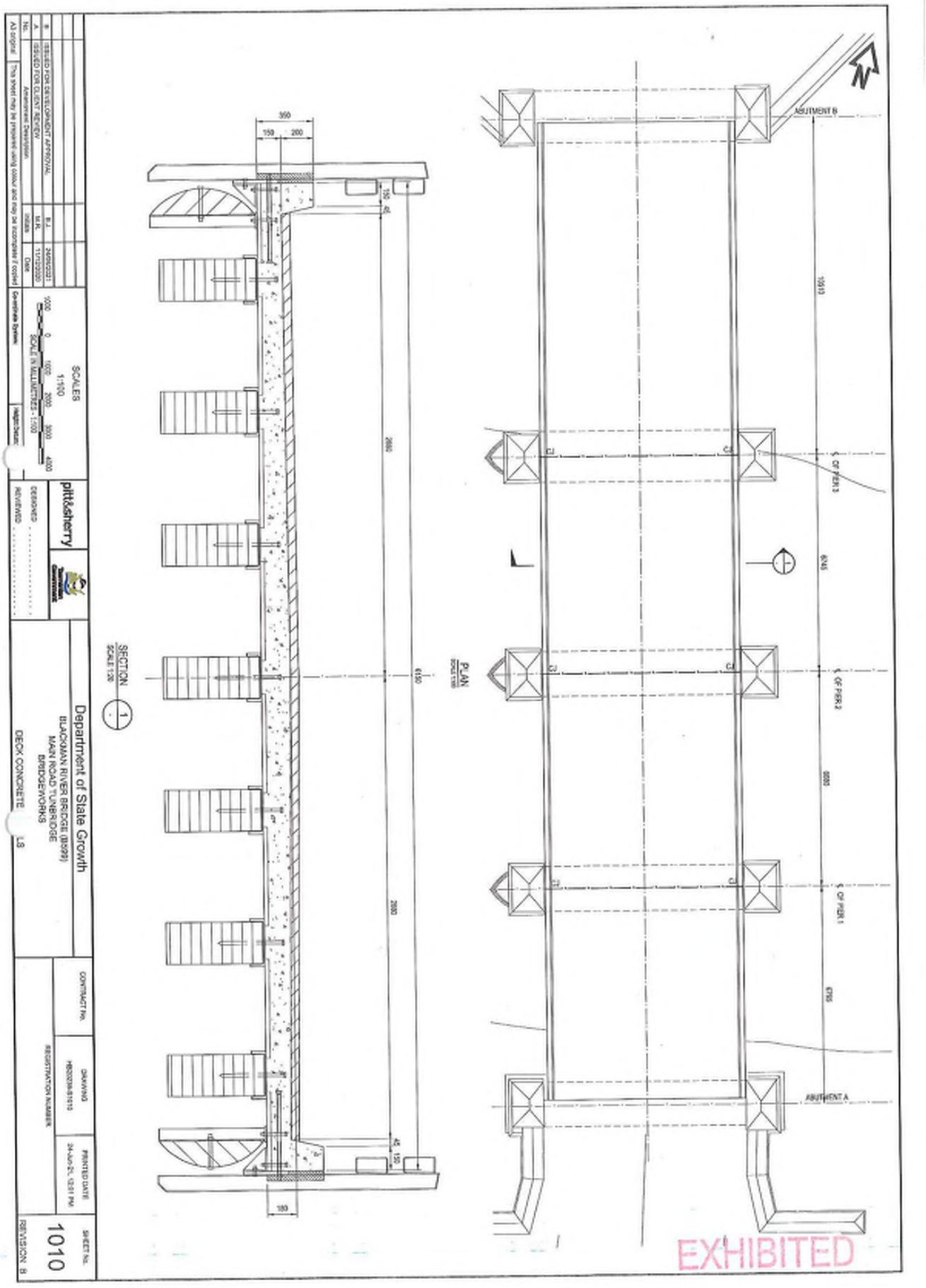
DESIGNED ....
REVIEWED ....

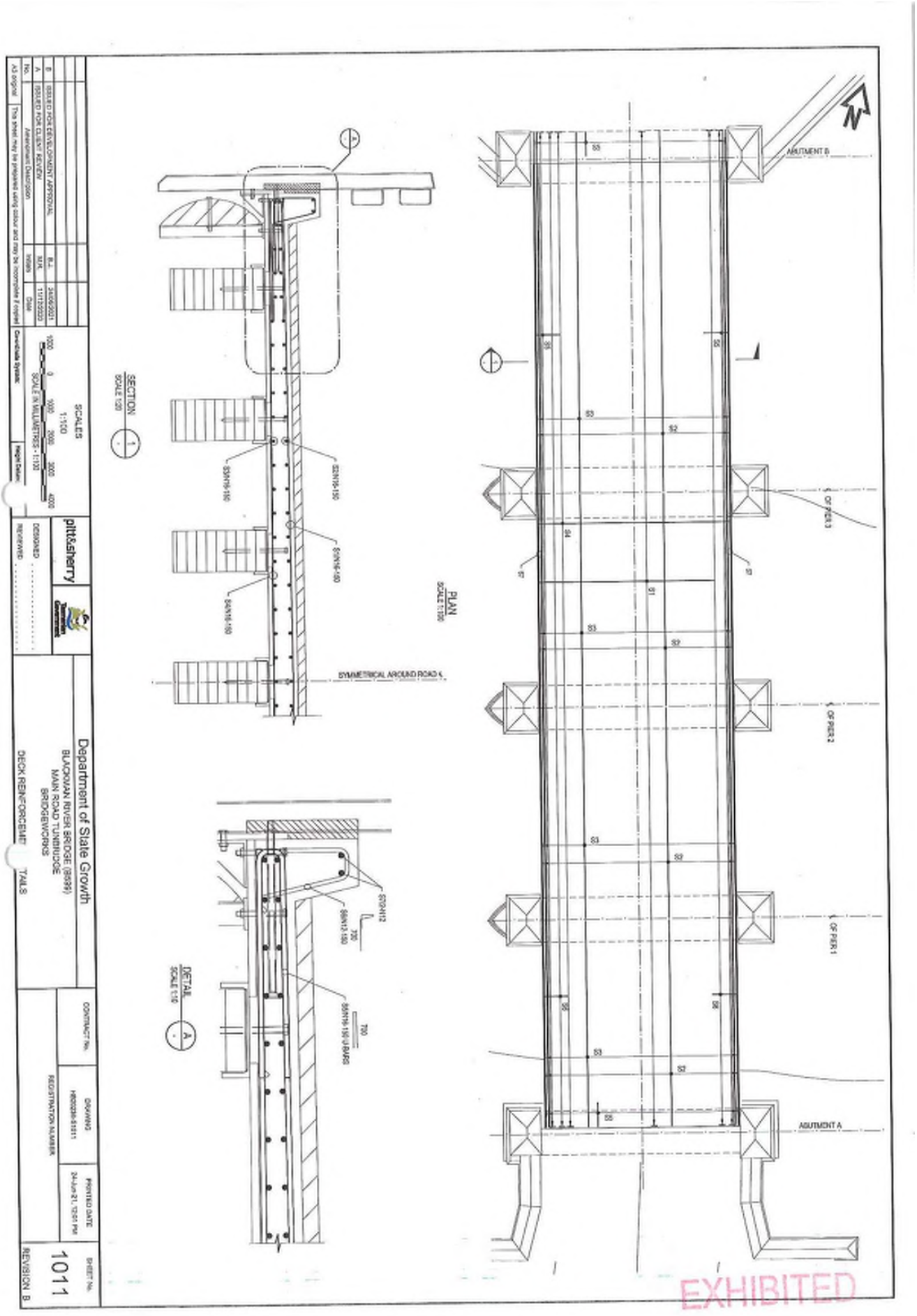
Department of State Growth
BLACKMAN RIVER BRIDGE (B599)
MAIN ROAD TUNBRIDGE
BRIDGEWORKS
BEAM LAYOU

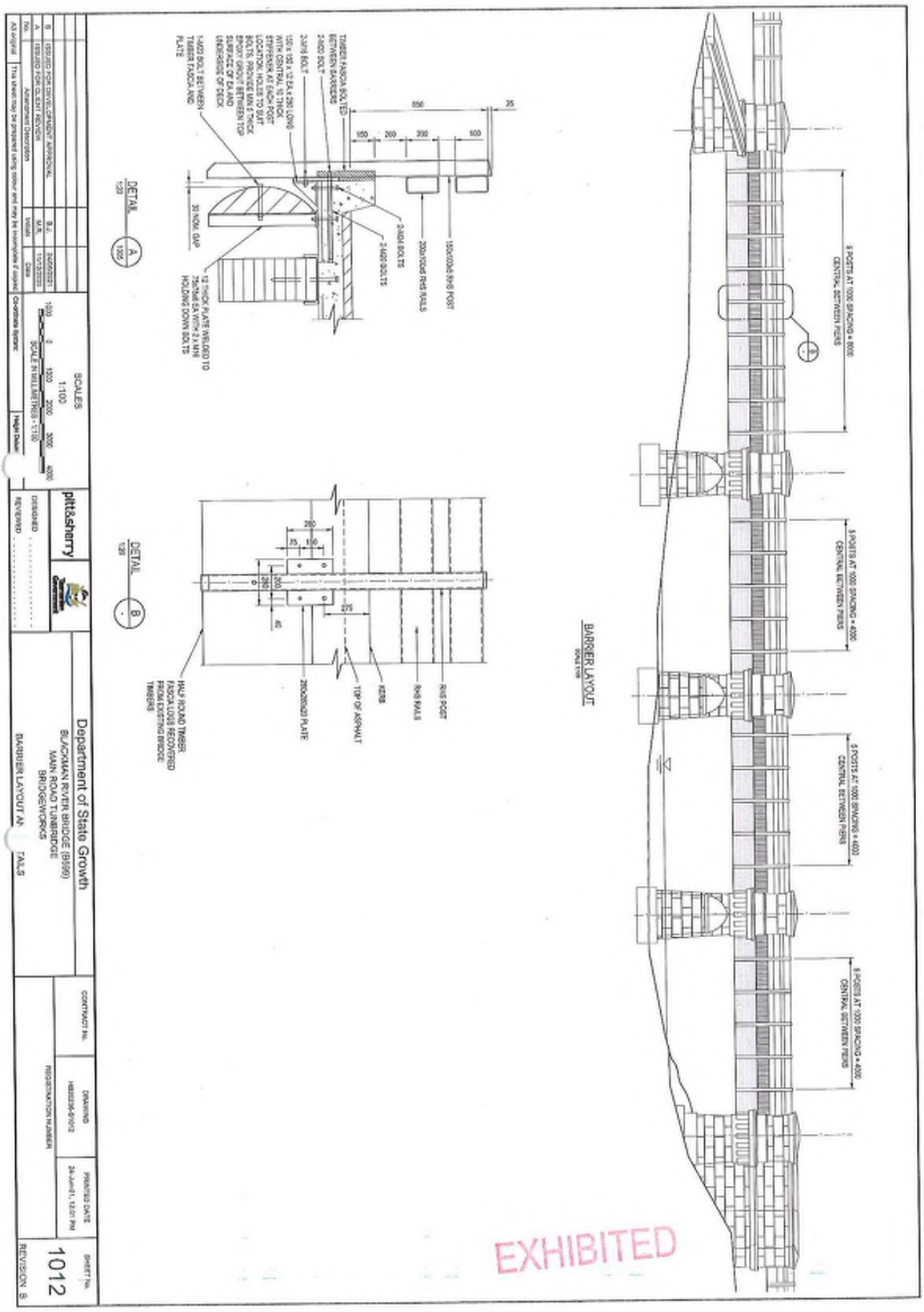
CONTRACT No. | DRAWING HB20236-S1007 | PRINTED DATE 24-Jun-21, 12:01 PM | SHEET No. 1007
REGISTRATION NUMBER
REVISION B


SPAN 1 (BEAMS B1 - B7) - ELEVATION
SCALE 1:20
SPAN 1 (BEAMS B1 - B7) - PLAN
SCALE 1:20
SPAN 2 (BEAMS B8 - B14)
SCALE 1:20
(SPAN 3 & 4 SIMILAR)
NOTES:
STEEL NOSING INSTALLATION
1. DRILL BOLT HOLES INTO TIMBER BEAM.
2. SAW CUT ALONG CENTERLINE OF SPAN 1 TIMBER BEAMS TO LENGTH OF NOSING.
3. PLANE TOP AND BOTTOM TIMBER BEAM TO ACCOMMODATE NOSING FLANGES TO LENGTH OF NOSING.
4. INSTALL STEEL NOSING IN SAW CUT AND INSTALL BOLTS.
EXHIBITED
Department of State Growth
BLACKMAN RIVER BRIDGE (B569)
MAIN ROAD TUNNELRIDGE
BRIDGEWORKS
BEAM DETAI
pitt&sherry
SCALES
1:20
DESIGNED
REVIEWED
CONTRACT No.
DRAWING
PRINTED DATE
SHEET No.
1008
REVISION B


ELEVATION (A) 1:20 SHOWING TIMBER BEAM
36 DIA GALV BOLTS, NUT AND WASHER, TYPICAL
STEEL BEAM NOSING - TYPICAL DETAILS
SCALE 1:20
ELEVATION (A) 1:20
36 DIA HOLES
PLAN (A) SCALE 1:20
ORTHOGRAPHIC - SHOWING STEEL NOSING
SCALE 1:20
22 DIA HOLES TO SUIT COACH SCREWS
ORTHOGRAPHIC - SHOWING TIMBER BEAM
SCALE 1:20
BEAM DEPTH
DIAPHRAGM DEPTH
SECTION (1) SCALE 1:20
PLAN SCALE 1:20
CENTRELINE OF DIAPHRAGM
DIAPHRAGM LENGTH
BEAM SPACING
TIMBER BEAM, TYPICAL
DIAPHRAGM
DIAPHRAGM DETAILS
FOR DIAPHRAGM LENGTH AND DEPTH REFER TO SHEET 1007.
20 DIA GALV TIE RODS WASHERS AND NUTS TYPICAL
NOTES:
1. ALL WELDS TO BE 6mm FILLET WELD.
2. ALL WELDS TO BE CATEGORY SP.
SCALES
1:20
SCALE IN MILLIMETRES - 1:20
pitt&sherry
Department of State Growth
BLACKMAN RIVER BRIDGE (B999)
MAIN ROAD TUNBRIDGE
BRIDGEWORKS
DECK CONCRETE
DESIGNED
REVIEWED
CONTRACT No.
REGISTRATION NUMBER
PRINTED DATE
SHEET No.
1009
REVISION B
EXHIBITED


ABUTMENT B
ABUTMENT A
EXHIBITED
pitt&sherry
Department of State Growth
BLACKMAN RIVER BRIDGE (B3091)
MAIN ROAD TUNBRIDGE
BRIDGEWORKS
DECK CONCRETE
1010


ABUTMENT B
ABUTMENT A
OF PIER 3
OF PIER 2
OF PIER 1
PLAN
SCALE 1:100
SECTION
SCALE 1:20
DETAIL
SCALE 1:10
SYMMETRICAL AROUND ROAD ℄
SSN16-150
SSN16-150
SSN16-150
SSN12-150
SSN16-150 U-BARS
700
SCALES
1:100
SCALE IN MILLIMETRES - 1:100
pitt&sherry
DESIGNED
REVIEWED
Department of State Growth
BUADUVAN RIVER BRIDGE (8599)
MAIN ROAD TUNBRIDGE
BRIDGEWORKS
DECK REINFORCEMENT DETAILS
CONTRACT No.
DRAWING
REGISTRATION NUMBER
PRINTED DATE
SHEET No.
1011
REVISION B
EXHIBITED


BARRIER LAYOUT
DETAIL A
DETAIL B
EXHIBITED
Department of State Growth
BUCKMAN RIVER BRIDGE (B590)
MAIN ROAD TUNBRIDGE
BRIDGEWORKS
BARRIER LAYOUT AN
DETAILS
pitt&sherry
SCALES
1:100
DESIGNED
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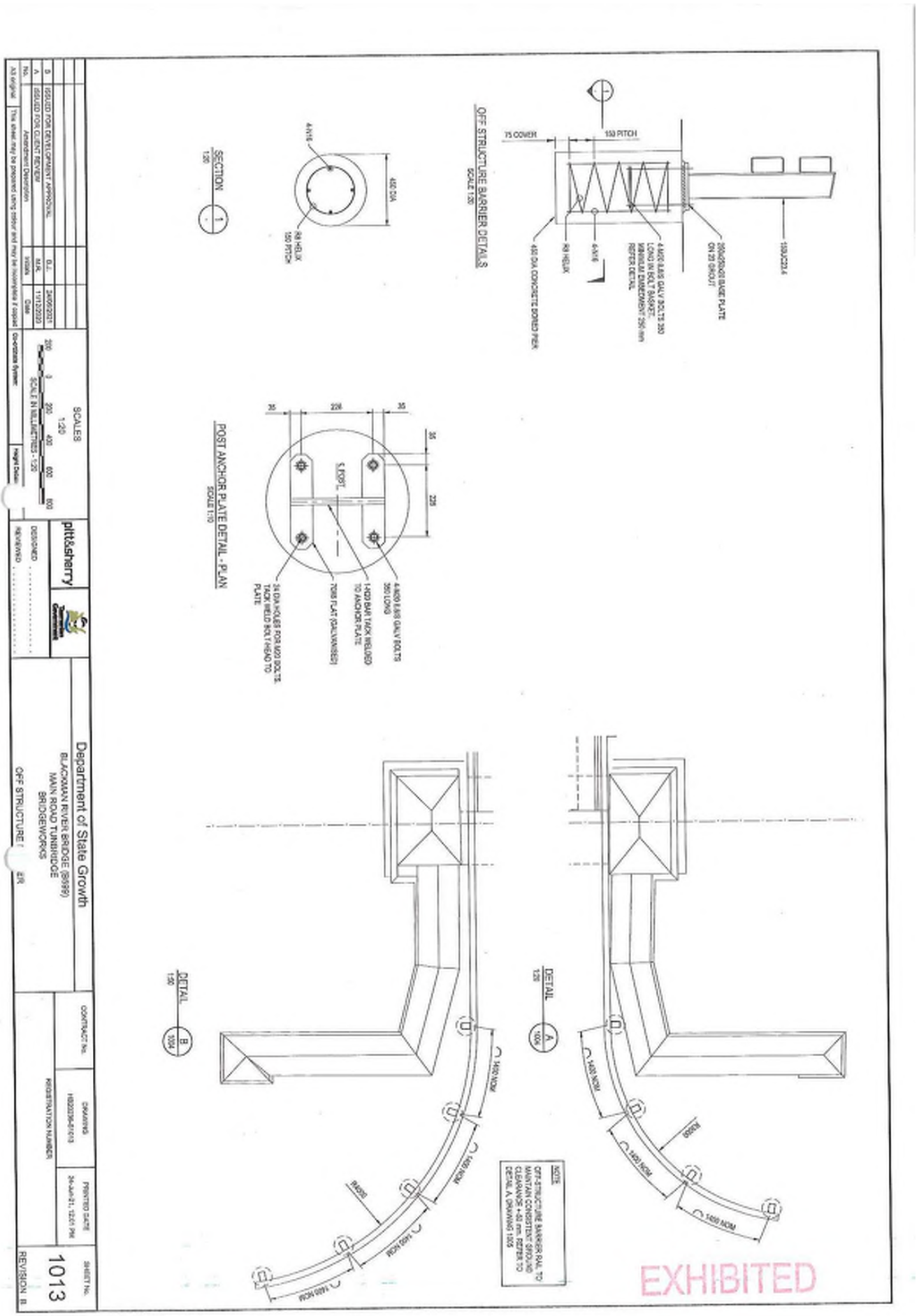
CONTRACT No.
DRAWING
PRINTED DATE
SHEET No.
1012
REVISION B


OFF STRUCTURE BARRIER DETAILS
SCALE 1:20
POST ANCHOR PLATE DETAIL - PLAN
SCALE 1:10
SECTION
DETAIL
NOTE
OFF-STRUCTURE BARRIER RAIL TO MAINTAIN CONSISTENT GROUND CLEARANCE +-50 mm. REFER TO DETAIL A DRAWING 1005
EXHIBITED
Department of State Growth
BLACKMAN RIVER BRIDGE (8699)
MAIN ROAD TURNBRIDGE
BRIDGEWORKS
OFF STRUCTURE
1013
REVISION B

Detailed Fabric Assessment

Appendix C

PETER SPRATT
CONSULTING CHARTERED ENGINEER
P. Spratt AM M.Env.St . Dip.CE FIEAust . LFAIB MASCE A.I.Arb.A

25 Gourlay Street
Blackmans Bay
TAS 7052

Ph. 03 6229 7280 M 0418 124 363
Email p.spratt@bigpond.net.au
ABN 55 120 015 973

14th. April 2021

Ref No 7775

Mr Bjorn Jensen
Pitt and Sherry
Level 1 Surrey House
199 Macquarie Street
Hobart TAS 7001

Blackman River Bridge, Tunbridge
Detailed Fabric Assessment

Dear Sir,
I have, to your request, carried out the above assessment.
I visited the site on the 1st. April last and carried out a visual inspection with some fabric testing in your company and that of Stonemason Edrei Stanton.
I advise that –

1. Previous Assessments.
I have had reference to the following-

- Blackman River Bridge. Historic Survey Report to Department of Transport. Lindy Scripps 1996.
- Blackman River Bridge, Heritage Assessment of Superstructure Replacement. Peter Spratt. June 2014.
- Blackman River Bridge, Historic Heritage Impact Assessment. Austral Archaeology. April 2015.
- Blackman River Bridgeworks- Concrete Slab Design Plans. Pitt and Sherry December 2020.
- Request for Additional Information. Southern Midlands Council December 2020.

2. Bridge Alterations

- The original bridge, of timber, was constructed in June 1841 and was damaged by a fire leading to a lengthy period of dilapidation until 1848 when the first iteration of the present sandstone foundation/timber girder planked deck bridge was constructed.
- The present four span bridge has sandstone abutments and three piers with superstructure of longitudinal timber beams supporting a timber planked deck set across the beams with longitudinal planks forming the roadway.
  There are large stone posts set on top of the piers.
- The first sandstone/timber girder bridge had only two piers giving three spans.
- From 1894 t0 1897 the bridge was altered to the 1889 specification-

  - the wing walls of the abutment on the Ross side to be taken down
  - a cutwater to be built to the existing abutment to match the other piers
  - excavation of the embankment for new abutment
  - a new abutment and wingwall to be built using the stone obtained from the demolition of the existing wing walls and to correspond with the old work

Peter Spratt
ABN 55 120 015 973

- two columns to with caps to correspond with the old ones
- two plates 10" x 3" x 23 feet long to be fixed on new pier and abutment to carry girders
- the seven girders to be 18" x 10" x 35 feet long and placed similarly to the old ones
- the decking to comprise planks 6" x 4" fastened to the girders with 8" spikes.
- a fence to be erected to the new span with 5" x 3" rails let into the stonework
- both old and new sections of the fence to be painted
- the girders to receive protective coatings of chenam and tar
- gravel boards to be laid on the whole length of deck with metal laid in between [see Appendix 1 for complete specification][2]

- Periodic replacement of rotted timbers has been necessary to the present day.
- In 1940, following a number of motor vehicle impacts, it was found necessary to repair cracked post stones, rebuild a south side post and pull three posts back into alignment.
- In 1943 the fourth span was given 5 timber piles at midspan to support the rotted girders.
- In 1951 work was carried out as -
  - filling in the centre of the upstream centre cap and replacing the back flagstone block
  - repairing the upstream intermediate cap and refacing the corners with sandstone rendering
  - reassembling the downstream pier and cap and replacing in its original position
  - refacing with rendering sections of the abutment on the southern side.
- In1962 the bridge was temporarily tommed to allow for a heavy load and in 1996-7 concrete and steel toms were placed under each span.
- In 1972 further vehicle damage repairs to the posts were carried out with some stones replaced.
- The toms were removed in 1983.

3. Assessment of Alterations

The original section of the bridge is the Eastern abutment but it appears to have been raised as indicated in photographs 6 and 9 below. This aligns with the 1889 specification requiring level adjustments.
The three present piers are not equally spaced. It is unknown as to whether the present spacing reflects foundation conditions, which pier has been inserted or whether new piers were constructed.
The piers were not mentioned in the 1889 specification.
The western abutment and its wing wall are an 1894-97 construction.

The original design of a timber girder bridge with longitudinal timber planked deck has been kept.
The bridge construction using timber has never been satisfactory with a record of continuing timber replacement at regular short intervals due to rot.
The massive stone posts have a record of damage, of movement and repairs due to motor vehicle impact.
The bridge load capacity has been severely impacted over its life due to timber rot with consequent usage limitations being imposed.
Tasmanian structural timbers are of low durability Class 4 giving an effective life span of only 5 years in harsh conditions. This compares with the 50 year durability of Class 1 timbers, such as Blackbutt and Ironbark, in other Australian States.

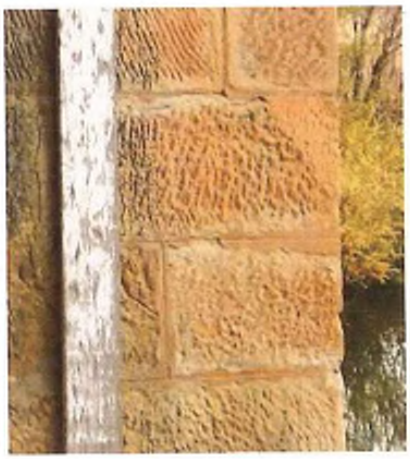
4. Inspection Observations
The following comments are illustrated by photographs 1-10.

- Trial drilling of stretcher pier stones shows them to be 370 thick with a small gap to other stone. There are full pier header stones under the posts suggesting that the piers have full width headers with little rubble infill between stretchers giving good solid construction.

View of full width header stone in pier.

Photograph 1.

- Drilling through bed joints in the piers shows the bedding is site soil with very little quicklime. This was common practice at the time but gives no bond strength and little resistance to washout with water entry following pointing loss.
- There is no structural cracking and no defects requiring attention in the piers and abutments other than the pointings.
- Pointing of stonework is a mix of good quality quicklime and later cement. There is substantial pointing loss in all stone faces.
- There is some damage from water retention and fretting where cement mortars have been used and replacing these mortars in fretting locations is warranted



Fretting at cement pointing.

Photograph 2.

- There is severe rot in all deck timbers and drilling of the girders shows severe internal rot.

  Photograph 3.

- All of the posts exhibit horizontal movements consistent with the historical record of vehicle impact. The posts have been altered with removal of supporting edge stones to allow for the insertion of the timber girders.

  Photograph 4.

- Concrete has been placed around some girders to support the cut back post edge. The work is clearly inadequate.

  Photograph 5.

Peter Spratt
ABN 55 120 015 973

- The change in stone heights on the eastern abutment suggests an alteration in adding height with a later extra height stone course.

  Photograph 6.

- There is significant rainwater runoff onto the eastern abutment.

  Photograph 7.

- Cracked and previously repaired post cap stone.

  Photograph 8.

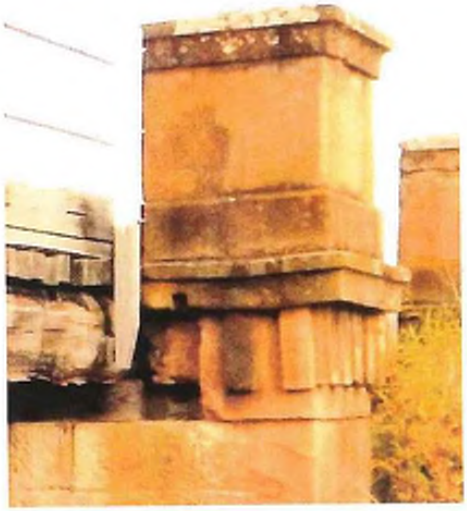
Peter Spratt
ABN 55 120 015 973

- View of eastern abutment, northern wall. Previous extensive stone fretting from rising damp due to downhill water runoff has been controlled by an air vent drain installed by Spratt around 8 years ago. Note stone height change.

Photograph 9.

- This post is recorded as being render repaired in 1940 after vehicle damage. It is severely cracked and distorted. It has no visible cracking to the render but will have no strength.

Photograph 10.



5. Strength of Tasmanian Sandstones

Compression The typical compressive strength of Tasmanian Sandstones is 60 MPa.
Tension Measured by - Dry Point Load Strength Index. (I_s) on 50dia.x50 specimens.
This is a good criteria for durability and varies widely in Tasmanian Sandstone.

Examples	Plummers Quarry	0.25MPa
	Tea Tree	1.13
	Ross	0.64
	Campania	0.31
	Waterworks	0.91
	Knocklofty	2.42
	Oatlands	0.90
	Melton Mowbray	1.51

I suggest the Ross data as best choice for the area.
Source - Sharples, Green, Spratt, Banks - Tasmanian Building Sandstones Vol 2. Dept of Mines Tas Unpub. Report September 1984

This source gave the Uniaxial Compressive Strength (UCS), as =24X I_s=15.36 for Ross.
The data and testing is 1984 and recent work has shown large errors may occur.
The (UCS), from recent testing, varies from 15-24x I_s giving large inaccuracy.
Current practice, for accuracy, is to measure the UCS directly and this is recommended.

Peter Spratt
ABN 55 120 015 973

6. Recommendations

The bridge is to have a major overhaul with new deck designed and constructed for a long life span.
This warrants remedial works to the sandstone abutments and piers to match this lifespan.

Making good the sandstone requires works as –

1. Replace and make good missing, defective and cracked stonework to posts.
2. Reface stonework on eastern abutment where face fretting exceeds 15mm.
3. Remove cement pointings where fretting is occurring.
4. Make good defective pointings in piers and abutments.

Cost Estimate

The costs are subject to uncovery to determine unknowns and no detail work has been done.
The estimate is subject to the above, is preliminary and suitable only for budget purposes.
Based on similar works I expect costs to be-

	$95,000
Contingency	$9000
Fees	$7000
GST	$11,000
TOTAL	**$122,000**

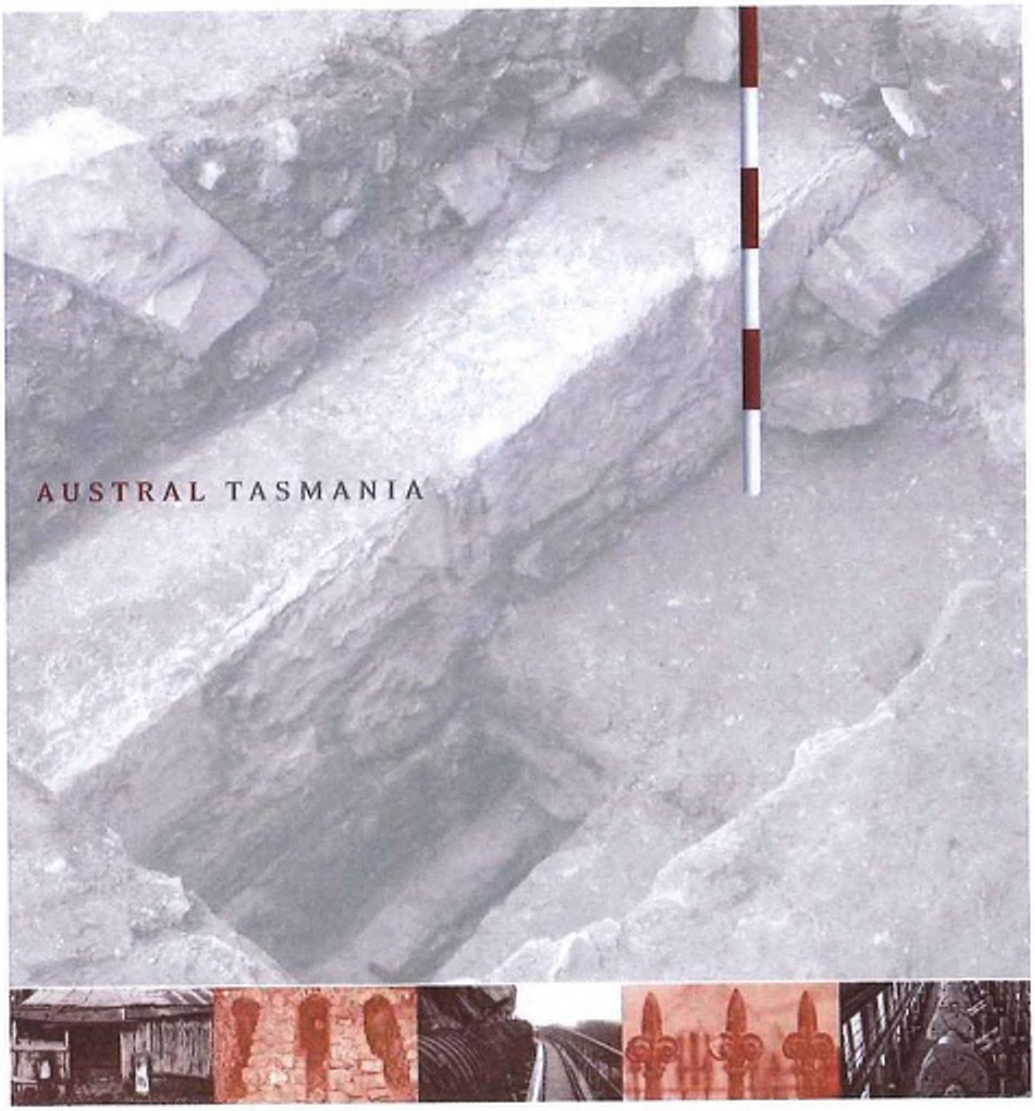
Yours faithfully,

PETER SPRATT AM

Conservation Management Plan & Heritage Impact Statement

Appendix D

pitt&sherry



Blackman River Bridge, Tunbridge

Conservation Management Plan and Heritage Impact Statement

Draft Report prepared for Pitt & Sherry

AT03012

April 2021

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Document Version	Date	Review Reason	Prepared By	Reviewed and Approved By
Draft V1	27 May 2021	Quality Assurance	James Puustinen, Alan Hay	Justin McCarthy
Final	19 July 2021	Client Review	Alan Hay, Justin McCarthy	Justin McCarthy

EXECUTIVE SUMMARY

Introduction

The Department of State Growth (DSG) has proposed works to the Blackman River Bridge in Tunbridge, Tasmania. DSG maintains the bridge on behalf of the Southern Midlands Council and submitted a number of renewal options for consideration. This option provides the best life cycle cost. The proposed works involve the replacement of the current timber elements with glue laminated timber beams supporting a concrete deck. The bridge is subject to statutory heritage management at both State and Local levels of government.

Following submission of a Development Application, Southern Midlands Council and Heritage Tasmania have requested DSG to provide additional information. This includes, in part, the preparation of a Conservation Management Plan (CMP) and a Heritage Impact Statement (HIS). Working in conjunction with Pitt & Sherry and Mr Peter Spratt, Consulting Chartered Engineer, Austral Tasmania Pty Ltd has been commissioned to prepare this documentation.

The Bridge and its Significance

The Blackman River Bridge was completed in 1849 and is a simply supported timber girder bridge using sandstone piers and abutments. An additional span was constructed on the northern end of the bridge in 1894.

The Bridge is permanently included in the Tasmanian Heritage Register and identified as a Heritage Place in the *Southern Midlands Interim Planning Scheme 2015*. The bridge has been re-assessed for its significance as part of this current project, finding that the place has historical value; rarity; research potential; demonstrates a class of place; potential social significance; has associative significance; and important aesthetic characteristics. Part of this significance relates to the bridge retaining its timber superstructure. Although not historic fabric, it is unusual in Tasmania and more broadly, being one of the oldest surviving timber-spanned bridges in Australia.

Conservation Policies

The purpose of the policies put forward in this CMP are to state how the conservation of the Blackman River Bridge and its setting may be achieved, and are based on an understanding of the cultural significance of the place.

The policies address a range of issues including recognition of the significance of the place; conservation processes and the management of change; use; and utilising suitable expertise during works.

A policy has also been included which specifies that heritage impacts should be avoided wherever possible, unless it is established that there are no prudent and feasible alternatives to these works. This policy recognises that the replacement of the existing timber structure with non-traditional materials will result in a heritage impact, but has been arrived at following the consideration of other options that may have resulted in a lesser heritage impact. Essentially, like-for-like timber replacement is deemed to be no longer suitable for economic or safety reasons.

Heritage Impact Statement and Statement of Compliance

A Heritage Impact Statement (HIS) has been prepared, along with a Statement of Compliance which considers the proposed works against the relevant provisions of the Heritage Code of the Planning Scheme.

The HIS concludes that the proposed glue laminated timber beams, concrete deck and painted steel railings will reduce or diminish the heritage significance of the bridge with regards to its historical values; rarity; representativeness; likely social values; associative values; and aesthetic characteristics. Some heritage benefits are however achieved by the proposal, specifically, that the use of the bridge will be restored which is of historical significance, and the bridge will continue to demonstrate its type of structure as a simply supported timber bridge, but utilising new technology of glue laminated beams as opposed to timber logs.

In recognising these potential impacts, State Growth has made efforts to minimise their extent. Existing timber girders will be salvaged and split to provide facades to the external faces of the glue laminated beams. The steel barricades will be of a similar colour and arrangement to what currently exists in

timber. These works will assist in maintaining the visual impression of the bridge as an historic structure, and be similar in form, details and patina to what currently exists. Perceptions of the success of these techniques are likely to be most effective for casual visitors, as opposed to closer inspection.

A review against the relevant Performance Criteria has been carried out, concluding that there are no prudent or feasible alternatives that would result in a lesser heritage impact, and that mitigation techniques can lessen the extent of impact.

State Growth has also indicated that economic and safety reasons for the proposed works are of greater value to the community than maintaining the heritage values related to the timber components of the bridge. Pitt & Sherry has found: that the existing timber structure, including the existing traffic barriers, is unfit for purpose in nearly all aspects; the sandstone sub-structure of the bridge is in very good condition given its age. There is no evidence of structural degradation in the sandstone sub-structure, although they note that the recent *Detailed Fabric Assessment* recommends that preventative maintenance should be carried out to the sandstone elements; the sandstone sub-structure, along with its foundations, is considered to have adequate vertical strength to carry contemporary loads and has sufficient capacity to resist expected horizontal loads due to stream flow and vehicles braking.

Recommendations

This report has been prepared to provide State Growth with advice as to the management of the heritage values of the Blackman River Bridge. It should be used to inform further planning work. The following recommendations have been made to assist with this process.

Recommendation 1

Sound timber work from the Blackman River Bridge should be salvaged for reuse as facades to conceal the external faces of the proposed glue laminated timber beams.

Recommendation 2

State Growth should investigate the feasibility of cutting or inscribing the asphalt deck surface to give the appearance of timber planks.

Recommendation 3

A detailed extant recording of the bridge should be made during the processes of the removal and renewal of the superstructure of the bridge. The recording should be made with reference to the Tasmanian Heritage Council's Practice Note 3: *Procedure for Recording a Heritage Place.*

Recommendation 4

The bridge barricade should be constructed from white painted, square or rectangular steel. Roads and Maritime Services (NSW) have previously designed steel barricades which resemble timber ones, which may be of assistance to this project.

Recommendation 5

All ground disturbances should avoid adjacent sites of archaeological potential. This includes potential remains of the first c.1822 bridge immediately downstream of the existing bridge; burials which were located at the end of the first bridge; and the convict road station at 132 Main Road, Tunbridge. These areas should be designated in the project specifications as 'Works Exclusion Areas' and be fenced off for the duration of works.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Client and project details

The Department of State Growth (DSG) has proposed works to the Blackman River Bridge in Tunbridge, Tasmania. DSG maintains the bridge on behalf of the Southern Midlands Council and submitted a number of renewal options for consideration. This option provides the best life cycle cost. The proposed works involve the replacement of the current timber elements with glue laminated timber beams supporting a concrete deck. The bridge is subject to statutory heritage management at both State and Local levels of government.

Following submission of a Development Application, Southern Midlands Council and Heritage Tasmania, DPIPWE have requested State Growth to provide a series of additional information. This includes, in part, the preparation of a Conservation Management Plan (CMP) and a Heritage Impact Statement (HIS). Working in conjunction with Pitt & Sherry and Mr Peter Spratt, Consulting Chartered Engineer, Austral Tasmania Pty Ltd has been commissioned to prepare this documentation.

This report has been prepared according to established guidelines and standards including Semple Kerr's *The Seventh Edition Conservation Plan* and the *Australia ICOMOS Burra Charter 2013*. The CMP accounts for the following key objectives:

- Understanding significance;
- Understanding condition; and
- A framework for management and change.

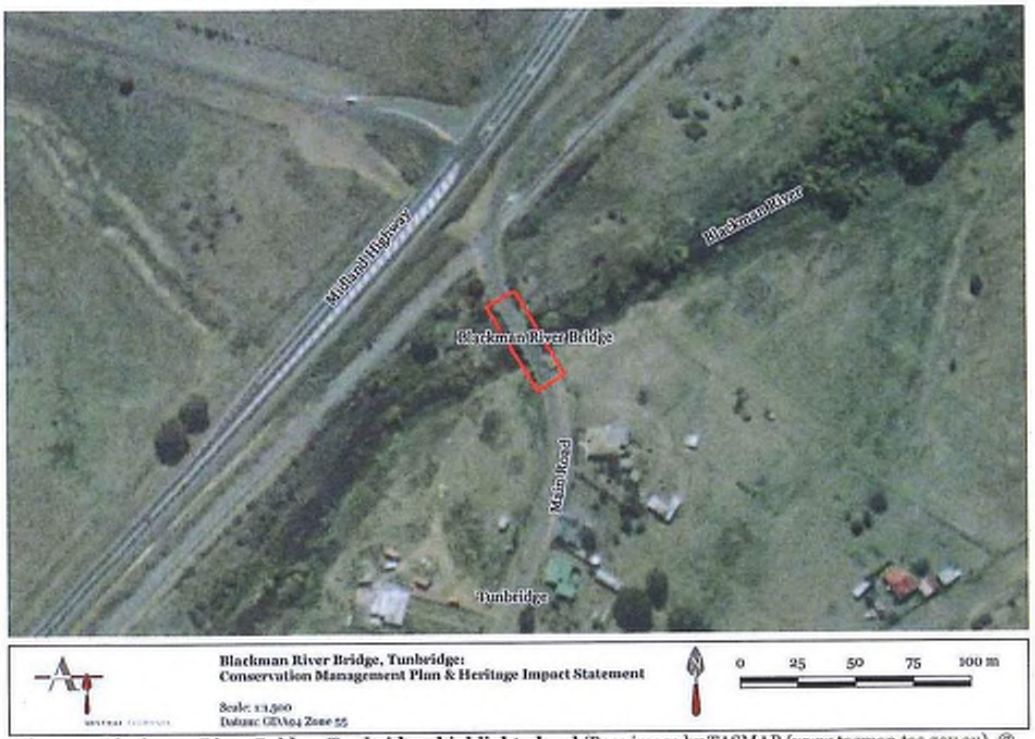

Figure 1: Blackman River Bridge, Tunbridge, highlighted red (Base image by TASMAP (www.tasmap.tas.gov.au), © State of Tasmania).

Figure 2: The Blackman River Bridge view of the upstream facade, looking to the north east (2015).

1.2 Authorship

This report was written by Justin McCarthy, Alan Hay and James Puustinen.

1.3 Limitations and Constraints

The advice, representations and recommended actions contained in this Conservation Management Plan are aimed at conserving the cultural heritage values of the Blackman River Bridge, and the management of change. The responsibility for assessing risks (real and/or perceived) arising from implementation of the report or aspects thereof rest solely with the owners and managers of the place.

No legal liability whatsoever is accepted by Austral Tasmania Pty Ltd for any direct or consequential loss, damage or injury (including without limitation any costs incurred in connection with proceedings either legal or arbitration) suffered by any person or entity which arises as a result of implementation of heritage conservation related advice at or about the place.

This report includes information summarised from previous investigations. Full and direct reference to the original source material is recommended.

Whilst every effort has been made to gain insight to the historic heritage profile of the subject study area, Austral Tasmania Pty Ltd cannot be held accountable for errors or omissions arising from such constraining factors.

1.4 Acknowledgements

The assistance of the following people and organisations is gratefully acknowledged:

- Mr Bjorn Jensen, Pitt & Sherry.
- Mr Peter Spratt, Consulting Chartered Engineer.

2.0 HISTORIC HERITAGE ASSESSMENT

2.1 Desktop review of registered and listed heritage places

Both Federal and State Acts of Parliament may have a bearing on the management of cultural heritage within or adjacent to the subject study area. Key legislation is summarised below. The summary is intended as a guide only and should be confirmed with the administering agency and, where necessary, specialist legal opinion.

Statutory heritage management applies at a State level under the *Historic Cultural Heritage Act 1995*, and also at a local level under the *Southern Midlands Interim Planning Scheme 2015*.

2.2 National Heritage Management Provisions

2.2.1 World/National/Commonwealth Heritage Lists

There is an established framework for the identification, protection and care of places of significance to the nation and/or Commonwealth. Entry in the National and/or Commonwealth Heritage Lists triggers statutory processes under the terms and provisions of the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Actions which will or may have a significant impact upon the recognised values of a listed place are required to be referred to the Australian Government Minister for the Environment, after which a judgement will be made as to whether the proposed action will require formal assessment and approval. The Act also provides for consideration of actions that may occur outside of a listed place that may have significant impact upon national heritage values, or actions taken on Commonwealth land or by Commonwealth agencies that are likely to have a significant impact on the environment (anywhere). Listing occurs by nomination, which may be made by any one at any time. The Act also provides for emergency listing where National Heritage values are considered to be under threat.

As at March 2021, the Blackman River Bridge is not included in or nominated to the World, National or Commonwealth Heritage Lists.

2.3 State Heritage Management Provisions

2.3.1 *Historic Cultural Heritage Act 1995*

The *Historic Cultural Heritage Act 1995* (*HCH Act*) is the key piece of Tasmanian legislation for the identification, assessment and management of historic cultural heritage places.

The *HCH Act* establishes the THR as an inventory of places of State significance; to recognise the importance of these places to Tasmania; and to establish mechanisms for their protection. 'State historic cultural heritage significance' is not defined, however the amended Act allows for the production of 'Guidelines', which presumably will use the existing assessment guidelines for the purposes of defining State level significance.[1]

A place of historic cultural heritage significance may be entered in the THR where it meets one of eight criteria. The criteria recognise historical significance, rarity, research potential, important examples of certain types of places, creative and technical achievement, social significance, associations with important groups or people, and aesthetic importance.

Works to places included in the THR require approval, either through a Certificate of Exemption for works which will have no or negligible impact, or through a discretionary permit for those works which may impact on the significance of the place.

Discretionary permit applications are lodged with the relevant local planning authority. On receipt, the application is sent to the Heritage Council, which will firstly decide whether they have an interest in determining the application. If the Heritage Council has no interest in the matter, the local planning authority will determine the application.

If the Heritage Council has an interest in determining the application, a number of matters may be relevant to its decision. This includes the likely impact of the works on the significance of the place; any

[1] *Assessing historic heritage significance for Application with the Historic Cultural Heritage Act 1995*

representations; and any regulations and works guidelines issued under the *HCH Act*. The Heritage Council may also consult with the planning authority when making a decision.

In making a decision, the Heritage Council will exercise one of three options: consent to the discretionary permit being granted; consent to the discretionary permit being granted subject to certain conditions; or advise the planning authority that the discretionary permit should be refused.

The Heritage Council's decision is then forwarded to the planning authority, which will incorporate the decision into any planning permit.

As at March 2021, the Blackman River Bridge is permanently entered in the THR. The assessment is detailed in its site history, description and assessment of significance, to the exclusion of aesthetic significance which was not a criterion at the time of registration. The registration datasheet and boundary plan for the bridge is included at Appendix 1.

2.3.2 *Works Guidelines for Historic Heritage Places*

The Tasmanian Heritage Council and Heritage Tasmania, DPIPWE, have issued *Works Guidelines for Historic Heritage Places* which must be applied when considering an application for an exemption or a discretionary permit. The guidelines provide a general reference for the types of works which may be exempt, or those where a permit will be required. They also define appropriate outcomes for a range of different works and development scenarios. Although specifically designed for places included in the THR, the guidelines provide useful advice for the management of heritage places generally.

The overarching guiding principles of heritage management are applicable to the proposed road improvements, specifically:

> 1: Understand why the place is significant
>
> Understand what makes a place significant before making any changes to the place. This can be done through historical research and examining the details of the place itself. Use this information to think about what components or spaces are the most significant, interesting and meaningful.
>
> 2: Changes to a place should be sympathetic to its significance
>
> Any changes to a place should be sympathetic to its significance. Avoid changes that will compromise and erode the place's significance; that will obscure significant features; or that will confuse understanding of the nature and evolution of the place.
>
> ....
>
> 4: Protect significant settings and significant views
>
> For many heritage places, it is important to protect its visual setting and any relationships to other significant elements. Demolition, alterations, new structures, landscaping or other changes that remove screen or impact on a place's significance should be avoided.

The guidelines do not include bridge works as a specific type of works. The following information is most applicable within the context of the proposed works and the identified heritage places:

Type of Works	What is generally eligible for an exemption?	Where is a discretionary application required by the Tasmanian Heritage Council and what are appropriate outcomes?
1. Maintenance and Repair of Built Elements		
1.1 Repair by select replacement	Selectively replacing sections or units of historic building fabric that are broken or decayed, where: - • the sections or units are demonstrably defective; and • repair is not feasible; and • the new work will match the material, detail, colour or finish of the original; and • the area of the replacement fabric is less than 25% of that part of the	Removing and replacing large sections of significant fabric. *Appropriate outcomes*: The amount of historic fabric replaced should be kept to a minimum so as to retain the authenticity of the place. Repairs that involve the introduction of discreet amounts of new material with little or no removal of the original should be pursued as the first option rather than replacement. Significant fabric should generally only be replaced where it has

Type of Works	What is generally eligible for an exemption?	Where is a discretionary application required by the Tasmanian Heritage Council and what are appropriate outcomes?
	structure on which the work occurs (ie: partial replacement).	degraded to such an extent that it can no longer be repaired. Where new works will be of a minor nature or are small in scale, it is preferable that there is a higher level of conformity between the new fabric and the original. New fabric and minor works can be distinguished by subtle means. For example, by distinguishing minor differences in construction, stylistic details, colour, material, and the junction between old and new. New fabric can also be distinguished by incorporating date or marking devices and by keeping records to document the feature as new works. Where significant elements (eg: historic doors, panelling etc.) are to be removed, it is preferable that they be kept on site in a secure location, so that they can be returned to their original location if required.
3. Restoration and Reconstruction		
3.1 Repair after minor damage (eg: resulting from fire, storm, but not gradual decay).	Salvage involving the removal of loose debris (resulting from a storm/fire etc.), where significant elements are retained and/or identified and safely stored. Reinstatement of significant elements to their original context. Reconstruction of significant elements (in which the form, detail and materials will be consistent with a known earlier state). See also section '1 Maintenance and repair of built elements' for repair of decayed elements.	Rebuilding to an altered form. *Appropriate outcomes:* Minimise changes to the significant features of a place. Changes in concealed areas will in many cases be acceptable. Damaged elements that are still structurally viable should be retained and incorporated into the "rebuild" in their original location so that they can still contribute to the place's authenticity. See also section '1 Maintenance and repair of built elements' for repair of decayed elements.
3.2 Restoration (ie: reinstating original fabric, possibly involving the removal of accretions)	Restoration in which: • suitably qualified and experienced trades people are employed to carry out the work; • the fabric is still in existence and is able to be re-used; • reconstruction is minimal, involving the substitution of missing or defective components with replica elements in a way that does not diminish the integrity of the whole; • accretions needing to be removed are clearly not historic fabric.	Reinstatement of elements (including original fabric) where the context of that fabric has substantially changed since it was removed. *Appropriate outcomes*: Traces of the place's evolution and history of use, which provide an important tangible illustration of its history and significance, should not to be stripped away to facilitate a preferred presentation of the place. In some cases it may be appropriate to demolish later additions that have little or no significance in order to restore or reconstruct elements that will reveal or enhance more significant aspects of the place.

Type of Works	What is generally eligible for an exemption?	Where is a discretionary application required by the Tasmanian Heritage Council and what are appropriate outcomes?
		Avoid adding details that are out of harmony with the place's architectural period as this will lead to confusion when trying to understand how a place has evolved. The new work should be materially compatible with what exists so as not to create conditions that will result in the decay of existing fabric.
3.3 Reconstruction (ie: new material introduced to replicate an element that is missing)	Reconstruction in which: • suitably qualified and experienced trades people are employed to carry out the work; • clear documentation exists to enable an earlier state to be reproduced • the reconstructed fabric is visually and physically compatible with the existing fabric; • the new work will be identifiable on close inspection or through interpretation.	Reconstruction where some aspects of the place's significance may be compromised. *Appropriate outcomes:* The work should be preceded by an investigation of the place's heritage significance and an analysis of competing or conflicting aspects of significance. In some cases it may be appropriate to demolish later additions that have little or no significance in order to restore or reconstruct elements that will reveal or enhance more significant aspects of the place. Material salvaged from other places and used in reconstruction should not be treated in a manner that conveys a false impression of the history and characteristics of the place. Interpretation can be used to counter any likely misconceptions.
6. Demolition, Relocation and Moveable Heritage		
6.2 Partial demolition	Demolishing or removing non-significant additions to heritage structures, where the work involved will not result in damage to historic fabric or will not markedly impact on the ability to understand the historical evolution of the place. Removing non-significant building fabric, applied finishes, fixtures or fittings.	Demolishing significant elements of a place. *Appropriate outcomes:* This should be avoided or minimised as far as practicable, so as to retain the heritage significance of the place. Partial demolition may be justifiable where it can achieve a greater conservation benefit; for example, where the partial demolition will allow for the sustainable use and conservation of the more significant parts of the place. Where an internal wall or other structural element is removed, it is desirable to keep vestiges (ie: traces) of the removed element as evidence of the past form of the building. Vestiges may be patches in the floor, wall nibs and ceiling bulkheads. In most cases the retention of vestigial elements is preferable to the complete removal of significant fabric. Where the fabric proposed to be removed is significant and has the potential to be

Type of Works	What is generally eligible for an exemption?	Where is a discretionary application required by the Tasmanian Heritage Council and what are appropriate outcomes?
		reinstated or meaningfully reused at the place, or if it has archaeological value (ie: as an artefact), the Heritage Council may require that fabric to be stored in good condition at the place.

Table 1: Relevant Information extracted from Works Guidelines

2.4 Local Heritage Management

2.4.1 *Southern Midlands Interim Planning Scheme 2015*

The Blackman River Bridge is located within the planning area of the *Southern Midlands Interim Planning Scheme 2015* (*SMIPS 2015*), however the bridge is an asset of the Northern Midlands Council.[2]

The *SMIPS 2015*includes a Local Historic Heritage Code, establishing local heritage places, heritage precincts, cultural landscape precincts and places of archaeological potential. Table E13.1 contains the list of heritage places. The Bridge is included on the list (No.380) with the general description noting it as a 'rare early sandstone bridge'.

The Scheme establishes a series of acceptable solutions and performance criteria for various proposed development scenarios of heritage places. Of most relevance to the Bridge are E13.7.1 Demolition and E13.7.2 Buildings and Works other than Demolition.

Clause E13.7.1: 'Demolition' has the objective To ensure that demolition in whole or part of a heritage place does not result in the loss of historic cultural heritage values unless there are exceptional circumstances.

There are no acceptable solutions under this standard for demolition and it must be assessed against the following performance criteria:

P1

Demolition must not result in the loss of significant fabric, form, items, outbuildings or landscape elements that contribute to the historic cultural heritage significance of the place unless all of the following are satisfied;

(a) there are, environmental, social, economic or safety reasons of greater value to the community than the historic cultural heritage values of the place;

(b) there are no prudent and feasible alternatives;

(c) important structural or façade elements that can feasibly be retained and reused in a new structure, are to be retained;

(d) significant fabric is documented before demolition.

Clause E13.7.2: 'Building and Works Other than Demolition' has the dual objectives of ensuring that development of a heritage place is:

(a) undertaken in a sympathetic manner which does not cause loss of historic cultural heritage significance; and

(b) designed to be subservient to the historic cultural heritage values of the place and responsive to its dominant characteristics.

There are no acceptable solutions under this standard and the works must be assessed against the following performance criteria:

P1

Development must not result in any of the following:

[2] ABC, Australia's oldest single span wooden bridge facing concrete future after Christmas eve fire: https://www.abc.net.au/news/2020-02-21/tasmania-tunbridge-wooden-span-bridge-fight-over-fix/11982966

(a) loss of historic cultural heritage significance to the place through incompatible design, including in height, scale, bulk, form, fenestration, siting, materials, colours and finishes;

(b) substantial diminution of the historic cultural heritage significance of the place through loss of significant streetscape elements including plants, trees, fences, walls, paths, outbuildings and other items that contribute to the significance of the place.

P2

Development must be designed to be subservient and complementary to the place through characteristics including:

(a) scale and bulk, materials, built form and fenestration;

(b) setback from frontage;

(c) siting with respect to buildings, structures and listed elements;

(d) using less dominant materials and colours.

P3

Materials, built form and fenestration must respond to the dominant heritage characteristics of the place, but any new fabric should be readily identifiable as such.

P4

Extensions to existing buildings must not detract from the historic cultural heritage significance of the place.

P5

New front fences and gates must be sympathetic in design, (including height, form, scale and materials), to the style, period and characteristics of the building to which they belong.

2.5 Non-Statutory Management and Identification

2.5.1 Register of the National Estate

The Register of the National Estate (RNE) was established in 1976 as a list of natural, Indigenous and historic heritage places throughout Australia, with limited statutory mechanisms relating to actions taken by the Commonwealth. As of February 2007, the RNE ceased to be an active register, with places no longer able to added or removed and the expectation that the States and Territories would consider places included on the RNE for management under relevant State legislation. The RNE ceased to exist as a statutory register on 19 February 2012 and references to the RNE were removed from the *EPBC Act*. The RNE continues to exist as a non-statutory information source. Coincidence with other heritage lists and registers (including the THR and planning scheme heritage schedules) is not uncommon. The bridge is included on the RNE.[3]

2.6 Section Summary

The following table summarises the various statutory and non-statutory mechanisms and identifies those in which part of the site is listed.

Register/Listing	Inclusion	Statutory Implications
National Heritage List	No	No
Commonwealth Heritage List	No	No
Tasmanian Heritage Register	Yes	Yes
Southern Midlands Interim Planning Scheme 2015	Yes	Yes
Register of the National Estate	Yes	No

Table 2: Summary of statutory and non-statutory mechanisms

[3] RNE, Bridge over Blackman River, Main Street, Tunbridge, TAS, Australia, 11637

3.0 HISTORICAL CHRONOLOGY

3.1 Introduction

A detailed history of the Blackman River Bridge was previously prepared by Scripps in 1996.[4] The Tasmanian Heritage Register entry also notes significant additional information regarding the association between the bridge and the Young Irelanders, who were exiled to Van Diemen's Land in 1848. The following provides a chronological summary of the key events relevant to the bridge.

3.2 Chronology

1811 Governor Lachlan Macquarie named the Blackman River during his first tour of Van Diemen's Land in 1811.

1822 The first Blackman's River Bridge was completed in 1822 by a convict road gang working under the director of Major Thomas Bell. The bridge was 'nearly one hundred feet long' (i.e., approximately 30 m), and described by Thompson as a primitive timber causeway.[5] The first bridge was located close to the current structure, Stancombe describing it as being slightly downstream.[6] An accurate plan showing the location of the first bridge is not known to exist, although it was depicted on large scale plans of the period, such as the 1829 map below.

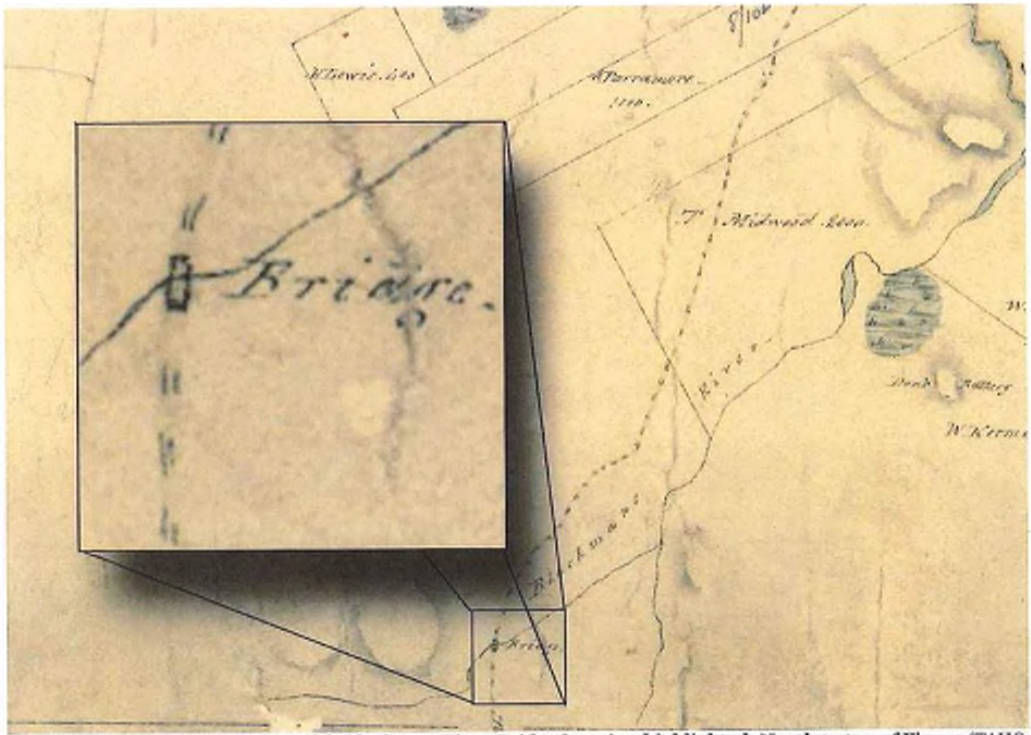

Figure 3: Detail from 1829 plan with Blackman River Bridge location highlighted. North to top of Figure (TAHO, AF395/1/14, Map - Exploration Chart 2 - South Esk, Macquarie and Elizabeth Rivers - surveyor W Wedge Darke)

1824-27? Previous histories have suggested that two Europeans were fatally speared by a group of Aboriginal people and were buried at the end of the original bridge.[7] Scripps disputes the veracity of this event, suggesting instead that a legend evolved from a known incident in 1816 when a party of two men and two women came under attack from a group of more

[4] Scripps, I., *Historic Surveys for Historic Tasmanian Bridges. Blackman River Bridge*, report prepared for the Department of Transport Contract No 492, January 1996
[5] Thompson, J, *A Road in Van Diemen's Land*, Tasmanian Government (DIER): Hobart, 2004, p.45
[6] Stancombe, GH, *Highway in Van Diemen's Land*, Stancombe: Glendessary: Western Junction, 1964, p.106
[7] *Ibid*

than 50 Aboriginal people in the vicinity of Salt Pan Plains, but escaped without loss of life or property.[8]

There may however be some truth in the story. Ross wrote in his 1829 almanac that:

> Almost in the centre of the plain, and at the 65th mile post on the Blackman's River, is the scite [*sic*] of the new township of Tunbridge. Across the stream is a bridge or platform of 5 or 6 arches. Formerly the native blacks had been very troublesome in this neighbourhood, as the traveler will remark by the melancholy appearance of some graves at the end of the bridge of the unfortunate herdsmen who had been murdered by them.[9]

Stancombe dates the above attack and burial to 1824, but the source is not cited. Confirmation of this event for this year has not been located. The closest event matching location and year that has been found so far occurred in 1827. Thomas Anstey, the Police Magistrate for Oatlands recorded an attack in June 1827 at the Arthur Mill, a property owned by William Lackey, on the Blackman River and to the west of Tunbridge. A newspaper account suggests that a group of about 100 Aborigines led by Kickerterpoller (also known as Black Tom/Tom Birch) were responsible for the attack. Two sawyers were speared during the event, resulting in the death of John Flood. A newspaper report noted that his colleague was unlikely to survive the wounds. It remains unconfirmed if it was Flood and his colleague who were buried near the bridge, as recorded by Ross above.[10]

1841 The timber bridge was badly damaged by fire in 1841. Repairs required its closure for one month, and it was described as being in a 'dilapidated state'. Plans to construct a new bridge were put on hold owing to difficulties in finding a suitable place to accommodate the convict road gang. In the meantime, traffic was redirected to cross the Blackman River by way of a ford, a dangerous exercise when the river was high.[11]

1846-49 Plans for a new bridge were prepared by James Victor of the Royal Engineers. Victor, in conjunction with the Superintendent of Public Works, Captain Frederick Forth had set the location of the new bridge as being near the old ford crossing. The Legislative Council voted £500 for the construction of a new bridge in 1846 and tenders for the supply of timber and lime were called for in May of that year.[12]

Construction of the new bridge was delayed however by planned reorganisation of the department. Responsibility for the Main Road and bridge works was transferred from Forth and the Roads Department to William Porden Kay, sometime Director of Public Works. Kay's focus appears to have been in the formation of the road leading from the south to the Blackman River and from there continuing to Ross in the north. Kay did note that sandstone for the bridge was readily available nearby and recommended that the bridge consist of two main stone arches in preference to wood. Public tenders for the bridge construction were called for in January 1847.[13] Copies of these plans have not been located as part of the research carried out for this current or previous projects.[14]

Works on constructing the new bridge appear to have begun in c.1847-48. Although public tenders had previously been called for its construction, it was built by a convict workforce supervised by John M Grant. The supply of the lime and timber was awarded to private contractors.[15]

A convict road station was established at Tunbridge for both constructing the bridge and the Main Road. This station was located adjacent to the bridge site, at the property now

[8] Scripps, *op. cit.*, p.1; Bonwick, J, *The Black war of Van Diemen's Land: with numerous illustrations and coloured engravings*, London: Sampson Low, Son, & Marston, 1870, p. 125
[9] Ross, J, *The Hobart Town Almanack, for the year 1829*, James Ross: Hobart Town, 1829, p.43
[10] Stancombe, *op. cit.*, p.106; TAHO, CSO1/1/316/7578, Nominal List of Inquisitions held by Mr Anstey on the bodies of twenty two persons murdered by the Aborigines from the 8th November 1826 to the 31st December 1830; *Colonial Times and Tasmanian Advertiser*, Friday 29 June 1827, p.3; *Colonial Times and Tasmanian Advertiser*, Friday 6 July 1827, p.4
[11] Scripps, *op. cit.*, p.3
[12] *The Courier*, Wednesday 27 May 1846, p.2; *Colonial Times*, Friday 29 May 1846, p.2; *Colonial Times*, Tuesday 19 January 1847, p.2
[13] *The Courier*, Wednesday 27 May 1846, p.2; *Colonial Times*, Friday 29 May 1846, p.2
[14] Copies of the bridge plans do not appear to have been transferred from the Royal Engineers to the Public Works Department. Indexes to the Colonial Secretaries Office, Public Works Department and Lands Survey Department have been reviewed in an attempt to locate the plans.
[15] Scripps, *op. cit.*, p.5

defined as 132 Main Road, Tunbridge. Moveable wooden buildings were initially erected on site to house the convicts whose job it was to erect permanent accommodation for the bridge and road gangs. The site included four large huts, intended to house 200 convicts, although by the end of 1848, a total of 310 men were stationed at the site. In addition to providing convict housing, the station was to include a senior assistant superintendent, an assistant superintendent, four overseers, a school master, a storekeeper and four watchmen.[16]

The bridge was nearing completion by early 1849. A description from this time noted that it would be:

> ... a good addenda to colonial work of ornament and utility. There are four pillars of freestone masonry, forming three arches or passages for the water, which is very inconsiderable except in flood seasons. Each arch is about four feet wide, covered over with tarred planks, four inches thick. The road in the immediate vicinity is nearly laid out and bounded, and formed ready for metalling.[17]

Kay reported on the completion of the bridge in August 1849.[18]

1849-50

Bridges provide a vital role in transport, communications and trade. The Blackman River bridge however also became an important meeting point for exiled members of the Young Ireland movement. The nationalist group emerged during the 1830s, supporting the repeal of the Act of Union which joined the Kingdoms of Great Britain and Ireland. The eruption of violence was prompted by the 1845 potato blight famine, eviction of tenant farmers, and the inspiration of other 1848 revolutions which gripped much of Europe.

A failed rebellion in July 1848 resulted in seven leaders of the movement being transported to Van Diemen's Land between 1849-50. The members of the group were deliberately separated in the colony and prevented from crossing the county borders to meet. Thomas O'Meagher lived at Ross, while Kevin O'Doherty lived in Oatlands. The boundary between the two counties was the Blackman River. In circumventing the restriction, the two used to meet mid-way across the bridge on Mondays. On their second meeting, the middle pier of the bridge was christened the Irish Pier. Meetings in Tunbridge continued for several months, until being relocated to Lake Sorell, which formed the boundary of three districts, and allowed John Martin to join the gatherings.[19]

1879

Like all similar structures, it is likely that maintenance, repair and renewal of the timber elements occurred periodically over the coming decades. The first documented major works occurred in 1879 with the renewal of the timber decking and fencing for three spans.[20]

1894

Tenders were called in 1894 to increase the size of the bridge to allow floodwaters to more easily pass through the spans. These works resulted in the construction of an additional span at its northern end. The specifications for the works required:

- Removal of the abutment on the Ross side of the bridge.
- Construction of a cutwater on the existing abutment to match the existing cutwaters on the other piers.
- Excavation of the embankment for a new abutment.
- A new abutment and wing wall using stone recycled from the existing wing walls.
- Two new columns with caps to match the existing.
- Installation of two new timber plates fixed on the new pier and abutment to carry the girders.

[16] Tasmanian Heritage Register, former Tunbridge Police & Convict Road Station, 119 Main Road Tunbridge, THR ID No. 10202; Scripps, *op. cit.*, p. 5
[17] *The Cornwall Chronicle*, Saturday 13 January 1849, p. 300
[18] *The Cornwall Chronicle*, Wednesday 22 August 1849, p.807
[19] Tasmanian Heritage Register, Tunbridge Bridge, THR ID No. 5585
[20] Scripps, *op. cit.*, p.6

- The replacement of seven girders, 35 feet long (i.e., approximately 10.7 m) and to receive a protective coating of chenam (i.e., prepared lime) and tar.
- Replacement of the timber decking and installation of gravel boards along its length.
- Installation of fencing along the new span and painting of all the fencing.[21]

Plans for these works do not appear to have been retained. The earliest depiction of the bridge which has been located dates from 1917 and shows the 1894 works (Figure 4). The modified bridge was described in 1938 as being:

> ... a masonry substructure with timber top, there are two abutments and three piers, with pillars rising from the ends of the abutments and piers acting as posts for the handrails of the bridge.[22]

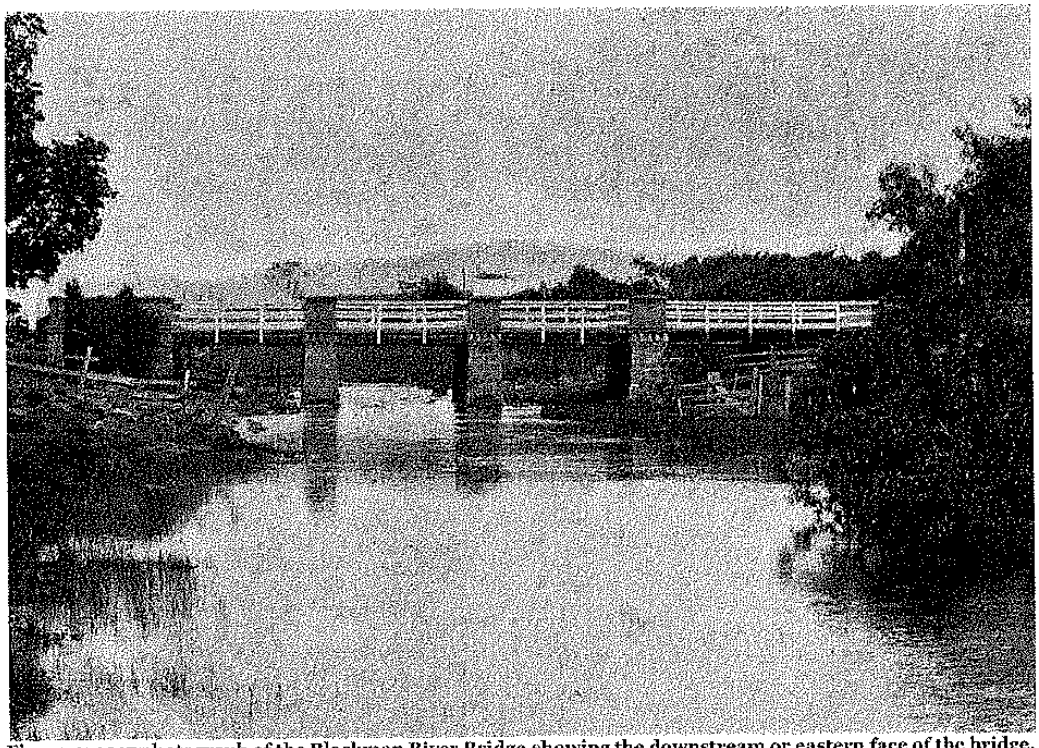

Figure 4: 1917 photograph of the Blackman River Bridge showing the downstream or eastern face of the bridge. The wall on the Tunbridge side can be seen on the left, while the new 1894 span is located on the right (TAHO, *The Weekly Courier*, Thursday 22 November 1917, p.17).

1906 Repair works were carried out to the handrails in 1906, and later that year the Tunbridge Road Trust reported on the dangerous condition of the bridge. The Minister authorised £50 for repair works, which included the replacement of a large part of the decking.[23]

1914-19 An inspection of the bridge in 1914 revealed that 16 of the girders had rotted and need replacement, while seven others were rotten on the top, but could be retained for another four of five years. Some of the renewal works appear to have been carried out, but both the Ross and Oatlands Councils complained about the dangerous state of the bridge in 1919, with insecure or missing side walls, and rotten decking and beams. The condition of the bridge was again investigated and it was recommended that eight girders be replaced and new decking installed. Some new hand rails were installed at this time.

[21] *Ibid*, p.8
[22] *Ibid*, p.10
[23] *Ibid*, p.11

1922-28

The Ross Council again brought the condition of the bridge to the attention of the Department in 1922. The bridge was inspected, and it was noted that urgent repairs were required, including renewing one girder, 70 pieces of decking and some of the posts for the handrail.[24]

Another section of decking was replaced in 1926, but further inspections in 1928 showed that it was futile to carry out further works to the decking, without replacing 11 of the girders. Approval was given to install two 36 feet (i.e., approximately 10.9 m) girders and nine 22 feet long (i.e., approximately 6.7 m) girders.[25]

1933-34

Partial replacement of the decking was carried out in 1933. The works however were unsuccessful, contributing to the unevenness of the deck. A request to carry out extensive deck replacement was rejected, on the basis that the entire superstructure would need to be renewed within six years. Instead, partial deck replacement and repairs to the kerbs and handrails was approved.[26]

1938-40

The advent of motor vehicle transport resulted in increased numbers of collisions with the bridge. Damage was caused to two pillars on its eastern side in 1938. The central pillar had been struck several times before, but a collision in June 1938 resulted in one of the large stones being displaced and falling into the river. The pillar was pulled back into position, and the missing stone retrieved. Further accidents over the next few years resulted in a pier on the south end being destroyed to the base, which was rebuilt in 1940, with three other pillars pulled back into alignment.[27]

1943-51

Extensive repair works were carried out in 1943. The Department advised that a completely new superstructure was required, with most of the timber work being rotten. The beams in spans 3 and 4 at the Ross end were in the worst state, some resting directly on the stone piers, without timber plates to fix them in place. The works were urgent and £445 was authorised to repair the two spans, in addition to replacing 50 % of the deck and adding runways to the bridge to keep vehicles in line. A new pier was added to support the fourth span at the Ross end of the bridge as part of these works. New packing timbers were also installed at the edge of each pier and abutment, with space between the timber and stone work filled with concrete.

In 1946 the sandstone wall on the Tunbridge approach to the bridge and a pier were damaged following a vehicle accident. Repair works were not considered urgent at the time, however by 1949 there was a risk that the pier would be lost completely. Consideration was given to rebuilding it using concrete bricks as an easier option than retrieving the displaced stones in the river, but was found to be impracticable. Instead, in 1951 a decision was made to restore the bridge to its historical shape, requiring:

- Filling in the centre of the upstream centre cap and replacing the sandstone capping block.
- Repairing the upstream intermediate cap and refacing the corners with sandstone rendering.
- Reassembling the downstream pier and cap and replacing in the original position.
- Refacing with render the abutment on the southern side.[28]

1956-61

Major repair works to the superstructure were carried out in 1956-57. Nine beams were replaced and the decking was renewed and sealed. The joints in the upstream ends of the piers were re-mortared. The works however were only partially successful. By 1961 the decking had shrunk with gaps up to 1.5 inches (i.e., approximately 3.8 cm) between the individual pieces, resulting in the road surface breaking up. The gaps were filled and the decking resealed.

[24] *Ibid*, p.12
[25] *Ibid*, p.13
[26] *Ibid*, pp. 13-14
[27] *Ibid*, p.14
[28] *Ibid*, pp.15-16

1962-66	Temporary propping or 'toms' was installed under the girders in 1962 to allow heavy loads to be transported over the bridge. However, more permanent solutions were put in place in 1966-67, when each span of the bridge was strengthened with concrete and steel props in order to obtain the maximum life out of the timber superstructure. This method was adopted to minimise disruptions to traffic movements on the highway.[29]
1972	By 1972 further damage had been done to the stonework on the downstream, southern side of the bridge following several vehicle collisions, some of which displaced stone work into the river. The damaged piers were repaired, including the installation of some new stones. Major upgrades were carried out to the Midland Highway during this period, resulting in the bypassing of a number of towns, including Tunbridge. The redirection of the highway removed most of the traffic from the Blackman River Bridge.[30]
1980s-2000s	Approval was given in 1980 to remove the steel and concrete toms and renew the timber superstructure. The decking was resealed in 1984. The bridge was declared an historic bridge by the Tasmanian Government in 1989. The decking was again renewed in 1994. Plans to seal the bridge decking to improve skid resistance were initially delayed, owing to community and National Trust concern that the decking should be left unsealed in the interest of its historic character. A meeting was held in February 1995 with representatives from the Department, community and Southern Midlands Council to discuss the issues and a petition was presented signed by a large majority of Tunbridge residents opposing sealing the deck. The following month an arsonist attempted to burn down the bridge but was unsuccessful. Ultimately, the Minister decided that the deck would be sealed and it remains in this state to the present.[31] More recent works have also taken place. Guard rails were installed at the end of the bridge and between the piers in 2002-03; vegetation on the upstream side was removed in 2004-05; timber elements were renewed, including the replacement of seven crushed beams in 2007-08; stonework on the eastern abutment and some of the upstream side superstructure was re-pointed in 2009-10; an air vent drain to remove dampness was installed in 2011-12; and, a new kerb was installed to move vehicular traffic off a crushed beam in 2014-15.[32]
2019-2021	An arson attack on Christmas Eve severely damaged the wooden spans and decking.[33] The bridge remains closed to the present in 2021.

[29] *Ibid*, pp.16-17
[30] *Ibid*, pp.17-18
[31] *Ibid*, pp.18-19; *The Mercury*, Friday 3 February 1995, p.1; *The Mercury*, Saturday 4 February 1995, p.5; *The Mercury*, Saturday 18 February 1995, p.5; *The Mercury*, Monday 20 March 1995, p.5
[32] Pers. Comm., Vincent Tang (State Growth) 25 March 2015; Email, Lillian Reardon (State Growth) to Darren McConnon (State Growth), 15 April 2015; Email, Darren McConnon (State Growth) to Lillian Reardon (State Growth), 16 April 2015
[33] ABC, Australia's oldest single span wooden bridge facing concrete future after Christmas eve fire: https://www.abc.net.au/news/2020-02-21/tasmania-tunbridge-wooden-span-bridge-fight-over-fix/11982966

4.0 FABRIC OF THE PLACE

4.1 Description of the Blackman River Bridge

The Blackman River Bridge is located on a bypassed section of the old Midland Highway, at the northern end of Tunbridge. The old highway, now 'Main Road', approaches the bridge by way of a wide 'S' turn, with post and rail fencing on the southern approach and at the north-eastern end. Because of the curves in the approaches, pedestrian views to the bridge piers and timber substructure are available from the road reserves. Access to the riverbanks to view the bridge is limited or restricted. The northern riverbank is private freehold property and lawful access requires owner permission. The southern riverbank on the Tunbridge side of the bridge is classified as a 'public reserve', but access is restricted by fencing.[34]

Three late nineteenth, early twentieth century timber houses are located on the southern approaches and the Main Line Railway crosses near its northern end. The immediate setting is largely cleared open pasture with exotic plantings (mostly willows) naturalised along the course of the Blackman River. The River is located in a shallow valley, and extended views up and down the river are available from the bridge.

Schematic diagrams of the existing general arrangement of the bridge are included in Figures 5-6. The bridge has three sandstone piers and stone abutments at both ends. It has a simply supported timber superstructure and is of four spans. Commencing at the southern, or Tunbridge end, span 1 is approximately 6.650 m long, span 2 is 6.700 m long, span 3 is 6.500 m long, and span 4 at the Ross end is approximately 10.050 m long. Span 4 and the northern abutment relates to the 1894 bridge works. The bridge is approximately 5.710 m wide between the timber railings.

The southern, Tunbridge approach to the bridge has sandstone walls lining both sides of the old highway. These walls were removed from the northern, Ross end of the bridge resulting in the current lower abutments which are not readily visible from the road.

The sandstone piers are tapered with cutwaters on their western, or upstream side. The piers extend in height and form the posts or pillars for the timber railings. Each pier includes sandstone corbels located at the same height as the timber girders. This detailing is not readily apparent when crossing the bridge by vehicle, but can be appreciated by pedestrians when the bridge is viewed from either end, or the river banks. Concrete infill has been placed on the inner side of each pier, around the log landings. The concrete work is crude in its appearance, and has an adverse visual impact on the bridge.

The bridge superstructure is of timber. Timber bearers are placed on each pier with the spans crossed by seven large timber logs or girders. The girders have been roughly formed to provide level tops and bottoms to attach to both the bearers and transverse decking. The girders have diameters ranging from 500mm - 650 mm for spans 1 to 3, and 520 mm - 700 mm for span 4.

Transverse decking has been placed across the girders, with the cut ends left exposed. The decking of the bridge is also timber. It has been laid longitudinally and then covered with a road surface. The decking material is readily appreciable, with gaps apparent between each plank, most notably towards the centre of the bridge. Timber kerbing lines each side of the road, with two rails of timber fencing placed within each stone pier.[35]

[34] LISTMap

[35] Peter Spratt Consulting Chartered Engineer, *Blackman River Bridge, Tunbridge. Heritage Assessment of Superstructure Replacement*, unpublished report to Pitt & Sherry, 17 June 2014; Pitt & Sherry, *Blackman River Bridge (B599) Renewal of Timber Superstructure and Barriers Concept Design Report*, unpublished report prepared for the Department of State Growth, 25 August 2014; Pitt & Sherry, Level 3 Condition Inspection Report. Bridge No. 599 Blackman River Bridge, unpublished report prepared for the Department of Infrastructure, Energy & Resources, May 2012

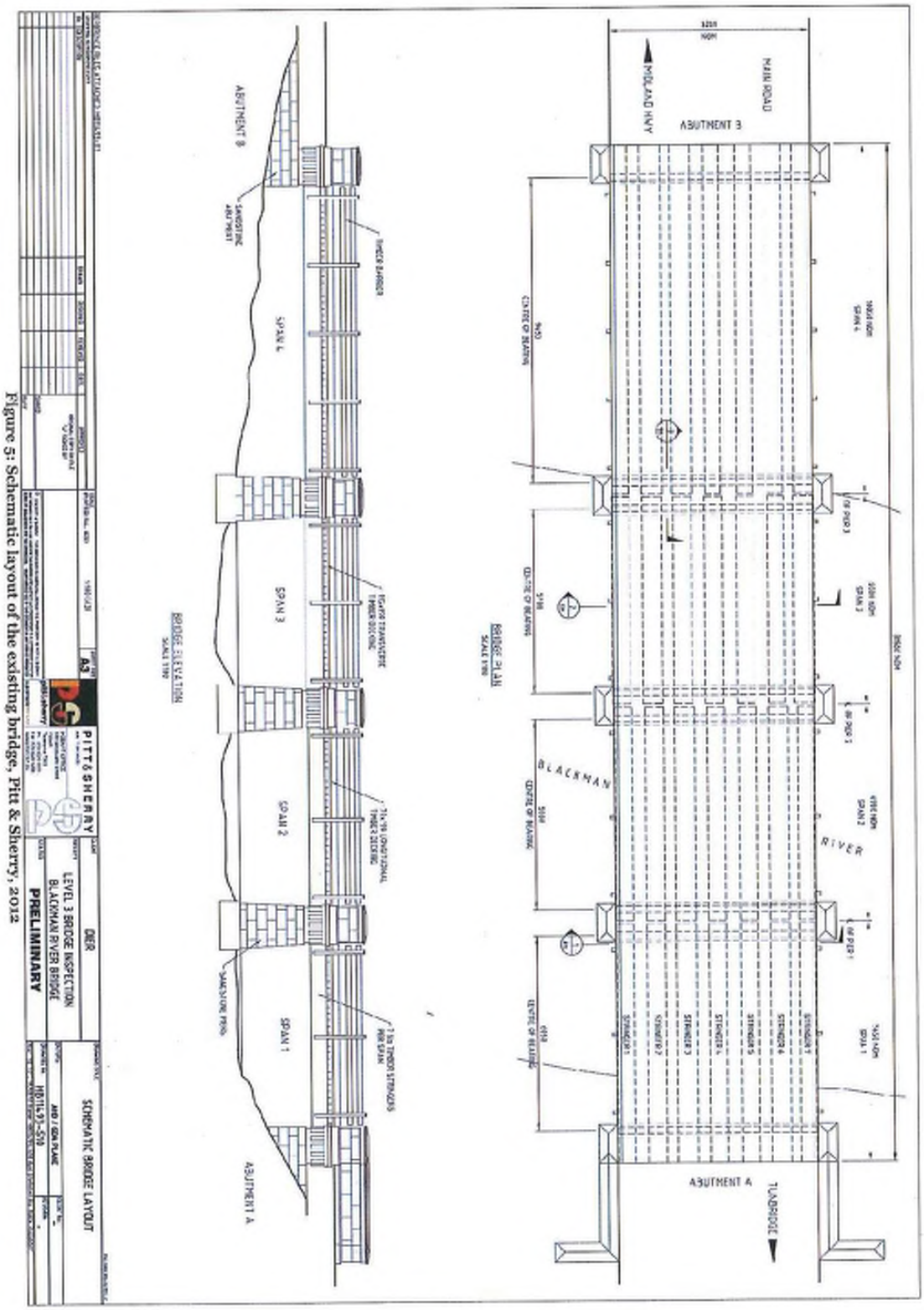

Figure 5: Schematic layout of the existing bridge, Pitt & Sherry, 2012

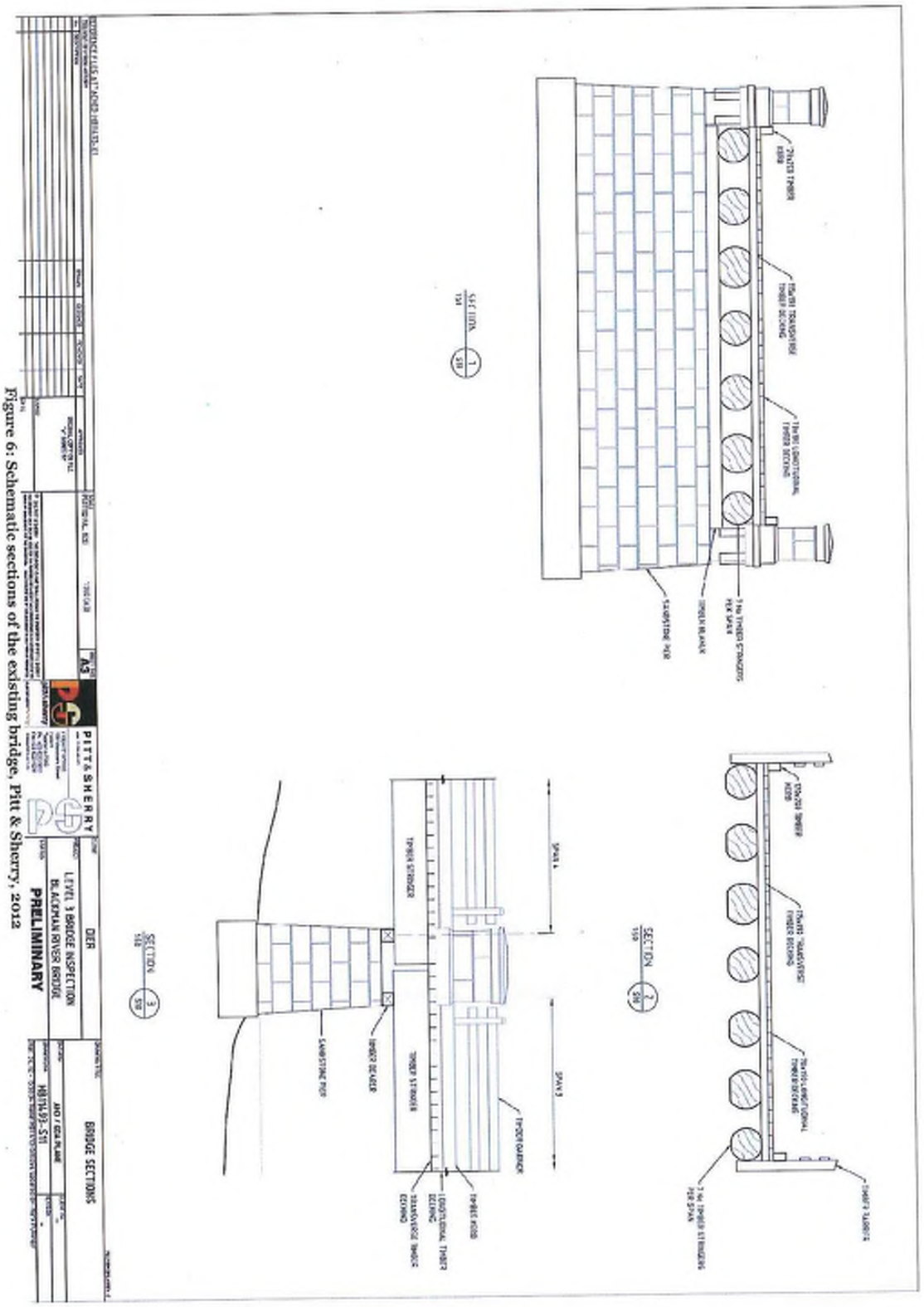

Figure 6: Schematic sections of the existing bridge, Pitt & Sherry, 2012

4.2 Fabric Assessment of the Blackman River Bridge

Two condition assessments of the Blackman River Bridge have previously been undertaken. Spratt provided an overview of the condition of the stonework in 2014, whilst Pitt & Sherry assessed the timber superstructure in detail in 2012.[36] A recent fabric assessment report of the structure, "Blackman River Bridge B599: Structural Report,' has also been completed this year and documents findings that were similar to those identified in the earlier works.[37] This report is based in part on 'Blackman River Bridge, Tunbridge Detailed Fabric Assessment' by Peter Spratt.[38] The original report by Spratt will be considered first.

The observations made by Spratt were:

- The stretcher piers were of solid construction with little fill or quicklime.
- No structural cracking or defects.
- Pointing of stonework is a mix of good quality quicklime and later cement with pointing loss on all stone faces.
- Some damage has occurred from water retention and fretting where cement mortar was used and replacement of these cement mortars is warranted.
- There is severe rot in all deck timbers and girders.
- All the posts exhibit movement consistent with vehicle impact, these posts have been altered for the insertion of timber girders.
- Concrete has been placed around some girders, but this work is inadequate.
- Evidence of an extra course of stone added in eastern abutment.
- There is significant rainwater runoff on to eastern abutment.
- Capstones have cracked and been repaired.
- Previous stone fretting of northern wall has been controlled by new air vent.
- A sandstone post damaged by vehicle is considered to have no strength.

Spratt provides the following conclusions:

> The bridge is to have a major overhaul with new deck designed and constructed for a longlife span.
>
> This warrants remedial works to the sandstone abutments and piers to match this lifespan.
>
> Making good the sandstone requires works as –
>
> 1. Replace and make good missing, defective and cracked stonework to posts.
> 2. Reface stonework on eastern abutment where face fretting exceeds 15mm.
> 3. Remove cement pointings where fretting is occurring.
> 4. Make good defective pointings in piers and abutments.[39]

In the Pitt and Sherry Fabric assessment report the sandstone substructure was considered to be in good condition 'with no significant movement of cracking in the abutments or piers.'[40] Although repairs to jointing and blockwork, especially in regards to the sandstone columns are necessary the load carrying capacity of both the piers and abutments were considered to be fully intact. The southern abutment rests on solid bedrock with solid rock adjacent to the northern abutment and northernmost pier. The area around the two southern piers could not be viewed directly but was instead sounded to a depth of 0.75m below water level with solid rock being indicated at this depth.

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[36] Pitt & Sherry, May 2012, *op. cit.*; Spratt, *op. cit.*
[37] Pitt & Sherry, 'Blackman River Bridge B599: Structural Report,' unpublished report prepared for State Growth, May 2021
[38] Spratt, P. "Blackman River Bridge, Tunbridge Detailed Fabric Assessment,' unpublished report prepared for Pitt & Sherry, April 2021.
[39] Spratt, April 2021, p.7.
[40] Pitt & Sherry, May 2021

The timber superstructure of the bridge is considered to be unsuitable for vehicular loads.[41] Earlier noted rotting of beams and deck planks was noted to have advanced from a 2018 site inspection. Drill testing of timber material to a depth of 125mm showed evidence of rot in every case. The spreader beams are heavily rotted and collapsing with the spreader beam at the southern abutment visibly folding under the load.

This report concludes that:

> The sandstone sub-structure, along with its foundations, is considered to have adequate vertical strength to carry contemporary loads. The design of any superstructure replacement should provide for adequate spreading of loads under beams, preferably using a structural material that is more degradation resistant than the existing timber spreader beams. The use of in situ cast concrete spreaders would not only allow such load spread but also permit the top of the piers and abutments to be well tied together, thus reducing the risk of future movement degrading the sandstone. It will be necessary to give careful consideration to avoiding future degradation to the sandstone by preventing the movement of moisture.
>
> The sandstone substructure has sufficient capacity to resist expected horizontal loads due to stream flow and vehicles braking. The existing timber traffic rails are unfit for purpose and should be replaced as part of any future superstructure replacement. Future "Low performance level" barriers may not fully comply with Australian Standards or DSG requirements but should provide the best outcome possible for traffic safety and protection of the sandstone bridge columns.[42]

[41] Pitt & Sherry, May 2021
[42] Pitt & Sherry, May 2021, pp.12-13

5.0 THE SIGNIFICANCE OF THE BLACKMAN RIVER BRIDGE

5.1 Assessing Significance

The assessment of cultural significance is a pivotal part of any Conservation Management Plan. In this report significance is firstly expressed in terms of the *Australia ICOMOS Burra Charter 2013* (the *Burra Charter*) definition of cultural significance Article 1.2 of the *Burra Charter* defines:

> Cultural significance means aesthetic, historic, scientific, social, or spiritual value for past, present or future generations.
>
> Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects.[43]

The *Southern Midlands Interim Planning Scheme 2015* defines 'historic cultural heritage significance' as having the same meaning as in the *Historic Cultural Heritage Act 1995* (*HCHA 1995*), namely, its significance in terms of the registration criteria, which are:

a) the place is important to the course or pattern of Tasmania's history;

b) the place possesses uncommon or rare aspects of Tasmania's history;

c) the place has the potential to yield information that will contribute to an understanding of Tasmania's history;

d) the place is important in demonstrating the principal characteristics of a class of place in Tasmania's history;

e) the place is important in demonstrating a high degree of creative or technical achievement;

f) the place has a strong or special association with a particular community or cultural group for social or spiritual reasons;

g) the place has a special association with the life or works of a person, or group of persons, of importance in Tasmania's history;

h) the place is important in exhibiting particular aesthetic characteristics.

The most useful and detailed elaboration of the difference between State and Local significance is the Tasmanian Heritage Council's *Assessing Historic Heritage Significance for application with the Historic Cultural Heritage Act*. At its simplest, the distinction between State and local is a question of whether the heritage values are important to a region or local community, or extend to being important to the whole of Tasmania.

In applying this distinction, thresholds have been developed to define the minimum required value/s that a place must possess to be considered as having heritage significance at either State or local levels.[44] This Conservation Management Plan has had regard to the principles contained in these Guidelines.

5.2 Comparative Analysis

As part of this assessment, a comparative analysis has been carried out as a useful means in understanding why the place and its components may have heritage significance, and how important they are, when compared with other similar places. In making comparisons, it is important to attempt to refer to a data set that will support 'like with like' evaluations. Within this report, the comparative analysis largely relates to the Tasmanian context.

The two components under consideration of this analysis are:

- Stone bridges; and
- Timber decked bridges.

The earliest Tasmanian bridges were poorly constructed of timber with earth covered timber decks resulting in continuous problems. These bridges were short lived, and were quickly replaced with more permanent stone or brick arches constructed under convict labour. With responsible Government in

[43] Australia ICOMOS *Burra Charter*, Art. 1.2
[44] DPIPWE, *op. cit.*

EXHIBIT F

1856 came the need to locally finance construction. Timber again became the predominate material. Wrought iron and steel remained reserved for special situations.[45]

Comparatively, Tasmania is fortunate in retaining a number of stone bridges constructed between 1838 and 1847. These include a timber and stone/earth causeway constructed in c.1823 in Campbell Town;[46] the Richmond Bridge (1825); the Strathroy Bridge at Kerry Lodge (1834); the Ross Bridge (1830-36); the Tacky Creek Bridge (1836); the Little Quoin Rivulet Road Bridge, Kempton (1840); the Lovely Banks Bridge (1840); Spiky Bridge (1845-48); the Stone Bridge, East Derwent Highway, Risdon (c.1840); the Jericho Bridge (c.1840); the Jordan River Bridge, Pontville (1848); the Three Arch Bridge, Little Swanport (c.1840s); and the Melton Mowbray Bridge (c.1840).[47] The Blackman River Bridge can be considered a representative example of a nineteenth century bridge constructed (or largely constructed) in permanent materials, and utilising convict labour in its construction.

Of these bridges, the Blackman River bridge most closely resembles the Pontville, Melton Mowbray and Jericho bridges, and in these cases the timber superstructures have all been replaced with concrete decks. The Blackman River Bridge is unusual in that it retains its timber superstructure, noting that this is quite recent fabric.

Previous publications and tourism promotional material claim that the bridge is Australia's oldest timber girder bridge.[48] This is incorrect. Two older bridges are known to exist in New South Wales. These are the Thomas James Bridge which is a single span timber deck bridge constructed on stone abutments (1830) and Clares Bridge, which has two spans over a stone pier and abutments, also constructed in 1830.[49]

The only other possible Tasmanian candidate that has been identified and which predates the Blackman River bridge is a small structure located at Campbell Town which possibly relates to the first timber and stone/earth causeway constructed in c.1823.[50]

Whilst not Australia's oldest timber girder bridge, the Tasmanian Heritage Register (THR) statement that the Blackman River Bridge is *one of* the oldest such bridges would be correct.

5.3 Existing Assessments of Significance for the Blackman River Bridge

The THR entry for the Blackman River Bridge is detailed in its analysis of the place – its history, fabric and values. The bridge has been included on the THR against four criteria: (a.) historical importance; (b.) rarity; (d.) importance in demonstrating a class of place; and (g.), associative significance. The existing THR entries have formed the basis of the assessment of significance prepared for this CMP. In addition, the RNE includes a brief statement, describing the values of the bridge as:

> A stone bridge of Colonial design, spanning the Blackman River on the old Midland Highway at Tunbridge. The bridge is still in use for local traffic and contributes to the townscape of Tunbridge.[51]

5.4 Assessment of Significance for the Blackman River Bridge

The following assesses the significance of the Blackman River Bridge against the eight criteria of the *Historic Cultural Heritage Act 1995*. It is substantially informed by the existing THR entry, and has been prepared with regard to the Tasmanian Heritage Council's *Assessing Historic Heritage Significance for application with the Historic Cultural Heritage Act* which assists in articulating statements of significance.

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[45] Balsille, GD, 'Notes on Tasmanian Highway Bridges', *Transactions of the Institution*, Vol XV, 1934, pp.1-2
[46] Evans, K, *Old Bridge, Bridge Street Campbell Town, Historical Review*, Tasmanian Heritage Council, 1998, pp.3-5
[47] Register of the National Estate
[48] O'Connor, C, *Spanning Two Centuries: Historic Bridges of Australia*, St. Lucia, Qld.: University of Queensland Press, 1985, p.75; http://www.heritagehighway.com.au/d/towns_and_history/tunbridge#.VRSjOeGqueA; ABC, Australia's oldest single span wooden bridge facing concrete future after Christmas eve fire: https://www.abc.net.au/news/2020-02-21/tasmania-tunbridge-wooden-span-bridge-fight-over-fix/11982966
[49] http://www.environment.nsw.gov.au/nswculturalheritage/ConvictSitesAlongTheWay.htm; Email, Ian Berger (RMS) to James Puustinen (Austral Tasmania), 27 March 2015
[50] Evans, *op. cit.*, pp.3-5
[51] RNE, Bridge over Blackman River, Main St, Tunbridge, TAS, Australia, 11637

HCH Act Criteria	Key State/Local Threshold Indicators[52]	Statement
(a.) The place is important to the course or pattern of Tasmania's history	***State*** *A notable example of regional settlement that demonstrates an important period or phase in the wider settlement and development of Tasmania.* *Demonstrates an important historical period or phase in the history of Tasmania.* *Demonstrates a notable period in the governance and administration of Tasmania.* *Notable example of the development of maritime and terrestrial civil infrastructure, transport and communications in Tasmania.*	The Blackman River Bridge is of historic cultural heritage significance because it demonstrates the development of the former Main Line of Road between Hobart and Launceston, the bridge being a key river crossing and the township being a key stopover point on the Road from c.1822 to c.1970. It also demonstrates the working of the convict labour system in the first half of the 19th century and the evolution of public infrastructure. The flat timber girder bridge is of a type favoured in Tasmanian road works from the 1840s, distinct from the masonry arch road bridges such as the one at Kempton which preceded it.[53]
(b.) The place possesses uncommon or rare aspects of Tasmania's history	***State*** *One of few comparable places across Tasmania that demonstrates any evidence of this event, etc Or a place that is unusually extensive, intact or undisturbed which demonstrates evidence of this event, etc Or the movement, custom or way of life is of particular interest to a community group.* *Demonstrates a composition of attributes that is unique or uncommon in its occurrence across Tasmania.*	The Blackman River Bridge is of historic cultural heritage significance because it is one of the oldest surviving timber-spanned bridges in Australia. Unlike the road bridges at Melton Mowbray and Jericho, this bridge has retained its timber decking.[54]
(c.) The place has the potential to yield information that will contribute to an understanding of Tasmania's history	***State*** *A comparative analysis suggests that further research at the place has the potential improve our understanding of Tasmania's past or archaeology of:* *a little-recorded aspect of Tasmania's past* *to fill gaps in our existing knowledge of Tasmania's past.* *to inform/confirm unproven historical concepts or research questions relevant to Tasmania's past.* *to provide information about single or multiple periods of occupation or use.* *to yield site specific information which would contribute to an understanding of significance against other criteria.*	The Blackman River Bridge has potential to provide new information related to the construction of bridges during the mid-nineteenth century and the major 1894 modifications. The importance of this information would be most relevant to the 1840s original construction, for which no plans or specifications appear to have been retained. The original c.1822 bridge location downstream may also have research potential. Little is known about this structure, and even its exact location has not been determined, simply noting that it was slightly downstream of the current bridge. Given its construction method (a timber causeway), archaeological evidence of the former crossing may be minimal. There is some potential that burial sites may be located on the river banks. An 1829 almanac noted that marked graves existed at the end of the c.1822 bridge, which - should evidence of the burials continue to

[52] Department of Primary Industries, Parks, Water and Environment, October 2011, *Assessing historic heritage significance for Application with the Historic Cultural Heritage Act 1995*
[53] THR 5585, Tunbridge Bridge (Blackman River), Old Main Road, Tunbridge, 7120 Tas
[54] *Ibid*

HCH Act Criteria	Key State/Local Threshold Indicators[52]	Statement
		exist - would place them close by, but slightly downstream of the current bridge.
(d.) The place is important in demonstrating the principal characteristics of a class of place in Tasmania's history	***State*** *A particularly fine example of the class in a state wide context, demonstrating a broad range of characteristics that are typical of the class such as aesthetic composition, design, architectural style, applied finish or decoration of historical importance.*	The Blackman River Bridge is of historic cultural heritage significance because it demonstrates the principal characteristics of a simple bridge constructed with a whole-log deck laid between a series of stone piers. The decorative treatment of the stonework is of special interest.[55]
(e.) The place is important in demonstrating a high degree of creative or technical achievement	***Does not meet the criterion threshold*** *The place has only an indirect or loose association with creative or technical achievement.*	Although the Blackman River bridge is distinctive in the applied decoration of corbels to the piers, it cannot be considered to be an innovative or creative design solution. This criterion is not met.
(f.) The place has strong or special association with a particular community or cultural group for social or spiritual reasons	***Unassessed but potential value*** *A place that symbolically represents some aspect of the past that a community or cultural group feels contributes to the identity of the local community.* *A place that is known, used and valued as a link between the past and present by the local community.*	The potential social values of the bridge have not been assessed. However, the local community may associate itself with the bridge for its importance in the establishment of Tunbridge; as one of the key structures within the town; and for the value attached to the bridge for its association with the Young Irelander movement, demonstrated by re-enactment events. The community concern demonstrated when the bridge was sealed in 1995 could also suggest that the bridge has strong or special meaning to the community.
(g.) The place has a special association with the life or work of a person, or group of persons, or importance in Tasmania's history	***State*** *A key phase(s) in the establishment or subsequent development of the place were undertaken by, or directly influenced by, the important person(s) or organisation and that person(s) or organisation made an important contribution to the history of Tasmania or the local area.* *One or more achievements for which the person(s) or organisation are considered important are directly linked to the place and that person(s) or organisation made an important contribution to the history of Tasmania or the local area.*	The Blackman River Bridge is of historic cultural heritage significance because of its special association with the Young Irelanders, who were exiled to Van Diemen's Land following the failed rebellion of 1848. During 1849, two of their number, Thomas O'Meagher and Kevin O'Doherty, met on the bridge regularly, it being the border of the separate districts to which the pair had been exiled. These meetings have been the subject of re-enactments.[56]
(h.) The place is important in exhibiting particular aesthetic characteristics	***State*** *A particularly fine and intact example of a place within a state wide context where its qualities such as form, scale, setting, unity, contrast, colour, texture and material combine to be visually distinctive.*	The Blackman River Bridge is important for exhibiting particular aesthetic characteristics. The bridge is distinctive in its use of materials, combining sandstone and timber elements which have weathered to achieve a complementary patina, yet retain a contrast between the crisp ashlar stonework and the roughly worked timber

[55] *Ibid*
[56] *Ibid*

HCH Act Criteria	Key State/Local Threshold Indicators[52]	Statement
		girders. Stonework details seen on the tapered cutwaters, and in particular the corbels attached to the piers, demonstrate a decorative design intent rarely seen elsewhere in nineteenth century bridges. The historic form of the bridge can be readily viewed from publicly accessible places. The curves in the road approaches allows for both faces of the bridge to be viewed and the construction methods, materials and detailing appreciated. Extended views are available from the bridge along the willow-lined Blackman River.

Table 3: Assessment of Significance

5.5 Levels of Significance

The various elements that form the Blackman River Bridge and setting have different levels of cultural significance. Understanding this hierarchy of significance provides guidance on the appropriate conservation processes. That is, proposed actions, works, or development potentially affecting the cultural significance of the place should be consistent with the relative levels of cultural significance of the elements of the place.

Providing levels of significance can also allow for the prioritisation of conservation works and the sound allocation of resources. Specific policies have been prepared on how the levels of significance are to be applied.

Each element has been given a rating of significance, from high, moderate to low. Neutral and intrusive elements are similarly identified. In combination, the various elements form a place of State and local level significance.

High Significance

Those elements considered representative of key functions or thematic contributions of the place relating to the construction and provision of transport infrastructure.

Elements of high significance will demonstrate earliness, intactness, rarity/representativeness and high aesthetic qualities. Elements of high cultural significance must be conserved.

Moderate Significance

Those elements considered representative of secondary functions or thematic contributions of the place. Elements may be described as being of moderate significance where they date from later periods of development, have a lower level of integrity, are typical of their form or type and do not have high aesthetic qualities. Although not being of high significance, these elements contribute to an understanding of the place. Elements of moderate cultural significance should be conserved wherever possible.

Low Significance

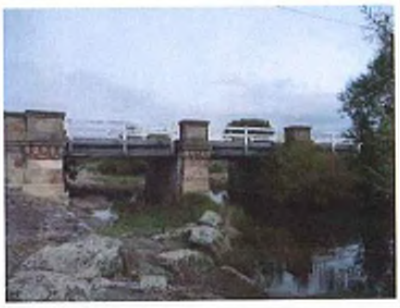
Those elements that contribute to the significance of the bridge and its setting, although have little heritage value in their own right. These elements may be recent introductions, or may have been so modified that they no longer have the ability to demonstrate their thematic context.

Elements of low significance should not be confused with neutral or intrusive elements. Elements of low cultural significance may be retained, modified or removed provided a conservation benefit can be demonstrated by the action.

Neutral and Intrusive Elements

Neutral elements make no contribution to the significance of the place, nor do they have an adverse impact on the place. Conversely, intrusive elements do have an adverse impact and should be removed.

5.6 Levels of Significance for Elements of the Blackman River Bridge and its Setting

Element	Level of Significance	Photograph
Sandstone bridge piers and wingwalls	High	
Timber superstructure	High in terms of traditional materials, but low in terms of historic fabric	
Timber railings	High in terms of traditional materials, but low in terms of historic fabric	
Timber decking	High in terms of traditional materials, but low in terms of historic fabric	

Element	Level of Significance	Photograph
Setting of bridge	High	
Area of Archaeological Potential – downstream from bridge (historic bridge alignment and burials)	High	

Table 4: Significance of Elements

6.0 CONSERVATION POLICIES

6.1 Introduction

The purpose of the conservation policies is to state how the conservation of the Blackman River Bridge may be achieved both in the short, medium and long term, and is based on an understanding of the cultural significance of the place. Conservation policies provide the philosophical basis for heritage management based on an understanding and recognition of the cultural significance of the place. Policies are not theoretical, but must take cognisance of the conservation needs of the place and relevant operational requirements.

The policies cover many aspects of the conservation of the bridge; these range from recognition of the significance, to the physical conservation needs and operational requirements.

6.1.1 Terminology

Much of the terminology used in conservation practice is standardised. The meanings of key terms used in this document are summarised below. The definitions are taken (almost verbatim) from the *Australia ICOMOS Burra Charter, 2013*.

Place	means a geographically defined area. It may include elements, objects, spaces and views. Place may have tangible and intangible dimensions.
Cultural significance	means aesthetic, historic, scientific, social or spiritual values for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups.
Fabric	means all the physical material of the place including elements, fixtures, contents and objects.
Related Place	means a place that contributes to the cultural significance of another place.
Associations	means the connections that exist between people and a place.
Setting	means the immediate and extended environment of a place that is part of or contributes to its cultural significance and distinctive character.
Conservation	means all the processes of looking after a place so as to retain its cultural significance.
Maintenance	means the continuous protective care of a place, and its setting. Maintenance is to be distinguished from repair which involves restoration or reconstruction.
Preservation	means maintaining a place in its existing state and retarding deterioration.
Restoration	means returning the a place to a known earlier state by removing accretions or by reassembling existing elements without the introduction of new material.
Reconstruction	means returning a place to a known earlier state and is distinguished from restoration by the introduction of new material.
Adaptation	means modifying a place to suit the existing use or a proposed use.
Use	means the functions of a place, including the activities and traditions and customary practices that may occur at the place or are dependent on the place
Compatible use	means a use which respects the cultural significance of a place. Such a use involves no, or minimal, impact on cultural significance.

6.2 Conservation Policies

Policy 1	The Blackman River Bridge should be actively conserved as a place of cultural significance primarily through preservation and maintenance, and otherwise managed in accordance with the guidelines and philosophy of the ICOMOS Burra Charter. All elements of cultural significance that form part of the Bridge and its setting should be retained and conserved.
Reason for Policy	The Blackman River Bridge is a place of heritage significance at both State and local levels. This significance should guide decisions about its future conservation, use and development. The Burra Charter contains the accepted basis for the conservation of heritage places in Australia.
Policy 2	The cultural significance of the bridge is embodied in the place itself, its fabric, setting, use, associations, meanings, and related places.
Reason for Policy	To recognise that the cultural significance of the place exists in certain elements of the fabric, setting, use, associations and meanings.
Policy 3	Elements of high cultural significance must be conserved. Elements of moderate cultural significance should be conserved wherever possible. Elements of low cultural significance may be retained, modified or removed provided a conservation benefit can be demonstrated. Neutral elements neither contribute nor have an adverse impact on the cultural significance of the place and may be retained or removed. Elements intrusive to the cultural significance of the place should be removed or modified in a sensitive manner that enhances the cultural significance of the place.
Reason for Policy	The cultural significance of the place should guide decisions about its future conservation, use and development.
Policy 4	Preservation, restoration and reconstruction (in that order) are the preferred conservation processes foe elements of cultural significance.
Reason for Policy	The order of conservation actions represents the most desirable heritage outcomes.
Policy 5	The Blackman River Bridge should be repaired to allow for continued vehicle and pedestrian use.
Reason for Policy	To ensure that the significant use of the bridge for vehicles and pedestrians is maintained.
Policy 6	Works or developments which would result in heritage impacts should be avoided, unless established that there are no prudent and feasible alternatives to these works.
Reason for Policy	Heritage impacts should be avoided wherever possible, however in some circumstances there may be no prudent and feasible alternatives that would result in a lesser heritage impact.
Policy 7	A detailed cyclical monitoring, maintenance and works program be prepared establishing the priorities and timeframes for implementing the policies of this plan.
Reason for Policy	The effectiveness of this Conservation Management Plan relies on the implementation of the policies by State Growth.
Policy 8	As required, an appropriately skilled stonemason with experience in working on historic structures undertakes conservation works to the stonework.

Reason for Policy	The significance of the bridge requires that conservation works utilise the best available expertise.
Policy 9	As required, an appropriately skilled stonemason with experience in working on historic structures replace badly decayed stones when subject to a 50mm surface loss. New stones should use 100mm thick inserts of a better quality stone.
Reason for Policy	Badly decayed stones pose a weakness to the structural capacity of the bridge.
Policy 10	As required, an appropriately skilled stonemason should replace lost bedding with a quicklime grout to make loose stonework solid.
Reason for Policy	To maintain the structural integrity of the bridge.
Policy 11	As required, the removal of cement and defective pointing of mortar joints and the repointing of same be undertaken by an appropriately skilled stonemason using a permeable quick lime based mortar coloured to match the recent repointing work. Repointing works should have a weather struck finish.
Reason for Policy	Effective pointing is required to prevent water entry into the bridge stonework.
Policy 12	The road surface is to be continually maintained.
Reason for Policy	To maintain the structural integrity of the bridge.
Policy 13	All actions, works or development affecting the fabric of the bridge are to be appropriately recorded.
Reason for Policy	The recording of works to the bridge is important in documenting the nature of the bridge and changes over time, and understanding past conservation works.
Policy 14	As required, organic growth is to be cleaned from the bridge. Care should be taken to ensure that the contractor is skilled in working on historic structures and that the methods and materials are appropriate to the cultural significance of the bridge and any necessary environmental considerations.
Reason for Policy	Care is required to ensure cleaning methods and materials do not damage the stonework or the environment.
Policy 15	The cultural significance of the Blackman River Bridge should be adequately interpreted to managers, users and visitors.
Reason for Policy	Sympathetic interpretation options for the place should be considered, provided they are planned and implemented for an identified purpose and audience.
Policy 16	All ground disturbances should avoid adjacent sites of archaeological potential. This includes potential remains of the first c.1822 bridge immediately downstream of the existing bridge; burials which were located at the end of the first bridge; and the convict road station at 132 Main Road, Tunbridge.
Reason for Policy	To avoid archaeological impacts and conserve the archaeological resource.
Policy 17	Missing, defective and cracked stonework to posts should be made good by an appropriately skilled stonemason.
Reason for Policy	To prevent further degradation and harm to the fabric of this structure and risk to the public.
Policy 18	Stonework should be refaced where face fretting exceeds 15mm, with the work undertaken by an appropriately skilled stonemason.
Reason for Policy	Refacing will help prevent further loss of the bridge's fabric through fretting.
Policy 19	This Conservation Management Plan should be reviewed at least once every ten years, or where new evidence is discovered that has the potential to impact on the present policies.

Reason for Policy	Conservation Management Plans should not be static documents but be regularly reviewed to ensure they remain relevant.

7.0 HERITAGE IMPACT STATEMENT

7.1 Introduction and Definitions

In its request for further information, Southern Midlands Council has required the preparation of a Heritage Impact Statement (HIS) (a report from a suitably qualified person setting out the effect of the proposed development on the historic cultural heritage significance of the place) for the proposed works.

Heritage Tasmania has not requested the preparation of a HIS, however the Works Guidelines provide the following definition:

> [*An*] Heritage Impact Statement (HIS) refers to a report that determines whether a proposed development will impact on a place's historic cultural heritage values, and if so, how these impacts might be avoided or ameliorated. A HIS is a clear and concise account of the proposed work that addresses four basic questions: (i) what is significant about the place in terms of its heritage values and are some parts more significant than others?; (ii) will the proposed works adversely affect the significance and if so how?' (iii) what measures, if any, are proposed to ameliorate any adverse impacts; and (iv) will the proposal result in any heritage conservation benefits that might offset any adverse impacts?[57]

7.2 Description of the Proposed Works

The following description should be read in conjunction with the bridge plans which are reproduced in full in Appendix 3. The proposal is to renew the existing timber superstructure and railings with new materials. The bridge will be 30.7m long and have a two lane deck, nominally 5.78m wide between the kerbs.

The existing sandstone piers and abutments will be retained. The existing timber deck and beams will be removed. These will be replaced by glue laminated beams which will support a concrete deck above. In turn, a layer of asphalt will cover the deck. Seven beams will cross each span. The timber laminate beams will be 26cm wide and vary from 60cm – 82.5 cm in depth. The new beams will be connected to the sandstone abutments and piers via anchor bolts. New grout will be installed at the junction between the two materials. Steel beam nosings will be used to connect the beams with the sandstone abutments at either end. Stone work will be cleaned and repairs will be carried out as necessary.

Timber work will be salvaged during the renewal, and will be cut down into half round fascias and placed on the exterior of the glue laminated beams to conceal these elements, and give the impression that the bridge remains a simply supported timber beam bridge.

The timber post railings will be removed and replaced with steel equivalents.

A visualisation of the completed bridge deck is included in the following Figure.

[57] Tasmanian Heritage Council, Heritage Tasmania, DPIPWE, *Works Guidelines for Historic Heritage Places*, November 2015, p.3

Figure 7: Visualisation of the renewed deck and railings (Pitt & Sherry)

7.3 Capacity of the Bridge to Carry the New Superstructure

The reports prepared by suitably qualified and experienced engineers Peter Spratt and Pitt & Sherry indicate that the original structure (i.e. the stone piers) have the capacity/ability to carry the proposed new superstructure and the maximum traffic loading afforded by the proposed load rating for the lifecycle of the proposed new works.

7.4 Responses to Heritage Tasmania's Request for Information

Heritage Tasmania have requested the following information:

1. Please provide evidence from a suitably qualified structural engineer that the historic sandstone bridge components have the structural adequacy to bear the loads of the proposed new superstructure and the intended design traffic loads;
2. Please provide details of any fixings required between the new superstructure and the historic sandstone substructure;
3. Please provide details of any conservation works required to the existing historic structures;
4. Please provide details of any finishes or colours proposed for the steel post-and-rail traffic barrier.

The structural fabric reports,[58] summarised in Section 4.2 and included in Appendix 3, provide a detailed assessment of the structural integrity of the sandstone bridge components and effectively responds to the first point of specific information required.

Information relating to the second point is included in the design plans shown in Appendix 1 of this report and summarised in Section 7.2 above.

[58] Pitt & Sherry, 'Blackman River Bridge B599: Structural Report' May 2021

The third point is also addressed by the structural fabric reports in Appendix 3, and detailed descriptions of these conservation works are included in Appendix 1 of this report as part of the design plans for the proposed works and summarised in Section 7.2 above.

Currently the steel post and rail traffic barriers are to be formed from hot dipped galvanised materials and no specific colour or treatment scheme is proposed over and above this.

7.5 Constraints and Opportunities Analysis

Within a conservation management framework, the significance of the bridge represents both constraints and opportunities which are summarised below:

1. The Blackman River Bridge is a place of heritage significance and the retention of heritage values should always be pursued where prudent and feasible.
2. The use of timber in the superstructure of the bridge is of heritage significance and a form that has existed since 1849. However, the timber elements themselves are of relatively recent construction and constitutes fabric of low significance.
3. Like-for-like replacement would typically be a desirable heritage outcome, however this would not meet current Australian Standards for either load capacity or bridge barrier capacity. The lifecycle of the new works (if completed in like-for-like timber) is estimated to be 20 to 25 years and like-for-like replacement would have significant cost implications into the future. The need for significant maintenance and substantial renewal at comparatively short intervals is not considered a sustainable long-term solution.
4. Where a timber girder bridge cannot be achieved as part of bridge upgrades, other timber technologies such as glue laminated girders are a viable alternative, and retain the substantial use of timber within the structure of the bridge which is significant.
5. Retaining the existing appearance of the bridge as proposed through the use of timber facades to the external faces of the girders will assist in minimising heritage visual impacts. However, the lack of authenticity in form, design and materials may have an adverse impact on the community appreciation of the bridge.
6. The use of timber traffic barriers on the bridge structure would be unlikely to meet any current traffic safety standards. This is due to the strength of the posts and rails themselves, but also the ability to anchor the posts into the deck. Besides safety, this has implications for the protection of the sandstone pillars into the future.

7.6 Assessment of Potential Heritage Impacts against Criteria

The following table quantifies the extent of possible impacts to the Blackman River Bridge, which considers impacts against each criterion, or value of significance.

Value	Potential for Heritage Impacts
Criterion (a.) Historical values	The renewal of the bridge superstructure in either traditional or new materials will result in a positive heritage impact by maintaining the use of the place for road transport, a function which has existed since 1849. The continued use of the place is a conservation benefit. The timber superstructure has been renewed multiple times and is not early fabric. It is however consistent with the original form and materials. The installation of a glue laminated beams and a concrete deck will not impact on those elements of the bridge constructed by convict labour (i.e., Abutment A and the piers), but would alter the way in which these elements are perceived, that is, the deck would appear different to what currently exists, and on close inspection beneath the bridge, so to would the beams. The use of glue laminated beams, although a twentieth century technology, will retain the substantial use of timber in the bridge which is significant.
Criterion (b.) Rarity	The bridge is listed for its rarity values because it is one of the oldest surviving timber spanned bridges in Australia. The value relates to the bridge still retaining a timber

Value	Potential for Heritage Impacts
	superstructure (which is unusual) and not the actual timber work itself, which is of a recent origin. The renewal of the existing timber girders with glued timber laminated beams will retain use of timber materials in the construction of the bridge. This is consistent with the continual process of renewal and refurbishment. Replacement of the timber deck with a concrete deck will have some heritage impact, although the bridge would remain a timber spanned structure which is a heritage benefit.
Criterion (c.) Research Potential	The research potential of the bridge does not form one of the formally listed values. However, the bridge (and surrounds) have been identified in this report as having research potential. The potential of the bridge to provide new important information regarding nineteenth century bridge construction largely relates to the original 1840s sandstone elements, aspects which are not well documented through the historical record. No, or very minor impact will occur to these elements through the superstructure renewal. The manner of attaching the laminated beams to the sandstone abutments and piers will cause a minor interference with this historic fabric. As recent fabric, the existing timber superstructure has no, to very little research potential. Research potential may exist on the adjacent riverbanks related to the earlier bridge/causeway crossing (c.1822); potential burial locations; and the convict road station site. The superstructure renewal will have no impact on these potential values, and any ancillary impacts can be avoided by designating these as 'works exclusion zones'.
Criterion (d.) Characteristics of a class of place	There will be some impact to this formally listed value. The bridge is listed in part for its ability of the demonstrate the principal characteristics of a simply supported sandstone and timber girder bridge. The use of glued timber laminated beams retains the substantial use of timber in the bridge which is a positive heritage outcome. The introduction of a concrete deck does introduce a substantial component of new materials, however the bridge would retain the use of timber in the girders which is a heritage benefit.
Criterion (f.) Social value	The social values of the bridge do not form one of the listed values. It is acknowledged however that the bridge may have strong or special meaning to the community, demonstrated by community concern during the 1995 sealing works and the use of the place for re-enactments of the Young Irelander meetings. The renewal option may impact on the social significance of the bridge by altering the appearance of the place. The bridge deck will no longer have the appearance of being formed from timber planks. It should be noted however that the current prominence of the planking has been caused by timber shrinkage and is not a desirable outcome. The works aim to replicate visual qualities achieved through existing construction methods and detailing through installing timber facades to the outer faces of the glue laminated beams and painting the steel barrier white to provide a similar appearance to the existing timber fencing. The above mitigation techniques are likely to assist in maintaining the visual impression of the bridge as an historic structure. This impression is likely to be most effective for casual visitors, but would not withstand close inspection.
Criterion (g.) Special association	The bridge is listed for its associative values because it was the meeting place for members of the Young Ireland movement during the late 1840s. The relevant question is the ability of the bridge through its fabric to demonstrate the time and place of these meeting events. The bridge does not appear as it did in 1849, following its extension in 1894. Nonetheless, a design unity exists between the two phases of works. Likewise, the timber superstructure is recent fabric, but is consistent with the original form and materials of the 1849 bridge. The bridge remains evocative of its 1849 form. The proposed mitigation techniques will assist in retaining the historic appearance of the bridge. However, the lack of authenticity in form, design and materials arising from this

Value	Potential for Heritage Impacts
	option may have an adverse impact on the community appreciation of the bridge as the place of meeting for Irish exiles.
Criterion (h.) Aesthetic characteristics	The aesthetic characteristics of the bridge do not form one of the listed values. However the bridge has been assessed in this report as having aesthetic significance from its distinctive use of materials which create a strong visual impression; the patina achieved from weathered stone and timber; creative details seen in the corbels placed on the piers (a design detail not seen in other bridges form this period); and the complementary relationship between the bridge and its rural setting with significant views available to the bridge piers and timber components. The proposed mitigation techniques are likely to assist in maintaining the visual impression of the bridge as an historic structure, and be similar in form, details and patina to what currently exists. Perceptions of the success of these techniques are likely to be most effective for casual visitors, as opposed to closer inspection.

Table 5: Assessment of Impacts Against Criteria

7.7 Options to Minimise Heritage Impacts

The concept design for the superstructure renewal already demonstrates an attempt to minimise heritage impacts, essentially by replicating the appearance of the existing bridge through concealing the beams with timber facades. This is a positive outcome and one which would satisfy passing inspection of the bridge, but not close examination. The following mitigation options are recommended:

- The reuse of existing sound timber work to create facades to the glue laminated beams;
- Cutting or inscribing the asphalt deck surface to give the appearance of timber planks;
- Creating a detailed photographic record documenting the processes of superstructure removal and renewal;
- Avoiding subsurface ground disturbances on the adjacent riverbanks to avoid impacts to potential archaeological resources; and
- Using white painted, square or rectangular steel to construct the bridge barricades. Roads and Maritime Services (NSW) have previously designed steel barricades which resemble timber ones, which may be of assistance to this project.

8.0 STATEMENT OF COMPLIANCE

8.1 Introduction

Southern Midlands Council has requested the preparation of a Statement of Compliance which sets out an assessment of the proposed development's compliance with the Heritage Code against the provisions of Clause E.13.7.1 and E.13.7.2 of the scheme. This is contained in the following table.

Performance Criteria	Statement
E13.7.1: Demolition Objective: To ensure that demolition in whole or part of a heritage place does not result in the loss of historic cultural heritage values unless there are exceptional circumstances.	
P1 Demolition must not result in the loss of significant fabric, form, items, outbuildings or landscape elements that contribute to the historic cultural heritage significance of the place unless all of the following are satisfied; (a) there are, environmental, social, economic or safety reasons of greater value to the community than the historic cultural heritage values of the place; (b) there are no prudent and feasible alternatives; (c) important structural or façade elements that can feasibly be retained and reused in a new structure, are to be retained; (d) significant fabric is documented before demolition.	The proposed development will result in the loss of significant fabric and forms which contribute to the historic cultural heritage significance of the place. However, it is considered that the following criteria are satisfied: (a) environmental, social, economic or safety reasons of greater value to the community than the historic cultural heritage values of the place; (see separate document) (b) The 'prudent and feasible alternatives' test is acknowledged by the Resource Management and Planning Appeal Tribunal (RMPAT) as a concept that is difficult to apply, but requires a value judgment on the part of the planning authority, and at the very least evidence to demonstrate that the question has been addressed. The RMPAT has also recognised that the extent of heritage significance is a relevant factor, namely, the greater the significance, the greater would be the prudence of adopting alternatives.[59] A range of options have previously been considered by the Department and found not to be viable. This includes a like-for-like replacement of the timber superstructure. The existing timber superstructure has reached the end of its serviceable life and requires renewal. It is not feasible to replace the current superstructure with a new timber structure. The construction of timber bridges on public roads has generally not occurred in Tasmania during the last 15 years. The reasons for this are due to economic, engineering and other practical aspects. A new timber superstructure would not meet the Australian standards for load capacity. With regard to economic aspects, life cycle costing analysis, whereby the present value of alternatives are compared using a common discount factor for future costs, has demonstrated construction in materials, such as glue laminated beams, pre-cast concrete and steel, are far superior option and reduces the ongoing asset management costs to the bridge owner. This principle has been established and accepted by both State and local governments. The key issue is that scarcity of timber resource suitable for bridges has occurred and driven up timber

[59] S Visagie v Hobart City Council and Ors [2017] TASRMPAT 2, pp.29-30

Performance Criteria	Statement
	sourcing costs whilst the quality has gone down, resulting in expected lives of only 15 years for a timber bridge. Practically, timber bridges create many challenges to build, especially those of a significant size (i.e. greater than single span, single lane). Timber bridges are very labour intensive with many occupational health and safety issues, whereas timber laminated girders and pre-cast concrete designs are mostly pre-formed off site and installed on site in much shorter timeframes, again reducing costs. The skills required to build timber bridges has also diminished as a result. (c) Important structural elements will be retained and reused in the new bridge superstructure. The existing timber girders will be split and form facades which conceal the external faces of the glue laminated beams. On passing inspection, the bridge will appear very similar to its current form. (d) An extant record will be produced prior to demolition of the timber superstructure.
E13.7.2: Buildings and Works other than Demolition Objective: To ensure that development at a heritage place is: (a) undertaken in a sympathetic manner which does not cause loss of historic cultural heritage significance; and (b) designed to be subservient to the historic cultural heritage values of the place and responsive to its dominant characteristics.	
P1 Development must not result in any of the following: (a) loss of historic cultural heritage significance to the place through incompatible design, including in height, scale, bulk, form, fenestration, siting, materials, colours and finishes; (b) substantial diminution of the historic cultural heritage significance of the place through loss of significant streetscape elements including plants, trees, fences, walls, paths, outbuildings and other items that contribute to the significance of the place.	(a) The proposed works will not result in heritage impacts through height, scale, bulk, form, and siting. The use of timber laminated beams is a new technology for the bridge, but retains the substantial use of timber materials in the bridge which is a key part of its significance and represents a heritage benefit. The visual changes from timber laminated beams will be minimised through the recycling of existing beams to form facades for the new structure. The new deck will be in concrete, which is not a traditional material on the bridge. However, on balance, this will not result in a substantial loss of historic heritage significance as the structure will still be able to demonstrate the key characteristics of a simply supported timber beamed bridge. A recommendation has been made to cut or inscribing the asphalt deck surface to give the appearance of timber planks. (b) The only relevant consideration for criterion (b.) is the replacement of the timber barricades with steel structures. This will not result in a substantial diminution of the heritage significance of the place, where the form and colour of the timber barricades is replicated in steel. The new barricades will continue to appear in a manner that is similar, and consistent with their existing form.

Performance Criteria	Statement
P2 Development must be designed to be subservient and complementary to the place through characteristics including: (a) scale and bulk, materials, built form and fenestration; (b) setback from frontage; (c) siting with respect to buildings, structures and listed elements; (d) using less dominant materials and colours.	Criterion P2 is partly relevant to the proposed works, with development being subservient and complementary and with regard to materials as referred to in criteria (a.) and (d.). The design attempts to visually replicate what currently exists with a simply supported timber beam bridge. Retaining the existing appearance of the bridge as proposed through the use of timber facades to the external faces of the girders will assist in minimising heritage visual impacts, that is, the new structure is designed to be subservient and complementary to the existing characteristics of the place. Perceptions of the success of these techniques are likely to be most effective for casual visitors, as opposed to closer inspection.
P3 Materials, built form and fenestration must respond to the dominant heritage characteristics of the place, but any new fabric should be readily identifiable as such.	Not relevant to the proposed works.
P4 Extensions to existing buildings must not detract from the historic cultural heritage significance of the place.	Not relevant to the proposed works.
P5 New front fences and gates must be sympathetic in design, (including height, form, scale and materials), to the style, period and characteristics of the building to which they belong.	Not relevant to the proposed works.

Table 6: Statement of Compliance

9.0 REFERENCES

9.1 Secondary Materials

9.1.1 Published & Unpublished Sources

Austral Tasmania Pty Ltd, *Blackman River Bridge, Historic Heritage Assessment*, Unpublished report, April 2015.

Balsille, GD, 'Notes on Tasmanian Highway Bridges', *Transactions of the Institution*, Vol XV, 1934

Bonwick, J, *The Black war of Van Diemen's Land: with numerous illustrations and coloured engravings*, London: Sampson Low, Son, & Marston, 1870

Evans, K, *Old Bridge, Bridge Street Campbell Town, Historical Review*, Tasmanian Heritage Council, 1998

Heritage Tasmania, Tasmanian Heritage Council, *Assessing historic heritage significance for Application with the Historic Cultural Heritage Act 1995*

O'Connor, C, *Spanning Two Centuries: Historic Bridges of Australia*, St. Lucia, Qld.: University of Queensland Press, 1985

Peter Spratt Consulting Chartered Engineer, *Blackman River Bridge, Tunbridge. Heritage Assessment of Superstructure Replacement*, unpublished report to Pitt & Sherry, 17 June 2014

Pitt & Sherry, *Blackman River Bridge (B599) Renewal of Timber Superstructure and Barriers Concept Design Report*, unpublished report prepared for the Department of State Growth, 25 August 2014

Pitt & Sherry, *Blackman River Bridge B599: Structural Fabric Report*, unpublished report prepared for the Department of State Growth, 25 August 2021

Pitt & Sherry, Level 3 Condition Inspection Report. Bridge No. 599 Blackman River Bridge, unpublished report prepared for the Department of Infrastructure, Energy & Resources, May 2012

RNE, Bridge over Blackman River, Main Street, Tunbridge, TAS, Australia, 11637

Scripps, L, *Historic Surveys for Historic Tasmanian Bridges. Blackman River Bridge*, report prepared for the Department of Transport Contract No 492, January 1996

Stancombe, GH, *Highway in Van Diemen's Land*, Stancombe: Glendessary: Western Junction, 1964

Tasmanian Heritage Council, Heritage Tasmania, DPIPWE, *Works Guidelines for Historic Heritage Places*, November 2015

THR, former Tunbridge Police & Convict Road Station, 119 Main Road Tunbridge, THR ID No. 10202

THR, Tunbridge Bridge, THR ID No. 5585

Thompson, J, *A Road in Van Diemen's Land*, Tasmanian Government (DIER): Hobart, 2004

9.1.2 Newspapers

Colonial Times, Tuesday 19 January 1847, p.2

Colonial Times and Tasmanian Advertiser, Friday 29 June 1827, p.3

Colonial Times and Tasmanian Advertiser, Friday 6 July 1827, p.4

Colonial Times, Friday 29 May 1846, p.2

The Cornwall Chronicle, Saturday 13 January 1849, p. 300

The Cornwall Chronicle, Wednesday 22 August 1849, p.807

The Courier, Wednesday 27 May 1846, p.2

The Courier, Wednesday 27 May 1846, p.2

The Mercury, Friday 3 February 1995, p.1

The Mercury, Saturday 4 February 1995, p.5