

RMS responses to comments raised by DP&I's independent bridge condition review

Comment	How addressed
1. From EIS Volume 1 Section 1.1 : Please explain the fundamental statement behind the need to demolish the existing bridge "...and it is no longer cost effective to maintain" [note: no evidence received in regard to maintenance tasks or their cost].	Bridge deterioration is discussed in Section 3.2.1 of the EIS and Sections 2.15.3 of the Submissions Report/PIR. Further information (including complete copies of investigation reports) have been provided to the Department separately and in responses to the Department's general questions on 6 May 2013, with summaries of each report provided in Appendix G of the Submissions Report/PIR. RMS formed the view that it is no longer cost effective to maintain the existing bridge based on its demonstrated poor condition, the substantial cost to rehabilitate the structure to ensure it is able to be maintained, and the resulting poor level of service that the structure would provide into the future (not meeting current standards and T44 design loading). In respect of pure maintenance costs, additional information will be provided separately to the department.
2. From EIS Volume 1 Section 1.2 Page 2 Second paragraph: Please justify the statement that "...RMS has assessed that is not practical to replace or repair these elements" when indeed there are at least two practical solutions described (one by RMS and one by Ray Wedgewood & Brian Pearson	There are a number of <i>feasible</i> rehabilitation methodologies that were considered for the bridge, however RMS assessed that rehabilitation is not <i>practical</i> for the same reasons as those identified above, as well as other factors such as the need for total or partial closure during rehabilitation.
3. From EIS Volume 1 Section 4.1.4 Page 34 Disadvantage #2: Damage to replacement bridge should existing bridge fail in a flood event. Assuming the existing bridge is refurbished and properly maintained explain how this event could happen	The existing bridge, proposed around 35 metres upstream of the new bridge, would comprise an additional waterway obstruction during flood events. Depending on the magnitude of flood there is a risk of very high debris loading on the existing bridge which could, in turn, have possible adverse effects on the new bridge. Even if the existing bridge is refurbished some level of risk would still remain. There are few examples of bridges being washed away in flood events. One such example is the Bridge over Page River at Gungy which was washed away around 2000.
4. The following details are requested for the Swansea, Junction and Hinton Bridges that have	A detailed response to this can be found in the attachment.

undergone refurbishment works: a) Nature of refurbishment works; b) Cost of refurbishment works (total cost and cost per m2); and c) Duration of refurbishment works.	
5. The above information should also be provided for Marrickville Council's bridge over the Cooks River which was discussed at our recent meeting (18/4/13).	RMS has limited information about this bridge (which is not an RMS asset) beyond the information provided in the presentation. Marrickville Council should be contacted for more detailed information. (Suggested contact David Matheson – Coordinator Civil Works 8595 2454)
6. What, if any, interventions to the bridge have taken place to reinstate the fabric of the bridge in the last 10 years? Note: not maintenance but refurbishment tasks	No specific interventions have taken place to reinstate the fabric of the bridge, although activities such as removal of spalling continue as part of bridge maintenance.
7. How often has the bridge been closed due to flooding in the last 100 years?	The bridge has been closed 64 times with the most recent closure in February 2012
8. How many underwater inspections have been taken after these floods? Please provide details of who did the inspection and when? Only one has been cited	One - after the 2012 flood. The inspection report was provided as part of the earlier package provided to the Department.
9. What year did RMS first identify the cracks in the piers?	2011
10.If a new bridge is to be built for the majority of through traffic and the existing bridge is to be retained, why should the existing bridge need to meet current loading standards? If not, to what standard should/could the bridge be refurbished to?	The bridge could be refurbished to meet light traffic loading (<20 tonnes) or could be strengthened to meet T44 standard. The former could continue to carry only light traffic and/or pedestrians and cyclists. The latter would allow longer/heavier vehicles. While the cost of refurbishing and strengthening the existing bridge was estimated to be around \$18M in 2011 dollars, rehabilitation without strengthening could be undertaken for around \$14M (2011 dollars). (These costs would have escalated to around \$20M and \$15M for 2013, respectively). Both would require ongoing operation and maintenance costs. Further details on operation and maintenance costs will be provided separately to the Department.
11.Who will own and maintain the existing bridge if it is retained?	RMS would seek to have the local council own and manage the asset.
12.If it is to be retained will RMS rehabilitate it at their cost, to meet RMS standards, before handover to the new owner?	This would be subject to future management arrangements and operating standards. Funding has not been allocated for the rehabilitation of an orphan structure
13.Why are illegal loads being allowed across the existing bridge if it lowers the load factor?	Illegal loads are not allowed on the bridge. A decision was made in 2003 to continue with

	General Access Vehicles (ST42.5) and Restricted Access Vehicles (BD62.5), and in 2011 to allow Higher Mass Limits (ST45.5 and BD68) subject to a range of measures including: • A detailed inspection and monitoring regime • Measures to ensure over mass and oversized vehicles do not cross the bridge
14. Please advise the details of a Level 2 inspection and a Level 3 inspection	RMS' bridge inspection regime includes four levels of inspections. An extract of the RMS Bridge inventory, inspection and condition rating policy is attached providing detailed information on each.
15. Please advise maintenance activities from the database created in 1994 onwards. Particular reference should be made to spall removal & repair (quantify) and other repairs to the fabric of the bridge	Records of these maintenance activities were provided in Attachment A of the package of RMS responses to the Department's general questions (provided on Monday 6 May). There is limited available information on RMS' bridge information system, however spalling removal is known to have cost \$1021 on 30 November 2009 and collision damage repair on 30 April 2010 cost \$ 3032.
16. Please advise costs for the maintenance activities undertaken from 1994 to present	As discussed in responses to DP&I comments made on 6 May 2013, maintenance costs for particular assets on the RMS database are only available until 2002 at which point the system began recording on a region/area basis. From 1994 until 2002 maintenance activities for Windsor Bridge totalled \$57,347.
17. Has RMS considered a solution where the deck joints are permanently 'locked up' such that the braking loads are transferred to the abutment?	This has not been considered by RMS and is not considered to be a practical design solution or possible to design for. Currently the bridge is operating with the joints 'locked up' but this has number of risks. One of the risks is significant wide cracks at ends of beams originating from dowel bars connecting beams to pier headstocks. As a risk mitigation RMS is regularly monitoring these cracks.
18. Please confirm that graphitisation was first identified in 2005 by CTI Please confirm cracks in some cast iron piers were first identified in 2011 by CDS	Confirmed
19. Please provide a source for the Concrete Carbonisation Damage Model	Bamforth P, 1998 <i>New approach to durability design using risk analysis</i> , Concrete Institute, Perth
20. Please advise in regard to the steel beam strengthening how this will reduce maintenance	The steel beam option is for strengthening the bridge to carry T44 design load and not for

activities. (Steel beams are difficult to access and the concrete beams become harder to access).	reducing maintenance activities. However this option is easy to construct and would be more cost effective to maintain in comparison to a concrete alternative as it has been established that the deterioration of bridge deck is due to carbonation of concrete.
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Attachment A

Further detailed response to item 4.

Item 4:

The following details are requested for the Swansea, Junction and Hinton Bridges that have undergone refurbishment works:

- a) Nature of refurbishment works;
- b) Cost of refurbishment works (total cost and cost per m²); and
- c) Duration of refurbishment works

A response to a) through c) for these bridges is presented in the table below.

Bridge	Nature and date of refurbishment works	Cost of refurbishment works (total & per m ²)
Swansea	• 2004/5 to 2006/7 – additional piling works and streambed protection works to protect piers with lower levels of embedment (\$6.57M) • 2007/8 to 2011/12 - cathodic protection works (\$5.25M) • 2011/12 – improvement to fender system (\$2.5M) • 2011/12 – patch painting (\$1.0M)	\$15.4M total \$10,059 per m ²
Hinton	• 2004/5 to 2006/7 – upgrade of timber approaches and Truss spans (\$7.58M) • 2008/9 to 2009/10 – painting of steel lift span (\$1.38M)	\$8.96M total \$8,696 per m ²
Junction	• 2005/6 – Full reconstruction of the bridge. Old bridge was demolished and rebuilt on site. A temporary Mabey Johnson Bridge was put in place for traffic side track	\$7.54M total \$15,808 per m ²