(No. 9)



PARLIAMENT OF TASMANIA

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

Bridgewater Bridge Refurbishment

Presented to His Excellency the Governor pursuant to the provisions of the Public Works Committee Act 1914.

MEMBERS OF THE COMMITTEE

Legislative Council

House of Assembly

Mr Harriss (Chairman) Mr Hall Mr Best Mr Green Mrs Napier

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INTRODUCTION

To His Excellency the Honourable Peter George Underwood, Officer of the Order of Australia, Governor in and over the State of Tasmania and its Dependencies in the Commonwealth of Australia.

MAY IT PLEASE YOUR EXCELLENCY

The Committee has investigated the following proposal: -

Bridgewater Bridge Refurbishment

and now has the honour to present the Report to Your Excellency in accordance with the *Public Works Committee Act 1914*.

BACKGROUND

The Bridgewater Bridge is located on the Midland Highway, which connects the city of Hobart to population centres in the North of the state. It carries two lanes of traffic and a rail line and it forms part of the Auslink network. The main span of the bridge consists of a welded steel-truss lifting span with stress-laminated timber deck. Flanking spans, both sides of the bridge, consist of steel trusses with concrete decks. Approach spans consist of steel girders with a concrete deck. The bridge was opened to road traffic in 1942 and rail traffic in 1946. This scope of works includes both the road and rail sections of the bridge.

The bridge operated as a lifting bridge until 2006, when during a routine inspection, deterioration of the ropes suspending the counterweights was identified. The bridge was closed to traffic whilst the counterweights were fixed in position. Currently the bridge lifting span does not operate. More recently, an inspection of the bridge outlined areas and options for refurbishment including a costing analysis for a 10 year and 15 year service life (Pitt & Sherry and Maunsell, November 2007). The Southern Tasmania National Transport Network Investment Program (2007-2016) proposes the ultimate replacement of the Bridgewater Bridge, however a life extension by 15 years has been proposed along with restoring the lifting function of the bridge. This project will provide that life extension.

The strategic objectives of the project are as follows:

- Maintain the existing level of service on the Midland Highway into the future;
- Improve safety for road users and bridge operation and maintenance staff;
- Reduce ongoing maintenance costs;
- Maintain the option for use of the bridge in the longer term; and
- Provide economic benefit to the Derwent Valley.

More specifically, the project aims to:

- Rectify existing structural deterioration and defects;
- Ensure the bridge reliably carries National Highway traffic for 15 years without the need for further major works;
- Ensure that the current rail facility is maintained;
- Minimise the risk of future unplanned road closures due to the escalation of existing structural issues;
- Restore the lifting operation of the bridge and access to the upper reaches of the River Derwent;
- Simplify the lifting operation, utilising contemporary electrical and mechanical systems, improve reliability and reduce maintenance; and
- Improve road user safety by upgrading traffic control barriers, signals and overheight warning systems.

EXISTING SITUATION

DIER has previously commissioned significant reports relevant to the Bridgewater Bridge Refurbishment project including the following:

- Maunsell Australia Pty Ltd, Bridgewater Crossing Existing Bridge Condition Assessment, August 2003; and
- Maunsell Australia Pty Ltd, Bridgewater Bridge Review, Report on Review and Recommendations for 10 to 15 Year Serviceable Life, September 2007.

These reports highlight a number of structural issues that require attention, with the most significant items being:

- Settlement at the southern abutment and pier 1;
- The need for replacement of the protective coating system and cathodic protection system; and
- The counterweights are deteriorating and require thorough inspection and treatment.

This project is, in part, a result of those investigations and recommendations. The scope of the project is generally in accordance with these reports with some modification in consideration of the critical importance of this structure to the National Highway. Recent investigations, that are now complete, have further informed scope development. Significant existing issues related to the Bridgewater Bridge are discussed below.

Ground and structural settlement at the southern abutment and pier 1 have been ongoing since construction and annual surveys indicate it is continuing. Maunsell

suggested a cause of this in their 2003 report but the cause is below the riverbed and can only be inferred from the surface. Suspected broken piles may be contributing to the settlement but the causeway itself is also settling and may be applying additional downward force on the piles. This continued settlement represents a significant risk to the future serviceability of the bridge and there is no guarantee that the settlement will continue at the historic gradual rate. To avoid a long closure of the bridge in the event of accelerated movement in the future, it is proposed to address the settlement in the refurbishment. A targeted geotechnical investigation early in 2009 will inform the final design.

The existing paint system on the bridge is lead-based. The paint system on the approach spans has broken down in many areas and failed completely in others but the lift span and flanking spans are in good condition. Paint has been falling into the River Derwent and this represents an obvious environmental risk. Without repainting, corrosion will continue to the point that the structural integrity of the bridge is compromised. The paint system has also broken down in some areas on the pedestrian handrails, exposing the lead-based paint. This represents a safety risk to pedestrians and it is intended that it be managed in the short term prior to the main construction contract.

The existing cathodic protection (CP) system has failed and been decommissioned. A functioning CP system reduces the rate of corrosion in steel reinforcement in concrete around the tidal zone. Corroded reinforcement can lead to spalling (cracking and failing) of the concrete and the need for significant repair. Repair can be time-consuming and costly and failure could result. Without a CP system, major repair works would be required within the next ten years. Installation of a new CP system is proposed to avoid the need for major, future repair works. The design and construction of the proposed CP system will attempt to avoid issues sometimes associated with such systems by completing the design using a specialist from DIER's consultant GHD and selecting equipment that is likely to be maintainable.

The concrete in the counterweights (large concrete blocks, suspended by cables above traffic) has spalled in some areas, with small concrete pieces falling to the bridge deck. If left untreated, it is likely that this spalling will continue to occur with the likelihood of larger pieces of concrete falling to the deck increasing. This poses an obvious risk to traffic. In terms of repair costs, it is also financially advantageous to address the problem now before it progresses. Encapsulation of the counterweights following treatment is proposed.

The lift span is currently not operational. In 2006, corrosion was identified in the cables connecting the lift span and the counterweights and the ropes were condemned. The counterweights have since been suspended directly from the tower structure, to reduce the load on the cables. DIER will make the lifting operation of the bridge functional again. This involves an upgrade of the lift machinery and replacement of all cables.

Traffic Issues

There has been a range of minor crashes on the bridge with most being minor rear end collisions associated with queuing. There has been at least one potentially serious heavy vehicle crash. Traffic speed is currently reduced to 60 km/hr and there is no intention to change that. Restoring the lift span operation will create potential conflict but this will be managed by improved signage and traffic signals.

In order to maintain a reasonable level of service on the Midland Highway, it is likely that the restored lifting functionality will operate only at particular times (outside peak times) and then, only on demand. Road users will become familiar with the times when traffic may be delayed. It is expected that delays caused by opening of the bridge will be limited to around ten to fifteen minutes.

SCOPE OF WORKS

The scope of works for the project can be categorised into separate areas of work. These areas are as follows:

Inspection, Analysis and Structural Assessment of Bridge

A level-2 inspection (as defined by Vicroads) of the towers and flanking spans, including the entire lifting mechanism load path, has been completed. Following the inspection, an assessment and analysis of the structure was undertaken to determine its capacity to withstand current traffic and wind loading with appropriate safety factors. Also included was fatigue modelling, analysis and assessment of the bridge. This stage of the project is complete.

Settlement of Southern Abutment and Pier 1

Ongoing settlement has occurred at the southern abutment and the southernmost pier (totalling around 600mm) since construction in the 1940s. Maunsell suggested, in their 2007 report, that the most likely cause of the settlement is failure in the timber piles and splices supporting the structure at those locations. These findings have been critically assessed and other causes are expected to be contributing to the settlement. This will be further tested with the completion of a focussed geotechnical investigation. It is expected that structural remediation will be undertaken.

Structural Repairs

A number of structural repairs and modifications are to be undertaken. These include the following works:

- Repair/replace damaged approach span expansion joints and lift span nosings. These are currently damaged, require regular maintenance and constitute a significant safety hazard when the associated steel plates become damaged and bend up into the traffic lanes;
- Repairs and modifications to other assorted elements as identified during the Level 2 inspection, analysis and assessment phase of works;

- Repair damaged flanking span bearing plinths. These plinths have suffered ongoing deterioration, due to their age and the harsh environment in which they are situated;
- Provision of improved connection (lateral restraint) between the approach span beams and the concrete deck they support. This will increase the capacity of the beams and reduce their wear and tear; and
- Treatment then encapsulation of counterweights to reduce deterioration and contain spalling concrete. Currently the counterweights are showing signs of deterioration and there is a risk that concrete will spall and fall to the bridge deck below without intervention.

Installation of New Cathodic Protection (CP) System

The existing CP system is defective and decommissioned. This scope of work will include the replacement of the existing system but the retention of some components where there is found to be a significant cost saving and little risk in doing so. DIER will implement what it sees as the best whole-of-life solution.

Blasting and Repainting the Approach Spans and Supporting Steelwork

Blasting and re-painting of the approach spans, supporting steelwork and other areas is required. Currently, lead-based paint is being lost into the River Derwent. Encapsulation of individual work areas, mechanical removal of the lead-based paint and gradual repainting of the bridge will be undertaken. It is proposed for this work to be completed ahead of the balance of construction works.

Refurbishment of Counterweight Traffic Barriers

The existing counterweight traffic barriers commonly jam causing traffic delays and a significant safety hazard. They will be refurbished to improve reliability. Due to historical poor compliance with the existing traffic signals, they will be replaced with generic signals. An over-height vehicle detection and warning system will also be installed. Cameras may be integrated with these systems to ensure compliance and therefore driver safety.

Replacement of Mechanical Equipment and Counterweight Cables

The existing mechanical plant and equipment, which drives the lift span, is outdated and presents a risk to operators and potentially to road users. It is prone to breakdown and requires a high level of skill, experience and risk in its operation. The replacement system will include not just new plant and equipment but also new systems with increased safety, reliability and efficiency.

The cables connecting the lift span to the counterweights will also be replaced. As mentioned above, the cables have been assessed as unsafe and will be replaced with new cables as part of these works. The existing temporary fixings between the counterweights and the bridge towers will be removed.

Bicycles

The Bridgewater Bridge is narrow and issues associated with the dimensions of the bridge will not be addressed as part of this project. Works will not extend along the causeway south of the bridge so there will be no additional facilities constructed for cyclists. The bridge has a footpath on the eastern side (rail on the west) and a wide sealed shoulder. These are considered satisfactory for use by cyclists. Cyclists' facilities will be considered as part of any future Bridgewater Bridge replacement.

Traffic Disruption

Remediation of the bridge will undoubtedly result in some traffic disruption. However this will be necessary to ensure the safety of both those undertaking the work and road users. It is expected that traffic management will be required for the major remediation activities as follows.

The majority of structural repairs can be undertaken with no traffic disruption however one lane will need to be closed to traffic for several weeks to accommodate works within the carriageway.

Ground improvement and bridge-works at the southern abutment may be undertaken outside of peak times or at night with one lane closed to traffic.

Replacement of expansion joints will require traffic to be removed from half of the carriageway, leaving insufficient space for through vehicles. Full closures of the bridge will be required at times (possibly full day closures), particularly when working in the centre of the carriageway.

The cathodic protection system can be installed from barges or scaffolding with little disruption to traffic.

Painting of the approach spans will be undertaken underneath the bridge, so the majority of works will not require lane closures. Work on guard rails may require lane closures.

Upgrade work on the machinery deck will take place above the road so it is expected that one lane will need to be closed during some of the works. Crane lifts may require brief (1-2 hours) full closures.

Refurbishment of the counterweight traffic barriers, although a minor part of the works, will require some (1-2 hours) lane closures during removal, installation and commissioning.

Mechanical works and change-over of counterweight cables is expected to require multiple half day complete closures for a period of up to 2 weeks. The nature of the works is such that the risk to traffic would be too great, should one lane be kept open during operations such as lifting heavy cables. The extent of such closures will be confirmed in conjunction with the contractor.

As stated above, some components of the project will require lane closures and full bridge closures will be required at times to ensure the safety of drivers and the construction team. DIER is still considering the issues associated with multiple short closures versus a single, longer closure. It is likely that a single closure would have several benefits over sporadic closures. Any planned closures would be advertised in advance and sufficient real time information would be provided to inform drivers of the need to take alternative routes. Traffic management during construction will be undertaken in consultation with local road authorities, as part of the ongoing public consultation process.

Rail services currently run out of Hobart via the Bridgewater Bridge on approximately a 32 hour cycle. Bridge works will require close co-ordination with the rail operator and rail manager and work on the track or affecting the integrity of the track will be completed under the existing track warrant system to ensure safety for all parties. The works are not expected to have a significant effect on rail services. It is proposed to improve reliability of the rail service by making improvements to the existing rail lock system.

Heritage Considerations

The Bridgewater Bridge and its associated landscape is an historic transport route of great importance to Tasmania. The first solution to crossing the obstacle of the Derwent was the 1830s causeway, one of the largest convict built engineering works ever undertaken in Australia. During the nineteenth century, the crossing evolved to meet new transport requirements. A timber bridge was added in 1849, and with the advent of the railways, the first of several rail bridges was constructed over the river in 1874.

The current landmark bridge was planned as early as 1938, but its construction was delayed by the outbreak of World War Two. The road bridge was completed in 1942, with the rail crossing being finished in 1947. The bridge demonstrates the innovation of the Tasmanian Public Works Department, notably the work of Allan Knight, and Victorian consultant engineer, David Isaacs. Following the replacement of the old floating Tasman Bridge, the Bridgewater Bridge is reported to have the largest surviving lift span in Australia. Other similar structures remain in use in other states. The bridge is also notable for its technological achievement. Isaacs provided advice on ways to address fatigue and brittle fracture of weld joints. Through this work, the

Bridgewater Bridge was the first Australian bridge, and possibly a world first, where specific design measures were researched and implemented to reduce the risk of metal fatigue in the joints.

The heritage significance of the Bridgewater Bridge is complex. None of the proposed works are considered to affect the heritage aspects of the bridge; consequently permits will not be required to undertake the work. The Tasmanian Heritage Council will be advised of the project and given an opportunity to provide comment on it.

Noise Considerations

It is considered that there will be no significant increase in traffic noise following the completion of the refurbishment. No permanent noise mitigation will be installed. DIER's Code of Practice on Traffic Noise does not consider construction noise but it is expected that the impact on local residents will be minor. It is planned for most works to take place in daylight hours for safety reasons, so it is possible that shift workers may be affected. Noise may be generated by construction vehicles and other work activities, but noise from these sources may not exceed that from highway traffic. Nearby residents will be advised of any need to undertake work at night.

Environmental Considerations

Lead based paint will be removed from the bridge with full encapsulation of individual work areas. DIER has a permit to undertake such works around the state until 2010. The safety and environmental risks associated with this and other tasks will be managed by the Contractor, who will be required to comply with DIER's requirements and environmental legislation. If well managed, it is expected that this work can be completed without environmental incident. No further environmental approvals are considered to be required.

Social Considerations

The bridge provides a critical link for intrastate and local traffic. This project will ensure the reliability of that link until a new bridge is constructed. The project will also ensure the possibility remains open for the bridge to be retained into the future.

The River Derwent has been used for transport for 200 years. Since 2006, boats of any size have not been able to pass beyond the Bridgewater Bridge. The project will restore access to New Norfolk for ferries and recreational boats. This will provide a potential economic benefit to the Derwent Valley and a social benefit to many.

The works will cause delays during construction and create some noise. These issues will be managed through public consultation. It is recognised that some people will be disproportionately affected by the works (e.g. a person living at Granton but working at Bridgewater would need to detour via the Bowen Bridge or New Norfolk). The need for some closures is driven by safety concerns. The possibility of longer

closures is driven by the desire to minimise overall inconvenience for road users by completing most work requiring closures in a single period. The preferred method of project delivery and the complexities of associated consultation and traffic control are still under consideration by DIER. The effect on road users is the primary consideration.

Stakeholder Engagement

A Stakeholder Engagement Plan has been developed by DIER. Consultation will be ongoing throughout the design and construction phases of the project. Due to the specialised scope and critical importance of the project, there is little opportunity for direct community involvement in project development. The aspects of the project requiring specific consultation are:

- Noise during construction;
- Lane and bridge closures; and
- Environmental issues associated with lead paint removal.

It is intended for closures to be planned to avoid significant events. The effect of closures of this vital transport link on freight operators and the travelling public is recognised by DIER.

Consultation to Date

The following key external stakeholders have already been advised of the proposed works and they will be kept informed of the need for lane closures, etc.:

- Tasmania Fire Service;
- Tasmania Police;
- SES;
- Tasmania Ambulance Service;
- Metro and Redline;
- Tasmanian Transport Association;
- Tasmanian Bus Association; and
- Brighton, Glenorchy and Derwent Valley Council.

No feedback has been received from any of these stakeholders.

Upcoming Consultation

The following external stakeholders will be advised of the proposed works closer to construction, once traffic management arrangements are better understood and will also be kept informed of the need for lane closures, etc;

• Rail operator, Pacific National;

- Rail Manager, DIER Rail Management Branch;
- Tasmanian Transport Association;
- Taxi Industry Association;
- Coach and Bus Association;
- Private bus operators;
- Freight Companies (including rail operator);
- RACT;
- Car Rental Companies;
- Tasmanian Heritage Council (THC);
- Marine and Safety Tasmania (MAST); and
- Department of Primary Industries and Water (DPIW).

Proposed Public Consultation

It is recognised that the travelling public typically has less need to make advanced arrangements to allow for the closure of the bridge than freight operators. The public will be advised well in advance of the commencement of construction using means such as:

- Public notices in the three main state newspapers;
- Media releases including radio updates on DIER's traffic service on ABC radio and other stations;
- Public displays at Brighton, Derwent Valley and Glenorchy Councils (all adjacent to the bridge). The public display will inform the public of the scope of the project and the expected project timing; and
- Fixed signage and variable message boards on site.

Single lane closures will not delay vehicles by more than a few minutes so no special advice is planned to be provided. Works will be timed to avoid peak times and it is planned to phase traffic lights to provide priority to peak flows. Immediately before bridge closures, additional variable message boards will be placed in locations to provide drivers with the opportunity to use other routes such as the East Derwent Highway and Mud Walls Road. Such locations may include South of Oatlands, North of the East Derwent Highway, Clearys Gates and Lutana.

Bridge Closures

Much was learnt during the forced bridge closure in 2006 about the effects of the closure of the bridge on traffic flow on other roads and highways. This knowledge will inform the traffic management plans for the bridge works.

PROJECT JUSTIFICATION

Safety Benefits

The proposed works provide the following safety benefits:

- Encapsulation of the counterweights for reduced likelihood of spalled concrete falling from the counterweights onto traffic below;
- Replacement of the protective coating system to prevent lead contaminating the River Derwent and reducing the likelihood of pedestrians coming into contact with lead-based paint;
- Improvement of over-height warning systems, signals and barriers will improve road user safety and the risk of damage to trucks and the bridge;
- Replacement of defective cables will restore structural balance to the structure;
- Replacement of antiquated mechanical equipment with contemporary equipment for reduced noise and improved reliability and safety;
- Replacement of steel plate expansion joints that, at times, constitute a hazard to traffic; and
- The provision of other safety features consistent with the bridge being a workplace for its operators.

Maintenance Benefits

The proposed works provide the following maintenance benefits:

- Installation of CP system reduces whole-of-life costs associated with concrete repair to the piers and abutments;
- Replacement of the lifting span machinery reduces future maintenance requirements of the equipment and improves operational reliability and efficiency;
- Repainting of the entire deck structure avoids the need for uneconomical future packages of minor painting works;
- Structural improvement reduces the overall risk of unplanned road closures resulting from structural failures;
- High maintenance items such as expansion joints and traffic control barriers will be upgraded to reduce maintenance; and
- The bridge currently requires daily inspections and maintenance. Attention to some of the high maintenance components should reduce this maintenance requirement.

Other Benefits

An operational lift span provides improved access upriver of Bridgewater Bridge and has likely economic befits for New Norfolk and the Derwent Valley, and undertaking this work now will preserve or restore the condition of the bridge to ensure its viability as a transport link into the future.

PROJECT COSTS

Cost Item	Amount (\$)
Structural Works	5,080,000
Mechanical Works	1,400,000
Overheads	1,490,400
Contingency and Outturn	3,729,600
TOTAL	11,700,000

EVIDENCE

The Committee commenced its inquiry on Monday, 19 January last with an inspection of the site of the proposed works. The Committee then returned to Parliament House whereupon the following witnesses appeared, made the Statutory Declaration and were examined by the Committee in public:-

- Andrew Fowler, Project Manager, Bridgewater Bridge Refurbishment Project, Department of Infrastructure, Energy & Resources;
- Phil Cantillon, Director Operations, Bridgewater Bridge Refurbishment Project, Department of Infrastructure, Energy & Resources;
- Andrew Murray, GHD Design Manager, Bridgewater Bridge Refurbishment Project; and
- Mr Ian Addison

Background

The Project Manager, Mr Fowler, provided the Committee with the following overview of the project:-

The Bridgewater Bridge refurbishment project is valued at \$11.7 million. It is primarily to reliably extend the life of the bridge until a new crossing is constructed in the same location or adjacent to the current bridge. The work consists predominantly of structural refurbishment and repair. The bridge was constructed in the early 1940s and fully open to road and rail traffic around 1946 and since that time there has been some significant strengthening work. But there is a need to undertake further work now in order to have the bridge remain reliably open for the next 10 to 15 years or thereabouts.

Regarding the major components of the project, the lower graphic there explains some of the terms. The approach spans on the left-hand side of the lower graphic are the fairly simple beam and slab-type arrangements. Hobart is to the left of the drawing, as you can see. Each of those

approach spans is supported by a concrete pier with concrete encased timber piles. There is also a single approach span at the Bridgewater end of the structure. Adjacent to the lifting span, which is coloured in purple, are what is known as the flanking spans which are steel truss elements with the orange-coloured towers in the bottom there and the spans themselves, which are not coloured.

The significant components of the project are starting from the southern end or from the left of the that bottom graphic; restabilisation of the western abutment or the area where the bridge meets the causeway and the first pier where there has been ongoing settlement since construction; the installation of a cathodic protection system to protect the tidal zones, in particular the concrete structure, from further deterioration - that is the areas that are coloured green in the graphic, right through from the south to the north; replacement of expansion joints with a more reliable system which is across all of the approach spans, all coloured blue in the lower graphic - not over the full extent but above each pier the expansion joints which have historically caused trouble and safety issues.

It is proposed to repaint the approach spans. The flanking spans and towers are in quite good condition but the protective coating, particularly on the southern section, is quite deteriorating and there is a need to blast the steel work to remove the existing lead-based paint system that is there, which involves full encapsulation to catch any of that waste material that is removed and the repainting with a contemporary system, not a lead-based system. That is over the full section there that is shown in blue, both on the south and on the north.

The other obvious and fairly high-profile public section of the work is to reinstate the lifting operation which was ceased in October 2006 when deterioration of the counterweight cables was identified. It is proposed to replace those cables as part of this work and also to refurbish much of the lifting mechanism. In many cases, that simply means removal, inspection, crack testing, repainting, lubricating and changing of minor components, that type of thing. But there is some more significant work, particularly around the control system itself with operating the bridge. Much of what is within the bridge at the moment is 1940s technology and although we are planning to keep some of those components, for example, the heavy gearbox that is in there, we see no reason to change that based on the inspections that have been done in recent months. So we would maintain that. We would upgrade the electronic and control system to make it easy to operate, safer and more reliable.

Also there will be some safety improvements for the rail operation. The bridge, since the late 1940s, has carried rail across there as well and there would be a need, once the lifting operation is restored, to also continue to carry rail services for now. The existing locking system that locks the rail into position when the bridge is moving down and when it is seated in the down position has been unreliable so we are seeking to either refurbish or replace that with a more reliable system.

As well as changing the counterweight ropes, we will encapsulate the counterweights so that there is no further risk of small sections of concrete falling on to the roadway below. That would be the bulk of the major components of the refurbishment,

Another thing we are seeking to do is to improve signalling for vehicles crossing the bridge to give them more advance notice that the bridge is about to be raised, and also to give a clear indication of the need to stop. There have been issues over compliance with vehicles continuing on through the red lights that are installed on the bridge at the moment, so that is obviously a safety issue.

Timing-wise the design work is being finalised at the moment and we are planning to proceed to tender in March with an open tender. We expect to award the tender in May and then proceeding immediately with construction. The completion of the project is expected to be late in 2010, but the bulk of the external work will happen in the warmer months around the end of 2009 and the start of 2010...

Major Issues

The Committee questioned the witnesses on the major issues addressed by the proposed works. Mr Fowler responded:-

To give you an idea of the major issues we are looking at, one is the settlement of the abutment and pier 1... Looking south, you can see the abutment is actually settling on ... the eastern side and that has been ongoing since construction and has been monitored. I don't know when the monitoring started but certainly in recent decades it has been monitored and it seems to be continuing at the same rate. So we are seeking to address that rather than let it go and continue to ensure that we don't have any unplanned closures in the future if something major happens as a result of that settlement... Old piling records indicate that not all of the piles are founded on rock in this location, so they are pulled up before they hit their expected depth. It appears they are being pulled down by the settling causeway. There is no indication that I am aware of that it is going sideways. I expect the measurements that have been taken today to simply be levels, which you can get quite reliably and accurately, but I am not aware of there being any indication of any sideways movement occurring there.

To give you an idea of corrosion ... the protective coating is entirely lost and there is a risk of losing significant amount of section. What you can see there is the result of some earlier strengthening work adding some plates underneath the beams to increase their capacity.

We are proposing to grout-inject the causeway in that area, which can be done under traffic and it is a fairly inexpensive process as well. It is fairly commonly used these days, so it is an economical approach that we expect will work, rather than doing a very expensive, major disruptive reconstruction in that area... You put a drilling rig on either side of the roadway and then drill down and inject grout in that area to stabilise the material around the pylons.

The counterweight arrangement is supported by the cable. In 2006 they were noticed to be defective in one area and at the moment they are suspended on heavy steel plates, so they are connected directly to the tower with only part of the load on the cables at the moment. The refurbishment project will replace those cables and treat the counterweights to reduce the rate of corrosion of reinforcement within the counterweights and also to reduce the rate of concrete spoiling. Another thing we intend to do is encapsulate the counterweights in a mesh so that we can still see what's happening with them and monitor them over time - that will be enough to

restrain any small pieces that come off. As part of the project we will remove any pieces that can be reasonably removed and repair them to eliminate that risk. What we see here is a typical example of something that would be refurbished - very heavy, large sheave wheels that carry the six large ropes up and over the top. We would be inspecting them for variance and also inspecting the sheaves themselves and touching up paint, looking for cracks in areas where there are likely to be cracks. Typically the bridge is very well built and very well engineered and we're not expecting to have any significant issues in items such as the sheave wheels...

Some of the drive mechanism is very old. On top of the bridge, as you have seen, there is a drive house and if we look at the gearbox - it is all 1940s stuff - it is very simple and quite easy to maintain. Initially we took our lead from the Road and Traffic Authority in New South Wales. They replaced this mechanical equipment on one of their bridges to put in something contemporary. The advice from our designers was that this is all very good - it is heavily engineered, easy to maintain, works well and we should keep the gearbox. The motor and brake arrangement - and there is a similar arrangement on the other side as well - is a different story. We're intending to replace the motors and the brake arrangement with something that's more reliable. There is anecdotal evidence that this is difficult and unreliable to use. It works through a system of levers and we would be putting in an automatic system but still one allowing overrides and a lot of feedback to the operators so they can see what's going on and they have to interact with the process. Some of the areas of the lifting where there could be confusion or room for human error will be eliminated. The existing system has a diesel engine, which is a back-up in the event of a power failure, so if the bridge is raised and there is a loss of power for some reason then you can lower the bridge back down using the diesel engine, by linking it into the gearbox.

At the moment we're still laying up options as to what we do. This is a system that works but we will probably need to do some minor work on the engine or we could potentially put in a smaller electric drive and a generator. We are still weighing up options, costs and benefits to be sure of what we do there. But much of what you see there will remain, with the exception of motors and braking systems...

We did investigate briefly whether it was a better alternative to move the operation off the actual lift span. At the moment, as you're lifting, the operators travel up with the lift span. Being an old structure and something you really need to understand and interact with, you are much better off to be there and feel what's happening and it is easier to control if you are actually on it. There is a very high factor of safety on the lifting mechanism. It is also balanced quite accurately; the weight of the lift span is balanced with the weight of the counterweights. If there was an event, such as a power failure or something more significant that is unforeseen, then the operators are right there and they have a chance to deal with it, rather than having to potentially scale the towers to get access to see what is going on. So, on balance, we have maintained the operation from on the lift span itself.

I mentioned the expansion joints, which at the moment are a steel plate system and which, over the years, have caused quite a lot of trouble. You can see the two traffic lanes there. What has happened in the past is that bolts have broken or the plates have broken and as trucks drive over them the steel folds up and you are left with protruding steel within the carriageway. So it is something that needs to be fixed immediately when that happens. So we are proposing to put in a simpler and very reliable, modern system of expansion joints to eliminate the steel plates and that potential hazard...

We are proposing to remove the steel plate and put in a hard nosing. There is a material called sealspec, which is a jackhammer-hard epoxy-type of material. We will put that in there and also a silicon-type of membrane to keep the dirt out. It would not take any load but it is a propriety system made by Greenall, which is an Australian expansion joint manufacturer. The system has been well tested here and overseas and it is ideal for this application and that would completely eliminate all these different components here, the steel edge, the steel flat and the bolts and all those things...

The actual material that would take the impact of trucks and vehicles going across is a very hard epoxy. So that would be located here and here and then the membrane across is just very tough, yet flexible and strong. It is similar to a silicon-type of material but it is made specifically for that purpose, so it is a membrane to keep all the dirt out from going down beneath the structure and keep the moisture out.

That is a view from underneath a typical expansion joint with a bolt coming down through the plate in the top and it has been fastened at the bottom. So it has obviously lasted a long time but it has required quite a lot of work. Quite a detailed aspect of the work is to get in there and remove those components and to rebuild this, particularly with part of it being under traffic while we are doing it, potentially...

At the abutment is all underground. Some measurements have been taken using an electronic process that has identified that there are most likely one or two broken piles or piles that aren't taking the load properly... Our designers have had a look at the issue. Initially we were looking at repiling the abutment and constructing a structure underneath the bridge in front of the existing abutment to resupport it with a different pile system, but we thought that was fraught with risk because there are existing piles in different directions and the rockfill and that sort of impact from piling could cause other issues as well. We are going for the softer approach of stabilising the abutment, given that looking at old geotechnical records indicates that the abutment is settling and is likely to settle. We have also looked at old piling records that indicate that the piles in that location weren't taken right down onto rock, so those piles have some room to continue to settle. If the causeway is applying pressure as it is settling itself, that will drag on those piles and pull the entire structure down.

Traffic Issues

The Committee questioned the witnesses with regard to traffic control during the proposed works, and the following exchange took place:-

- *Mrs NAPIER* –(In relation to the replacement of expansion joints) Can you only do half the road while you are doing it? You have your options in terms of traffic control. Do you have to close the whole road to deal with that part of the work?
- *Mr FOWLER* With the system we are proposing you can do it in short lengths at a time. So the plan is to do one-third at a time so you are leaving one lane of traffic open and then you can do

the other third. But the middle section would require lane closures or full closures. So there is no way to get into the middle section because there is not sufficient width to allow vehicles to get past when you are working in the centre of the road which is unfortunate. But there certainly have been very significant issues with this in the past with people having to urgently go out there and cut off these plates and things.

Mrs NAPIER - Does it decrease its effectiveness if you have it broken up into three parts?

Mr FOWLER - No, it does not.

Mrs NAPIER - Would it be better to have a single section through or not?

- *Mr FOWLER* It would not necessarily be better. With the system we are thinking of using it should not make any difference. There is some economy, obviously, in doing the whole width of the road in one section rather than coming back and doing it in multiple bites. So traffic control, in particular, is something we are still working through. So we are weighing up the options of multiple brief closures versus a longer closure and doing all of the work in one sustained closure, one hit. The considerations for that are based purely on transport considerations. So it is all about efficiency and inconvenience and how the general public and freight operators can handle perhaps regular closures for a long period versus one closure so that they would know that the bridge was closed for a period and they would know to make alternative arrangements, rather than potentially being unsure of which way they needed to travel on any particular day. So it is something that we are debating and we will possibly involve the contractor in that as well. We will be consulting more with freight bodies and emergency authorities, as well as advising the community well in advance. But it is something we are still working through because it is obviously a big issue. But that work needs to be done and it is a matter of finding the best way to do it...
- *CHAIR* Because you're still in the process of considering whether you're going to have multiple short closures of the bridge versus one single longer closure, you also refer in your submission to the lessons learnt during the closure in 2006 or 2007. What are the significant issues you learnt from that closure which might then impact on your decision as to one long closure or multiple short closures of the bridge?
- *Mr FOWLER* The issues are probably similar whether it is short closures or a long closure. My understanding is initially when the bridge was closed at short notice there was obviously a lot of extra traffic that went onto the East Derwent Highway and other roads heading north.
- *Mr CANTILLON* I can probably answer that because I was there at the time. I think what it comes down to is that we hadn't done a closure of that magnitude for quite a while. I think the last time was when we re-decked the bridge, which was probably in the mid-1990s, I think. You just refine the traffic management schemes, work out how some of the junctions will operate under traffic, how you get the message across, when you need to do it, which people you use all those arrangements. It is just a refinement of those, so if you were going to a longer closure, what would you operate, how would you operate, who would you tell, who would you get involved. You might recall, at the Bowen Bridge we had transport inspectors operating there at one point

during a closure and that was really just at peak times to assist us with managing the flow. So it is detail like that.

Rail Issues

The Committee questioned the witnesses with regard to the rail provisions and the following exchange took place:-

- *Mr HALL* In regard to rail and I think, Andrew, you mentioned rail 'for now' when this committee looked the Brighton transport hub recently I think it was indicated to us that if the hub goes ahead and provided we get a rail operator and all sorts of ifs, buts and maybes, the rail link would still continue from Granton through to Hobart. Is that still the case?
- *Mr FOWLER* Yes. When I said 'for now', that is an issue that is separate to me but it is certainly for the foreseeable future. We are doing what we need to do to allow rail to continue to operate for as long as it needs to.
- *Mr HALL* If in the future a new four-lane bridge were built, would the rail be located on that bridge or on the old one, presuming that is kept?
- *Mr FOWLER* With the new bridge planned to be constructed in that vicinity within the next 10 to 15 years there is of course the option of maintaining the existing bridge to use as a local service road and to serve rail. The plan at the moment, I believe, is to construct a reasonably high bridge to allow for navigation of vessels through the Bowen Bridge and up under the Bridgewater Bridge so constructing a similar 15 or 16 metre-high bridge. In that case rail could not travel across that bridge. There is no thought of having an operating structure, so if rail were to operate or continue to operate it would stay on the old bridge as long as it stayed there.
- *Mr CANTILLON* The planning study that will shortly commence will look at all the options and go back to the basics and look at how the existing bridge could be utilised and should it be utilised, the form and structure that would replace the new road et cetera. All those fundamental questions will be reviewed as part of that study but within a fairly short time frame. The intent is to try to get through the overall study within about a 10-year period.

Lifting Mechanism

The Committee questioned the witnesses with regard to the lifting mechanism. The following exchange took place:-

Mr FOWLER - The Derwent River is a navigable river, including the upper reaches, so there is a requirement to still allow navigation for vessels underneath the bridge. Importantly, I think the value of the mechanical refurbishment is quite

low in the scheme of the project. The project is mainly about structural refurbishment: the cathodic protection system, the abutment settlement, repainting and other minor repair work - expansion joints and such things. If you look at a cost benefit, the benefit is primarily to tourism in general but more particularly to the Derwent Valley area; allowing pleasure vessels and potentially ferry operators to have tourist ferries running up north of the Bridgewater Bridge, as well as providing access up there for special events such as the Derwent Valley Festival and general access for pleasure craft...

In its heyday I think around four barges a day used to travel down there, and that would have stopped in the early 1980s. It was down into the single numbers of lifts per week. Occasionally there were peak periods, such as when there were events or the yacht clubs arranged to sail up there. It is not a common occurrence but then the value of the mechanical side of the refurbishment is only around \$1.5 million to \$2 million, which is a cost that could easily be recouped by additional revenue to businesses in allowing that public benefit.

- *Mr HALL I* think *Mr* Green asked a question on site, that if it did happen you would have constraint times of when the bridge mechanism could be used so that you didn't disrupt traffic flow. Is that potentially what you would do?
- *Mr FOWLER* That's an option. In recent years the bridge was only operated during daylight hours, for safety reasons, and that would remain. There is the potential to minimise the effect on the National Highway and certainly to the rail operator to only have the bridge opening at certain times. You might find that a tourist ferry might want to go up there and come back down one hour later, so if you allowed, for example, a one-hour window in the morning and a one-hour window in the afternoon that wouldn't be suitable for them.
- Mr HALL And the disruption time is approximately 10 minutes?
- *Mr* FOWLER Yes, it's about 10 minutes. We're not doing anything to change that situation. That would effectively come down to increasing the speed of the lift and there would be safety concerns in so doing. We keep it running at the same speed. A lot of it is about navigation as well. A boat can't proceed under the bridge until the bridge is fully up and they receive the all-clear from the bridge operator. It takes time for the boat to go through and then they have to lower the bridge back down and remove the traffic barriers. There's quite a system that needs to be followed to get a vessel through there so there would be no way to reduce that time significantly.
- *Mr GREEN Is there a bridge operator?*
- *Mr FOWLER* It is my understanding that there are people who still train to operate the bridge. They certainly did move it both for vessels and maintenance up until 2006. But as part of this project we will need to retain people.
- *Mr* **BEST** As to the mechanical refurbishment of the bridge, with the counterweights, for example, is that what you consider as part of the mechanical refurbishment or is that separate?

- *Mr* FOWLER I'm trying to recall where we put it in the estimate. I believe it is literally part of the mechanical but, if the counterweights were to remain there, that is something that would need to be addressed because there would be the potential issue of small sections of concrete falling onto the roadway.
- *Mr BEST* That is what I was thinking. Some of the mechanical refurbishment, while it is in connection with the re-operation of the bridge, would need to be done anyway, wouldn't it?
- *Mr FOWLER* It would, and potentially the counterweight ropes would be similar. At the moment the load is shared between the ropes, which is a normal arrangement, and the steel plate hangers that are installed there. So the bridge was never designed to have the counterweights directly suspended and when much of the load is put directly on to the top of the structure without the slightly elastic effect of the cables, then the behaviour of the bridge could be quite different in the long term. The ideal structural approach would be to replace those cables anyway and still maintain the same arrangement of the lift span weight being balanced by the counterweight.
- *Mr BEST* So what is restraining those counterweights now?
- *Mr FOWLER* Some of the load is taken by the cables, but because they are quite long there is some movement on them. There was a system of heavy steel plates which is connected directly into the top of the tower but also picks up the load of the counterweights. There is some adjustment to get the right balance, using measurements to measure what load is on the cables and what load is on the steel hangers and also to get the bridge so it felt right. Most of the load is taken directly by the steel hangers, but I think only about 15 per cent by the cables.
- *Mr BEST* Is the current arrangement the way the counterweights are being held suitable long term? I am not suggesting it is unsafe, but I wonder whether this is part of what you need to address.
- *Mr FOWLER* It is considered safe. The bridge behaves well and structurally it is fine, so the hangers could take all of the weight, and new cables could take all of the weight obviously it is designed to work that way which will allow it to remain in place for another 15 years or potentially longer without addressing it and replacing those cables. Given that there is around \$500 000 to replace the cables, it is seen as being good insurance and gives the option of operating the structure again as well as restoring the original balance.

Ongoing Maintenance

The Committee questioned the witnesses with regard to the ongoing maintenance. The following exchange took place:-

Mrs NAPIER - I am interested in your reference to the fact that you are looking at at least a 15year life for the bridge - although it would appear in terms of some of the work that needs to be done on the expansion joints and the lead-based paint which needs to be replaced, that there hasn't been a lot of overall maintenance in that area, bar the lifting span.

- *Mr FOWLER* There has been, and certainly in recent decades there has been a very active program and possibly right since construction of having people on the bridge maintaining it and engaging in tasks every day.
- *Mrs NAPIER* What are your annual maintenance costs for the bridge? What is built into the budget for that?
- *Mr FOWLER* We are looking at just the refurbishment works and the actual capital cost of refurbishment, rather than the ongoing maintenance in this case. We are looking to reduce maintenance costs by putting in systems that require less maintenance or where some things historically require a lot of maintenance to try to eliminate that and put in something that is more contemporary.
- *Mrs NAPIER* Do you have a recurrent figure across five years, or something like that, that you use for ongoing maintenance?
- *Mr FOWLER* We would have, but I don't have that figure.
- *Mr CANTILLON* I would have to take that on notice, but I think it is of the order of a bit over \$100 000.
- *Mrs NAPIER* So it is fairly small bickies in relative terms.
- *Mr CANTILLON* Yes. Some of the features of the work, such as the cathodic protection, will be preserving the bridge for a much longer period as well. In a sense there is this 15-year window, but we are hedging our bets and designing key elements of it so it can last a bit longer if need be.
- *Mr FOWLER* We had a consultant do a report for us to look at what work was required just to allow the bridge to remain for 15 years and a lot of the issues we are rectifying as part of the refurbishment, they are suggesting we could just let go and effectively let the bridge deteriorate based on the assumption that it would be demolished in 15 years. Then by installing the cathodic protection, we are looking after the concrete work that is there; by replacing the paint, we are looking after the steel work that is there and that keeps the option of maintaining the bridge into the future.
- *Mrs NAPIER* After we get to the 15-year period, are we anticipating new pavements, for example? There is a reference to that in the report. How many more years will that bridge give us?
- *Mr FOWLER* It is hard to say but nothing has been found to date to indicate that it has any definite life. Bridges typically are designed for a 100-year life span. One major component that would need replacement sometime after 15 years would be the lift span deck. The bridge at the moment is on its third deck so the deck is a component that moves a lot. What is installed at the moment is a timber deck. You would not be aware of that to drive over it, but underneath the asphalt there is a timber deck and that will deteriorate with time. It is maintained and it is kept tight. So it keeps moisture out of it and it is kept sealed, obviously. But that is one significant component that would need replacement into the future beyond 15 years.

- *Mrs NAPIER* But if the work was done on the abutments and on the main tower, there is no reason it could not be there for another 50 to 100 years?
- *Mr FOWLER* There is no reason now. The bridge, obviously being built in the 1940s, was built to cater for lighter loads and smaller vehicles than we now have so that is an issue. The lift span is a critical component. If you have heavier vehicles on there then potentially the lift span could be overloaded. So it would depend to some extent on strategic directions with heavy vehicle traffic.
- *Mrs NAPIER* But you could put a load limit on it, as long as it can handle the rail traffic?
- *Mr FOWLER* Rail traffic as well. At the moment Tasmania runs lighter trains than some other States do with double-stack containers and larger locos, for example. But there is no issue with loadings at the moment. We have completed a very intensive structural inspection and also structural modelling of the bridge under both rail and traffic loadings as well as other loadings, such as wind loadings. So there is nothing that is identified and with ongoing maintenance there is no reason the bridge could not be maintained longer.

The one aspect that is difficult to maintain is the structure beneath the water which is different, but that is still monitored using divers from time to time. I am not sure of the frequency of that sort of work but it is still monitored.

- *Mrs NAPIER* So if we assume that that might continue for potentially another 100 years, your reference earlier was to the fact that the department's current thinking is that you might well be able to maintain that as the rail option and secondary road with the alternative bridge at least being built to facilitate river traffic. That would imply that we do need to maintain, in better working condition, the lifting mechanism for the times it is used?
- *Mr CANTILLON* As I mentioned earlier, I think all options are open: do we put rail on the existing bridge; do we create a new rail bridge? Certainly the maintenance works that we carry out on the bridge will be sufficient for a reasonable term with the traffic that it is carrying. If the bridge is to carry lighter loads and local traffic only, that creates another scenario. I think all of those issues will be reconsidered when we do the current planning investigations over the next 10 years. So we do not have a direct pathway, although we know that we will have a bridge that will be in pretty good condition and could be used for a much longer period. It could potentially be rail. Maybe rail should be on a different bridge. All those factors will come into it.

Consultation

The Committee questioned the witnesses with regard to the consultation process. The following exchange took place:-

Mrs NAPIER -You referred to consultation within your paper under 4.7.1. There is a number of organisations that you identified that you have spoken to, but then there is quite a significant number of other transport-related organisations that you have not talked to. Is there any rationale to that? It would appear that most of the initial ones you are talking to are government sourced and emergency service people.

Mr FOWLER - Yes.

- *Mrs NAPIER* But then I notice there are quite a few transport operators in the other group. Is there any rationale for delaying that?
- *Mr FOWLER* No, there is not and we planning to get them involved very soon. But we saw that, as far as consultation goes, the ones we have written to earlier might have had more input into how we are proposing to do things, such as how we are setting up the construction, whereas many of the transport bodies are more interested in what is happening and timing and a lot of the aspects that were still not as well developed months ago when we were writing to the others. So it was very early advice, just to keep them informed that there was going to be a project and the approximate timing but once we have looked into this issue of multiple short closures versus a single longer closure then we will have something to talk to the freight and transport operators about.

Project Costs

The Committee questioned the witnesses with regard to the project costs. The following exchange took place:-

- *Mr HALL* Given the volatile state of the world economy, do you expect some pretty competitive tenders to come in on these projects? The cost of some raw materials has substantially dropped in the last few months.
- *Mr FOWLER* We would certainly hope so. Obviously in the last couple of years steel prices have increased a lot and labour costs have increased, and fuel until recent months. From what we hear within the industry, we're expecting to get some competitive tenders. There may well be some large mining projects, for example, that have been put on hold and there may be contractors with less work on their books these days.
- *Mr HALL* Yes, that is the reason I asked the question. You might have some pleasant surprises. In the last three, four or five years a lot of projects have been very expensive.
- *Mr FOWLER* That's right. You would have seen from the estimate we've allowed for some quite high contingencies on the refurbishment in particular because a lot of the work we're proposing to do is simply inspecting components, pulling them apart and having a look and putting them back. There are still potential surprises there waiting for us but there is no physical way to get in and ascertain what we need to do until we have a contractor involved who can get in and pull things apart.
- *Mr CANTILLON* I think when we go to tender one of the things we'll have to look at is how we can reach into the market. It is a particular industry that is properly geared up to carry out this specialist type of work. I think it is about how we can reach that market to ensure that we get the best competitive prices and the best expertise. Some of that market exists in Tasmania but there are certainly a lot of mainland contractors we would looking for as well...

- *CHAIR* Right at the outset of your submission you make the comment that the funding is subject to the signing of the MOU between the Australian Government and the Tasmanian Government. I do not understand what the nature of the MOU is, so can somebody give us the detail of that please?
- *Mr CANTILLON-* The memorandum of understanding is a replacement document for the current bilateral agreement that exists between the Tasmanian Government and the Australian Government. It is a document that is read in conjunction with the current notice administration that exists and the two, once the MOU is signed, will be the manner in which the money is handed out between both parties. It is much shorter document. It contains cash flows which indicate the priorities of the relative works. Really, for a lot of the operational details, they would do more to the current notice of administration.
- *CHAIR* So, again, you point out there that, with the MOU having still not been signed, technically the State Government is exposed to a contribution of 20 per cent, but that is unlikely? Is that a fair estimation, that it is unlikely that the MOU will be signed, therefore the project will be funded by the Feds?
- *Mr CANTILLON* Yes, that is right. The process is under way. The Government has indicated a level of support for the MOU. We are basically just in negotiations on the documentation and the Government is supporting progressing those discussions with ultimately finalising the MOU as quickly as possible.
- *Mrs NAPIER* The Australian Government has committed \$14 million, but the combined cost of the Lyell Highway junction that it committed to and the Bridgewater Bridge maintenance is only \$12.5 million. So what are we going to do with the extra \$1.5 million?
- *Mr CANTILLON* It is \$14 million between the two. The bridge is \$11.7 million and the Lyell is \$2.3 million. So there is a straight 80:20 based on that \$14 million...
- *CHAIR* I have one other question but it is related to the contingencies and I note in your submission at 5.2 that you mention that the estimate does not include any particular contingencies under the major unknown items. Yet, by your own evidence earlier, you have reminded the committee that the contingencies are themselves very substantial at \$3.3 million total out of \$11.7 million. Does not one fit within the other? Whilst you might not have made a specific and particular contingency for major unknown items, wouldn't they necessarily be bound up with those significant contingencies of around the 50 per cent?
- *Mr FOWLER* We expect they would be. The Australian Government requires us to come up with a 90 per cent confidence estimate so we have to be extremely confident that we can deliver the project for this amount which is why we have those quite high contingency amounts against each item there. But realistically, we can expect that we will not incur all of those contingency costs for the project and if there was something completely unforseen that is not covered as a line item, then it could well fit into the project. Time will tell. Also with the industry the way it is at the moment, we could have a quite a wide range of tender prices submitted too. So we might find, as it was suggested, that we do get quite competitive tenders which then gives us more than enough

confidence to fully deliver the project and perhaps incorporate some additional features in there if we have the opportunity.

- *Mr CANTILLON* Prudently, when we do our estimates, we work on about a 6 per cent out-term dollar effect each year. Other road authorities, New Zealand, Queensland Main Roads, having been working on 10 per cent. So there are some unknowns there.
- CHAIR Regarding the term 'out-term dollar effect', Phil, can you remind us what that is, please?
- *Mr CANTILLON* It is the cost of doing a project in the future. So it might be 12 months in, two years in or three years in. So this estimate, \$11.7 million, is based on what the cost of the project will be with a 90 per cent level of confidence at the time it will be completed.
- *CHAIR* Because it is a two-year project, you have factored in \$410 000 as the second year out term?
- *Mr CANTILLON* Yes, and you will see a similar approach with the Brighton bypass as well.
- *CHAIR* In connection with that question I asked about the contingencies. Andrew has just indicated that you are expecting some pretty competitive tenders and that in fact you might be able to work some extra components into the project. But the document says you have not in fact taken account of unknown items because you do not know what they might be. You say in the submission that there are some items that could be removed from the scope if unforeseen issues arise. The first point is that it is unlikely, I think, by your own evidence, that unforeseen matters might impact the job. The second part of the question is then, what items might be removed if in fact those contingencies are blown?
- *Mr FOWLER* We presented a scope to the Australian Government and we need to keep that scope. There is a limit to what we can remove from the scope or what can we can add in that is not initially in there. But just in minor adjustments potentially to some of the items, for example if you look at the cathodic protection system, we have different options there for what we do. We can install a very comprehensive system that does not use any of the existing components that are available there. There is an existing defective system that's turned off and we're seeking to either remove or abandon that system that has been ineffective. If we had to, there are some components of it that we could use and there would be a minor saving in doing that. I am indicating minor savings. We couldn't delete the significant components or we wouldn't be meeting the scope that we put forward to the Federal Government.
- *CHAIR* Do you have any estimate of the closure regime impact on the construction costs, whether it is single-lane closure or a long-term closure? Again, your contingencies table makes mention of that.
- *Mr FOWLER* Last week we had a meeting with the designers and also with key DIER bridge maintenance personnel, including the DIER superintendent, and we discussed that issue. The designers at the moment are working up an estimate looking at both options: completing much of the complex work within one sustained bridge closure without any traffic on the bridge versus

doing it in stages with short closures. We feel there is enough contingency within each of these line items to cover both possibilities.

Heritage Concerns

The Committee questioned the witnesses with regard to the heritage of the bridge. The following exchange took place:-

- *Mr GREEN* Can you remind me of the heritage aspects of the bridge and the causeway?
- *Mr FOWLER* There's a bit in the report. I don't want to quote just what's in the report but there was initially a convict-built small causeway, which I think is quite well documented. There was a timber bridge, I believe, and a later larger structure to get vehicles across. There was also the swing bridge with the central pivot arrangement that still remains there. I am not sure off the top of my head which structure the stone columns relate to; it would have been one of the very early structures. The heritage aspects of the current bridge, apart from the remains of the old bridges, are predominantly around the type of construction. It's quite an early welded steel structure.
- *Mr GREEN-* You said if a decision was made to demolish the bridge. Under the existing arrangements, is it possible to demolish the bridge with the heritage listing that exists?
- *Mr CANTILLON* Where things left off a couple of years ago the answer was probably no. Having said that, there is a whole suite of options available. What we're going to do is have a look at each of those options again. One particular option, one candidate option, is to retain the existing bridge in some form, maybe as a local road, and build a new bridge. Is that the right answer? Earlier options, if you go back to 1999, were based on the assumption that the existing bridge was coming down.
- *Mr GREEN* We have a bridge that is not nearly as ornate and well-engineered as the one in Ulverstone that has been heritage-listed in recent times, as you would be aware. We wanted to knock that bridge down but we haven't been able to. A lot of the existing work that is going on on this bridge, it seems to me, is fairly prudent from the point of view of the heritage of the bridge anyway.
- *Mrs NAPIER* That was cement decay, wasn't it?
- *Mr GREEN-* Yes. It is very historic from the point of view of the design engineer and the way it's been engineered and all of the other things associated with it. The fact that you are keeping a lot of that engineering goes a long way to providing some continuity in that regard. So I think that,

if there is an argument about spending money with respect to the refurbishment of this bridge, a lot of it could be seen as reasonable from the point of view of heritage. Do you think that is reasonable or not?

Mr FOWLER - I think that is reasonable. With another structure in a different situation there may have been overriding reasons to demolish it, if it became unsafe due to deterioration and lack of maintenance which has certainly happened with other structures in other places. But in this case the bridge has been well maintained. There are no significant structural issues. It can carry the current traffic loadings and current vehicle dimensions.

DOCUMENTS TAKEN INTO EVIDENCE

The following documents were taken into evidence and considered by the Committee:

- Department of Infrastructure, Energy and Resources Submission Bridgewater Bridge Refurbishment; and
- Submission from Mr Ian Addison Brighton Bypass and Bridgewater Bridge.

CONCLUSION AND RECOMMENDATION

The need for the proposed works was clearly established. The bridge requires upgrading and refurbishment to operate adequately into the future as part of the National Highway. For at least the next fifteen years, if not longer, the repairs to the lifting mechanism will provide for significant economic and social boost to the Derwent Valley. The works will also ensure the ongoing safety of road users over the bridge.

The proposed works would ensure the ongoing operation of the bridge and significantly reducing maintenance costs

Accordingly, the Committee recommends the project, in accordance with the documentation submitted, at an estimated total cost of \$11,700,000.

Parliament House Hobart 13 March 2009 Hon. A. P. Harriss M.L.C. Chairman