

**THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS MET IN THE LONG ROOM, PARLIAMENT HOUSE, HOBART, ON MONDAY 19 JANUARY 2009.**

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**BRIDGEWATER BRIDGE REFURBISHMENT PROJECT**

**Mr PHIL CANTILLON, DIRECTOR OPERATIONS/BRIGHTON BYPASS PROJECT DIRECTOR, Mr MICHAEL KING, BRIGHTON BYPASS TECHNICAL MANAGER, Mr BRIAN DAWS, PROJECT MANAGER, BRIGHTON BYPASS SOUTH, AND Mr ANDREW FOWLER, PROJECT MANAGER, BRIGHTON BYPASS NORTH WERE CALLED, MADE THE STATUTORY DECLARATION AND WERE EXAMINED.**

**CHAIR** (Mr Harriss) - Welcome, gentlemen. We appreciate the site visit to both projects this morning. It was most informative, in particular the opportunity to see the intended route of the Brighton bypass. That gave us a good appreciation of the challenges within which you are working regarding the terrain and the crossing of some rivers and streams. Phil, you are familiar with the process in terms of the relative informality that we like to keep in this committee. One you have made your full presentation we will ask some questions.

**Mr CANTILLON** - I was going to hand it over to Andrew Fowler. We are intending to provide an overview on the report. We have some key photographs of both the bridge and the defects themselves which might help your understanding of the task at hand.

**Mr FOWLER** - 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. That is a brief rundown.

**Mr CANTILLON** - Mr Chair, I wondered whether it would be appropriate to just highlight some photographs that show the particular defects.

**CHAIR** - Yes, that would be good.

**Mr FOWLER** - We have a PowerPoint presentation here. We have been out there for an inspection so I will not bother calling up the photographs of the bridge itself. This one here shows some of the heritage aspects of the previous bridge - the stone abutments at the northern side. You can see the railway heading both to the newsprint mill and towards the north of the State. To give you an idea of the major issues we are looking at, one is the settlement of the abutment and pier 1. This is an image of the abutment at the south. I don't think I have one that clearly shows the settlement there. Looking south, you can see the abutment is actually settling on the left-hand side of the photograph or 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.

**Mrs NAPIER** - You say it is happening more on the east than on the west.

**Mr FOWLER** - It is, yes.

**Mr BEST** - Is that the fast southern - is that next to the causeway?

**Mr FOWLER** - Yes, it is - right at the causeway. The thought is that the causeway is settling and that has been documented with surveys as well. Since both the abutment and pier 1 are founded on the causeway, or have piles going through the causeway, that ongoing settlement of the causeway is allowing the whole structure to settle.

**Mr BEST** - Is that the only one that is moving or -

**Mr FOWLER** - Just the abutment and the first pier.

**Mr BEST** - Oh, right, I see.

**Mr FOWLER** - 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.

To give you an idea of corrosion, this photograph might make it clear. It is fairly typical of the underside of one of the approach spans, so obviously the protective coating is entirely lost and there is a risk of losing significant amount of section through there. What you can see there is the result of some earlier strengthening work adding some plates underneath the beams to increase their capacity.

**Mr BEST** - Just going back to that abutment that was falling or sliding down, you believe it is heading straight down, or could it be going sideways?

**Mr FOWLER** - 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.

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.

**Mr BEST** - Just put one beside it, do you?

**Mr FOWLER** - No. 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.

This shows another indication of typical corrosion, so again it's looking at an approach span - one of the supports under the approach span. It is not as significant as it looks necessarily, but it's just an indication of how much the protective coating has broken down. This sort of thing, if left indefinitely, could become much more of an issue.

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.

**Mr BEST** - Are the electric motors in pretty good condition?

**Mr FOWLER** - 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.

**Mr BEST** - So it would still be operated from the drive house?

**Mr FOWLER** - Yes, still from the drive house. 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.

**Mr BEST** - What do you put in there?

**Mr FOWLER** - What we are planning to do, within the end part there is a gap underneath that. I have another photo that will show that, but 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.

**Mr BEST** - So it is like a rubber compound?

**Mr FOWLER** - 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.

**Mrs NAPIER** - 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.

There is another heritage aspect with the pivot for the old swing bridge, which is still on site next to the current navigation span. The bridge carries rail as well, so there is a fixed component of rail in the moveable section. We also need to improve the reliability of the

system which at the moment occasionally gets damaged by trains or doesn't engage fully and can potentially cause delays to train services. We are seeking to fix that.

We have an image of the area where the deterioration has been identified. The ropes are maintained, even now that there is very little load on them. A protective film is applied to them to try to reduce any corrosion but corrosion was still identified in one area, which is the reason the lifting operation was ceased back in 2006. Another area for refurbishment is the operating winches that move the bridge up and down. We are planning to dismantle and inspect the winches to ensure there are no issues and to rectify anything we find. There's nothing that is apparent there, but just lubricating and inspecting bearings and minor work. The minor cables will be replaced as well. They have all been in place for more than 30 years, which exceeds their life span. They're still in reasonable condition but we would be interested in changing them to ensure we don't need to come back within the next 15 years and change them then.

**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.

**Mr HALL** - In regard to the lifting mechanism, the fact that it has been out of commission now for a couple of months or more -

**Mr FOWLER** - Two years.

**Mr HALL** - Sorry, two years - and the fact that traditionally what was floated down the river from Norske Skog on barges no longer occurs because they use rail, what is the cost benefit of restoring that lifting mechanism for what might arguably only be the odd pleasure craft?

**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.

**Mr HALL** - Prior to the lifting mechanism being closed, approximately how many vessels a week were affected? I drive backwards and forwards across it but I can't ever remember it being stopped for the mechanism to be lifted.

**Mr FOWLER** - There weren't that many. 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.

**Mr BEST** - Do you use stainless steel cables?

**Mr FOWLER** - No, just greased steel.

**Mrs NAPIER** - I am interested in your reference to the fact that you are looking at at least a 15-year 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.

**Mrs NAPIER** - Ten years ago I heard that too, but thank you.

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.

**Mr HALL** - I have a question which I suppose is a generic question for both of these projects. 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.

**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.

**Mr BEST** - I suppose it gets back to the other issue about the mechanical component, in that most of it you would have had to have refurbished anyway.

**Mr FOWLER** - That is right.

**Mr BEST** - Because if you continue to use it, whether or not you are going to raise it or lift it, the fact is you have to maintain it for safety reasons.

**Mr FOWLER** - It is, if anything, more difficult to maintain at the moment because in the past they used to raise it to maintain it, to get access to ropes and get all the components turning so that they could lubricate them effectively. But that has not happened for more than two years now.

I will say again, the mechanical refurbishment is quite a minor component of the project overall than much of this restructure work which obviously preserves the bridge for 15 years or beyond if those systems are installed and kept operating and maintained well.

**Mr BEST** - If it has a lesser life after 15 years, in the sense of it not being a major arterial bridge, then upgrades increase its life too, potentially?

**Mr FOWLER** - If you take the load off it, it would. It is very dynamic structure. If you are standing on it, it does move a lot, but that is part of the heritage aspects of the bridge as it was designed, considering fatigue which was not well understood in those days but it is well detailed and well designed.

**Mr GREEN** - It is 60 kph across there at the moment?

**Mr FOWLER** - Yes. When I started that load testing, we did have to drive a truck across at 80 kph.

**CHAIR** - Michael Hodgman could have answered that for you!

*Laughter.*

**Mrs NAPIER** - I see it as a good solution for the rail. We have the rail fixed, now let's build the bridge.

**CHAIR** - I have a number of questions, if I might. 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 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.

**Mrs NAPIER** - So your document isn't right on the southern Tasmania national transport

**Mr CANTILLON** - I suppose the passage time has clarified the level of funding and the details of the projects which are now encapsulated in the draft

**Mrs NAPIER** - How much is the Lyell Highway junction?

**Mr CANTILLON** - It is \$2.3 million.

**CHAIR** - That's a big jump from the \$0.5 million in 2003.

**Mrs NAPIER** - That must be some of the road as well.

**CHAIR** - As to the settlement of the southern end on the abutment, you've indicated that the only assessment that can be made so far is that there is likely to be settlement but there is a possibility of some actual pile damage and that can only be determined, I presume, from an underwater investigation? What other investigation is required to determine that?

**Mr FOWLER** - Not underwater as such. 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.

**Mr BEST** - You mentioned that you can grout that. You said that you can drill down and pump in grout.

**Mr FOWLER** - That's right. 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.

**Mrs NAPIER** - How far does that go down?

**Mr FOWLER** - It's already moved 600 mm since the 1940s, so it's gradual.

**Mrs NAPIER** - Sorry, I meant the depth of the pile?

**Mr FOWLER** - I'm not sure. It's probably in the vicinity of 20 metres or more. There are certainly records but I don't have them to hand. It varies where you are on the river as to how deep those piles are, but 20-30 metres is not uncommon.

**Mr GREEN** - Has anybody done any work with respect to the siltation on both sides? Is that directly caused by the causeway, do you think? Would that be putting pressure on it?

**Mr FOWLER** - No, we haven't looked at; we have strictly looked at the refurbishment of the structure itself. The causeway could well have some effect on that siltation but we haven't looked at that.

**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.

**Mrs NAPIER** - Which reminds me, Melton Mowbray had 80 kph signs for four kilometres there today and no sign of roadworks anywhere. Everyone travelling south tried to do the right thing, whilst everyone scootalooped at 110 in the opposite direction. It seems to me that it breeds contempt of road signage. There was no problem at all on the hill coming down into Kempton because there were roadworks.

**CHAIR** - That is unrelated to this project, of course, but the department will take note that it won't happen with this project.

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 unforeseen 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.