Inquiry into the circumstances surrounding the closure of the Forth Road Bridge

Written submission to the Infrastructure and Capital investment Committee

The Forth Estuary Transport Authority (FETA)

Forth Estuary Transport Authority Committee Library Review

This note contains an overview of selected Forth Estuary Transport Authority (FETA) related documents. It includes the review of selected FETA; agendas, board meeting minutes and reports. Please be aware that this review was exclusively limited to documents held online in the City of Edinburgh Council’s Committee library. Records of 59 boards meetings are listed online in this library, given the volume of material associated with these 59 meetings and the time constraints, the review was limited and is not fully exhaustive.

1. Complete list of reviewed items

Attached to this note, as Appendix 1, is a catalogue of Board meeting dates between 02/09/2005 and 24/04/2015 which includes extracts of selected meeting minutes, reports and other documents generally related to maintenance.

See attached Appendix 1; sectioned by date to reflect the different levels of Cllr Hinds involvement with FETA.

2. Maintenance Topics

Below is a selection of reports titles and meeting minutes between 26/10/2010 and 16/12/2011 which comment on wide range of various maintenance topics; these are augmented by short extracts as appropriate.

REPORT: Item 5: Revenue and Capital Budget 2010-2013 and Indicative Capital Plan to 2024/25 – 26/02/2010

EXTRACT: 4.2: “Capital Expenditure 2010/11

The proposed budget for 2010/11 is £8.730m. The main schemes budgeted are:

- Main Expansion Joint Replacement - £1.638m
- Viaduct Bearing Replacement - £5.022m
- Parking Area Landscaping and Reconstruction - £0.200m
- Tower Painting/Dropped Objects Canopy - £0.250m
- Main Cable Dehumidification - £0.307m
- Suspended Span Gantry Refurbishment - £0.275m
- Main Towers Cathodic Protection - £0.200m
- Other Capital Projects - £0.563m
- Revenue Investigations and Studies - £0.275m”
For further detail on the above schemes please refer to the above titled report (hyperlink provided).

**REPORT: Item 6: Review of Capital Projects - 16/12/2011**

EXTRACT: 3.9 “Full Replacement of the Truss End Links- Following the assessment of the suspended span truss, these critical structural members were found to be significantly overstressed during certain combinations of loading. However, given the cost and difficulty in replacing these elements and the potential disruption to bridge users, further examination of the probability of certain combinations of load occurring and further structural analysis has been carried out to try to determine the most realistic level of stress in the members. After the Forth Replacement Crossing opens the existing bridge will carry only light traffic under normal operating conditions. One key factor in reducing load is the reduced probability of certain conditions of traffic loading occurring within the relatively short time period left until the Forth Replacement Crossing opens. As a result of this work there is now the potential to upgrade the existing links rather than carry out a full replacement. Upgrading the links will cost significantly less than full replacement and for this current priority ranking analysis on non-committed schemes, it has been assumed that the upgrading scheme can be carried out. However, if this proves not to be the case then the full replacement scheme would have to be reconsidered. It should be noted that if the full replacement scheme were required, the cost of the works would reduce significantly the number of other schemes that could be carried out.

EXTRACT 3.10 “Strengthening Works to the Suspended Span Truss - There are levels of significant overstress within certain structural members that make up the suspended span truss under certain loading conditions. Similarly to the Truss End Links a reduced traffic loading could be used to take cognisance of the fact that after 2017 traffic loading on the bridge will reduce significantly.”

The above extract is an early note raising concerns with the Suspended Span Truss and Truss End Links (this may not be the earliest mention of these components). For further detail on the above please refer to the above titled report (hyperlink provided).

3. Truss Concerns

Here are various reports and minutes which relate specifically to structural elements of the bridge, supplemented by various extracts of text (this list is not exhaustive).

**Reports:**

2. **REPORT:** Item 6: Review of Capital Projects - 16/12/2011
3. **REPORT:** Item 10. Revenue and Capital Budgets – 27/02/12 (extracts below).
4. REPORT: Item 4: Capital Plan and Reserves Update – 26/10/2012 (extracts below).
7. REPORT: Item 5: Capital Plan and Reserves Update – 20/02/2015 (extracts below)

Extracts:


EXTRACT 7.3 “In addition, and as reported by the Chief Engineer and Bridgemaster in December 2011, there are significant non-committed schemes that will have to be deferred due to budgetary restraints. Deferring these projects may lead to an increase in their overall cost. These projects are:

- Painting of the Suspended Span Truss
- Painting of the Viaduct Box Girders
- Resurfacing of the Main Span Southbound
- Full Replacement of Truss End links
- Strengthening Works to the Suspended Span Truss
- Main Tower Wind Barriers/Impact Strengthening”

REPORT: Item 4: Capital Plan and Reserves Update – 26/10/2012.

EXTRACT. 2.2; “As reported to Members at the September 2012 meeting, there are a number of committed capital projects currently being carried out on the bridge. In addition, the Authority is liable for the legacy costs of the M9 Spur Extension/A8000 Upgrading Scheme. As Members are aware, the Scottish Government’s September 2011 Spending Review resulted in a 58% reduction in the Authority’s capital funding and, as a result, a number of capital projects have had to be deferred to beyond 2015. As reported, a further utilisation of the Authority’s reserves and a further rescheduling of less urgent capital works have had to be carried out in order to provide funding for the replacement of all the cable band bolt assemblies.”

EXTRACT. 3.9; “Of the remaining non-committed schemes, the four projects detailed below have the highest estimated cost and therefore have to be considered in part or full for deferral in order to significantly reduce the predicted deficit. These are:

- The Upgrading of the Main Cable Acoustic Monitoring Project
- Improvements to the Suspended Span Underdeck Gantry’s
- Truss End Linkages Strengthening Work
- Improvements to the Suspended Span Underdeck Access System”

EXTRACT. 3.10; “The purpose of the Upgrading of the Main Cable Acoustic Monitoring Project is to increase the probability of detecting wire breaks in the main cables. Given the history and work carried out on the main cables and the estimated reduction in strength that has been established it is important to
maintain confidence in wire break detection and for that reason I recommend that this project remains in the programme and is not deferred. The Strengthening of the Truss End Links is vital to maintain the operational capacity of the bridge to carry heavy abnormal loads and for that reason I recommend that this work is also retained within the programme.”

EXTRACT. 3.12: “It should be noted that deferral of part or all of these projects does increase the risk to the long term structural integrity of the bridge and is likely to increase the actual cost of the works when they are eventually carried out.”

REPORT: Item 5: Capital Plan and Reserves Update – 20/02/2015

EXTRACT: 3.3 below:

“Truss End Linkages

Following the assessment of the suspended span truss, these critical structural members were found to be significantly overstressed during certain combinations of loading. However, given the cost and difficulty in replacing these elements, and the potential disruption to bridge users, further examination of the probability of certain combinations of load occurring, and further structural analysis was carried out to try to determine the most realistic levels of stress in the members. After the Queensferry Crossing opens, Forth Road Bridge will carry only light traffic under normal operating conditions. One factor to be considered is the reduced probability of certain conditions of traffic loading occurring within the relatively short time period left until the new bridge opens. As a result of this analysis work, there is now the potential to upgrade the existing links rather than carry out a full replacement. A repair option involving strengthening existing welds and adding stiffeners to the tower steelwork has been developed and this option has been designed and an independent check carried out. The intention of the Authority was to carry out a trial repair on one tower leg and if successful, this repair would be carried out on the other three tower legs. However, due to issues with the quality of the existing tower steelwork; the difficulties of access and the existence of red lead paint, coupled with the loss of key management staff, the focus is now on completing the trial on one tower leg before the end of May 2015. If the trial is successful, a recommendation would be made to Transport Scotland that this work be continued post abolition of FETA. If the repair trial is unsuccessful then full replacement will have to be considered by Transport Scotland. The cost of carrying out the repair option to all the links is estimated to be £410,000. Strengthening the links will cost significantly less than full replacement which has an estimated cost of £15 million.”

Please refer to Appendix 3, for a copy of the above titled report.

Note: From the document reviewed alone, it cannot be determined whether these Truss issues are related to the structural concerns that resulted in the bridge closing in December 2015.
4. Other

Below is a list of dates recording the appointment of Councillor Hinds in her various positions on the FETA Board.

- Vice Convenor: 15/06/2012 – 16/11/2012
- Member: 17/11/2012 – 30/06/2013
- Convenor: 01/07/2013 – 31/05/2015

Other notable dates:

- Decision to remove tolls: 11/02/2008
- Dissolution FETA: 31/05/2015

5. Further Truss related Decisions and Timeline

Two specific Truss schemes that are commonly referred to involve the Suspended Span Truss and Truss End Linkages.

Below is a brief summary of their timeline, the recommendation present to the board and the decision taken by the board.

**Suspension Span Truss**

**24/02/2006.** Item 5. Budget 2006/07 Non-recurring expenditure 5.5. Strengthen Suspended Span Truss - £20K.

**24/02/2006.** Item 05 Capital Plan 2020/21 - Appendix 2.

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<tr>
<td>Assessment &amp; Strengthen</td>
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**Recommendation:** To note the report and approve the 2006/07 proposed budget as submitted; And approve the indicative long term capital plan to 2020/21;

**Decision:** To approve the 2006/07 proposed budget, and; to approve the indicative long-term capital plan to 2020/21.


4.3.6. “Revenue costs of Capital Plan - £0.343m over spend – Mainly accelerated spend on the Suspended Span Truss Strengthening investigation, anchorages....”
**Recommendation:** It is recommended that the Authority note the contents of this report.

**Decision:** To note the budget monitoring report.

16/12/2011 - Item 6 Review of Capital Projects: 3.6 “The significant non-committed schemes that will have to be deferred are:

- Painting of the Suspended Span Truss
- Painting of the Viaduct Box Girders
- Resurfacing of the Main Span Southbound
- Full Replacement of Truss End links
- Strengthening Works to the Suspended Span Truss
- Main Tower Wind Barriers/Impact Strengthening”

**Recommendation:** It is recommended that Members note the contents of this report.

**Decision:** The board noted the report.

Please refer to Appendix 3, for a copy of the above titled report (re-prioritisation of projects post Sept 2011 spending review).

27/02/2012: Item 10: Capital Plan and Reserves Update.

7.3 “there are significant non-committed schemes that will have to be deferred due to budgetary restraints. Deferring these projects may lead to an increase in their overall cost. These projects are:

- Painting of the Suspended Span Truss
- Full Replacement of Truss End links
- Strengthening Works to the Suspended Span Truss”

**Recommendation:** The Authority is recommended to note the report and:

i. Approve the 2012/13 Revenue budget, as detailed in Appendix 1;
ii. Approve the Capital budget for 2012/13, as detailed in Appendix 2;
iii. Note the indicative Revenue and Capital budgets for 2013/14 and 2014/15, as detailed in Appendix 1 and 2;
iv. Note that a report, appending Revenue and Capital Grant letters 2012/13, will be presented to the meeting of the Authority in April 2012.
v. Approve the arrangements for reserves as set out in section 6 of the report.
vi. Note the risks identified in paragraph 7.

**Decision:** The Authority agreed to:

i. approve the 2012/13 revenue budget, as detailed in Appendix 1 to the report;
ii. approve the capital budget for 2012/13, as detailed in Appendix 2 to the report;
iii. note the indicative revenue and capital budgets for 2013/14 and 2014/15, as detailed in Appendices 1 and 2;
iv. note that a report, appending revenue and capital grant letters 2012/13, would be presented to the meeting of the Authority in April 2012;
v. approve the arrangements for reserves as set out in section 6 of the report; and
vi. note the risks identified in paragraph 7.

Truss End Linkages

23/02/2007 – Item 4. Budget 2007/08. Non-recurring expenditure. 5.30: Truss end linkages - £150K (at this point in time, this is only accounted for as a one off item and is hence not included in the long term Capital Plan forecast).

Recommendation: To note the report and approve the 2007/08 proposed budget as submitted; And approve the indicative long term capital plan to 2021/22;

Decision: To approve the 2007/08 proposed budget, and; to approve the indicative long-term capital plan to 2021/22.

Please refer to Appendix 2, for a copy of the above titled report.

26/10/2012: Item 4: Capital Plan and Reserves Update 2.2;

“As Members are aware, the Scottish Government’s September 2011 Spending Review resulted in a 58% reduction in the Authority’s capital funding and, as a result, a number of capital projects have had to be deferred to beyond 2015.”

3.9; “Of the remaining non-committed schemes, the four projects detailed below have the highest estimated cost and therefore have to be considered in part or full for deferral in order to significantly reduce the predicted deficit. These are:

Truss End Linkages Strengthening Work ”

3.10: “The Strengthening of the Truss End Links is vital to maintain the operational capacity of the bridge to carry heavy abnormal loads and for that reason I recommend that this work is also retained within the programme.”

3.12: “It should be noted that deferral of part or all of these projects does increase the risk to the long term structural integrity of the bridge and is likely to increase the actual cost of the works when they are eventually carried out.”

Recommendation: It is recommended that the Authority note the contents of this report.
**Decision:** The Authority noted the report and approved the retention of certain schemes within the capital programme of works and the deferral of others as detailed in the report.

**20/02/2015:** Item 5: Capital Plan and Reserves Update.

3.3. “**Truss End Linkages - Following the assessment of the suspended span truss, these critical structural members were found to be significantly overstressed during certain combinations of loading. However, given the cost and difficulty in replacing these elements, and the potential disruption to bridge users, further examination of the probability of certain combinations of load occurring, and further structural analysis was carried out to try to determine the most realistic levels of stress in the members…….”

“…….Authority was to carry out a trial repair on one tower leg and if successful, this repair would be carried out on the other three tower legs. However, due to issues…………….completing the trial on one tower leg before the end of May 2015. If the trial is successful, a recommendation would be made to Transport Scotland that this work be continued post abolition of FETA. If the repair trial is unsuccessful then full replacement will have to be considered by Transport Scotland…..”

**Recommendation:** It is recommended that Members note the contents of this report.

**Decision:** 1) To note the report. 2) That the Chief Engineer and Bridgemaster report back to the Board meeting on 24 April 2015 on progress with upgrading and strengthening work on the truss end linkages and any operating restrictions which may be required to be put in place on the Bridge in terms of its capacity to carry abnormal vehicles.

Please refer to **Appendix 4**, for a copy of the above titled report (the last report that mentions Truss End Linkages in detail).
APPENDIX 1 - Forth Estuary Transport Authority Committee Library Review

Maintenance related document review (NOTE: This sheet contains a review of maintenance only related material between 02/09/2005 - 23/04/2012 found in MINUTES listed only at Council's online Committee library). The search was not exhaustive.

Link to online Committee library

**Sheet 1 - CLLR HINDS AS CONVENOR**

<table>
<thead>
<tr>
<th>Meeting Date</th>
<th>Document Title</th>
<th>Related Discussions</th>
<th>Recommendations</th>
<th>Decisions</th>
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<tr>
<td>1 23/08/2013</td>
<td>Full Meeting Papers and Minutes</td>
<td>Bridge Operating Contract - Update The Chief Engineer and Bridgemaster updated members on the Scottish Government’s proposal to dissolve FETA and contract out the maintenance and operation of the Forth Road Bridge and the New Forth Crossing. In discussion, it was noted that the City of Edinburgh Council had presented evidence to the Parliamentary Committee considering the Bill.</td>
<td>It is recommended that members note the contents of this report.</td>
<td>The Authority noted the report and expressed a desire that the contract include provision for local employment to ensure, as far as possible, community benefit arising from the contract award.</td>
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<td>2 25/10/2013</td>
<td>Full Meeting Papers and Minutes</td>
<td>Capital Plan and Reserves Update The Chief Engineer and Bridgemaster gave an update on the capital programme. The Chief Engineer and Bridgemaster reported on the main items proposed to be carried out and a number of deferred projects. As reported previously, the key structural risks were the condition of the anchorages and the main cables. However, the latest inspection of the main cables had produced results that further reduced the risk of future replacement of the cables being necessary or traffic restrictions on the bridge having to be enforced. The significant non-committed capital projects that had been put forward to be carried out prior to abolition of FETA were: main cable acoustic monitoring upgrade; suspended span gantry improvements; truss end linkages; suspended span under-deck access (immediate improvements), and pier defences painting. In addition, a number of schemes were to be brought to tender readiness to allow them to be carried out post abolition of FETA: expansion joint replacement; viaduct painting, and suspended spans underdeck access improvements (main works).</td>
<td>It is recommended that Members note the contents of this report.</td>
<td>To note the monitoring report on the funding of the capital programme to 2015.</td>
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<tr>
<td>Full Meeting Papers and Minutes</td>
<td>Dissolution of FETA – Update and Transitional Arrangements The Chief Engineer and Bridgemaster gave an update on the Scottish Government’s intention to dissolve FETA and to contract out the maintenance and operation of the Forth Road Bridge and the new Queensferry Crossing. Transport Scotland had determined that the contract to maintain and operate both bridges would be awarded, following a tendering exercise, to the Bridge Operating Company. It was expected that the award of the contract would be announced in December 2014 with commencement on 1 June 2015</td>
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<td>It is recommended that members note the contents of this report.</td>
<td>To note the position on the transitional matters and dissolution of FETA</td>
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<td>Full Meeting Papers and Minutes</td>
<td>Cable Band Bolt Replacement – Legal Update Resolution to Consider in Private The Board agreed that the public be excluded from consideration of this item of business on grounds that it involved the disclosure of exempt information as defined in paragraph 12 of Schedule 1A of the Access to Information Act 1989. The Chief Engineer and Bridgemaster gave an update on the Authority’s position regarding court proceedings relative to failures of the nuts forming part of the cable band bolt assemblies.</td>
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<td>To approve the recommendations by the Chief Engineer and Bridgemaster in pursuance of the case by Feta.</td>
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<td>2 31/01/2014</td>
<td>Agenda</td>
<td>No maintenance related topic mentioned</td>
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<td>21/02/2014</td>
<td>Full Meeting Papers and Minutes</td>
<td>Dissolution of the Authority – Update and Transitional Arrangements</td>
<td>It is recommended that members note the contents of this report.</td>
<td>1) To note the report. 2) To note that the Convener, Vice-Convener and the Chief Executive had arranged to meet Transport Scotland to discuss concerns regarding future staffing issues.</td>
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<td>An update was provided. The successful bidder for the contract to maintain and operate the bridge was expected to be announced in November 2014. Transport Scotland had confirmed that it was their intention to include admission to the Lothian Pension Fund as a contractual obligation on the new Bridge Operating Company. Members expressed concern at the way in which the transfer of staff, following dissolution, was being dealt with.</td>
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<td>11/04/2014</td>
<td>Full Meeting Papers and Minutes</td>
<td>Capital Plan and Reserves Update</td>
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<td>To note the report.</td>
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<td>Truss End Linkages - Following the assessment of the suspended span truss, these critical structural members were found to be significantly overstressed during certain combinations of loading. However, given the cost and difficulty in replacing these elements, and the potential disruption to bridge users, further examination of the probability of certain combinations of load occurring and further structural analysis was carried out to try to determine the most realistic levels of stress in the members. After the Queensferry Crossing opens, Forth Road Bridge will carry only light traffic under normal operating conditions. One factor to be considered is the reduced probability of certain conditions of traffic loading occurring within the relatively short time period left until the new bridge opens. As a result of this analysis work, there is now the potential to upgrade the existing links rather than carry out a full replacement. A repair option involving strengthening existing welds and adding stiffeners to the tower steelwork has been developed and a trial is being carried out on the south west tower leg. If successful, then this repair will be carried out on the other three tower legs. The cost of carrying out the repair option to all the links, over years 2013 to 2015, is estimated to be £0.434 million. Strengthening the links will cost significantly less than full replacement which has an estimated cost of £10 to £15 million. If the trial is not successful, then the full replacement scheme would have to be reconsidered post abolition of the Authority. The trial works have been designed and an independent check of the design has recently been completed. Work on site is expected to begin in March of this year.</td>
<td>It is recommended that Members note the contents of this report.</td>
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<td>5</td>
<td>Full Meeting Papers and Minutes</td>
<td>Update on Upgrading the Main Cable Acoustic Monitoring and Improving the Suspended Span Underdeck Access System (Advance Works)</td>
<td>It is recommended that Members note the contents of this report.</td>
<td>To note the report and that further updates on these and other projects contained in the capital programme would be submitted to future meetings of the Authority.</td>
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<td>The approved capital budget for 2014/15 included a sum of £0.955m for the upgrading of the main cable acoustic monitoring and £0.768m for improvements to the suspended span underdeck access system (advance works). Tenders had been issued for both these schemes and had been awarded to Price Brothers (UK) Ltd and Raynesway Construction Ltd respectively. Both projects were due to start on site in May and both were expected to be concluded by November 2014.</td>
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<td>11/04/2014</td>
<td>Full Meeting Papers and Minutes</td>
<td>Dissolution of the Authority – Update and Transitional Arrangements An update was provided on the dissolution of the Forth Estuary Transport Authority. Members expressed concerns at the way in which the transfer of staff, following dissolution, was being dealt with and that Transport Scotland had been unable to facilitate regular familiarisation visits to the site of the Queensferry Crossing for FETA staff.</td>
<td>It is recommended that Members note the contents of this report.</td>
<td>1) To note the report. 2) That the Convener write to the Chief Executive of Transport Scotland expressing the Authority’s concerns at the lack of involvement of FETA staff in the transitional arrangements and reminding him of the importance of including staff in any arrangements relating to the transfer going forward.</td>
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<td>Members received a briefing from the Chief Engineer and Bridgemaster regarding cable band bolts on the Forth Road Bridge.</td>
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<td>To note the update and to approve the recommendations by the Chief Engineer and Bridgemaster in respect of pursuance of the case.</td>
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<td>5</td>
<td>Minutes</td>
<td>Cable Band Bolts – Update</td>
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| 20/06/2014 | Full Meeting          | Dissolution of the Authority - Update                | An update was provided on the dissolution of the Forth Estuary Transport Authority. Transport Scotland had indicated that the successful bidder for the contract to maintain and operate both bridges from June 2015 was expected to be announced in November 2014. Discussions were continuing in relation to the transfer of staff from FETA under TUPE regulations. Transport Scotland has confirmed their intention to include admission to the Lothian Pension Fund as a contractual obligation on the new Bridge Operating Company. A meeting between Transport Scotland, the Unions and the FETA management team had been held on 26 February 2014. Concerns had been raised by FETA over the senior management team’s future roles and responsibilities following the TUPE transfer. This issue had also been the subject of further discussions between the Convener, Vice-Convener, the Chief Executive and Transport Scotland. | 1) To note the report.  
2) To request that the Chief Engineer and Bridgemaster seek further clarification from TS on the future arrangements for traffic on Forth Road Bridge. |
| 03/10/2014 | Full Meeting          | Cable Band Bolts - Update                           | Members received a briefing from the Chief Engineer and Bridgemaster regarding the cable band bolts on the Forth Road Bridge.                                                                                       | 1) To note the update and record the Authority’s thanks to the team involved. |
| 12/12/2014 | Full Meeting          | Dissolution of the Authority – Update and Transitional Arrangements | Transport Scotland had informed the Authority that AMEY LG Ltd had been selected as the preferred bidder for the Forth Bridges Operating Contract. No further meetings had been held between Transport Scotland, the Unions and the FETA management team since 26 February 2014. Concerns had been raised by FETA over the senior management team’s future roles and responsibilities following the TUPE transfer. This issue had also been the subject of further discussions between the Convener, Vice-Convener, the Chief Executive and Transport Scotland. | 1) To note the report.  
2) To record the Authority’s concerns that only two bidders remained for the Forth Bridges Operating Contract and the risk and potential consequences around that.  
3) To seek clarification from Transport Scotland on their definition of “all registered taxis” being permitted to use the Queensferry Crossing and any proposed restrictions for other modes of transport. |
| 02/02/2015 | Notice of Special Meeting and B Agenda | Item likely to be considered in private | | |
### Full Meeting

#### Papers and Minutes

- **Dissolution of the Authority — Update and Transitional Arrangements**
  
  An update was provided on the dissolution of the Forth Estuary Transport Authority.
  
  On 28 November 2014, Transport Scotland informed the Authority that Amey LG Ltd., had been selected as preferred bidder for the Forth Bridges Operating Contract. The contract was awarded to Amey on 18 December 2014.

It is recommended that members note this report and approve the proposal to consent to a temporary reduction in the speed limit on the Forth Road Bridge, to 40 mph, to facilitate works on the Queensferry Crossing.

1) To note the report.

2) That the Convener write to Scottish Ministers seeking further clarification on the use of the Forth Road Bridge following the opening of the Queensferry Crossing.

3) To agree that it was essential for the Authority to ensure protection of staff and continuity of service provision in the period up to the transfer to the new Bridge Operating Company in June 2015.

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- **Capital Plan and Reserves**
  
  An update was provided on the funding of the Authority's capital programme of works until dissolution of the Authority on 31 May 2015. Members were briefed on the following key committed capital projects being carried out by the Authority:
  - main cable acoustic monitoring upgrade
  - truss end linkages
  - improvements to the suspended span underdeck gantries
  - pier defences painting and
  - cathodic protection repairs

It is recommended that Members note the contents of this report

1) To note the report.

2) That the Chief Engineer and Bridgemaster report back to the Board meeting on 24 April 2015 on progress with upgrading and strengthening work on the truss end linkages and any operating restrictions which may be required to be put in place on the Bridge in terms of its capacity to carry abnormal vehicles.

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- **Truss End Linkages**
  
  Following the assessment of the suspended span truss, these critical structural members were found to be significantly overstressed during certain combinations of loading. However, given the cost and difficulty in replacing these elements, and the potential disruption to bridge users, further examination of the probability of certain combinations of load occurring, and further structural analysis was carried out to try to determine the most realistic levels of stress in the members. After the Queensferry Crossing opens, Forth Road Bridge will carry only light traffic under normal operating conditions. One factor to be considered is the reduced probability of certain conditions of traffic loading occurring within the relatively short time period left until the new bridge opens. As a result of this analysis work, there is now the potential to upgrade the existing links rather than carry out a full replacement. A repair option involving strengthening existing welds and adding stiffeners to the tower steelwork has been developed and this option has been designed and an independent check carried out.

The intention of the Authority was to carry out a trial repair on one tower leg and

1) To note the report.

2) That the Chief Engineer and Bridgemaster report back to the Board meeting on 24 April 2015 on progress with upgrading and strengthening work on the truss end linkages and any operating restrictions which may be required to be put in place on the Bridge in terms of its capacity to carry abnormal vehicles.

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18/03/2015

**Notice of Special Meeting and B Agenda**

- Item likely to be considered in private
24/04/2015

Dissolution of the Authority – Update and Transitional Arrangements

An update was provided on the dissolution of the Forth Estuary Transport Authority. The Chief Engineer and Bridgemaster advised that he had expressed some concerns over the future roles of some of the staff following transfer. Letters from five staff members outlining their individual concerns were presented to members at the meeting. The Convener had written to Scottish Ministers seeking clarification on the future arrangements for traffic on the Bridge once the new Queensferry Crossing was opened. The response from the Minister for Transport and Islands was submitted.

Transport Scotland had formally written to FETA to request that the Authority implement a temporary 40mph speed limit on both carriageways of the Bridge in the vicinity of the realignment works for the approach and off ramps for the new bridge. Transport Scotland has stated that all FETA staff will transfer directly into the employment of the Bridge Operating Company, and the TUPE regulations will apply.

The transfer of staff is being overseen by the Vice Convener of FETA, Councillor Tony Martin, who has been appointed by the FETA Board to carry out that role. However, as the Chief Engineer and Bridgemaster, I have expressed some concern over the future roles of some staff following transfer. Details of progress on the TUPE transfer will be reported separately by the Solicitor to the Board.

It is recommended that members note this report and approve the recommendation to impose a temporary 40mph speed limit on the bridge as detailed above.

1) To note the updates.
2) To implement a temporary 40mph speed limit on both carriageways of the Bridge as requested by Transport Scotland.
3) That the Chief Executive facilitate a meeting with the Convener, Amey, Transport Scotland and the Minister for Transport seeking clarity on a range of issues of concern relating to the practicalities of how business would be conducted post-dissolution of the Authority.
4) To note that the Chief Executive would report back to the Board on the outcome of these discussions.
5) That the Chief Engineer and Bridgemaster, the Convener and ViceConvener meet with Transport Scotland to discuss key significant issues and challenges as part of the handover arrangements prior to 31 May 2015.

Main Cable Acoustic Monitoring Update

An update was provided on issues regarding reported wire breaks and the acoustic monitoring system on the main cables of the bridge. Forth Estuary Transport Authority 24 April 2015 These wire breaks had all been recorded by the original acoustic monitoring system which was due to be removed once the new system was commissioned. It was proposed to recommend to Transport Scotland that the existing system was run in parallel with the new system until such time as the reliability of the new system could be validated against the existing system. Work on the wires was unlikely to be completed before 31 May 2015 and any contracts would require to be novated to Transport Scotland or Amey.

The Chief Engineer and Bridgemaster had discussed this matter with Transport Scotland.

It is recommended that Members note the contents of this report.

To note the update.
**APPENDIX 1 - Forth Estuary Transport Authority Committee Library Review**

*Note: This sheet contains a review of maintenance only related material between 02/09/2005 - 23/04/2012 found in MINUTES listed only at Councils online Committee library. The search was not exhaustive.*

**Link to online Committee library.**

**Sheet 2- CLLR HINDS TIME AS BOARD MEMBER ONLY**

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<thead>
<tr>
<th>Meeting Date</th>
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<th>Related Discussions</th>
<th>Recommendations</th>
<th>Decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>17/12/2012</td>
<td>Full Meeting Papers</td>
<td>To update members on changes in membership of the Board in respect of the City of Edinburgh Council representation. In the light of Councillor Lesley Hinds' resignation as Vice-Convener of FETA, to secure appointment of a new Vice-Convener. Councillor Work has resigned from the Authority with effect from 14th November. Councillor Lesley Hinds resigned as Vice-Convener of the Authority with effect from 16th November, 2012 but will remain as a member of the Authority. Accordingly, it would be appropriate for the Authority to appoint a Vice-Convener from amongst the remaining City of Edinburgh Council members.</td>
<td>It is accordingly recommended that the Authority:-(i) note the resignation of Councillor Work and the appointment of Councillor Orr as the City of Edinburgh Council representative, (ii) appoint a new Vice-Convener from among the City of Edinburgh Council representatives.</td>
<td>The Authority:- (i) expressed its thanks to Councillor Work for his contribution over many years as a member of the FETA Board; (ii) noted the resignation of Councillor Work and the appointment of Councillor Orr as the City of Edinburgh Council representative; and (iii) agreed that Councillor Orr be appointed as the new Vice-Convener.</td>
</tr>
</tbody>
</table>

| Minutes       | Cable Band Bolt Replacement Update | The following report was heard in private in terms of paragraph 12 of Schedule 7A of the Local Government (Scotland) Act 1973. The Chief Engineer and Bridgemaster introduced this report updating members on the work carried out to replace all 944 cable band bolt assemblies on the main cables. | The Authority noted the report. | |

| 25/02/2013    | Minutes | Bridge Operating Contract - Update | The Chief Engineer and Bridgemaster updated members on the Scottish Government's proposals to dissolve FETA and contract out the maintenance and operation of the Forth Road Bridge and the New Forth Crossing. The indicative programme of dates for implementation of the Bridge Operating Contract were given and it was noted that three distinct work streams required to be completed prior to the implementation date of June, 2015, namely:- The Parliamentary Bill; the Bridge Operating Contract; and The Transfer of Staff. Brief details were provided for each of the above points. | The Authority noted the report and approved:-(i) the written submission by the Chief Engineer and Bridgemaster to the Infrastructure and Capital Investment Committee and Finance Committee regarding the Forth Road Bridge Bill dated 23rd January, 2013; (ii) the proposal to modify the existing Board Room to construct a Control and Structural Health Monitoring Room for the Bridge Operating Contract as detailed; and (iii) agreed that the Convener write on behalf of the Authority to Transport Scotland expressing concern at the limited proposals for use of the Contact Centre. | |

| Minutes       | Third Main Cable Inspection Report | The Chief Engineer and Bridgemaster provided members with the results of the third main cable inspection. The results appeared to indicate that the rate of deterioration of cable strength had been reduced and the factor of safety against failure of the cables had not materially diminished. | The Authority noted the report. | |

| 10/05/2013    | Full Meeting Papers and Minutes | The Chief Engineer and Bridgemaster updated members on the work to investigate the condition of the main cable anchorages. | Members are asked to note the contents of this report | The Authority noted the report. |
### Bridge Operating Contract - Update

The Chief Engineer and Bridgemaster updated members on the Scottish Government’s proposal to dissolve FETA and contract out the maintenance and operation of the Forth Road Bridge and the New Forth Crossing. In discussion, it was noted that the City of Edinburgh Council had presented evidence to the Parliamentary Committee considering the Bill.

It is recommended that members note the contents of this report.

The Authority noted the report and expressed a desire that the contract include provision for local employment to ensure, as far as possible, community benefit arising from the contract award.

### Appointment of Convener and Office Bearers

Members considered a report by the Clerk which outlined the need to appoint a Convener and Vice-Convener and office bearers of the Authority with effect from 1st July, 2013.

1. The Board is asked to appoint a Convener of FETA from the representatives of the City of Edinburgh Council, and a Vice-Convener from the representatives of Fife Council, to be effective from 1st July, 2013.
2. To agree that the Convener and Vice-Convener of the Board be appointed as Convener and Vice-Convener of the Appointments and Appeals Committee and otherwise to confirm membership of the Committee.
3. To appoint Sue Bruce (Chief Executive, the City of Edinburgh Council), as Chief Executive; Carol Campbell (Head of Legal Risk and Compliance), the City of Edinburgh Council) as Clerk; and Hugh Dunn (Head of Finance, City of Edinburgh Council) as Treasurer, with other officer support function arrangements to continue under existing arrangements with the member authorities or as might otherwise be requested by the Chief Executive of the Authority.

**Decision**

The Authority agreed to:
1. appoint Councillor Hinds (City of Edinburgh Council) as Convener and Councillor Martin (Fife Council) as Vice-Convener and office bearers of the Authority;
2. to appoint Sue Bruce (Chief Executive, City of Edinburgh Council) as Chief Executive; Carol Campbell (Head of Legal Risk and Compliance, City of Edinburgh Council) as Clerk; and Hugh Dunn (Head of Finance, City of Edinburgh Council) as Treasurer with other officer support function arrangements to continue under existing arrangements with the member authorities or as might otherwise be requested by the Chief Executive of the Authority; and
3. noted that the remaining members of the Appointments and Appeals Committee would comprise one more member each from City of Edinburgh and Fife Councils, as well as Councillors Conn and Giacopazzi.

### Capital Plan and Reserves Update

During this second round of deferrals, the four projects detailed below were identified as having the highest estimated cost. Therefore, these projects had to be considered in part or full for deferral in order to produce a significant reduction in the predicted deficit. These projects were:
- The Upgrading of the Main Cable Acoustic Monitoring Project
- Improvements to the Suspended Span Underdeck Gantry
- Truss End Linkages Work
- Improvements to the Suspended Span Underdeck Access System

The Upgrading of the Main Cable Acoustic Monitoring Project and the Truss End Links Project were both considered vital to maintain the operational capacity of the bridge and were retained in the programme. The Improvements to the Suspended Span Underdeck Gantry and the Improvements to the Suspended Span Underdeck Access System are two separate schemes and were selected for deferral to post 2015. However, it was noted that it could be possible to carry out some limited works during 2013 to 2015 on both these deferred schemes. There is always a residual risk when maintenance works are deferred and it was noted that deferral of part or all of these projects does increase the risk to the long term structural integrity of the bridge and is likely to increase the actual cost of the works when they are eventually carried out.

It is recommended that Members note the contents of this report.

The Authority noted the report.
## APPENDIX 1 - Forth Estuary Transport Authority Committee Library Review

**Maintenance related document review** (NOTE: This sheet contains a review of maintenance only related material between 02/09/2005 - 23/04/2012 found in MINUTES listed only at Councils online Committee library). The search was not exhaustive.

**Link to online Committee library**

### Sheet 3 - CLLR HINDS TIME AS VICE CONVENOR

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<thead>
<tr>
<th>Meeting Date</th>
<th>Document Titles</th>
<th>Related Discussions</th>
<th>Recommendations</th>
<th>Decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>15/06/2012</td>
<td>Full Meeting Papers and Minutes</td>
<td>Appointment of Office Bearers and Committee</td>
<td>The Authority is recommended to: (a) appoint a Vice-Convener from among the City of Edinburgh Council representatives to serve until 30th June, 2013;</td>
<td>The Authority appointed Councillor Hinds as the Vice-Convener to serve until 30th June, 2013;</td>
</tr>
<tr>
<td></td>
<td>Full Meeting Papers and Minutes</td>
<td>Members considered a report by the Clerk which outlined the need to appoint a Vice-Chair and members of the Appointments and Appeals Committee.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full Meeting Papers and Minutes</td>
<td>Cable Band Bolt Assemblies Update</td>
<td>It is recommended that Members note the report.</td>
<td>The Authority noted the report.</td>
</tr>
<tr>
<td></td>
<td>Full Meeting Papers and Minutes</td>
<td>Future Maintenance and Operation of Forth Road Bridge and Forth Replacement Crossing - Update</td>
<td>It is recommended that Members note the contents of this report.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minutes</td>
<td>Cathodic Protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03/09/2012</td>
<td>Minutes</td>
<td>Pier Defences Cathodic Protection</td>
<td></td>
<td>The Authority noted the report.</td>
</tr>
<tr>
<td></td>
<td>Minutes</td>
<td>Future Maintenance and Operation of Forth Road Bridge and Forth Replacement Crossing Update</td>
<td>In noting the report, the Authority expressed thanks and congratulations to the staff of the Authority for their skills and professionalism throughout a difficult time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capital Update Plan</td>
<td>The Chief Engineer and Bridgemaster reported on various projects: including the anchorage investigation, the main cable internal inspection, the cable band bolt assemblies replacement, the viaduct bearings replacement, improvements to deck half joints trial, dropped object canopy, truss end links and cathodic Protection.</td>
<td>It is recommended that Members note the contents of this report.</td>
<td>The Authority noted the report.</td>
</tr>
</tbody>
</table>
The Chief Engineer and Bridgemaster gave an update on the funding of the Authority’s capital programme of works until 2015. It was noted that Transport Scotland officials had advised that no additional capital funding was available for the Authority and that, following the Scottish Government’s 58% reduction in the Authority’s capital funding, a number of non-committed capital projects would require to be deferred due to the Authority having no other significant income stream and the liability for the legacy costs of the M9 Spur Extension/A8000 Upgrading Scheme would not be removed from the Authority’s budget.

It is recommended that Members note the contents of this report and, with regard to the non-committed capital schemes, approve the recommendations for the retention of certain schemes within the capital programme of works and the deferral of others as detailed.

The Authority noted the report and approved the retention of certain schemes within the capital programme of works and the deferral of others as detailed.

The following report was heard in private in terms of paragraph 12 of Schedule 7A of the Local Government (Scotland) Act 1973. The Chief Engineer and Bridgemaster introduced this report which updated members on the eventual outcome of the contractual disputes arising from cathodic protection works carried out on behalf of the Authority.

The Authority noted the report.
## APPENDIX 1 - Forth Estuary Transport Authority Committee Library Review

### Sheet 4 - PRE CLLR HINDS INVOLVEMENT

<table>
<thead>
<tr>
<th>Meeting Date</th>
<th>Document Title</th>
<th>Related Discussions</th>
<th>Recommendations and Decisions</th>
</tr>
</thead>
</table>
| 02/09/2005       | Minute FIRST INTERNAL INSPECTION OF THE MAIN CABLE  | - Inspections show a small number of wires broken and corroded wires containing cracks. The consultants had recommended installing a monitoring system. The tenders received estimated cost of £500,000. This along with increased inspection work on the main cable had led to an increase of capital spend required to complete the investigation work. | 1) To note the report.  
2) To approve the revised Capital Plan allowance of £3.525m. |
| 25/11/2005       | Minute MAIN TOWER PAINTING - The General Manager gave a progress report on the main tower painting programme. As a result of the redesign and development of the dropped objects canopy and painting platform, the total project cost had risen from £3.114 million to £3.565 million. | 1) To note the report.  
2) To approve the revised Capital Plan allowance of £3.565m. |
| 24/02/2006       | Minute Dehumidification of Main Cables - Consultancy Services Tenders - estimated cost of £1.2m. | To procure suitable qualified engineering consultants to carry out: (a) a feasibility study and prepare and supervise a scheme for dehumidifying the main cable at an estimated cost off 1.2m; and (b) a feasibility study into the replacement/augmentation of the main cables at an estimated cost of between £1 m and £1.5m. | 1) To accept the tender. |
| 28/04/2006       | Minute The First Internal Inspection of Main Cable - Update Report The Scottish Executive's consultants had confirmed the findings of the Authority's consultants on the condition of the main cables. They had concluded that the internal inspection and cable strength calculations had been performed in accordance with accepted practice. The findings also indicated that assessment of future strength loss beyond a few years could not be definitive but suggested that loading restrictions could be required from 2013. | 1) To note the report. |
| 29/06/2006       | Minute Meeting with Transport Minister - Discussions with the Minister had touched on several areas. Inc: There should be a high level first element to the feasibility study to replace/ augment the main cable. This would tell by summer 2007 whether it was likely to be possible to replace the cable and what traffic restrictions would be required. | 1) To note the report. |
| 25/08/2006       | Minute Feasibility Study for the Replacement / Augmentation of the Main Cables - Consultancy Services Tenders - 6 tender had been received. W.A Fairhurst & Partners scored the highest combined marks in terms of quality and price and was deemed to be the most economically advantageous | 1) To accept the tender of £508,948 by W.A Fairhurst & Partners |

Main Cables - Update - The contractor Advitam had been on site since April of this year to install the acoust. 1) To note the report.
<table>
<thead>
<tr>
<th>Date</th>
<th>Minute Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/12/2006</td>
<td>Dehumidification of the Main Cables - Tenders - Three tenders had been submitted. The tender by C Spencer Limited had scored the highest quality mark combined with the lowest tender sum and was recommended for acceptance.</td>
<td>To accept the tender of £7,767,567.19 by C Spencer Limited to install a system to dehumidify the main cables</td>
</tr>
<tr>
<td>1/12/2006</td>
<td></td>
<td>1) To note the report.</td>
</tr>
<tr>
<td>23/02/2007</td>
<td>Main Cables - Update - Three main breaks had been confirmed to date. Eight applications had been received for the tender for works for the dehumidification of the main cables. An allowance of £12 million had been allocated for the project and it was estimated at a cost of £9.5 million excluding supervision. W A Fairhurst and Partners were progressing with the feasibility study on replacing/augmenting the main cables on the bridge.</td>
<td>1) To note the report.</td>
</tr>
<tr>
<td>27/04/2007</td>
<td>Waterproofing and Resurfacing of Northbound Carriageway - The project had been programmed to start in April 2007 and would be carried out over approximately 16 weekends. It was planned to take advantage of the resurfacing arrangements to install part of the de-humidification equipment on the west main cable.</td>
<td>1) To accept the tender of £3,845,833.87 by Tarmac Ltd National Contracting</td>
</tr>
<tr>
<td>01/06/2007</td>
<td>No maintenance points to note</td>
<td>1) To note the report.</td>
</tr>
<tr>
<td>22/06/2007</td>
<td>Waterproofing and Resurfacing of Northbound Carriageway - Phase 1 of the works had started on 13 April 2007 and had been completed on 18 June 2007. All the concrete slab panels forming the deck of the north side span had now been completed and the south side span was 88% complete. However, only 13% of the main span steel deck panels had been completed. Traffic volumes were down by up to 30% during weekend working but delays of up to 90 minutes were still being experienced.</td>
<td>1) To note progress on this project.</td>
</tr>
</tbody>
</table>
Minute
Waterproofing and Re-surfacing of northbound carriageway Phase 2 Commencement - On behalf of the authority the Chair commended those involved in the contract for waterproofing and re-surfacing works in the main and side spans of the northbound carriageway as the work was completed on time despite weather delays.

Feasibility Study for the Replacement or Augmentation of the Main Cables Progress Report - There was submitted a report by the General Manager and Bridgemaster on the progress of the feasibility study. It was noted that a draft engineering report would be submitted by mid-December enabling a comprehensive report to be presented to members for consideration at their meeting on 22nd February, 2008. This report would not conclude on the condition of the cable anchorages which would be the subject of a tender to carry out intrusive investigations and/or load testing of individual elements of the anchorages. On an indicative cost of £5 million had been used for budget purposes.

Replacement/Refurbishment of Joints and Bearings - There was submitted a report by the General Manager and Bridgemaster advising members on progress of the work to replace/refurbish the joints and bearings of the bridge. The feasibility study for the joints had been substantially completed. However, the study on bearings had been delayed and it was agreed that the remedial or replacement work should be carried out as two separate contracts. Consultant engineers had concluded that the replacement of all the expansion joints should be considered a priority as the rate of wear would increase rapidly. To carry out the work it was estimated that eight weeks of carriageway closures would be required and the first carriageway closure would be likely to be put in place in April, 2009 and for this reason it was proposed that a detailed consultation with major stakeholders and a subsequent public information exercise took place.

Review of Parapets and Barriers - There was submitted a report by the General Manager and Bridgemaster advising members of the ongoing investigation and testing of the bridge parapets and barriers. The report advised of the tests carried out by consulting engineers, the new design rules and advice on assessment and recommended that further testing be carried out to determine whether or not work should be carried out on the barriers.

1) To note the current position with respect to the study.
2) To note that a tender report in relation to the anchorages would be submitted to a future meeting of the authority.

1) To approve the replacement of the bridge joints and to approve the commencement of stakeholder consultation.

1) To note the content of the report and to note further reports would be submitted as the results of testing and other work became available.
Minute Post of Chief Engineer & Bridgemaster - Delegated Powers - There was submitted a report by the Clerk regarding the removal of the post of General Manager & Bridgemaster and the creation of the post of Chief Engineer & Bridgemaster and the requirement that the Chief Engineer & Bridgemaster be authorised to exercise delegated functions under the authority's governance documents.

Minute Main Tower Painting Platform - There was submitted a report by the Chief Engineer & Bridgemaster on damage sustained by the Main Tower Painting Platform on Wednesday, 9th January, 2008 due to high winds. The damage led to closure of the bridge. The damage arose from failure of floor panels and their connections and this would be the subject of an investigation to be carried out by an independent Specialist Engineering Consultant.

Minute Replacement of Main Expansion Joints Update - There was submitted a report by the Chief Engineer & Bridgemaster providing members with an update on work to replace the main expansion joints on the bridge. The authority had approved the proposal to replace these joints in November, 2007 and consulting engineers had been retained by the authority to provide the design and contract supervision necessary to carry out the works.

Minute Feasibility Study for the Replacement or Augmentation of Main Cables Update and Intern Stage 2 Report - There was submitted a report by the Chief Engineer & Bridgemaster advising members of the Intern Stage 2 Report and progress of the feasibility study to replace or augment the main suspension cables. There was submitted a report by the Chief Engineer & Bridgemaster advising members of the Intern Stage 2 Report and progress of the feasibility study to replace or augment the main suspension cables. The stage 2 study had identified the most appropriate options for either replacement or augmentation of the main cables should this be necessary. It would only be necessary for the current scheme to dehumidify the cables fails to prevent further deterioration the dehumidification scheme is on programme and was expected to be completed in late 2009 and the effectiveness of this scheme would be determined by the inspection in 2011/12. It was noted that the study was commenced prior to the decision to provide another crossing. The report detailed the option and the different traffic management layouts which would be required to be put in place to deal with the options. The report also highlighted the position in relation to anchorages of the cables.

Minute Deck Expansion Joint Replacement - There was submitted a report by the Chief Engineer & Bridgemaster providing members with a brief update of the progress on the scheme to replace the suspended span deck expansion joints. The report advised of the results of the second internal inspection and testing of main cables on the bridge and concluded that the authority's consulting engineers had estimated that the loss of strength of the main cables is currently marginally over budget and advised that this indicated the timescale when intervention in the form of loading restrictions might be required had been extended from 2014 to 2021. There was a degree of confidence that the deterioration of the cables could be arrested by dehumidification prior to strength loss reducing to a level where such intervention was required. The report noted that a third internal inspection was proposed in 2011/12 to verify the effectiveness of dehumidification and review the timing of the need for intervention.

Minute Main Expansion Joints Replacement Tender - 3 tenders were received. The tender submitted by Balfour Beatty scored the tender submitted by Balfour Beatty for the sum of £137,731,932.86 was deemed to be the most economically advantageous bid. However, this was some £5 million above that estimated and this would impact on the capital plan and further discussion would require to take place with the government to determine how this increase in the cost of the project might be dealt with. This should be dealt with as a matter of urgency.

Minute Dehumidification of Main Cable - Update Report - The report concluded that: (a) the trial was showing that initial lengths of the west cable were drying out; (b) the works were now behind programme because of poor weather over the summer and discussions were ongoing to try to make up this time. Some delays have also been caused by the need to replace cable band bolts. Further poor weather in October and November may cause more delays; and (c) the works were currently marginally over budget but the delays caused by inclement weather could lead to a further cost increase which had not yet been identified. Members would be kept appraised of any significant increases at future meetings.

Minute Bridge Dehumidification - The report advised of the results of the second internal inspection and testing of main cables on the bridge and concluded that the authority's consulting engineers had estimated that the loss of strength of the main cables is currently marginally over budget and advised that this indicated the timescale when intervention in the form of loading restrictions might be required had been extended from 2014 to 2021. There was a degree of confidence that the deterioration of the cables could be arrested by dehumidification prior to strength loss reducing to a level where such intervention was required. The report noted that a third internal inspection was proposed in 2011/12 to verify the effectiveness of dehumidification and review the timing of the need for intervention.

Minute "1) That the Chief Engineer & Bridgemaster be the authorised Officer in charge of the authority’s governance documents."

Minute "1) That the report be noted and further report presented on completion of the investigation."
Cable Band Bolts Inspection - There was submitted a report by the Chief Engineer and Bridgemaster advising members of issues relating to cracking in cable band bolts. The report advised that, a small number of bolts were found to have cracked and were in the process of being replaced. Faber Maunsell, Consulting Engineers, had been appointed to investigate the cracking and a full report would be submitted to a future meeting of the Authority.

Main Expansion Joints Replacement Update - There was submitted a report by the Chief Engineer and Bridgemaster updating on the project to replace the main expansion joints. The report outlined the background, the position regarding funding and the tender costs and gave options for carrying out the replacement of the joints. It was noted that further discussions would take place with the Government and reports would be submitted to the Authority.

Main Expansion Joints - Underdeck Access Platforms - Tender

There was submitted a report by the Chief Engineer and Bridgemaster on the replacement of the main expansion joints. It gave a brief summary update on the tender submitted by Balfour Beatty and, following the commitment of the Scottish Government to a definite programme for the construction of the Forth Replacement Crossing by 2016, reported on the review of the Authority’s main expansion joint project to determine whether it could be deferred after 2016. The findings of the review were detailed together with a number of residual risks which had been identified in relation to the temporary failsafe devices.

Main Expansion Joints Update - There was submitted a report by the Chief Engineer and Bridgemaster on the replacement of the main expansion joints. It gave a brief summary update on the tender submitted by Balfour Beatty and, following the commitment of the Scottish Government to a definite programme for the construction of the Forth Replacement Crossing by 2016, reported on the review of the Authority’s main expansion joint project to determine whether it could be deferred after 2016. The findings of the review were detailed together with a number of residual risks which had been identified in relation to the temporary failsafe devices.

Tower Painting Dropped Object Canopy - Tender

Five contractors had been invited to tender for the erection of a dropped object canopy to the North Tower of which two had declined to submit offers. The received tenders had been evaluated before the financial bids were opened. One tender did not pass the quality threshold and the financial bid had been returned, unopened. Following evaluation of the two tenders, the Chief Engineer and Bridgemaster recommended that the tender submitted by C Spencer Ltd (Barton on Humber) of £1,849,845 was the most economically advantageous bid and should be accepted. The costs of the works would be met out of the allocation of £2.5m included in the capital plan.

Pier Defences Cathodic Protection

The Authority resolved, in terms of Section 50(a)(i) of the Local Government (Scotland) Act 1973, that the public be excluded from the meeting during consideration of the following item of business on the grounds that it involved the disclosure of exempt information as defined in Paragraph 12 of Part 1 of Schedule 7(a) of the Act. Details were provided on the condition of the cathodic protection system forming part of the pier defence.

Viaduct Bearings Replacement Tender

Six tenders had been submitted. Following the evaluation the Chief Engineer and Bridgemaster recommended acceptance of the most economically advantageous tender.

1) That the report be noted.
Main Cable Update
The Chief Engineer and Bridgemaster gave an update of de-humidification works and internal inspection of condition of cables. He gave an analysis of the data available this far on the strength of the cables. On de-humidification, he said that whilst there was good reason to have confidence that it could slow down or halt corrosion, it could not restore strength loss and there was no body of evidence yet available to allow assurance to be given that it would prevent further reductions in strength loss. Therefore, further inspections and strength evaluations would be require to be made over the life of the Bridge.
1) To note the report and congratulate the staff and consultants involved on the work being done.

Anchorages Update
The Chief Engineer and Bridgemaster gave an update the anchorage chambers. A sum of £6.6 million had been included in the capital plan for this work. Work on tender documents was proceeding in regard to the South anchorages with a view to a tender being awarded by the summer of 2011. Excavation work would take a year to complete and the first indications of the condition of the anchorages would not be known until 2013.
1) That the report be noted.

Viaduct Barriers Update
The Chief Engineer and Bridgemaster reported on work carried out in testing the viaduct vehicular barriers for compliance. The tests had shown that the barriers conformed to national requirements for bridge carriageways for speeds of up to 80 km/hour. Therefore, he considered that a sum set aside in the capital plan of £2.3 million for strengthening work would no longer require to be expended.
1) That the report be noted.

Forth Replacement Crossing and Maintenance Responsibility - Meeting with Minister (item 1)
The Convener reported that he and other representatives of the Board had met with the Minister for Transport, Infrastructure and Climate Change on 12 October 2010. The Board representatives had communicated their wish for FETA to be involved in the operation and maintenance of both crossings and to maximise the existing experience and expertise of staff, including issues of design and planning for maintenance. The discussions had also touched on budgetary issues and the capital programme. The Minister had indicated that the Scottish Government had not yet taken a position on whether there was to be one body jointly responsible for maintenance of the crossings or two separate entities - the issues of FETA and future responsibilities for maintenance of the replacement crossing had purposely been omitted from the legislative proposals at this stage. He was however conscious of the points being made by FETA and in particular the need to maximise the knowledge and expertise of staff. Again, a structure for local community involvement for the future was fully recognised.

As regards future funding, the Minister had indicated that there would be reductions across the public sector next year but that Transport Scotland were also working with colleagues in regards to the particular engineering and maintenance issues associated with major bridges, recognising the special issues involved.

To note the information and that the officers Working Group was working on a case for maintenance on behalf of FET A.
Acceptance Details were provided on the tenders submitted for the works to facilitate investigation of the structural integrity of the main cable anchorages and approval was sought to accept the tender submitted by John Graham (Dromore) Ltd.

To accept the tender submitted by John Graham (Dromore) Ltd for the sum of £3,497,849.

1) To note the report.

Localised Wind Shielding at Main Towers
An update was provided on the outcome of a feasibility study to determine whether or not localised wind shielding could be retro-fitted to the main towers of the Bridge. Flint and Neill Limited (Consulting Engineers) had been appointed to carry out the study. In the draft of their final report two options were presented with Option 1 being based on the M48 Severn Bridge solution and Option 2 being designed to be less visually intrusive. Option 2 appeared to have more advantages than Option 1 due to it providing retro-fitted shielding but taking advantage of the visual context of the Bridge and its surroundings and the costs being lower than Option 1. The estimated costs of the works for Option 2 were £1.625m. A sum of £1.69m had been allocated in the capital plan for the project. Before approval was sought from the Board further tests and meetings with the relevant Planning Authorities and Historic Scotland would be undertaken.

1) To note the report.

Main Towers Impact Protection/Strengthening
An update was provided on the outcome of a feasibility study to determine whether or not an impact protection system could be retro-fitted to the main towers of the Bridge. Flint and Neill Limited (Consulting Engineers) had been commissioned to investigate ways of reducing the vulnerability of the main towers to impact by heavy goods vehicles (HGVs). Costs had been estimated at £6m to install a barrier at the main towers. A sum of £1.4m had been allowed for the capital plan for this work and if the proposals were to go ahead additional funding would have to be obtained. Additionally, before a barrier could be fitted there were several difficulties that would have to be overcome. In light of these issues the Chief Engineer and Bridgemaster indicated that he did not intend to commission any further work to upgrade the barriers.

1) To note the report.

The Chief Engineer and Bridgemaster introduced this report, the purpose of which was to provide members with information on the third main cable inspection tender and recommend acceptance of a tender to carry out the works submitted by C. Spencer Limited. In presenting the report, it was noted that the initial tendered sum had been reduced significantly as a result of reducing the number of panels to be inspected and other efficiency savings.

The Board approved the negotiated tender submitted by C. Spencer Limited for the sum of £2,573,310, to carry out the third internal inspection of the main cables.
<table>
<thead>
<tr>
<th>Date</th>
<th>Minute</th>
<th>Subject</th>
<th>Action taken by Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td>16/12/2011</td>
<td>Minute</td>
<td>Future Maintenance in Operation of FRB and FRC</td>
<td>The Board noted the report</td>
</tr>
<tr>
<td>27/02/2012</td>
<td>Minute</td>
<td>Weekend Carriageway Closures / Restrictions - September 2012</td>
<td>The Authority noted the report.</td>
</tr>
<tr>
<td>23/04/2012</td>
<td>Minute</td>
<td>Cable Band Bolt Assemblies Update</td>
<td>The Authority agreed:</td>
</tr>
</tbody>
</table>

The Chief Engineer and Bridgemaster introduced this report, the purpose of which was to update members on the Scottish Government’s announcement that a competitive tender exercise will be held for a single contractor to manage and maintain both the Forth Replacement Crossing and the Forth Road Bridge. All FETA staff will transfer to the winning bidder and, in discussion, it was noted that the Minister had given an assurance to all FETA staff that their jobs would be protected by TUPE. Members expressed appreciation for the professionalism and commitment of staff during a period of uncertainty.

The Chief Engineer and Bridgemaster introduced the report, which explained that there might be a need for possible weekend carriageway closures or restrictions during September 2012 to carry out the Replacement of the Suspended Decks Half Joint Trial. If these closures were necessary, then other maintenance and operational works which also required closures would be brought forward to make full use of the opportunities provided by the closures.

The Chief Engineer and Bridgemaster introduced the report which provided members with an update on issues regarding cable band bolt assemblies and the need for repair. Members noted the requirement to act quickly to ensure the bolt assemblies be replaced as a matter of urgency.

The Authority agreed:
(i) the use of the negotiated procedure for the procurement of the works contract for replacement with the cable band bolt assemblies;
(ii) that if an acceptable tender could be negotiated with C. Spencer Limited, that the Chief Engineer and Bridgemaster, in consultation with the Convener (or, in the Convener’s absence, the Chief Executive), authorise acceptance of the tender and report the matter to the June, 2012 board meeting; and
(iii) the use of the negotiated procedure for the procurement of the consultancy contract to appoint Aecom.
Purpose of report

The purpose of this report is to present to the Authority a proposed budget for 2007/08 and an indicative financial plan to the year 2021/22.

Background

2.1 The proposed budget for 2007/08 has been prepared in consultation with the General Manager and is submitted for consideration and approval by the Authority.

2.2 The report deals with the proposed recurring and non-recurring expenditure and income for 2007/08 and includes an indicative financial plan, to the year 2021/22.

2.3 At its meeting on 20th March, 2006, the Board was advised that Scottish Ministers had rejected the Authority’s application for Approval in Principle for an Integrated Transport Initiative including a Road User Charge. Members were also advised of the making of the Forth Road Bridge (Toll Period) Extension Order 2006 which extended the tolling period to 31st March, 2010. The financial plan has been prepared on the basis of the current tolls.

Main report

Recurring Expenditure

2007/08

3.1 The budgetary provision for recurring expenditure represents all costs of administration, day-to-day maintenance, traffic operation and toll collection. The proposed base budget for 2007/08 is £5,969m, an increase of £0.516m (9.5%) from the 2006/07 budgeted position of £5.453m.

3.2 The additional budgetary provision for recurring expenditure is required for:

i) Employee costs - increase of £345,825: This is mainly due to:
   a) pay award amounting to £80,056;
   b) increase in employers’ superannuation contributions totalling £32,309;
   c) full year effect of the review of salaries agreed by the Board at its meeting on 24th February, 2006 totalling £51,919.
d) a provision is also made for an increase in part time employees totalling £15,593 in respect of support assistants for electronic tolling offset by a reduction in part time manual workers;

e) a provision totalling £138,454 for full time staff changes. This is a result of an increase of two support assistants in Administration totalling £36,648, which has been offset by a reduction of a support assistant in Toll Collection of (£15,157). Three additional posts totalling £116,963 have also been provided for in Maintenance of Bridges, etc: an electronics technician for electronic tolling duties, and an assistant inspector and electrician to assist in the capital programme and fulfil statutory obligations under Health and Safety and Electrical Installation Regulations. The latter two posts are financed by a reduction in consultants fees in respect of the non-recurring expenditure;

f) other costs totalling £27,494 mainly increments and change of conditions of service.

ii) Administration - buildings and other costs - increase of £65,138: This is mainly due to increases in insurance £15,815; stationery £8,000 and legal support costs £42,963;

iii) Maintenance of Bridges, Buildings, etc - other costs - increase of £109,313: This is mainly due to repairs and maintenance, and electricity costs totalling £22,000; operational equipment and materials totalling £62,153 (mainly in respect of painting of hangers £20,000, viaducts and side towers £7,000, workshop and access equipment £18,000, and public lighting £15,000); and an increase in insurance costs £6,545.

iv) Traffic Operations - communications, weather emergency and other costs - decrease of (£18,794): This is mainly due to lower requirements for transport (£9,180), mainly repairs and maintenance, and fuel; and supplies and services (£9,440), mainly operational equipment and materials.

v) Toll Collection - other costs - increase of £14,560: This is mainly due to printing costs.

3.3 Recurring expenditure is shown in Appendix 1 of this report.

Income
2007/08

3.4 The proposed base budget for 2007/08 is £12.122m, a decrease of £1.270m (9.5%) from the 2006/07 budgeted provision of £13.392m. This is due to:

i) A reduction in toll income £1.047m. In accordance with the Board decision of 25th November, 2005 the 2006/07 income budget assumed a higher tolls income due to the planned reduction of discounts from 10% for cars and 35% for HGVs to a general level of 5% from November 2006. On advice from the Boards solicitors, the Board subsequently agreed on 28th April, 2006 that the existing discounts remain in place. There is also an anticipated decrease in the number of crossings during 2007/08 due to the resurfacing of the northbound main and side spans. In addition, there is an allowance for an underlying traffic volume increase of 1% compared to a budgeted increase of 1.5% in 2006/07.
ii) An expected reduction in interest receivable from £530,000 to £300,000 to take account of balances held by the City of Edinburgh Council on behalf of the Authority, external investment, and the incidence of expenditure on capital works. In addition, rental income is projected to increase by £7,000.

3.5 Income for 2007/08 is shown in Appendix 1 of this report.

Non-Recurring Expenditure 2007/08

3.6 The proposed budgetary provision for non-recurring expenditure is shown in Appendix 1. Bridge and transportation schemes are shown separately and represent the funding requirements of the ongoing programme of works.

3.7 The proposed base budget for 2007/08 is £13.804m for bridge schemes, £7.673m for transportation schemes, and £1.892m for income in respect of grant for the M9 Spur/A8000 main contract. The receipt of this grant will bring the total received from the Scottish Executive to £24m. Schemes include: The Resurface of the Main/Side Span North as noted by the Authority at its meeting on 1st December, 2006, the Main Cable Dehumidification as approved by the Authority at the same meeting, the Main Cable Replacement/Augmentation Study, and completion of the works for the M9 Spur/A8000 Upgrading.

3.8 Appendix 2 details the proposed non-recurring expenditure plan to 2021/22.

Prudential Code for Capital Finance in Local Authorities

3.9 The Prudential Code for Capital Finance in Local Authorities has been developed by CIPFA, the Chartered Institute of Public Finance and Accountancy, as a professional code of practice to support local authorities in determining their programmes for capital investment in fixed assets. FETA is required under Section 12 of the Local Government in Scotland Act 2003 to have regard to the Prudential Code when determining its programme for capital investment.

3.10 The key objectives of the Prudential Code are to ensure that the capital investment plans of local authorities are affordable, prudent and sustainable - or, in exceptional cases, to demonstrate that there is a danger of not ensuring this, so that the local authority concerned can take timely, remedial action.

3.11 Estimates of expenditure and income have been prepared to allow an assessment of the affordability of FETA’s financial plan. The financial plan is based on the current level of tolls. On this basis, it is estimated that management, maintenance and operation of the Bridge together with existing commitments made in respect of transport schemes and completion of the A8000 scheme is affordable.

3.12 The financial plan which is shown in Appendix 3, includes a grant of £24m from the Scottish Executive towards the cost of design and construction of the A8000 Scheme. At its meeting on 28th April, 2006, members were advised that notwithstanding rejection of AiP, the Scottish Executive grant aid of £24m would be made available for the M9 Spur/A8000 project.
3.13 The Financial plan provides for non-recurring expenditure of £40m over the next three years, including £6m in respect of the A8000, £12m in respect of the Main Cable, £10m for works on Bearing and Joint Replacement, and £5m on the Resurface of Main/Side Spans North. Based on this level of expenditure, it is assessed that the Authority would need to borrow £10m during 2007/08 and £5m during 2008/09. The extent and terms of any borrowing by FETA will need to be considered as the detailed proposals for capital works are developed.

4 Reserves Strategy

4.1 Cumulative reserves to 31st March 2007 are estimated to total £9.578m. This includes an estimated net expenditure for 2006/07 amounting to £9.065m, a decrease of £1.132m from the budgeted net expenditure of £10.197m.

4.2 This is mainly a result of slippage on non-recurring expenditure totalling £1.777m principally the Main Cable Replacement/Augmentation Study; the Toll Registration, Toll Plaza and Administration Block Extension; South Anchorages and Store Areas; and the Replacement of the VMS System. These underspendings have been offset by the impact of better than expected progress on the A8000 Scheme and a budgeted income for the Sale of the Car Park not realised.

4.3 The proposed budget as submitted for 2007/08 results in a net expenditure of £13.432m. This, together with the estimated cumulative reserves to 31st March 2007 totalling £9.578m and borrowing of £10m during 2007/08 referred to in paragraph 3.13 above results in a cumulative estimated reserve of £6.146m at 31st March 2008.

4.4 It is the responsibility of the Treasurer to advise the Authority about the level of reserves that they should hold and to ensure that there are clear protocols for their establishment and use. The Authority requires to plan on a long-term basis and secure funding now for its core business of operation and maintenance of the bridge.

4.5 Guidance issued by CIPFA advises that local authorities, on the advice of their finance Directors/Treasurers, should make their own judgements regarding an appropriate level of reserves, taking into account all the relevant local circumstances.

4.6 Reserves can be held for three main purposes:

i) a working balance to help cushion the impact of uneven cash flows and avoid unnecessary temporary borrowing - this forms part of general reserves;

ii) a contingency to cushion the impact of unexpected events or emergencies - this also forms part of general reserves;

iii) a means of building up funds, often referred to as earmarked reserves, to meet known or predicted liabilities. Earmarked reserves include sums set aside for major schemes, insurance reserves and budget flexibility schemes.
4.7 A detailed risk analysis has been undertaken as part of the 2007/08 budget process. This has identified a number of potential risks inherent in the budget process and these are summarised below. Not all of these risks, however, can be quantified.

i) It is difficult to predict future bridge maintenance requirements. For example, new codes on structural assessment resulted in unforeseen strengthening works to towers totalling £12.74m; consideration of a Ship Impact Risk Evaluation required the provision of pier defences costing £9.91m; and, following extensive testing of the hanger ropes, it was decided to replace all hangers, including surfacing of northbound carriageway, at a cost of £9.71m. At this stage, it should be noted that £12.4m has been included in the non recurring expenditure plan for works in respect of the main cable.

ii) Estimation of contract costs - Much of the work on the Bridge is unique, therefore there may be differences between the estimated and actual cost for contracts. Examples in the past include: strengthening works to towers estimated to cost £9.7m, actual cost £12.7m; provision of defences to the main tower piers estimated cost £7.4m actual cost £9.9m. Currently, contracts estimated to total £10m for bearing and joint replacement and £65.6m for suspended span painting are still to be awarded.

iii) Adverse weather conditions and unplanned works would have a detrimental affect on toll income.

4.8 The Authority’s Scheme of Delegation allows the general manager to vire money between one budget head and another, always providing that the total approved is not overspent or expected to be overspent. This allows the general manager to take corrective action to respond to emerging pressures and to redirect any budget underspends to service priorities within each financial year.

4.9 The Authority has approved a budget flexibility scheme which assists the general manager to plan in a more strategic manner and encourages better use of scarce resources. In addition, budget flexibility requires that overspend in one year be addressed in the following year.

4.10 Borrowing facilities have been arranged with the Public Works Loan Board to enable the Authority to borrow when necessary. At its meeting on 1st December, 2006, the Authority approved a recommendation to delegate to the Treasurer the authority to undertake borrowing when appropriate to meet anticipated borrowing requirements.

4.11 Close monitoring of the financial position is undertaken to ensure that all commitments entered into by the Authority continue to be affordable and sustainable.

4.12 Provision of an appropriate level of reserves is a fundamental part of prudent financial management. A level of balances would need to be maintained to allow the Authority to manage cash flow on capital expenditure, meet any emergency expenditure and allow the Authority to respond to any material change in circumstances or events.
4.13 The projected balance by year 2022 on the General Fund of £7.5m (Appendix 3), is considered to be adequate, taking into account the authority’s overall financial resources, the risks identified in this report and the arrangements in place to manage these.

5 Recommendations

The Authority is recommended to:

i) note the report and approve the 2007/08 proposed budget as submitted;

ii) approve the indicative long term capital plan to 2021/22;

iii) approve the arrangements for reserves as set out in section 4 of the report.

DONALD McGOUGAN, Treasurer.


Appendices

Appendix 1 - Proposed Budget 2007/08
Appendix 2 - Capital Plan to 2021/22
Appendix 3 - Financial Plan based on current tolls

Contact/tel

Ian Knowles: 0131 469 3173

Background Papers

Budget Papers held at the offices of the Treasurer
## APPENDIX 1

### FORTH ESTUARY TRANSPORT AUTHORITY

#### BUDGET 2007/2008

<table>
<thead>
<tr>
<th>RECURRING</th>
<th>£</th>
<th>Non-Recurring</th>
<th>£</th>
</tr>
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<tbody>
<tr>
<td>Administration</td>
<td>1,555,619</td>
<td>Traffic Operations</td>
<td>1,036,900</td>
</tr>
<tr>
<td>Maintenance of Bridge, Buildings, etc</td>
<td>1,820,852</td>
<td>Toll Collection</td>
<td>1,039,988</td>
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<tr>
<td>Total Gross Expenditure</td>
<td>5,453,359</td>
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<tr>
<td>Non-Recurring</td>
<td>18,135,000</td>
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<tr>
<td>Total Net Expenditure/(Surplus)</td>
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#### INCOME

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<tr>
<td>Toll Income</td>
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<tr>
<td>Other Income</td>
<td>683,000</td>
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<td>Total Income</td>
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#### MOVEMENT IN GENERAL FUND BALANCE

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<td>General Fund Balance at 31/3/06 brought forward</td>
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<tr>
<td>Add: Estimated net expenditure 2006/2007</td>
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<tr>
<td>Estimated Cumulative General Fund Balance to 31/3/2007</td>
<td>(9,578,311)</td>
</tr>
<tr>
<td>Add: Budgeted net expenditure 2007/2008</td>
<td>13,432,401</td>
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<tr>
<td>Less: Estimated borrowing 2007/2008</td>
<td>(10,000,000)</td>
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<tr>
<td>Estimated General Fund Balance carried forward to 2008/2009</td>
<td>(6,145,910)</td>
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# FORTH ESTUARY TRANSPORT AUTHORITY

## BUDGET 2007/2008

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<tr>
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<td>£</td>
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<tr>
<td></td>
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<td>£</td>
</tr>
<tr>
<td><strong>1 Administration</strong></td>
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</tr>
<tr>
<td>1.1 Employees - Pay etc</td>
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<td><strong>Total</strong></td>
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<td>1,688,543</td>
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<td><strong>2 Maintenance of Bridges, Buildings etc</strong></td>
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<td>2.1 Employees - Pay etc</td>
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<td>2.2 Carriageways</td>
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<td>2.3 Main Cables</td>
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<td>6,500</td>
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<td>2.5 Main Towers</td>
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<td>2.6 Deck Structure</td>
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<td>74,900</td>
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<td>2.7 Anchorages</td>
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<td>13,550</td>
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<td>2.8 Viaducts and Side Towers</td>
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<td>24,900</td>
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<td>2.9 Toll Plaza</td>
<td>8,750</td>
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<td>2.10 Subways</td>
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<td>2.11 Grounds</td>
<td>13,500</td>
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<tr>
<td>2.12 Parking Area</td>
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<td>2.13 Buildings</td>
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<td>31,500</td>
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<td>2.14 Workshops</td>
<td>22,500</td>
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<td>2.15 Garages</td>
<td>7,050</td>
<td>11,050</td>
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<td>2.16 Public Toilets</td>
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</tr>
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<td>2.17 Compressor House</td>
<td>37,810</td>
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<td>2.18 Stores</td>
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<tr>
<td>2.19 Boilerhouse</td>
<td>2,550</td>
<td>2,550</td>
</tr>
<tr>
<td>2.20 Hopetoun Compound</td>
<td>4,250</td>
<td>5,750</td>
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<tr>
<td>2.21 Boathouse and Slipway</td>
<td>2,050</td>
<td>3,050</td>
</tr>
<tr>
<td>2.22 Access Equipment</td>
<td>21,850</td>
<td>27,350</td>
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<tr>
<td>2.23 Rescue Launch</td>
<td>1,800</td>
<td>3,800</td>
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<td>2.24 Public Lighting</td>
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<td>2.25 Other Maintenance</td>
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<tr>
<td><strong>Total</strong></td>
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<tr>
<td><strong>3 Traffic Operations</strong></td>
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<tr>
<td>3.1 Employees - Pay etc</td>
<td>845,988</td>
<td>885,444</td>
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<td>3.2 Communications</td>
<td>24,700</td>
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<td>3.3 Weather Emergency</td>
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<td>3.4 Other Costs</td>
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<td><strong>Total</strong></td>
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<td><strong>4 Toll Collection</strong></td>
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</tr>
<tr>
<td>4.1 Employees - Pay etc</td>
<td>811,050</td>
<td>833,902</td>
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<td>4.2 Other Costs</td>
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<td>240,410</td>
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<tr>
<td><strong>Total</strong></td>
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<td>1,074,312</td>
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<td><strong>5,453,359</strong></td>
<td><strong>TOTAL RECURRING EXPENDITURE</strong></td>
<td><strong>5,969,401</strong></td>
</tr>
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**FORTH ESTUARY TRANSPORT AUTHORITY**

**BUDGET 2007/2008**

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<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>£</td>
<td>£</td>
<td>£</td>
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</tbody>
</table>

### 5 Non-Recurring Expenditure

**a) Bridge Schemes**

- **5.1 Vehicle Replacements**: £95,000
- **5.2 Minor Projects**: £250,000
- **5.3 Viaduct Outrigger Beams**: £10,000
- **5.4 Viaduct Gantry and Runway Beam**: £0
- **5.5 Suspended Span Truss Assessment**: £75,000
- **5.6 Vehicle Parapet Study**: £275,000
- **5.7 Parapet and Barrier Replacement**: £50,000
- **5.8 Toll Equipment, Plaza Improvement, and Admin Block Extension**: £300,000

**b) Transportation Schemes**

- **5.32 M9 Spur/A8000 Main Contract**: £7,623,000
- **5.33 Cross Forth Ferry Study**: £50,000
- **5.34 Rosyth Link Road**: £0
- **5.35 Preparation of Charging Order**: £0
- **5.36 Ferry Toll Park and Ride**: £0
- **5.37 Multi Modal Crossing**: £0
- **5.38 Bus Corridor Study**: £0

**Income**

- **5.40 M9 Spur/A8000 Main Contract - Grant**: £1,892,000
- **5.40 Sale of Car Park**: £0

**TOTAL NON RECURRING EXPENDITURE**: £19,585,000

**TOTAL GROSS EXPENDITURE**: £25,554,401
## APPENDIX 1

### FORTH ESTUARY TRANSPORT AUTHORITY

#### BUDGET 2007/2008

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<tr>
<th>Budget 2006/2007</th>
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<tr>
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<tr>
<td>25,554,401</td>
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### INCOME

6  Toll Income

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<td>6.1 Revenue from Tolls</td>
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<td>11,662,000</td>
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7  Other Income

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<td>7.2 Miscellaneous</td>
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<td>7.3 Interest on Revenue Balances</td>
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<table>
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<tr>
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<tbody>
<tr>
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<td>TOTAL INCOME</td>
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<tr>
<td>10,196,731</td>
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1. **Purpose of report**

1.1 To provide members with a brief update of Bridge and Transportation schemes included in the long term Capital Plan to 2021/2022.

2. **Main Report**

2.1 The FETA Order 2002 details the functions of the Authority in section 7. i.e. (a) It shall be responsible for the management, maintenance and operation of the bridge and (b) may develop, support and fund such schemes and measures which it considers appropriate to reduce road traffic congestion on the bridge or encourage an increase in the use of public transport across the Forth.

2.2 FETA's Local Transport Strategy published in June 2005 sets out the vision, strategy and key transport policies of the Authority. The Bridge schemes listed in the long term Capital Plan are those schemes that are considered to be essential for the maintenance and operation of the bridge. The Transportation Schemes listed are those schemes committed to or in feasibility study stage.

2.3 No allowance has been made for the possible replacement of the suspended span vehicle parapets (subject to testing) or works resulting from the main cable replacement/augmentation study which is also examining the integrity of the cable anchorages.

2.4 Carriageway or lane closures will be required to carry out many of the planned works and each carriageway or lane closure will be fully utilised to minimise the impact of disruption. Most of these carriageway or lane closures will be carried out overnight. However, weekend restrictions will be required to carry out waterproofing and resurfacing of the carriageways and where possible, access will be gained to carry out dehumidification work to the main cables. Longer term carriageway closures may be required in the future to carry out the replacement or refurbishment of the main bridge and viaduct expansion joints.

Intermittent closures of the footway/cycletracks will also be required to carry out some of these schemes. However, one footway/cycletrack will remain open at all times.
3. **Bridge Schemes**

3.1 **Main Cable Acoustic Monitoring**

Commissioning of the system was completed in August 2006 and both main cables are now being continuously monitored for wire breaks. Four breaks have been confirmed to date, none of which coincide with previously inspected panels.

3.2 **Main Cable Dehumidification**

In December 2006, members accepted the tender of C. Spencer, for the installation of a system of dehumidification to the main cables. The design of the access systems is ongoing and site works are programmed to start in April of this year. The west cable works are programmed to be completed by September 2008 and the east cable by September 2009. Weekend carriageway closures have been programmed for both 2008 and 2009 to enable this work to be carried out. However, it is hoped to minimise these carriageway closures by utilising innovative design techniques. In addition, the weekend carriageway closures required during the summer 2007 for the resurfacing of the northbound carriageway will also be utilised. It should be noted that it is likely that it will take between 12 and 18 months for each cable to be effectively dried out.

3.3 **Main Cable Replacement / Augmentation Feasibility Study**

In August 2006, members approved the appointment of WA Fairhurst (Glasgow) to carry out the feasibility study. Fairhurst's team includes engineering consultants Cowie Consult (Denmark), Amman & Whitney (USA), traffic modelling consultant SIAS (Edinburgh) and economic consultant Roger Tym & Partners (Glasgow). Work on the study is continuing and includes an assessment of the cable anchorages. No allowance has been made for works resulting from this study.

Fairhurst's tender indicated a thirteen month study period but the Transport Minister has requested an interim high level report by the end of May 2007. It will be possible to give a view on the likely replacement scenario by then based on the engineering judgement of the internationally experienced team, subject to ratification in the final report due in the Autumn.

3.4 **Main Cable Investigation**

Work on the first internal inspection was concluded in December 2005. A second internal inspection is programmed to be carried out in 2009 on the mid span panel of the east cable. This panel exhibited the most significant levels of corrosion when inspected in 2004. This second inspection will establish the level of corrosion in 2009, and hence assist in the determination of the rate of loss of strength over time. It will also determine the condition of the cable immediately prior to dehumidification being installed. A further inspection will be carried out at this panel in 2013/14 to establish whether or not the dehumidification scheme has halted, or significantly reduced, the rate of corrosion.
Notwithstanding the above, provision has been made to allow an immediate interim inspection to be carried out if the acoustic monitoring system indicates that a high number of wire breaks are occurring in the cables. A limited number of weekend closures will be required to carry out any future inspection work.

3.5 Parapet and Barrier Replacement

Testing and sampling work on the suspended span carriageway barriers is ongoing and full scale site impact tests are scheduled to be completed in April 2007. No allowance has been included for parapet replacement on the suspended structure.

A notice to engage a consulting engineer to prepare a scheme for the replacement of the viaduct carriageway barriers has been placed in the Official Journal of the European Union and contract work is scheduled to start on site in November 2007 and be completed by April 2009. It is hoped the viaduct barriers can be carried out without carriageway closures by utilising temporary barriers and narrow lanes.

3.6 Replacement/Refurbishment of Deck Joints and Replacement of Viaduct Bearings

These elements are the main expansion and articulation joints to the suspended spans and the viaducts and allow the decks to rotate, expand and contract. The viaduct bearings transfer the loads from the viaducts to the supporting piers and abutments. They also allow for rotation and horizontal movement.

The existing joints and bearings are the original as constructed elements and have reached the end of their service life. A notice to engage a consulting engineer to prepare a scheme for the replacement of the joints and bearings has been placed in the Official Journal of the European Union. The contract works are programmed to be awarded in early summer 2008 with completion on site in late summer 2010.

Whilst it is likely that replacement of the bearings may be carried out with limited disruption to traffic, the replacement or refurbishment of the joints is likely to involve significant disruption. Initial studies and discussions with owners, consulting engineers and contractors involved in replacing or refurbishing similar joints on other bridges have now indicated that it is unlikely that this work can be carried out during weekend closures.

The first task of the consulting engineer’s commission will be to carry out a feasibility study to examine the options available. That study is scheduled to be completed at the end of September 2007 and the results and the implications for traffic will be reported to members.

3.7 Resurface Main and Side Spans Northbound

(See separate report)

Resurfacing will be required again on the northbound main span in 2016/2017.
3.8 Resurface Main Span Southbound

The main span southbound is programmed to be resurfaced during 2013/14.

3.9 Toll Equipment Replacement/Toll Plaza Improvements and Administration Building Extension

(See separate report).

3.10 Main Tower Painting

Following the completion of the erection of the Dropped Object Canopy at the south main tower, the Tower Painting Platform was successfully raised up to the top of the tower in the late summer 2007. Work on improvements to the access to the top of the south tower has been ongoing throughout the autumn and winter of 2006/7. Painting of the south tower above deck is programmed to start in April 2007 and be completed by October. Thereafter, the dismantling of the canopy and its re-erection at the north tower, then final dismantling to store, will be undertaken by a combination of in-house resources and external contractor(s). This work will also be, whenever possible, programmed to utilise closures required for other schemes. However, some additional weekend carriageway closures may be necessary and a limited number of total bridge closures will be required. These total bridge closures will be short in duration and will be carried out in the early hours of the morning (00.30 to 03.30).

4. Transportation Schemes

4.1 M9Spur/A8000

The project is progressing well with works well underway on all structures. Whilst the earthworks are weather susceptible, current progress will result in completion by the Autumn of 2007. FETA was awarded a £24m grant from the Scottish Executive towards the overall cost of £39m.

4.2 Cross Forth Ferry Studies

Further engineering studies are being undertaken with Fife Council as lead authority. An allowance of £50,000 has been included in the Capital Plan in 2007/08.

4.3 Other Transportation Scheme Funding

As a result of the rejection by Scottish Ministers of the Authority’s Road User Charging Scheme, no further funding has been allocated against transportation schemes in the Capital Plan 2007/8 to 2021/22.
5. **Car/Lorry Park**

5.1 At its meeting on 29\textsuperscript{th} October, 2004, the Board accepted the terms of a provisional agreement for the sale of one acre of the car and lorry park and asked for clarification of the value of the land. Following discussions with Cala and Corus, a provisional offer of £1.1m, subject to planning, was made for the land and necessary access rights which was included in the 2006/07 budget. Agreement with the developer regarding the additional value of the access road could not be reached, and as a result Missives were not concluded for the sale of the land. Further discussions with developers may continue, however, the proceeds for the sale of part of the car/lorry park has not been included in the proposed 2007/08 budget.

6. **Recommendation**

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**Note:** Figures include a 2% VAT margin and are subject to change.
### FORTH ESTUARY TRANSPORT AUTHORITY

#### BUDGET 2007/08

#### FINANCIAL PLAN

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#### Assumptions / Risks:

- communications contract ends 2008/9
- assumes a reduction in one-off running costs in 2007/08 and an increase of 2.5% p.a. on a base line of £5.4m from 2008/09.
- assumes toll income increases in line with an underlying traffic growth of 1% and the impact of projected bridge maintenance.
- assumes interest on balances held received at 4.5% and paid at 5%
- assumes further toll extension approved from 1st April 2010 at current toll levels.

Includes Scottish Executive grant of £24m from 2005-2008. £8.081m awarded for 2005/06, £14.027m for 2006/07 and £1.892m for 2007/08.
Review of Capital Projects

1 Purpose of Report

1.1 To provide members with details of the review carried out of the Authority’s Indicative Capital Plan, over the three year period 2012/13 to 2014/15, following the Scottish Government’s Spending Review of September 2011.

1.2 The estimated capital costs and reserve levels are based on capital plan forecasts at 31st August 2011.

2 Background

2.1 Transport Scotland have confirmed that the Capital Grant for the next three years, 2012/13 to 2014/15, has been set at £13.8 million which is a reduction of £19.354 million (58%) from the Indicative Capital Plan approved by the Board in February 2011.

2.2 The sum granted allows the Authority to meet its current estimated contractual commitments including the third internal inspection of the main cable although, as reported previously, this project will be reduced in scope. However, as a result of the reduction in funding, all non-committed schemes within the Indicative Capital Plan have had to be reviewed and the result of this review are detailed in this report.

2.3 All of the non-committed schemes included in the Indicative Capital Plan are considered essential to maintain the long term integrity of the bridge and approaches, and include schemes that will help to reduce future maintenance costs.
3 Main Report

3.1 The current total estimated cost of the committed schemes over the next three years is approximately £8.99 million.

The committed schemes are listed below:

- Viaduct Bearing Replacement
- Anchorage Investigation
- Main Cable Internal Investigation
- High Mast Lights Removal (retention only)
- Landscape Works (retention only)
- M9 Spur Extension/A8000 Upgrade (retention and claims)

3.2 As members are aware, most of the maintenance which requires lane or carriageway closures is carried out overnight with only a small percentage of work being carried out at weekends. There is a substantial cost premium in carrying out works in this manner and there could be significant savings on some capital projects, and in the routine maintenance of the bridge, if works were carried out using longer term daytime lane and carriageway closures. However, the disruption to the network and to users, and the delay costs to the economy, would be unacceptable. Therefore, this option of reducing cost by adopting daytime closures has not been pursued.

3.3 In order to determine which non-committed schemes should be taken forward a method of ranking by priority using risk analysis techniques has been used. This has involved evaluating each scheme by looking at the political, economic, social, technical, legal and environmental risks if each individual scheme was not carried out. As a consequence of the complex technical nature of most of the schemes this PESTLE analysis was supplemented by a separate Failure Mode and Effect Analysis (FMEA) which has been carried out on the technical aspects of each scheme.

3.4 The object of carrying out these analyses is to try and determine the priorities for capital spend, with a reduced budget, without affecting safety, the structural integrity of the bridge or the core purpose of the Authority.

3.5 For the purposes of the review of non-committed schemes it has been assumed that £2.4m could be drawn down from reserves to support the transition to lower levels of grant funding. On this basis it is estimated that total funding available for non-committed schemes would be around £7.2m (see table 1 below):
Table 1 - Capital plan - funding available for uncommitted schemes 2012-15

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<td>Less, Committed capital schemes</td>
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<td><strong>Balance to fund uncommitted schemes</strong></td>
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Table 2 below shows the non-committed schemes and their priority ranking. Given the funding available, these are the schemes that can be undertaken over the next three years.

**Table 2 Priority Ranking of Non-Committed schemes**

<table>
<thead>
<tr>
<th>Schemes</th>
<th>Priority Ranking</th>
</tr>
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<tbody>
<tr>
<td>Main Cable Dehumidification</td>
<td>1</td>
</tr>
<tr>
<td>Main Cable Acoustic Monitoring</td>
<td>2</td>
</tr>
<tr>
<td>Main Towers Cathodic Protection (Piers)</td>
<td>3</td>
</tr>
<tr>
<td>South Anchorage Regeneration+</td>
<td>4</td>
</tr>
<tr>
<td>Truss End Links Remedial Works</td>
<td>5</td>
</tr>
<tr>
<td>Cable Band Bolt Replacement</td>
<td>6</td>
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<td>Suspended Span Gantry Improvement</td>
<td>7</td>
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<tr>
<td>Dismantle Dropped Object Canopy</td>
<td>8</td>
</tr>
<tr>
<td>Suspended Span Under Deck Access</td>
<td>9</td>
</tr>
<tr>
<td>Improvements to Deck Half Joints</td>
<td>10</td>
</tr>
<tr>
<td>Vehicle Replacement</td>
<td>11</td>
</tr>
<tr>
<td>Resurface Main Span South (patching)</td>
<td>12</td>
</tr>
<tr>
<td>Abutment Approach Barriers</td>
<td>13</td>
</tr>
</tbody>
</table>

Note: +new scheme

In addition to the above, some £250,000 would be available for contingencies and to carry out investigations and studies on future capital schemes to ensure that they can be progressed sufficiently without undue delay when funding becomes available. This sum will also be utilised to complete the side tower saddle impact study and other smaller capital funded studies.
3.6 The significant non-committed schemes that will have to be deferred are:

- Painting of the Suspended Span Truss
- Painting of the Viaduct Box Girders
- Resurfacing of the Main Span Southbound
- Full Replacement of Truss End links
- Strengthening Works to the Suspended Span Truss
- Main Tower Wind Barriers/Impact Strengthening

It should be noted that any additional investigatory work arising from the current anchorage investigation project could not be carried out within the funding levels granted by the government.

3.7 Painting of the Suspended Span Truss and the Viaduct Box Girders

There are no safety critical issues with these two large painting schemes and they can be deferred without affecting, in the short to medium term, the functioning of the bridge. However, it has been over 25 years since some areas of steelwork have been painted and there is a risk that as the existing paintwork deteriorates any future painting schemes may not achieve the expected life. Given that the major portion of money spend on these painting projects is to provide access and containment, it follows that to achieve best value the existing paint should not be allowed to deteriorate to a point which begins to affect the life of the new system being applied.

3.8 Resurfacing of the Main Span Southbound

Given that surfacing thickness is only 38 mm, it is unlikely that any potholing of the surfacing would cause a significant safety issue for drivers. However, unlike most bridge decks the main span deck of the Forth Road Bridge is an orthotropic steel deck. The top plate is only some 12.7 mm thick and the bonding of the surfacing to the deck plate is crucial to ensure that fatigue stresses in the deck do not increase to an unacceptable level.

After time, mainly due to trafficking by heavy goods vehicles, the surfacing begins to de-bond from the top plate allowing the potential for fatigue damage to be initiated. Unfortunately, the threshold that fatigue damage might start occurring is not readily calculated but experience at Forth has shown that the potential for de-bonding can begin after eight to nine years. The southbound main span carriageway was last resurfaced in 2004 and to extend the life of the surfacing past 2013 does increase the risk of fatigue damage occurring due to de-bonding. It is likely that damage can be repaired but these repairs would be expensive to carry out and may involve traffic restrictions.

Notwithstanding the above, when the Forth Replacement Crossing opens the current policy is for the Forth Road Bridge to be used for public transport only under normal operating conditions and this should increase the surfacing life. In addition, if resurfacing can be postponed until after the Forth Replacement Crossing opens, then the disruption caused to users during such works can be minimised.
3.9 **Full Replacement of the Truss End Links**

Following the assessment of the suspended span truss, these critical structural members were found to be significantly overstressed during certain combinations of loading. However, given the cost and difficulty in replacing these elements and the potential disruption to bridge users, further examination of the probability of certain combinations of load occurring and further structural analysis has been carried out to try to determine the most realistic level of stress in the members. After the Forth Replacement Crossing opens the existing bridge will carry only light traffic under normal operating conditions. One key factor in reducing load is the reduced probability of certain conditions of traffic loading occurring within the relatively short time period left until the Forth Replacement Crossing opens. As a result of this work there is now the potential to upgrade the existing links rather than carry out a full replacement. Upgrading the links will cost significantly less than full replacement and for this current priority ranking analysis on non-committed schemes, it has been assumed that the upgrading scheme can be carried out. However, if this proves not to be the case then the full replacement scheme would have to be reconsidered. It should be noted that if the full replacement scheme were required, the cost of the works would reduce significantly the number of other schemes that could be carried out.

3.10 **Strengthening Works to the Suspended Span Truss**

There are levels of significant overstress within certain structural members that make up the suspended span truss under certain loading conditions. Similarly to the Truss End Links a reduced traffic loading could be used to take cognisance of the fact that after 2017 traffic loading on the bridge will reduce significantly.

3.11 **Main Tower Wind Barriers/Impact Strengthening**

Significant sums were allocated to both of these schemes within the February 2011 Indicative Capital Plan. However, following completion of the consulting engineer’s reporting in April 2011, it was recommended that the Main Tower Impact Strengthening work should not be taken forward. However, it was noted that work was required to study the effect of potential impact collision on the Side Tower Saddles. With regard to the Main Tower Wind Barriers, it was recommended that further studies be carried out before any scheme could be progressed. It should be noted that the benefits of both these schemes reduces significantly when the Forth Replacement Crossing opens as the existing bridge will only carry public transport vehicles under normal operating conditions.
4 Conclusion

4.1 The proposed three year capital grant to FETA has been reduced by 58% and, as a result, a review of the Authority’s Capital Plan over this period has been carried out. This review has confirmed that the Authority’s current contract obligations can be met and has also identified the balance of funding available to carry out the non-committed capital schemes.

4.2 Based on the Capital Plan at 31 August 2011, and excluding committed schemes, it is estimated that some £7.2m would be available to carry out the remaining non-committed capital projects. This would involve utilising £2.4m from reserves to ease the transition to lower levels of funding leaving an unallocated reserves balance of around £1m. Further discussion will be required between officials of FETA and Transport Scotland to assess financial risks, consider the reserves strategy and establish the balance of risk between FETA and Transport Scotland.

4.3 Using risk analysis techniques, a priority ranking of the non-committed schemes has been carried out to determine which schemes can be taken forward within the available budget. Several schemes have had to be deferred and others reduced in scope. Further adjustments may have to be made depending on the actual spend profile over the next three years.

4.4 The results of this review will be monitored closely and further details will be brought to the Board in February 2012.

5 Recommendation

5.1 It is recommended that Members note the contents of this report.

Barry R Colford
Chief Engineer and Bridgemaster

Appendices

Contact/Tel: Barry Colford / 0131 319 3092

Background:

Papers Held in the office of the Chief Engineer & Bridgemaster
Capital Plan and Reserves Update

1 Purpose of Report

1.1 To provide Members with an update on the funding of the Authority’s Capital Programme of Works until dissolution of the Authority in 2015.

2 Background

2.1 The Capital Plan is kept under continual review in order to monitor changes to the budget and the level of reserves.

2.2 As reported previously, the key structural risks that have been present on Forth Road Bridge for some years were identified as the condition of the Main Cables and Main Cable Anchorages.

2.3 However, the results of the Third Internal Inspection of the Main Cables indicated that the risk of future replacement of the cables being required, or traffic restrictions on the bridge having to be enforced, has reduced.

2.4 In addition, the completion of the Anchorage Investigation work, which showed the pre-tensioned strands to be in much better condition than expected, reduced the risk that future replacement of the anchorages would be required.

3 Main Report

3.1 During the latter stages of 2014, and into 2015, the priority with regard to the Capital Plan has been to try to ensure completion of committed projects prior to abolition of the Authority, expected to be 31 May 2015. In addition, efforts are being directed at preparing a number of specific uncommitted projects to either design or tender stage, to enable these projects to be carried out post abolition. These projects that are considered vital, but are projects that FETA cannot commit to completing prior to May 2015.

3.2 Some projects which FETA had hoped to complete or bring forward this year have had to be postponed or reduced in scope as a result of technical issues and due to the loss of key management staff.
The significant committed capital projects that are being carried out by the Authority are as follows:

**Main Cable Acoustic Monitoring Upgrade**
The purpose of the Upgrading of the Main Cable Acoustic Monitoring Project is to increase the likelihood of detecting wire breaks in the main cables. The original system was installed in 2006 and at that time it was very much a prototype system and one of the first installed on a bridge of this size. Since then advances have been made in the field of acoustic monitoring of main cables and more advanced systems have now been installed on Severn and Humber Bridges. In order to increase confidence in the reliability of the detection of wire breaks, it was recommended that the existing system be upgraded and augmented. A budget of £955,000 had been allowed for this work in 2014/15 and the current estimate of spend for the financial year is £755,000.

Work started on site in June 2014 and the system was commissioned in December 2014. Unfortunately, several junction boxes have had to be relocated from the main span of the bridge due to excessive vibration from the structure affecting the instrumentation. The junction boxes will be relocated at the main towers which will involve re-cabling works. Completion of this remedial work is expected to be in April 2015.

**Truss End Linkages**
Following the assessment of the suspended span truss, these critical structural members were found to be significantly overstressed during certain combinations of loading. However, given the cost and difficulty in replacing these elements, and the potential disruption to bridge users, further examination of the probability of certain combinations of load occurring, and further structural analysis was carried out to try to determine the most realistic levels of stress in the members. After the Queensferry Crossing opens, Forth Road Bridge will carry only light traffic under normal operating conditions. One factor to be considered is the reduced probability of certain conditions of traffic loading occurring within the relatively short time period left until the new bridge opens. As a result of this analysis work, there is now the potential to upgrade the existing links rather than carry out a full replacement. A repair option involving strengthening existing welds and adding stiffeners to the tower steelwork has been developed and this option has been designed and an independent check carried out.

The intention of the Authority was to carry out a trial repair on one tower leg and if successful, this repair would be carried out on the other three tower legs. However, due to issues with the quality of the existing tower steelwork; the difficulties of access and the existence of red lead paint, coupled with the loss of key management staff, the focus is now on completing the trial on one tower leg before the end of May 2015. If the trial is successful, a recommendation would be made to Transport Scotland that this work be continued post abolition of FETA. If the repair trial is unsuccessful then full replacement will have to be considered by Transport Scotland. The cost of carrying out the repair option to all the links is estimated to be £410,000. Strengthening the links will cost significantly less than full replacement which has an estimated cost of £15 million.
Further analysis work is also being carried out to re-assess the current capacity of the links to carry Abnormal Vehicles. This work may result in an operation restriction on the passage of the heavier loads that cross the bridge and may increase traffic disruption. A further report will be brought to the April 2015 Board Meeting.

The Improvements to the Suspended Span Underdeck Gantries
This work is required not only to improve the operational efficiency of the maintenance of the suspended spans underdeck but also to provide improvements to the health and welfare of the staff using the underdeck gantries. Following a tender process, a contract has been awarded to C Spencer to provide new drive systems to the existing gantries at a cost of £759,000. Work started in January 2015 but is not expected to be completed until after abolition of the Authority. Therefore, these works are likely to be novated to Amey.

Pier Defences Painting and CP Repairs
As reported previously to Members, the Cathodic Protection (CP) system, which is fitted to the Pier Defence Works, has been failing to provide the levels of protection set out in the original specification. The Pier Defences comprise of a series of steel cofferdams surrounding the base of the main towers and reduce the risk of marine vessels impacting on the steel legs of the main towers below deck level.

CP in this case involves applying an impressed electrical current to the piles forming the cofferdams. In this way corrosion of the surface of the steel is controlled. The technique is commonly used in steel pipelines, ships, oil platforms and marine steel piled structures.

While no significant damage to the integrity of the cofferdams was found during the last dive survey in 2008, action is required in the short to medium term to ensure there is no long term effect on the steel piling.

Legal advice was sought to determine the liability for the failure of the system, and after some considerable time and effort, mediation took place between the Engineer, Contractor and the Authority. A settlement between all three parties to carry out and finance remedial works was reached and the Authority’s contribution to the remedial works, the settlement agreement works, was £118,000. Issues with the design of the remedial works had delayed works starting on site. Discussions also took place with Scottish Natural Heritage and Marine Scotland concerning the environmental issues surrounding the project. The majority of the settlement agreement works were carried out during 2014 and it is hoped that the outstanding settlement agreement works will be completed in April 2015. Further costs have been included for the upgrading of the transformer rectifiers which are out with the settlement agreement. An allowance has been made in the budget for FETA to procure these new transformer rectifiers from the Contractor, however, there have been delays in their supply and this work may now have to be carried out post abolition.

The CP system only fully protects the steel sheet piling below mid tide level. Above that level, the piles are protected by the original bituminous paint coating. The work is likely to involve grit blasting the steelwork and applying a new coating and it was intended that the Authority’s own in-house painters carry out the works. However, due to departure of key management staff, this project has had to be postponed. It is hoped that Transport Scotland will carry out this work post abolition.
3.4 In addition to these works being carried out, and following discussions with Transport Scotland, a number of schemes were planned to be brought to ‘tender or design readiness’ to allow them to be carried out post abolition of FETA. These were:

- Deck Joint Replacement
- Viaduct Painting
- Suspended Spans Underdeck Access Improvements (Main Works)

The Deck Joint Replacement Project has been developed to the stage where it can be put out to tender. The Suspended Spans Underdeck Access Improvements (Main Works) have been fully designed and checked but have not been completed to tender stage and it is proposed that further design work be carried out to develop the scheme so that it can be carried out in 2015/16, post abolition. The Viaduct Painting project has had to be delayed due to engineering issues and the departure of key management staff and no further work is planned by FETA.

3.5 Transport Scotland had requested that a schedule of capital works considered to be essential to ensure the future structural integrity of the Forth Road Bridge be forwarded to them for inclusion within the Forth Bridges Operating Contract. FETA officers have not had sight of this contract but have met regularly with and provided Transport Scotland with updates to that schedule. The current version of the schedule showing works FETA considers is required over a ten year period is shown in Appendix 1. The total sum over ten years is £81.6 million and a large part of that cost is in the work to strengthen and paint the suspended span truss. Other significant schemes include the replacement of the deck joints (delayed until the opening of the new crossing); the resurfacing of the main span and viaducts; viaducts painting; the suspended span underdeck access improvements (main works) and the improvements to the suspended span gantries.

4 Recommendation

4.1 It is recommended that Members note the contents of this report.

Barry R Colford
Chief Engineer and Bridgemaster

Appendices
Contact/Tel: Barry Colford (0131 319 3092)
Background Papers:
## Capital Plan - 10 Year Post-2015 (Draft 10 February 2015)

### Capital Schemes

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**Key:** yellow box indicates committed scheme.

**Grey box indicates "As of Right" works.

**Assumptions:** Full replacement of deck half joints and new truss end linkages are not required.